FOREST INVENTORY AND ANALYSIS
NATIONAL CORE FIELD GUIDE

VOLUME I: FIELD DATA COLLECTION PROCEDURES FOR PHASE 2 PLOTS

SRS Version 7.0

BASED ON
FOREST INVENTORY AND ANALYSIS
NATIONAL CORE FIELD GUIDE
VERSION 7.0

OCTOBER 2015

This field guide is subject to revision.
The responsibility of keeping this field guide current
with distributed updates resides with the user.

Changes from the Phase 2 Field Guide version 6.1 to version 7.0

Changes documented in change proposals are indicated in **bold** type. The corresponding proposal name can be seen using the comments feature in the electronic file. These change pages are intended to highlight significant changes to the field guide and do not contain all of the details or minor changes.

- 1.12 FIELD GUIDE VERSION. Changed *Values* from "6.0" to "7.0".
- **1.19.2 Collected Readings. Modified introductory text.**
- **1.19.3 GPS UNIT. Deleted code 1 and modified text of codes 2, 3, and 4.**
- **1.19.14 AZIMUTH TO PLOT CENTER. Modified the *When collected* from "When GPS UNIT = 1, 2, 3, or 4" to "When GPS UNIT = 2, 3, or 4".**
- **1.19.15 DISTANCE TO PLOT CENTER. Modified the *When collected* from "When GPS UNIT = 1, 2, 3, or 4" to "When GPS UNIT = 2, 3, or 4".**
- **1.19.16 GPS ELEVATION. Modified the *When collected* from "When GPS UNIT = 1, 2 or 4" to "When GPS UNIT = 2 or 4".**
- **1.19.17 GPS ERROR. Deleted the following text: "As described in Section 1.19.2, make every effort to collect readings only when the error less than or equal to 70 feet. However, if after trying several different times during the day, at several different locations, this is not possible, record readings with an error of" and "071 to 999 if an error of less than 70 cannot be obtained". Modified the *When collected* from "When GPS UNIT = 1 or 2" to "When GPS UNIT = 2".**
- **1.19.18 NUMBER OF READINGS. Modified the *When collected* from "When GPS UNIT = 1 or 2" to "When GPS UNIT = 2".**
- 2.3.1 Forest Land. The page numbers associated with the attributes of interest were corrected for current content.
- 2.3.2 Nonforest Land. The page numbers associated with the attributes of interest were corrected for current content.
- 2.5.7 OWNER. This variable was deleted in version 6.0 but left as a placeholder until version 7.0. It is repeated here for the convenience of the user. All the variables after the deleted variable have been renumbered.
- 2.5.10 ADMINISTRATIVELY WITHDRAWN AREA NAME. Corrected this variable to be listed as CORE OPTIONAL. This correction is consistent with the intent of the original change proposal for version 6.0 (Reserve_AdminWithdrawn_Change_proposal2.doc)
- **5.0 Tree and Sapling Data. Introductory paragraphs. Added standing dead saplings to definition of tally sapling and modified the text to reflect this by changing "5.0 inches" to "1.0 inch".** Also corrected the text in the first bullet under the paragraph starting "The following apply at remeasurement:"
- **5.1 SUBPLOT NUMBER. Modified the *When collected* for saplings.**
- **5.2 TREE RECORD NUMBER. Modified the *When collected* for saplings.**
- **5.4 AZIMUTH. Modified the *When collected* for saplings.**
- **5.5 HORIZONTAL DISTANCE. Modified the *When collected* for saplings.**
- **5.7 PRESENT TREE STATUS. Modified the *When collected* for saplings. Also modified the text of code 2 – dead tree, and the note listed under the list of codes.**
- **5.7.1 RECONCILE. Modified the *When collected* for saplings. Also added a new table, which is an abbreviated table from appendix 8, describing how to tally standing dead saplings with respective PRESENT TREE STATUS, RECONCILE CODE, and STANDING DEAD, which are being collected for the first time in Field Guide version 7.0.**
- 5.7.1 RECONCILE. The following text was added to codes 3 and 4 in version 6.1 and repeated here for the convenience of the user: "Includes previously nonsampled subplots."
- **5.7.2 STANDING DEAD. Modified the descriptive text for saplings. Also modified the captions for figures 20-22 for saplings.**
- **5.7.3 MORTALITY. Modified the text and the *When collected* for saplings.**
- **5.8 SPECIES. Modified the *When collected* for saplings.**
- **5.9 DIAMETER. Deleted the following text from the introductory text: "Macroplot tree diameter thresholds are determined according to regional specifications (see regional field guides for more information)." Also modified the *When collected* and *Tolerance* for saplings.**
- 5.9.2 DIAMETER AT BREAST HEIGHT (DBH). Corrected several figure references in the text.
- **5.12 DIAMETER CHECK. Modified the *When collected* for saplings.**

- **5.14 TOTAL LENGTH. Modified the *When collected* for saplings. Also corrected the Values from "005 to 400" to "001 to 400".**

- **5.15 ACTUAL LENGTH. Modified the *When collected* for saplings. Also corrected the Values from "005 to 400" to "001 to 400".**

- **5.16 LENGTH METHOD. Modified the *When collected* for saplings.**

- 5.20.1 DAMAGE AGENT 1. The following text was added in version 6.1 and is repeated here for the convenience of the user: "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." Also, added text to the general agent column for code 13000.

- **5.23 DECAY CLASS. Modified the text and the *When collected* for saplings.**

- 8.0 Phase 2 (P2) Vegetation Profile (Core Optional). The introductory text was clarified.

- **8.3.2 LEVEL OF DETAIL. Modified the text in codes 2 and 3.**

- 8.6.1 SPECIES GROWTH HABIT. The text was modified. All five codes were also revised.

- 8.6.4 SPECIES CANOPY COVER. The introductory text was modified.

- **Appendix 1. State and County, Parish, or Borough FIPS Codes. Added the county codes for the following Pacific islands: 60 – American Samoa; 64 – Federated States of Micronesia; 66 – Guam; 68 – Marshall Islands; 69 – Northern Mariana Islands; and 70 – Palau.**

- **Appendix 2. FIA Forest Type Codes. Added code 988 and description**. Modified code names of codes 982, 987, and 989 to match the names in the FIA database.

- Appendix 3. Made the following corrections to the species code list:

FIA code	Changes (in red type)
6573	Changed common name from grapefruit to key lime
6574	Changed common name from citris xaurantium to sour orange
6575	Changed common name from shaddock to lemon
6576	Changed common name citron to grapefruit
6577	Changed common name from tangerine to sweet orange
7279	Corrected scientific name from Guajacum officianale to Guaiacum officianale
8750	Corrected common name from troipical almond to tropical almond

- Appendix 7. Tolerance/MQO/VALUE/Units Table. Updated this appendix based on changes in the rest of the document.

- **Appendix 8. Tree Coding Guide. Updated this appendix for changes in sapling measurement.**

- **Appendix 11. Damage Codes. The following changes were made in version 6.1 and are repeated here for the convenience of the user. The sixth column heading was changed from "New Category?" to "General Category Designation". The following changes were made to the appendix:**

Code	Old Threshold	New Threshold	Old REGION	New REGION
11012		Any evidence of a successful attack.		NRS
12005		Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected		NRS
12029		Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected		NRS
12047		Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected		NRS
12048		Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected		NRS
12068		Any occurrence		NRS
12086		Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected		NRS
12136		Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected		NRS
12197		Any occurrence		NRS
12200		Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected		NRS
13010	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected		SRS	

Code	Old Threshold	New Threshold	Old REGION	New REGION
14001		Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected		NRS
14033		Any occurrence		NRS
15001		Any damage to the terminal leader; damage ≥20% of the roots, stems, or branches		NRS
15004		Any damage to the terminal leader; damage ≥20% of the roots, stems, or branches		NRS
15026		(no change)	SRS	SRS; NRS
15031		Any damage to the terminal leader; damage ≥20% of the roots, stems, or branches		NRS
15065	Any damage to terminal leader; damage to ≥ 20% of lateral shoots and buds		SRS	
15088		Any damage to the terminal leader; damage ≥20% of the roots, stems, or branches		NRS
17011		Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected		NRS
22011		Any occurrence		NRS
22075		Any occurrence		NRS
22076		Any occurrence		NRS
22002	Any visual evidence			
22003	Any visual evidence			
25022		Damage ≥20% of the foliage with ≥50% of the leaf/needle affected		PNW
25057		Damage ≥20% of the foliage with ≥50% of the leaf/needle affected		NRS
25072		Damage ≥20% of the foliage with ≥50% of the leaf/needle affected		NRS
26002		Any occurrence on the bole or stems (on multi-stemmed woodland species), or on branches ≤1 foot from boles or stems; damage to ≥ 20% of branches		PNW
41001		Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected ; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected.		PNW
41002		(no change)	SRS	SRS; PNW
41003		(no change)	IW	IW; PNW
41004		Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected ; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected.		PNW
41005		(no change)	IW	IW; PNW
41006		(no change)	IW	IW; PNW
41007		Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected ; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected		PNW
41008		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.		(no change)
41009		Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected ; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected.		PNW
41015		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		PNW

Code	Old Threshold	New Threshold	Old REGION	New REGION
		affected; >20% of the branches affected ; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected.		
90010		(no change)	ALL	IW; PNW; NRS

- **Appendix 11. Damage Codes. The following damage codes were modified in version 7.0 according to the damage code change procedure. Changes to the damage code list were proposed according to the accepted procedure, and discussed and approved at the DAB meeting, Feb. 2015 in Portland, OR.**

Code	Old Threshold	New Threshold	Old REGION	New REGION
10016		**Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected ; damage ≥20% of the foliage with ≥50% of the leaf/needle affected**		PNW
11006			**IW**	IW; NRS
11030			**IW; SRS**	IW; NRS; SRS
14073		**Any damage to the terminal leader; damage ≥20% of the foliage with ≥50% of the leaf/needle affected**		PNW
21008		**Any occurrence**		PNW
21016		**Any occurrence**		PNW
24006		**Damage ≥20% dieback of crown area**		PNW
24010		**Damage ≥20% dieback of crown area**		PNW
41013		**Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected ; damage ≥20% of the foliage with ≥50% of the leaf/needle affected.**		PNW
41014		**Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected ; damage ≥20% of the foliage with ≥50% of the leaf/needle affected.**		PNW
50020		**Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected ; damage ≥20% of the foliage with ≥50% of the leaf/needle affected**		PNW

- **Appendix 14. FIA Pacific Islands Tree Species Codes. Added this appendix.**

Changes from the Reorganization of the Field Guide

Several variables were moved from their original locations to a different chapter of the field guide to more closely match the data collection program. These changes are summarized in the following table:

New variable number	Variable name	Original variable number
1.22 (Plot Level Data chapter)	P2 Vegetation Sampling Options introductory material	8.3
1.22.1	P2VEGETATION SAMPLING STATUS	8.3.1
1.22.2	LEVEL OF DETAIL	8.3.2
1.23	INVASIVE PLANT SAMPLING STATUS (Plot-level variable)	9.3
1.24	INVASIVE PLANT SPECIMEN COLLECTION RULE (Plot-level variable)	9.12
1.25	DWM introductory material	10.3
1.25.1	DWM SAMPLING STATUS (BASE)	10.3.1
1.25.2	DWM NUMBER OF SUBPLOTS (BASE)	10.3.2

1.25.3	DWM NUMBER OF TRANSECTS ON SUBPLOT (BASE)	10.3.3
1.25.4	DWM TRANSECT LENGTH (BASE)	10.3.5
1.25.6	DWM NOTES (BASE)	10.3.5
2.6.1 (Condition Class chapter)	CONDITION FUELBED TYPE (OPTIONAL)	10.4.1
3.12(Subplot Information chapter)	P2VEG SUBPLOT SAMPLE STATUS	8.4.2
3.13	VEGETATION NONSAMPLED REASON	8.4.3
3.14	VEGETATION SUBPLOT NOTES	8.4.5
3.15	INVASIVE PLANT SUBPLOT SAMPLE STATUS (Subplot-level variable)	9.5
3.16	INVASIVE PLANT NONSAMPLED REASON (Subplot-level variable)	9.6
3.17	INVASIVE PLANT DATA NOTES	9.7

- The sections were renumbered after the variables were moved. References to specific sections in the text were also changed to match the new section numbers.
- Deleted all the *When collected, Field width, Tolerance,* and *MQO* information from the variables. This information now all resides in appendix 7.
- 1.22.1 (old 8.3.1) P2 VEGETATION SAMPLING STATUS. Modified the last sentence to match the relocation of the variable.
- 1.25.5 DWM SUBPLOT LIST (BASE). Added this variable to match the data collection program.
- Figure 21 in chapter 5 was replaced with a new figure.
- 5.24 LENGTH TO DIAMETER MEASUREMENT POINT (CORE OPTIONAL). The *When collected* was corrected (see table below).
- 10.6.9 (old10.8.9).HIGHCOUNT REASON (BASE). Modified the text to match the *When collected*. Changed "Enter a code if any of the counts on the transect are greater than 100 pieces." to "Enter a code if any of the counts on the transect are greater than or equal to 100 pieces."
- The When collected statements were condensed for several variables as shown in the table below:

Item #	**Variable name**	**Old when collected**	**New when collected**
1.15	HORIZONTAL DISTANCE TO IMPROVED ROAD	All plots with either one accessible forest land condition class (PLOT STATUS = 1) or one accessible nonforest land condition class when nonforest is field-measured (PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS =1)	When PLOT STATUS = 1 or PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS =1
1.16	WATER ON PLOT	All plots with either at least one accessible forest land condition class (PLOT STATUS = 1) or one accessible nonforest land condition class when nonforest is field-measured (PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS = 1)	When PLOT STATUS = 1 or PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS = 1
1.22.2 (8.3.2)	LEVEL OF DETAIL	On all plots where P2 Vegetation is being sampled (P2 VEGETATION SAMPLING STATUS = 1 or 2)	When P2 VEGETATION SAMPLING STATUS = 1 or 2
2.5.1	RESERVED STATUS	CORE: All accessible forest land condition classes (CONDITION CLASS STATUS = 1) CORE OPTIONAL: All condition classes	CORE: CONDITION CLASS STATUS = 1 CORE OPTIONAL: All condition classes
2.5.2	OWNER GROUP	CORE: All accessible forest land condition classes (CONDITION CLASS STATUS = 1) CORE OPTIONAL: All condition classes	CORE: (CONDITION CLASS STATUS = 1) CORE OPTIONAL: All condition classes
2.5.4	STAND SIZE CLASS	All accessible forest land condition classes (CONDITION CLASS STATUS = 1)	When CONDITION CLASS STATUS = 1
2.5.5	REGENERATION STATUS	All accessible forest land condition classes (CONDITION CLASS STATUS = 1)	When CONDITION CLASS STATUS = 1
2.5.6	TREE DENSITY	All accessible forest land condition classes (CONDITION CLASS STATUS = 1)	When CONDITION CLASS STATUS = 1

Item #	Variable name	Old when collected	New when collected
2.5.7	OWNER CLASS	CORE: All accessible forest land condition classes (CONDITION CLASS STATUS = 1) CORE OPTIONAL: All condition classes	CORE: When CONDITION CLASS STATUS = 1 CORE OPTIONAL: All condition classes
2.5.8	OWNER SUB-CLASS	State owned condition classes (OWNER CLASS = 31)	OWNER CLASS = 31
2.5.13	ARTIFICIAL REGENERATION SPECIES	All accessible forest land condition classes (CONDITION CLASS STATUS = 1) with evidence of artificial regeneration (REGENERATION STATUS = 1)	When CONDITION CLASS STATUS = 1 and REGENERATION STATUS = 1
2.5.14	STAND AGE	All accessible forest land condition classes (CONDITION CLASS STATUS = 1)	When CONDITION CLASS STATUS = 1
2.5.15 2.5.17 2.5.19	DISTURBANCE 1 DISTURBANCE 2 DISTURBANCE 3	All accessible forest land condition classes (CONDITION CLASS STATUS = 1) or accessible nonforest condition classes when nonforest is being sampled (NONFOREST CONDITION CLASS STATUS = 2)	When CONDITION CLASS STATUS = 1 or NONFOREST SAMPLING STATUS = 1 and NONFOREST CONDITION CLASS STATUS = 2
2.5.21 2.5.23 2.5.25	TREATMENT 1 TREATMENT 2 TREATMENT 3	All accessible forest land condition classes (CONDITION CLASS STATUS = 1)	When CONDITION CLASS STATUS = 1
3.8	SUBPLOT SLOPE	All subplots with at least one accessible forest land condition present on subplot (SUBPLOT/MACROPLOT STATUS = 1) or subplots with an accessible nonforest condition class present when nonforest is being sampled (NONFOREST SUBPLOT/MACROPLOT STATUS = 1)	When SUBPLOT/MACROPLOT STATUS = 1 or NONFOREST SUBPLOT/MACROPLOT STATUS = 1
3.9	SUBPLOT ASPECT	: All subplots with at least one accessible forest land condition present on subplot (SUBPLOT/MACROPLOT STATUS = 1) or subplots with an accessible nonforest condition class present when nonforest is being sampled (NONFOREST SUBPLOT/MACROPLOT STATUS = 1)	When SUBPLOT/MACROPLOT STATUS = 1 or NONFOREST SUBPLOT/MACROPLOT STATUS = 1
3.10	SNOW/WATER DEPTH	All subplots with at least one accessible forest land condition present on subplot (SUBPLOT/MACROPLOT PLOT STATUS = 1) or subplots with an accessible Nonforest condition class present when Nonforest is being sampled (NONFOREST SUBPLOT/MACROPLOT STATUS = 1)	When SUBPLOT/MACROPLOT STATUS = 1 or NONFOREST SUBPLOT/MACROPLOT STATUS = 1)
3.12 (8.4.2)	P2 VEG SUBPLOT SAMPLE STATUS	On all subplots where P2 Vegetation is being sampled on accessible forest land (P2 VEGETATION SAMPLING STATUS=1) and at least one accessible forest land condition (CONDITION CLASS STATUS = 1) exists within the 24-foot radius subplot, or P2 Vegetation is being sampled on all accessible land conditions (P2 VEGETATION SAMPLING STATUS=2) and at least one accessible forest condition or measurable nonforest condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) exists within the 24-foot radius subplot	When P2 VEGETATION SAMPLING STATUS=1 and at least one accessible forest land condition (CONDITION CLASS STATUS = 1) exists within the 24-foot radius subplot, or P2 VEGETATION SAMPLING STATUS=2 and at least one accessible forest condition or measurable nonforest condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) exists within the 24-foot radius subplot.
5.6	PREVIOUS TREE STATUS	All new live and standing dead tally trees > 1.0 inch DBH/DRC On remeasurement plots, all previously tallied trees	On SAMPLE KIND = 2, all previously tallied trees ≥ 1.0 inch DBH
5.24	LENGTH TO DIAMETER MEASUREMENT POINT (CORE OPTIONAL)	CORE OPTIONAL: All live and dead tally trees (except woodland species) ≥ 1.0 inch DBH	CORE OPTIONAL: All live and standing dead tally trees (except woodland species) ≥ 1.0 inch DBH

- Appendix 13. Ownership Prefield Procedures. Revised format of table in section A13.57.3 for readability.

- Page margins were changed to maximize space on each page and to minimize the document length.

Contents

APPENDICES AND REGIONAL SUPPLEMENTS

FOREST INVENTORY AND ANALYSIS
NATIONAL CORE FIELD GUIDE

VOLUME I: FIELD DATA COLLECTION PROCEDURES FOR PHASE 2 PLOTS

Version 7.0

Version History:

1.1 March 1999 (first version implemented, Maine, 1999)
1.2 August 1999
1.3 September 1999 (revised from Bangor, ME Data Acquisition Band meeting, Aug. 1999)
1.4 February 2000 (revised from Charleston, SC Data Acquisition Band meeting, Dec 1999)
1.5 January 2001 (revised from Portland, OR Data Acquisition Band meeting, Sept. 2000)
1.6 March 2002 (revised from Tucson, AZ Joint Band meeting, Jan. 2002)
1.7 February 2003 (revised from Charleston, SC Joint Band Meeting, Feb. 2003)
2.0 April 2003 (revised from Atlantic City, NJ, Data Acquisition Band Meeting, Mar. 2003)
October 2003 (revised from Anchorage, AK, Data Acquisition Band Meeting, Aug. 2003)
January 2004 (revised from Data Acquisition Band conference calls with FIA Management Team Approval)
August 2004 (revised from Asheville, NC, Data Acquisition Band Meeting, Aug. 2004)
3.0 October 2005 (revised from change management process, change proposals approved by FIA Management Team, from Asheville, NC, Data Acquisition Meeting, Aug. 2004, and from Las Vegas, NV, Data Acquisition Meeting, Mar. 2005)
4.0 October 2007 (revised from change management process, change proposals approved by FIA Management Team, from Flagstaff, AZ, Data Acquisition Band Meeting, Sept. 2006, and from multiple Data Acquisition Band conference calls)
5.0 July 2009 (revised from change management process, change proposals approved by FIA Management Team, from Charleston, SC, Data Acquisition Band Meeting, Mar. 2009, and from multiple Data Acquisition Band conference calls)
October 2010 (revised from change management process and from Portland, OR, Data Acquisition Band Meeting, Feb. 2010 and subsequent conference calls)
6.0 October 2012 (revised from change management process, change proposals approved by FIA Management Team; from Portland, OR, Data Acquisition Band Meeting, Feb. 2011; and multiple Data Acquisition Band conference calls)
7.0 October 2015 (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)

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INTRODUCTION

This document describes the standards, codes, methods, and definitions for Forest Inventory and Analysis (FIA) field data items. The objective is to describe CORE FIA field procedures that are consistent and uniform across all FIA units. **This CORE is the framework for regional FIA programs; individual programs may add variables, but may not change the CORE requirements.** Unless otherwise noted, the items in this field guide are considered CORE, that is, the information will be collected by all FIA units as specified. Items or codes specified as CORE 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 (Volume I of the FIA field methods guide) can be measured by a two-person field crew in less than one day, including travel time to and from the plot.

This document also describes additional regional standards, methods and definitions for the southern FIA unit. This serves to enhance the National CORE, not change it. All regional items and clarifying text are shaded in the same manner as this paragraph. Variables or codes not collected in the field by the Southern Research Station will appear as light gray text when printed (example text). Certain categories may have been collapsed down to the header item to save space. Items that have been collapsed may be reviewed in the National Core Field Guide, version 7.0 at http://www.fia.fs.fed.us/library/field-guides-methods-proc.

The FIA program is in transition, changing in response to legislation and new customer demands. One of these demands is for increased consistency, which this field guide begins to address. Another change was the merger of the FIA program with the field plot component of the Forest Health Monitoring (FHM) program's Detection Monitoring. A systematic grid was established that includes some, but not all former FIA plots. This grid contains the Phase 2 plots, the annual survey plots that are designed for measurement on a rotation such that a portion of the plots are measured each year. The rotation length varies by region. The former FHM Detection Monitoring field plots are the Phase 3 plots, a subset of the Phase 2 plots. The same basic plot and sampling designs are used on all the plots.

The focus of Volume I is on data that are collected in the field on all Phase 2 plots in the FIA sample. The methods in Volume I are also used on Phase 3 plots except when specifically noted otherwise in the methods text. Volume II of the series describes an additional, expanded suite of data collected on the Phase 3 subset of plots. Volume II contains methods for the following indicators: ozone bioindicator plants; lichen communities; soils (physical and chemical characteristics); crown condition; and vegetation diversity and structure. Note that the down woody materials field procedures are now included only in Volume I. Volume III of the series (in preparation) will document the office procedures including data elements measured in the office, data from other sources that are merged into the FIA database, and CORE compilation and analysis algorithms. When complete, the three-volume set will describe the CORE FIA program field data, all of which are measured consistently across the country.

Field Guide Layout

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

0	General Description
1	Plot Level Data
2	Condition Class
3	Subplot Information
4	Boundary References
5	Tree Measurements and Sapling Data
6	Seedling Data
7	Site Tree Information
8	Phase 2 (P2) Vegetation Profile (core optional)
9	Invasive Plants
10	Down Woody Materials
+	National Appendices 1 – 8
+	Regional Supplements

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> **[PDR Prompt]**

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>

Data elements, descriptions of when to collect the data elements, field width, tolerances, MQO's, and values, apply to both Phase 2 plots (formerly called FIA plots) and Phase 3 plots (formerly called FHM Detection Monitoring plots) unless specifically noted. Field width designates the number of columns (or spaces) needed to properly record the data element.

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). Some CORE 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 = 24.0 feet
Area = 1,809.56 square feet or approximately 0.04 acre or approximately 1/24 acre

Microplot:

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

Macroplot:

Radius = 58.9 feet
Area = 10,899 square feet or 0.25 acre (ac) or 1/4 acre

Annular plot: (outer ring around the subplot):

Radius = from 24.0 feet to 58.9 feet
Area = 9088.4 square feet or approximately 0.21 acre or 5/24 acre

The distance between subplot centers is 120.0 feet horizontal.
The minimum area needed to qualify as accessible forest land is 1.0 acre.
The minimum width to qualify as accessible forest land is 120.0 ft

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 General Description

The CORE field plot consists of four subplots approximately 1/24 acre in size with a radius of 24.0 feet. The center subplot is subplot 1. Subplots 2, 3, and 4 are located 120.0 feet horizontal (+/- 7 feet) at azimuths of 360, 120, and 240 degrees from the center of subplot 1, respectively (see fig. 1). Throughout this field guide, the use of the word ‘plot’ refers to the entire set of four subplots. ‘Plot center’ is defined as the center of subplot 1. As a CORE OPTION, the field plot may also include macroplots that are ¼ acre in size with a radius of 58.9 feet; each macroplot center coincides with the subplot’s center. Macroplots are numbered in the same way as subplots.

If the macroplots are not installed, the subplots are used to collect data on trees with a diameter (at breast height, DBH, or at root collar, DRC) of 5.0 inches or greater. If the macroplots are installed, then subplots are used to collect data on trees from a diameter 5.0 inches to the breakpoint diameter and the macroplot is used to collect data on trees with diameter greater than the breakpoint diameter.

Macroplots are not installed in the South and all text regarding macroplots in Section 1.0 to 7.0 has been removed or text changed to light gray for this regional guide.

Each subplot contains a microplot of approximately 1/300 acre in size with a radius of 6.8 feet. The center of the microplot is offset 90 degrees and 12.0 feet horizontal (+/- 1 foot) from each subplot center. Microplots are numbered in the same way as subplots. 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]). Note: Longleaf pine must be at least 0.5 inch at the root collar. Planted seedlings must meet the same size requirements listed above.

As a CORE OPTION for a Phase 2 plot that is not part of the Phase 3 subset, data for one or more of the Phase 3 indicators may be collected on the plot. If a region exercises the option to collect one or more Phase 3 indicator(s) on a Phase 2 only plot, the entire suite of measurements for the particular indicator(s) described in the appropriate chapter must be collected for the data for that indicator to be core optional.

Each unit may choose which Phase 3 indicators to collect as core optional on a Phase 2 plot that is not a Phase 3 plot. They may choose no indicators, all indicators or a subset. If they choose to collect data for a Phase 3 indicator, all the procedures for the indicator must be followed for that indicator to be considered core optional (data in the National Information Management System [NIMS]). If a subset of measurements for an indicator are collected, that is considered a regional enhancement and the data will be in the regional database.

Macroplots may be used to provide a better sample of rare population elements, such as very large trees.

The annular plot may be used for destructive sampling such as collecting soil samples. Also the term annular plot will be used for instructions in the field guide, for example, instructions on numbering trees when the macroplots are installed.

Macroplots are not installed in the South and all text regarding annular plots in Section 1.0 to 7.0 has been removed or text changed to light gray for this regional guide.

Data are collected on field plots at the following levels:

Plot	Data that describe the entire cluster of four subplots.
Subplot	Data that describe a single subplot of a cluster.
Condition Class	A discrete combination of landscape attributes that describe the environment on all or part of the plot. These attributes include CONDITION CLASS STATUS, RESERVED STATUS, OWNER GROUP, FOREST TYPE, STAND SIZE CLASS, REGENERATION STATUS, and TREE DENSITY.
Boundary	An approximate description of the demarcation line between two condition classes that occur on a single subplot, microplot, or macroplot. There is no boundary recorded when the demarcation occurs beyond the fixed-radius plots.
Tree	Data describing 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.

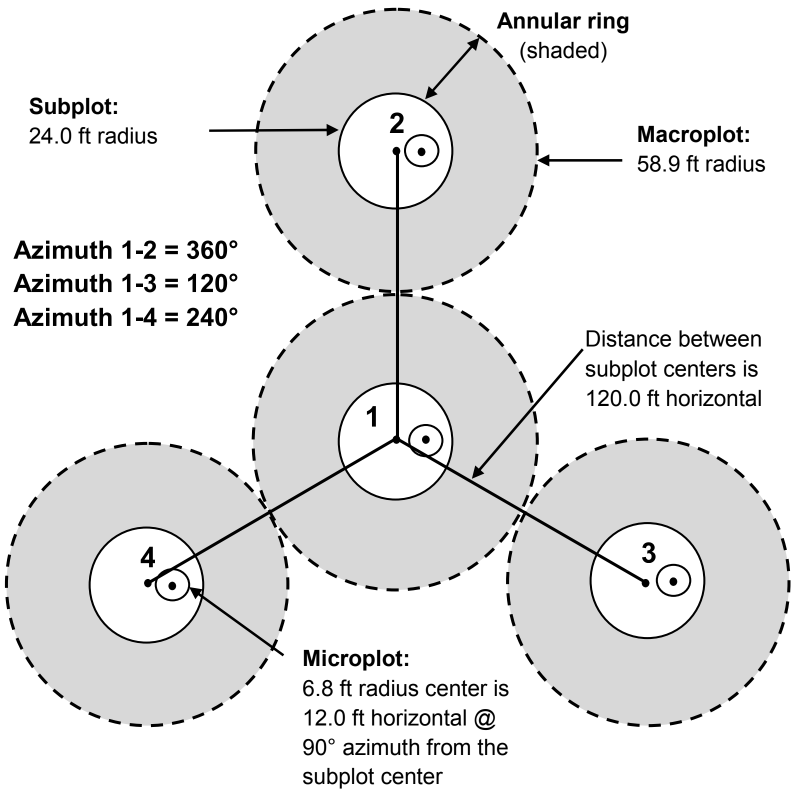


Figure 1. FIA Phase 2 plot diagram. See individual Phase 3 chapters for Phase 3 plot figures.

0.1 Plot Setup

Plots will be established according to the regional guidelines of each FIA unit.
Plots will be established according to the regional guidelines of each FIA unit. Mark each subplot and microplot center with a wire pin. Bend the subplot center pin in a “horseshoe” shape. If the previous subplot center pin(s) is found, a new “horseshoe” shape pin is placed over the existing pin location. Bend the microplot center pin in a “pigtail” shape. These pins should be bent so that both wire ends can be pushed into the ground. If the previous microplot pin is found, inspect the condition of previous pin. If the previous microplot pin requires replacement, remove the previous pin and place a new “pigtail” shaped pin. Note: The use of multiple markers at the microplot can degrade the accuracy of the horizontal distance measurements to individual trees. If the previous pin cannot be found, triangulate from previous tallied trees or witness/reference trees to accurately reestablish the subplot or microplot center to the original location. Place pins at all subplot and microplot centers that contain an accessible forest condition, even if there is no tally on the subplot or microplot. When the crew cannot occupy the plot center because safety hazards exist, or the plot center is inaccessible or out of the sample, the crew should check the other subplots. If any subplot centers can be occupied and are in the sample, the subplots that can be occupied should be established and sampled following normal procedures. When a subplot center or microplot center cannot be occupied, no data will be collected from that subplot or microplot; instead, the entire subplot or microplot should be classified according to the condition preventing occupancy (i.e. CONDITION CLASS STATUS 4 [census water] or 5 [nonsampled]).

The following table provided can assist in locating subplot 2-4 from a subplot other than subplot 1.

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

If a subplot was installed incorrectly at the previous visit, the current crew should remeasure the subplot in its present location and contact the field supervisor. In cases where individual subplots are lost (cannot be relocated), use the following procedures:

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

When a plot is remeasured, the status of the offset microplot will be indicated on the past data printout. If the microplot status is listed as “NEW” or “CENTER”, the offset microplot was not installed in the previous inventory and the cruiser installs a new microplot. All saplings on the new offset microplot are assigned RECONCILE code 3 (missed live). If the status is listed as “REMEASURE” or “OFFSET”, the offset microplot was installed in the previous cycle and should be remeasured normally.

0.2 Plot Integrity

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

- Scribing and nailing tags on witness trees so that subplot centers can be relocated.
- Boring trees for age on subplots and macroplots to determine tree age, site index, stand age, or for other reasons.
- Nailing and tagging trees on microplots, subplots, and macroplots so that these trees can be identified and relocated efficiently and positively at times of remeasurement.
- Nailing, scribing, or painting microplot, subplot, and macroplot trees so that the point of diameter measurement can be accurately relocated and remeasured.

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

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

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

0.3 Ownership Information

Ownership information is to be recorded on all accessible forest land conditions. Prior to actual fieldwork in a county, ownership data is collected from county courthouse records. It is important to gather as much information as possible on the initial visit to the courthouse to avoid a return visit while the fieldwork is occurring. Every effort is made to provide all of the county materials. However, the crew still has the responsibility prior to ownership collection, to review the county materials for missing current and/or past imagery, past draw sheets or non-forest aids, and past data sheets required to collect ownership and locate the field plot. If materials are missing, the crew should contact the appropriate Knoxville or Starkville personnel to have these materials provided prior to ownership and/or field data collection.

NOTE: If the ownership has changed either from or to National Forest, the state coordinator or field supervisor must be notified.

SURVEY SYSTEMS
There are two primary boundary surveys: metes-and-bounds and Public Land Survey (PLS). The metes-and-bounds method uses map and parcel whereas the PLS uses section, township, and range to describe boundaries. Field crews should become familiar with the method used in their respective state.

OWNERSHIP DATA ENTRY

The ownership data entry function of the Mobile Integrated Data Acquisition System (MIDAS) will be used to enter ownership information for all forested conditions on a plot. Cruisers are still expected to collect the ownership information on paper at the courthouse, for now. This required data will then be entered via MIDAS and transmitted with the plot information. The plot will not pass the final edit unless the ownership data entry function is completed. The ownership variables described below are required for all forested conditions encountered on a plot. If a forested plot has only one condition but multiple owners, record the owner at plot center. **NOTE: The national ownership variables (Appendix 13) are being phased in over the first two years of 6.0 implementation. When they become available, this section will no longer be valid. Cruisers will receive a field guide update at that time. Until then, use the following guidelines when collecting ownership information.**

GENERAL OWNERSHIP PROCEDURES:

1. Determine if the plot location samples forest land. Keep in mind the plot layout. One or more of the subplots may sample forest land. This is where preliminary work is beneficial.

2. Locate the plot location on county courthouse tax maps using the aerial photograph. When available, rely primarily on the old photograph to locate the plot on the county tax maps. Also use the plot sketch from the previous survey. It may show distinguishing physical characteristics that may help delineate the ownership boundaries. If there is more than one parcel in the vicinity of the plot, record information for each possible parcel. The adjacent tract may be in another owner category or may help you gain access to the plot.

3. Record the name, address, and owner class for the owner of each parcel. Cross check the owner with the past survey to verify an actual ownership change or if either the current or previous assignment was in error.

4. Determine the total acreage of each parcel and the number of forest acres, if required. Woodland acres are broken out of the total acreage in some states and can be used to determine percent forest. In other

states, however, pine plantations are included in the agriculture category. In these cases, use the aerial photograph/imagery and the field visit to estimate the percent forest of the tract. Field check the percent forest information when the plot appears to have been planted, naturally reverted, or land cleared.

5. Record all pertinent ownership information on the "Forest Land Ownership Classification" sheets and the "Sample Location Reference Page." In addition, the ownership information must also be recorded in the data recorder program. The following provides instruction on entering the ownership information in the data recorder.

0.3.1 OWNER YEAR **[OwnYr]**
Record the year in which the ownership information was originally collected.

0.3.2 OWNER MONTH **[OwnMn]**
Record the month in which the ownership information was originally collected.

0.3.3 OWNERSHIP TYPE **[OwnTy]**
Record whether the ownership information corresponds to an ownership that (likely) owns part or all of the plot (OWNER TYPE = 1). At this time, SRS is collecting information only for the actual plot owner. Other options may be available when the national ownership proposal is fully implemented.

When collected: All ownerships recorded for a plot
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

1	Ownership information corresponds to a potential plot ownership

0.3.4 CONDITION LIST **[CList]**
Record each CONDITION CLASS NUMBER to which this ownership record should be applied.

0.3.5 OWNER CLASS **[OwnCl]**
Record the OWNER CLASS of the current owner. Use the same value assigned in the condition record.

0.3.6 FIRST NAME **[First]**
Record the first name of the ownership.

When collected: All individual and family plot ownerships (OWNER CLASS = 45 and OWNER TYPE = 1)
Field width: 50 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters

0.3.7 LAST NAME **[Last]**
Record the last name of the ownership, including suffixes.

When collected: All individual and family plot ownerships (OWNER CLASS = 45 and OWNER TYPE = 1)
Field width: 50 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters

0.3.8 COMPANY **[Comp]**
Record the name of the company or organization that owns the forest land as indicated by public tax records or other data sources.

When collected: All corporate and other private organization plot ownerships (OWNER CLASS = 41, 42, 43, or 44 and OWNER TYPE = 1)
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

0.3.9 AGENCY **[Agenc]**
Record the name of the public agency that owns the forest land as indicated by public tax records or other data sources.

When collected: All public plot ownerships (OWNER CLASS = 11, 12, 13, 21, 22, 23, 24, 25, 31, 32, or 33 and OWNER TYPE = 1)
Field width: 50 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

0.3.10 MANAGEMENT UNIT **[MgtUn]**

If available, record the name of the management unit that owns the forest land as indicated by public tax records or other data sources.

When collected: CORE: All public and private plot ownerships (OWNER TYPE = 1)
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

0.3.11 ADDRESS 1, 2, 3 **[Add1, Add2, Add3]**

Record the mailing address for the ownership. 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: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE > 1)
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

0.3.12 COUNTRY **[Cntry]**

Record the two-character code for the country of the mailing address for the ownership. The default value is United States (US).

When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE = 1)
Field width: 2 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: See section A13.57.3

0.3.13 CITY **[City]**

Record the city of the mailing address for the ownership.

When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE = 1)
Field width: 100 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters

0.3.14 STATE **[State]**

For ownerships with mailing addresses in the United States (including territories and protectorates), record the state of the mailing address for the ownership.

When collected: All ownerships recorded for a plot with mailing addresses in the United States (OWNER CLASS ≥ 11 and OWNER TYPE = 1 and ADDRESS COUNTRY = “US”)
Field width: 2 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: See section A13.57.2

0.3.15 ZIP CODE **[Zip]**

Record the postal code of the mailing address for the ownership. Postal codes for US and foreign addresses should be included here.

When collected: All ownerships recorded for a plot with mailing addresses in the United States (OWNER CLASS ≥ 11 and OWNER TYPE = 1 and ADDRESS COUNTRY = “US”)
Field width: 10 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Alphanumeric

0.3.16 PROVINCE **[Prov]**

For ownerships with mailing addresses outside of the United States, record the province, state, or other pertinent geographic division of the mailing address of the ownership.

When collected: All ownerships recorded for a plot with mailing addresses outside of the United States (OWNER CLASS ≥ 11 and OWNER TYPE = 1 and ADDRESS COUNTRY ≠ “US”)
Field width: 50 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters

0.3.17 OWNERSHIP PHONE NUMBER 1, 2 TYPE **[Ph1Ty, Ph2Ty]**
When available, record whether the phone number is a work, home, mobile, or other number.

When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE = 1)
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values: Null values are permissible

1	Work
2	Home
3	Mobile
4	Other (note required)

0.3.18 PHONE NUMBER 1, 2 **[Phon1, Phon2]**
When available, record the primary phone number for the ownership, including area code. If available, record the extension in OWNER PHONE NUMBER 1 EXTENSION. It should be formatted as numbers separated by dashes (e.g., “123-456-7890”).

When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE = 1)
Field width: 12 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Numbers and the special character ‘-’ (dash). Null values are permissible

0.3.19 OWNERSHIP PHONE NUMBER 1 EXTENSION **[Ph1Ex, Ph2Ex]**
When available, record the extension associated with the primary phone number for the ownership.

When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE = 1)
Field width: 5 digits
Tolerance: No errors
MQO: At least 95% of the time
Values: Numbers. Null values are permissible

0.3.20 PRIVATE OWNER INDUSTRIAL STATUS **[IndSt]**
Record the code identifying the status of the owner with regard to being considered industrial as determined by whether or not they own and operate a primary wood processing plant. A primary wood processing plant is any commercial operation which originates the primary processing of wood on a regular and continuing basis. Examples include: pulp or paper mill, sawmill, panel board mill, post or pole mill, etc. Cabinet shops, “mom & pop” home-operated businesses, etc., should not be considered as industrial plants. If any doubt exists with the determination by the field crew about the owner’s industrial status due to name, commercial plant size, type plant, etc., choose code 0.

When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 40 and OWNER TYPE = 1)
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

0	Land **is not** owned by industrial owner with a wood processing plant
1	Land **is** owned by industrial owner with wood processing plant

0.3.21 OWNERSHIP E-MAIL ADDRESS **[Email]**
When available, record the e-mail address for the ownership.

When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER 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

0.3.22 SURVEY DESCRIPTION **[Desc]**
Record the map description for the ownership record. There are two primary methods used to document survey boundaries – metes and bounds or the Public Land Survey System (PLSS). The map description should be recorded in one of two formats depending on the survey method:

Metes and bounds:
Mx Px (Where M = Map, P = Parcel and x = recorded value)

PLSS:
Tx Rx Sx (Where T = Township, R = Range, S = Section and x = recorded value))

If the information provided at the county courthouse does not follow one of these two formats, record the data in a logical format and comment in the notes how it was recorded.

0.3.23 DATA SOURCE **[Srce]**

Record the data source used to determine the ownership (e.g., tax office, GIS, owner, etc.).

When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE = 1)
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

1	Tax office
2	GIS
3	Owner
4	Other

0.4 Locating Sample Plots

Each crew should always consider weather forecasts, water levels, plot access, and state and corporate cooperation when working a county. Each county should be worked in the most efficient manner possible. Always contact National Forest System (NFS) district and county forest offices, and county sheriff as soon as you enter the county. Contact the landowner and always let local people know who you are and what you are doing when leaving an official vehicle near a residential area.

STOP AT HOUSES, KNOCK ON DOORS, ETC. DO NOT DRIVE ACROSS CROPLAND, WILDLIFE CLEARINGS, YARDS, ETC. UNLESS YOU HAVE PERMISSION FROM THE LANDOWNER. PARK THE VEHICLE AND WALK. "POPPING" A LOCK OR USING A MASTER KEY WILL NOT BE TOLERATED. IF A ROAD HAS WATER-BARS OR A CABLE WITH A LOCK DO NOT DRIVE ON IT.

Fill out a sample location sheet (draw sheet) for all forested plots, landclearings and non-forest plots whenever a non-forest plot has adjacent forestland within 50 feet of <u>any</u> subplot center. A draw sheet for a non-forest plot will insure that all 4 subplots are completely and totally within the non-forest condition. This will aid cruisers in the next survey to identify those plots that may have started to revert, but did not meet the minimum cover requirement. In addition, this will allow check cruisers to know exactly where PC was located in relation to the adjacent forestland. If a sample location sheet is filled out for a non-forest plot, then label "Non-Forest Aid" at the top of the sample location sheet.

Each crew will be furnished with both new and old photos (when available), plot sheets, ownership and field classification sheets, county maps, and National Forest ownership maps. All non-forest plots and possible reversions (a sample location or a portion of a sample location that was non-forest in the previous inventory but now forest) must be chained in using the old photo pinprick. Correct the pinprick on the new photo/imagery after the field visit, if needed.

Access to Starting Point (SP) -- In the Sample Location Sheet (draw sheet) section "SP Sketch" sketch a map of the route used to access the SP. Include location of the landowners' house, road names and numbers, obvious landmarks, and other prominent features that will aid the next field crew to locate the SP. Both the SP and PC should be clearly marked on the sketch map.

Starting Point -- Select a permanent landmark or physical feature as the SP for locating the sample location. Intersections or sharp bends in roads, streams, or drainage ditches, field corners, prominent trees, and other features which can be readily identified both on the ground and on the photo make good starting points. The ideal starting point tree is a healthy, unique species, with unusual form, in a prominent location. At remeasurement relocations, the starting point on the old location sheet can often be used again. Scribe the SP tree with an "X" well above DBH (or well below depending on topography) and tag the tree at ground level, facing plot center.

Complete a new draw sheet with the prior starting point information on land clearings, possible reversions that are chained into that do not meet minimum stocking levels, and on non-forest plots that are close (i.e., within 50 feet of any subplot center) to being partial plots and label "Non Forest Aid" at the top of the new sample location sheet. Copy the starting point information off the old sheets for any non-forest plots when the previous cruiser recorded the information. A starting point is not necessary if the plot center was non-forest during the past survey and all four subplots are obviously non-forest at the present time.

Note: No mark is needed on an SP if the point is permanent and readily identifiable, such as the corner of a building or a road intersection. Reference a tree when possible. Do not scribe an SP in people's yards, on hiking trails or elsewhere where unsuitable. In these situations scribe the backside of the SP if possible and put a note stating that the "X" was either placed on the backside of the tree or not scribed at all.

<u>PHOTO WORK/IMAGERY</u>

New imagery (Digital Ortho Photos or DOQ/DOQQ) is currently being printed on paper using a color laser printer. When making any notation on the imagery a ball point or rolling ball pen should be used. Felt tip-type pens (such as Sharpies) may dissolve the ink on the DOQ and should be avoided.

On revisited plots, the cruiser must compare the coordinates on the new imagery to the previous crew's coordinates downloaded from the data recorder program. If the coordinates are the same and are verified to be within 50 feet of the actual plot location on the ground, new coordinates are not required for nonforest plots only. All forest plots require new coordinates, regardless of the accuracy of any previous coordinate. Plot center can be pinpricked or marked, or crews may use the new imagery crosshairs to identify plot center.

On revisited plots where the previous crew's coordinates are not within 50 feet of the actual plot location on the ground then a reference azimuth, angle of intersection, and azimuth to plot center are drawn on the new imagery to aid in the establishment of an accurate course to sample location, verify placement of the pinprick for plot center, and ground check the office photo interpretation. Note any corrected pinpricks on the front and back of the new imagery. Crews should enter GPS STATUS = 1. (see 1.34).

In instances where it is impractical to draw up the new imagery due to the absence of an easily accessible reference line or none exist on the imagery (i.e. large areas of marsh and water) and the plot center location on the new imagery and the old photography/imagery can be positively identified as being in the same location on the ground, then use the coordinates that are located on the new imagery. In addition, verify that the coordinates on the new imagery are within the 50 foot tolerance of the previous crew's coordinates. If so, use the previous crew's coordinates. If the previous crews coordinates are not within the 50 foot tolerance of the previous crews coordinates and it is impractical to draw up the new imagery contact your field supervisor or state coordinator.

In instances where the crew cannot duplicate the plot center when drawing up from the old photography/imagery to the new imagery due to inaccuracy of older photography (i.e. areas of high relief, on edges of photography, or etc.) then pinprick/mark the new imagery as close as possible to the old photography/imagery and use draw up procedures to collect a new coordinate from the new imagery. It is advisable to contact your field supervisor or state coordinator before you proceed to insure accuracy.

All plots established for the first time must be drawn up on the new imagery to verify correct plot location and must include a reference azimuth, angle of intersection, and azimuth to plot center.

All forested plots established for the first time (SK1 or SK2 reversions) must be within 50 feet of the DOQ coordinate. Crews must compare their collected PC GPS coordinate with the PC DOQ coordinate prior to any plot establishment and data collection. If the difference between the coordinates is out of tolerance (i.e., more than 50 feet), the crew must adjust the ground location to be within tolerance. All nonforest plots established for the first time do not require a coordinate to be entered into the PDR. The previous coordinate represented on the DOQ is used unless it is found to be in gross error and then a new coordinate is required.

It is advisable to be within 2000 feet of the plot center when drawing up photography/imagery to reduce error if possible.

Reference Azimuth -- For a reference azimuth, select a straight road section, drainage ditch, field edge, or draw a line between two well-spaced landmarks. Avoid standing near metal objects, e.g., railroads, bridges, or power line towers, since they can influence the compass reading.

Measure the reference azimuth with a compass to the nearest degree and record on the tally sheet under starting point notes, disregarding magnetic declination. If no linear features exist on the photo/imagery, GPS coordinates of two point features can be used to obtain a reference azimuth. Prior to driving to the sample location, identify two distinct features on the photo/imagery within a reasonable distance (usually 1-2 miles) from the sample location. At each point feature, record 180 fixes in averaging mode on the GPS receiver (GPS can only be utilized when error falls below +/- 70 feet). The reference azimuth, based on magnetic north, is determined by using the distance feature in the GPS unit.

If the reference azimuth line and the azimuth to plot center do not intersect on the photo/imagery, draw a line perpendicular to the reference azimuth line making it cross the azimuth to plot center. Use the perpendicular as the new reference azimuth line after adding or subtracting 90.

Angle of Intersection -- With a protractor measure the interior angle between the reference azimuth and azimuth to plot center arrows to the nearest degree. The interior angle should be between 20 degrees and 90 degrees. Record the angle on the draw page under starting point notes.

Photo/Imagery Notation

Note the following information on the front of the new photograph/imagery for all plots when applicable:

- Reference azimuth line with an arrow indicating direction and azimuth noted.
- Course to plot azimuth line with an arrow indicating direction and azimuth noted.
- Starting Point circled and indicated as SP. All plots
- GPS Way Point circled and indicated as WP for completely non-forest plots only.
- Interior angle noted with arrows drawn to the azimuth lines.
- Note which plots have corrected pinpricks.

Note the following information on the back of new photographs/imagery for all plots when applicable.

a. Plot number, if not already noted.
b. Land use code at plot center. If land use is a hayfield, record cropland land use (11) and write "hay" next to the code number. If the land use is Agricultural Land (10), developed (30-34) or Other Nonforest (40), then write a short description of the type of development, e.g., "back yard", "grocery store", "barn", etc. This will aid the next crew to ensure the same area is re-evaluated.
c. Date (mm/dd/yyyy).
d. Cruiser and assistant initials and codes.
e. Circle and note the "correct" pinprick if a correction has been made
f. GPS coordinates (optional)
g. Note on the back of the new photograph/imagery when plot center has reverted, been landcleared or is inaccessible
h. If a plot is nonforest but a draw sheet is filled out due to the proximity of forest land to one or more subplots (i.e., within 50 feet of any subplot center), then record 'See Nonforest Aid' on back of photo.

<u>Course to plot</u>

The course to sample location can be determined by measurements from the photo/imagery for new plot locations, reversions, partials, or land clearings and lost plots when the SP has been removed. The azimuth and distance can be determined using GPS, if further than 500 feet, or by using compass and chain. Pacing to most locations is possible unless underbrush, water, or rough topography make pacing impractical. Pacing between SP and PC can be used to verify a previously reported course to sample location, but not for establishing a plot.

When old starting points are used at remeasurement locations, use the same distance and azimuth recorded in the previous survey with corrections necessary to account for declination and errant distances recorded by the previous crew. Accurate measurement of azimuth and distance from SP to PC can be by GPS navigation when the distance exceeds 500 feet or by traversing on the ground.

Establishment of Sample KIND 1 locations using GPS:
To begin, manually enter the plot coordinates in the GPS unit. Using the GPS, navigate to within 100’ – 150’ of the plot. If possible, locate a good SP which is discernable on the photo. Set the GPS down and take a new coordinate in the averaging mode. Collect the required number of readings based on the GPS unit type (Garmin – 180 readings; Allegro – 25 readings) for the coordinates to be accurate. Once the GPS has reached the required number of readings, store the current position as a waypoint. Using the distance function in the GPS unit, calculate the course to plot based on these two coordinates. At this point, chain the remaining horizontal distance and azimuth to establish plot center. Once you are at PC, collect a new coordinate for the plot. Take the number of readings as required by the GPS type. Compare the observed coordinates with the target coordinates to verify you are within the required 50’ limit. If the coordinate’s difference is greater than 50’, take another coordinate. If this coordinate is still out of tolerance, reestablish the plot using the previously described procedures. If the coordinate is within tolerance, record these coordinates as the new plot coordinates in the data recorder and install the plot. Note: In some cases, an SP is established after the plot is completed along a road, intersection, or other feature. A good SP should be easily identified on the photo, easily found on the ground and unlikely to be disturbed before the next cycle.

<u>RELOCATING OF SAMPLE KIND 2 PLOTS USING GPS, DRAW SHEET AND PAST DATA</u>

As with SK1 plots, enter the DOQ plot coordinate in the GPS unit. If the old SP is found, collect a new coordinate at SP and project a new waypoint using the course to plot azimuth and horizontal distance. (Note: If the old SP is not found, establish a new SP and draw up the photo to establish a new course to plot to project as a new waypoint.) Using the GPS unit, navigate to the DOQ PC coordinate. If you have a good coordinate, evidence of the old plot should be noticed: witness trees or objects as described in the next section. If upon reaching the coordinate and no evidence of witness trees or pins can be found, check the location of the projected PC coordinate. Place temporary flagging at the DOQ coordinate and projected coordinate location and begin to search the area for evidence of the plot. If there has been cutting, review the past tree data information for all subplots. Since only the witness trees are marked, past data trees will require triangulation to find a subplot. This is done by examining species, azimuths, distances and diameters of standing trees or stumps located on either a subplot and/or microplot. If the plot still cannot be found and the course to plot was less than 500 feet, return to the SP and chain the distance to PC. Flag this location and search again. If no pins are found, but you have been able to locate a subplot(s) using past data trees, do not place any pins until you have examined past data trees that are located at the edge of the subplot and/or microplot. If the pin is not properly placed, these previously tallied trees may now be out of the subplot. After you “stick” the pin and edge trees are still out, then trees beyond 24.0 ft. and saplings beyond 6.8 ft. were incorrectly tallied by the previous crew (cruiser error).

When there has been a disturbance such as clearcut or thinning where there are no remaining residuals trees from the previous cycle, the crew establishes the plot as near as possible to the old location. Crews must still attempt to use triangulation from stumps to locate the plot before “sticking” a new set of pins for the plot.

If the plot was not disturbed (no change on the ground between cycles) and cannot be found, a second attempt to locate the plot is done by another crew and/or QA personnel. If it’s another crew, then a final attempt to locate the plot will be done by QA personnel. If the plot is not found by QA, the plot is considered “lost.” A lost plot requires a SRS AUTHORIZATION CODE and new PLOT NUMBER for the replacement plot. The code and new plot number is requested from the Knoxville office. To obtain a code and new plot number, the zone supervisor requests the code with the provided justification (why is the plot lost?) and who should receive the code and new plot number for SK3 plot installation. The new plot number is added to the MIDAS state plot list. To account for the lost plot and the new plot, the following steps are followed upon receiving the code and new plot number:

- PLOT STATUS 3 and PLOT NONSAMPLED REASON 06 are assigned to the lost plot MIDAS file. SRS AUTHORIZATION CODE is required.
- A SK3 plot is established at the DOQ coordinate location with the new PLOT NUMBER.
- The DOQ and other county materials are updated to reflect the new plot number.

Plots that are denied access or hazardous also require a SRS AUTHORIZATION CODE. The crew contacts their state coordinator or field supervisor with justification to request the code. These plots are entered as PLOT STATUS 3 and PLOT NONSAMPLED REASON 02 or 03. Note: Hazardous plots may not be hazardous at all times of the year. For example, if a plot cannot be accessed due to high water, then it should be placed on hold until the water level recedes.

Witness Trees
When possible, two witness trees reference the location to subplot 1. In the absence of trees, use distinct objects such as fence corners, boulders, etc. If another subplot is referenced, be sure to note which subplot is monumented with witness trees on the draw sheet.

Witness trees should be:

1. Close to the pin and spaced approximately at right angles from the pin
2. Not likely to die or be cut within 5-7 years, e.g., pine sawtimber
3. A species easily located in the stand
4. At least 5 inches DBH (At least 2 inches DBH if no 5 inch DBH trees are present)
5. If there are no witness trees, use whatever is available near the subplot center and describe its' relationship to the pin (e.g., large down log that you can tag, a large rock, etc.) and describe these on the sample location reference page.

Witness tree data:

a. Species
b. DBH to the last 0.1 inch
c. Azimuth from pin to center of tree at ground level
d. Horizontal distance to 0.1 ft. from pin to center of tree

Note: For a DRC woodland species, record the distance and azimuth to the stem that is tagged and not the geographical center of the tree.

Mark the base of each witness tree with a metal tag (3 to 4 inches long) facing plot center. Scribe an "X" well above DBH facing the pin and be careful not to penetrate the cambium. Do not scribe or place a white tag on trees in people's yards, picnic areas, etc. Be sure to note on the draw page if you did not scribe and/or tag the trees.

Mark one of the witness trees with a designated tag (Venetian blind material) by nailing the tag at approximately six feet (or at a location easily viewed when navigating to the plot) facing the line of approach from the SP. Record the color of the tag on the sample location page.

DRAW SHEET REQUIREMENTS

As previously stated, all forested plots, landcleared plots, and nonforest plots that require a "non-forest aid" require a draw sheet. The information on the draw sheet must be legible. The elements of the draw sheet are the following:

a. Plot Identification information includes the following variables or MIDAS state configuration items: State, Cycle, Subcycle, Inventory Year, County, Plot#, and Phase.

b. Date of plot is the completion date of the plot.

c. Field Editor initials are required to indicate that the draw sheet has been reviewed for all elements and it is complete and without error. The editor can be the cruiser and/or the assistant.

d. PC and SP coordinate are entered. The SP coordinate is optional. If a new PC coordinate is not taken, the coordinate entered should reflect the coordinate used to locate the plot.

e. Photo Information consists of the reference azimuth and angle of intersection. These are used to correct a DOQ coordinate's location. A DOQ correction is required if the new coordinate differs more than 50 feet from the DOQ coordinate or the ground location does not match the DOQ location. For example, the ground location is clearly forest land, but the DOQ coordinate has the plot location in a nonforest condition.

f. Plot Information describes whether a plot is partial (forest and nonforest conditions present on the plot), landcleared at PC, and/or reverted at PC. It also indicates plots that are accessed by boat, completed from a boat and the distance from boat to landing. This information is used by the next crew for planning.

g. Owner Information includes the name, owner class and telephone number.

h. SP Description and Field Notes describe the starting point (tree or object) and additional notes to locate the starting point. If a tree is used, the species, diameter and other identifiers about the tree are indicated.

i. Course to Plot is entered from SP to PC. However, there are situations where additional course to plot information may be warranted from an alternate SP to PC or from SP to an outer subplot.

j. Witness Trees (or object) information is indicated for the subplot center being witnessed. For most plots this is subplot 1. Subplot 2, 3, or 4 can be witnessed for partial plots and nonforest plots that require a "non-forest aid." Landcleared plots do not require witness information unless it meets the nonforest requirements for a "non-forest aid.

k. SP to PC Sketch must provide enough detail so that the SP or PC can be located on the ground. The sketch must include road names/numbers; nearest town, intersection or landmark; mileages when applicable; a North arrow; and any other features that are determined to be necessary. Neatness and clarity are required.

l. Plot Area Sketch is a general sketch of the plot. It should include any features that will aid the next crew in locating the plot or subplots. These features may be water, fences, divisions of forest type, etc.

m. Crew Information includes name and SRS issued cruiser code.

n. Sketch to Plot is a quick overview of what elements are encountered from SP to PC along the course to plot. These features may include R.O.W., fences, water, etc.

o. Subplot Condition and Boundary Sketch is a rendering of the conditions and boundaries present on each subplot. Since the plot diagram is not to scale, is not critical that boundary lines match between subplots.

p. Notes are written as needed. These notes usually describe unusual situations in regards to the plot or subplots. For example, "Subplot 3 was not established by the previous crew at 120' but at 110'." Or sometimes they reflect safety issues like "Subplot 4's plot center falls on the edge of a cliff and the microplot center is occupied by rattle snakes!"

Draw sheet example for a plot with accessible forest land (front)

STATE	CYCLE	SUBCYCLE	INV. YEAR	COUNTY	PLOT#	PHASE	YEAR	MO	DAY	FIELD EDIT			QA USE		
05	10	1	2011	143	0999	2	2011	08	17	MTB					

GPS COORDINATES						
	LATITUDE			LONGITUDE		
Plot center	36	01	59.38	21	05	00.67
Starting point	36	02	03.17	21	04	53.49
PHOTO INFORMATION						
REFERENCE AZIMUTH						
ANGLE OF INTERSECTION						

PLOT INFORMATION			
PARTIAL PLOT	X	BOAT ACCESS PLOT	
LANDCLEARED AT PC		PLOT MEASURED BY BOAT	
REVERTED AT PC		DIST. FROM BOAT LANDING	

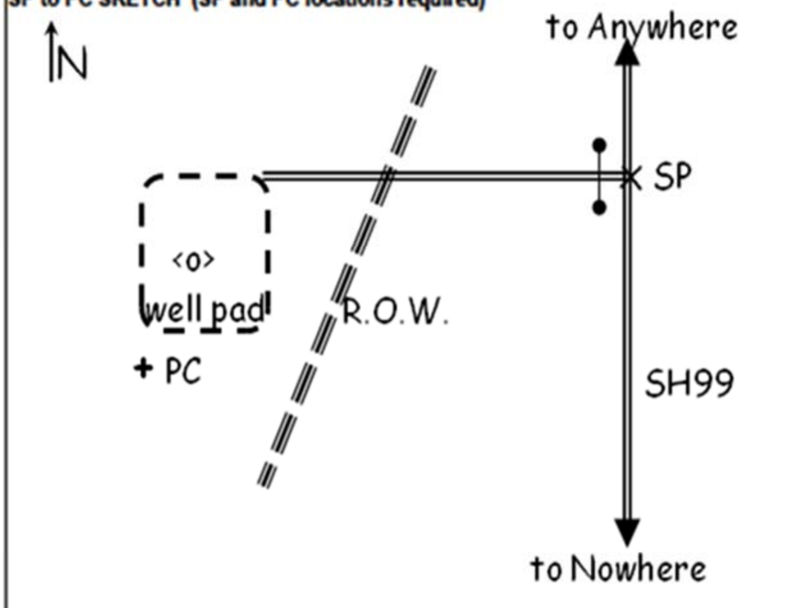
OWNER INFORMATION			
NAME	C.A. Wood		
OWNER CLASS	45	PHONE	(479) 123-4567

SP DESCRIPTION AND FIELD NOTES
SP is the intersection of well access road and SH 99. Locked gate 20' west of SP.

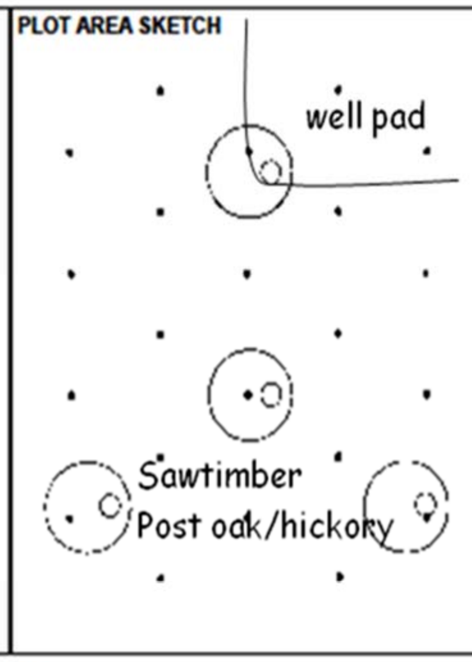
COURSE TO PLOT				
FROM	AZ.	DIST.	CIRCLE SLOPE OR HOR	TO
SP	245	703'	SLP HOR	PC
			SLP HOR	
			SLP HOR	
			SLP HOR	
			SLP HOR	

WITNESS TREES		SUBPLOT NUMBER: 1
	WHITE TAG	BASE TAG
SPECIES NAME	Post Oak	Pignut Hickory
DBH	12.2" @ 5.6'	9.0"
AZIMUTH	343	077
HOR. DIST	6.6'	15.2'
NOTES	Fork @ 10'	

SP to PC SKETCH (SP and PC locations required)

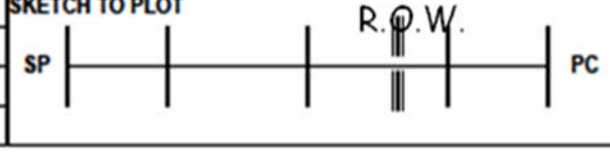


PLOT AREA SKETCH



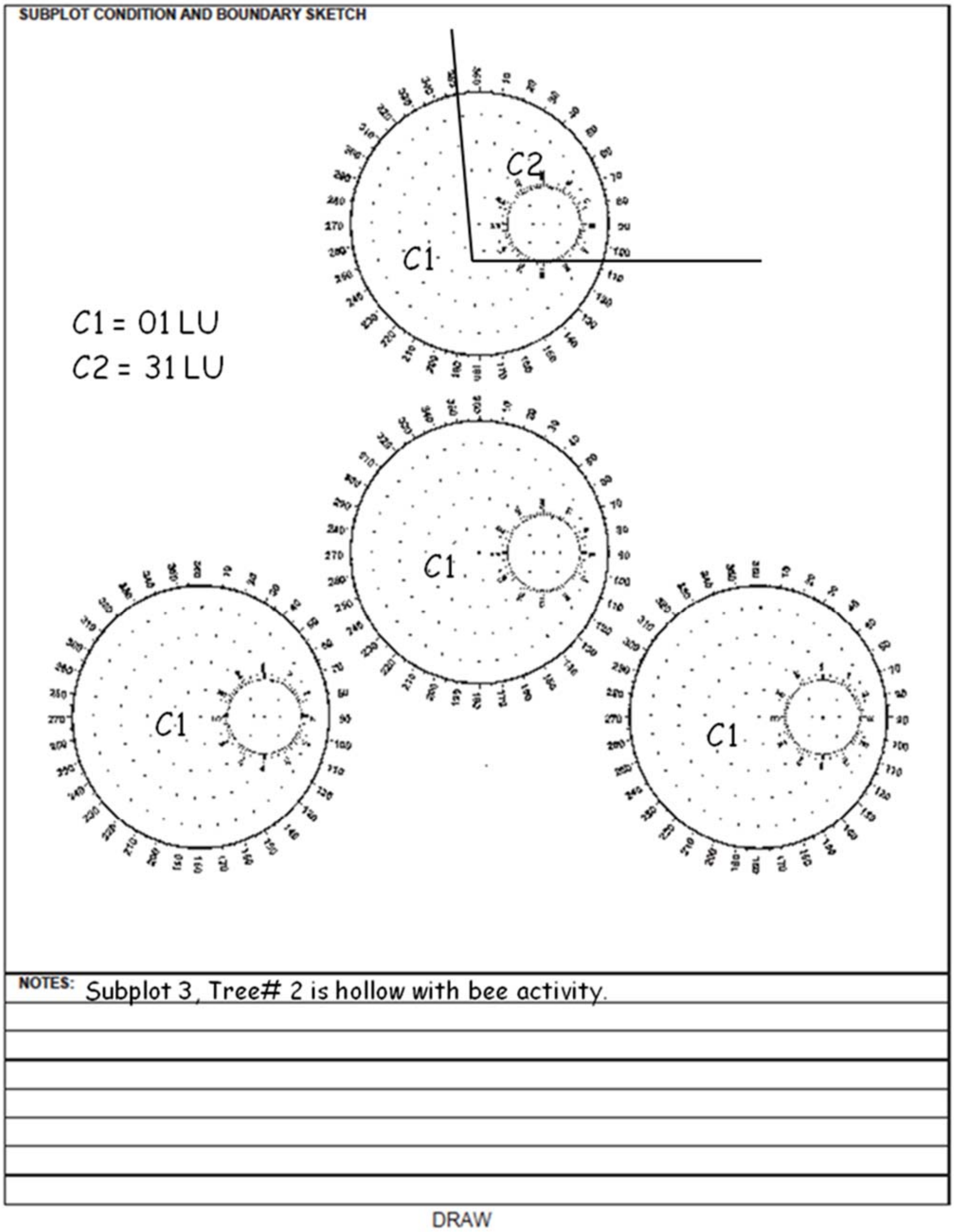
CREW	NAME	CODE
CRUISER	T.H. Best	998
ASSISTANT 1	I.M. Better	999
ASSISTANT 2		

SKETCH TO PLOT



DRAW

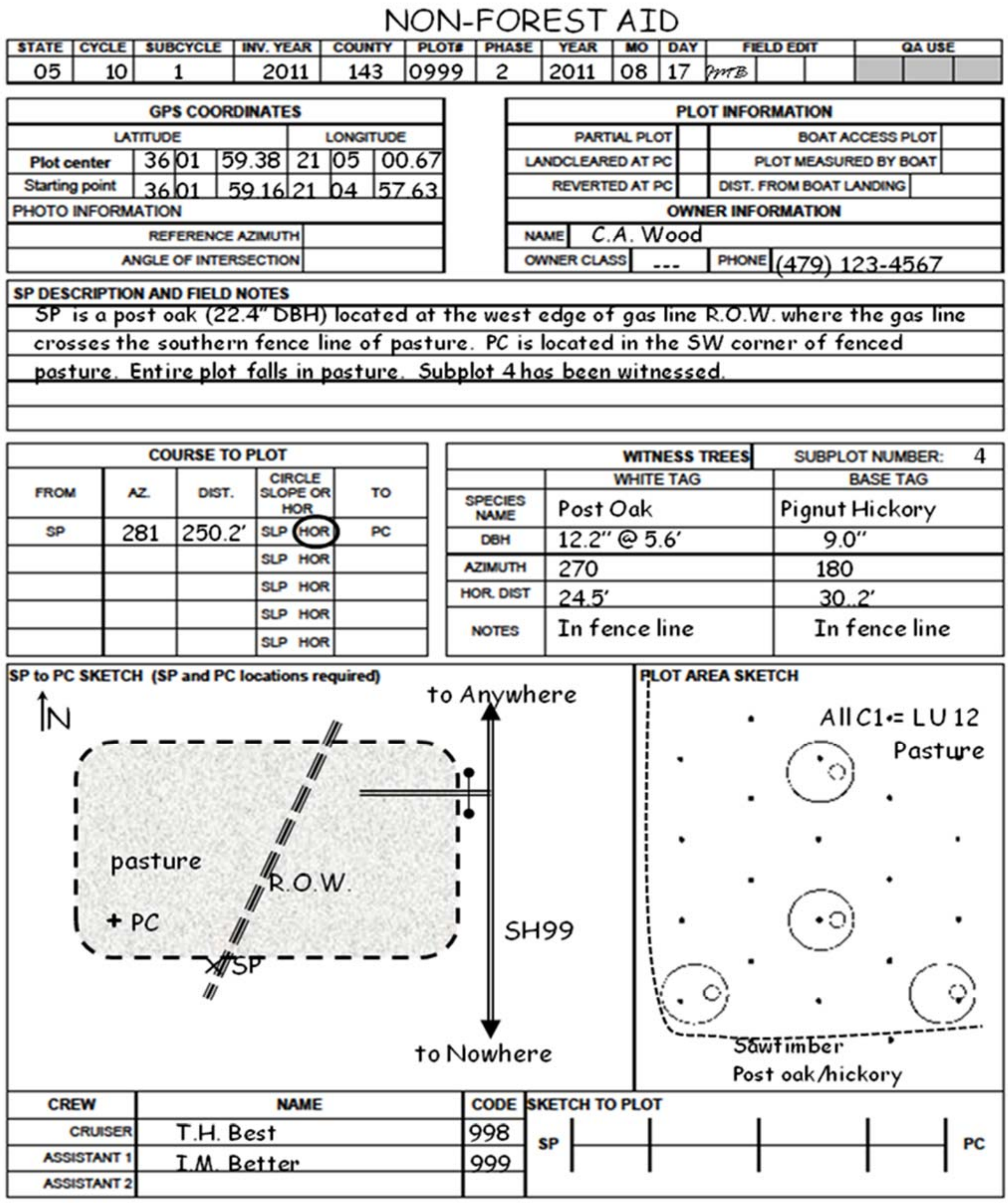
Draw sheet example for a plot with accessible forest land (back)



Non forest plots that require a non-forest aid will require a new draw sheet at each cycle visit. This will prevent what is known as "plot drift" for nonforest plots that have not been permanently monumented at PC. The non-forest aid prevents plot drift (movement of the nonforest location between cycles where no change has occurred on the ground) by witnessing the center location of any subplot. The subplot witness should be identified on the draw sheet. A subplot pin can be placed unless it's a hazard for the nonforest condition. For example, a pin should not be placed in fields that are tilled or mowed.

Crews establishing plots near a forested edge (where the forest stand age is greater than the time gap between cycles) must verify that the change from PLOT STATUS 2 to 1 is not due to plot drift. If a non-forest aid was not provided, crews must contact Knoxville or Starkville to see if a non-forest aid is present with the previous cycle materials or an older cycle. Older imagery may be requested as well. If the crew suspects cruiser error of the original plot establishment, the crew must contact their supervisor for instruction on how to best establish the plot.

Draw sheet example of a Non-Forest Aid



NON-FOREST AID

STATE	CYCLE	SUBCYCLE	INV. YEAR	COUNTY	PLOT#	PHASE	YEAR	MO	DAY	FIELD EDIT	QA USE
05	10	1	2011	143	0999	2	2011	08	17	MTB	

GPS COORDINATES	LATITUDE			LONGITUDE		
Plot center	36	01	59.38	21	05	00.67
Starting point	36	01	59.16	21	04	57.63

PHOTO INFORMATION

REFERENCE AZIMUTH	
ANGLE OF INTERSECTION	

PLOT INFORMATION

PARTIAL PLOT		BOAT ACCESS PLOT	
LANDCLEARED AT PC		PLOT MEASURED BY BOAT	
REVERTED AT PC		DIST. FROM BOAT LANDING	

OWNER INFORMATION

NAME	C.A. Wood		
OWNER CLASS	---	PHONE	(479) 123-4567

SP DESCRIPTION AND FIELD NOTES

SP is a post oak (22.4" DBH) located at the west edge of gas line R.O.W. where the gas line crosses the southern fence line of pasture. PC is located in the SW corner of fenced pasture. Entire plot falls in pasture. Subplot 4 has been witnessed.

COURSE TO PLOT

FROM	AZ.	DIST.	CIRCLE SLOPE OR HOR	TO
SP	281	250.2'	SLP HOR	PC
			SLP HOR	
			SLP HOR	
			SLP HOR	
			SLP HOR	

WITNESS TREES — SUBPLOT NUMBER: 4

	WHITE TAG	BASE TAG
SPECIES NAME	Post Oak	Pignut Hickory
DBH	12.2" @ 5.6'	9.0"
AZIMUTH	270	180
HOR. DIST	24.5'	30.2'
NOTES	In fence line	In fence line

CREW	NAME	CODE
CRUISER	T.H. Best	998
ASSISTANT 1	I.M. Better	999
ASSISTANT 2		

DRAW

0.5 County Edit Procedures

Pre-field edit: When the plot materials are received, the appropriate section of the Accounting Check Sheet should be completed to ensure that all materials are accounted for before starting the county. If anything is missing (i.e., old maps, any photos/imagery, plots sheets, etc.), let your field coordinator know. County materials should be reviewed prior to ownership collection.

Post-field edit: Though an edit is performed in the office after data has been transmitted, data corrections made by the field crew are much more accurate than those made by office editors. Therefore, to ensure the best possible data now and in the future, a field edit should be performed on both the electronic plot data and the plot materials prior to the return of the county folders.

After completing plot data collection in the field, a full plot edit should be run on the data. All warnings and errors should be reviewed while still on the plot. If corrections are warranted, they should be applied at that time unless further review is needed. If the crew believes a warning and/or error is not valid, the MIDAS programmer should be contacted. The crew should also review the draw page and imagery to ensure that the plot is documented thoroughly and accurately and that any necessary annotations have been made on the imagery. Check for SP description, course-to-plot and that the SP description and SP to PC sketch match. Check completeness of the plot area sketch, SP to PC sketch and sketch to plot (when needed). Make sure all plots have a North arrow and the ownership is recorded. Check the witness tree information for completeness.

Check the photographs/imagery making sure that all the SP's are marked, the photographs/imagery are drawn-up (if applicable), and all required information is recorded on the back of the photographs/imagery. Check math on course to plot azimuth, reference azimuth and angle of intersection (if applicable).

Once the edit is complete, once again count all county materials and complete the appropriate section on the Accounting Check Sheet. Ensure that all materials are accounted for before they are returned to the state coordinator or field supervisor. If any materials have been lost, document the missing items so they may be replaced for the next inventory (if possible).

1.0 Plot Level Data

All variables listed in Section 1.0 are collected on plots with at least one accessible forest land condition (PLOT STATUS = 1) and all NONFOREST/NONSAMPLED plots (PLOT STATUS = 2 or PLOT STATUS = 3). In general, plot level data apply to the entire plot and 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 (CONDITION CLASS STATUS = 1). A plot is nonsampled if the entire plot is not sampled for one of the reasons listed in PLOT NONSAMPLED REASON.

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

Trees on previously forest land plots will be reconciled during data processing. There is a distinction between plots that have been clearcut, and plots that have been converted to another land use (landcleared). A clearcut plot is considered to be forest land until it is actively converted to another land use. Additional information concerning land use classifications is contained in Section 2.3.

1.1 STATE **[STATE]**

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

Values: See Appendix 1 (Pre-populated in MIDAS)

1.2 COUNTY **[CNTY]**

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.

Values: See Appendix 1 (Pre-populated in MIDAS)

1.3 PLOT NUMBER **[PLOT]**

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).

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.

Values: 00001 to 99999 (Pre-populated in MIDAS except in replacement plots)

SRS Note: Plot numbers in the South adhere to the following numbering system:

00001 – 00999	Standard field plots
09000 – 09999	Temporary or supplemental plots
RXXXX	Certification plots (paper tally only – not valid for MIDAS)

1.4 PLOT STATUS **[PltSt]**

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

Values:

1 Sampled – at least one accessible forest land condition present on plot
2 Sampled – no accessible forest land condition present on plot
3 Nonsampled – possibility of forest land

.5 NONFOREST SAMPLING STATUS **[NFSam]**

Record whether this plot is part of a nonforest inventory. If NONFOREST SAMPLING STATUS = 1, then the entire suite of attributes that are measured on the forest lands will be measured and only those suites of attributes that are measured on forest lands will be measured on nonforest lands.

Values:

0 Nonforest plots / conditions are not inventoried
1 Nonforest plots / conditions are inventoried

SRS Note: Nonforest inventories are not conducted in our region. This variable will be autofilled in the data recorder.

1.6 NONFOREST PLOT STATUS

1.7 PLOT NONSAMPLED REASON **[PNSR]**
For entire plots that cannot be sampled, record one of the following reasons.
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 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 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. SRS Note: This code should **only** be used when the PC falls outside the state boundary. Valid in state border counties only.
11 Ocean – Plot falls in ocean water below mean high tide line.

1.8 NONFOREST PLOT NONSAMPLED REASON
1.9 SUBPLOTS EXAMINED

1.10 SAMPLE KIND **[SK]**
Record the code that describes the kind of plot being installed.

Values: (Pre-populated in MIDAS)

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, PLOT STATUS = 3, and the appropriate NONSAMPLED REASON code. The plot number for the new (replacement) plot is assigned by NIMS.

1.11 PREVIOUS PLOT NUMBER **[PrPl#]**
Record the identification number for the plot that is being replaced.

Values: 00001 to 99999

1.12 FIELD GUIDE VERSION
Record the version number of the National Core Field Guide that was used to collect the data on this plot. FIELD GUIDE VERSION will be used to match collected data to the proper version of the field guide. This is a configuration variable and is used in the plot name file name in MIDAS only.

Values: 7.0

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 **[Year]**
Record the year that the plot was completed.

Values: $\geq$ 2003

1.13.2 MONTH **[Month]**
Record the month that the plot was completed.

Values:

January	01	April	04	July	07	October	10
February	02	May	05	August	08	November	11
March	03	June	06	September	09	December	12

1.13.3 DAY **[Day]**

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

Values: 01 to 31

1.14 DECLINATION (CORE OPTIONAL)

1.15 HORIZONTAL DISTANCE TO IMPROVED ROAD **[DRoad]**

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.

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.

A private drive or access road within accessible forest land is considered a road if it meets the qualifications stated above.

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 WATER ON PLOT **[Water]**

Record the water source that has the greatest impact on the area within the accessible forest/nonforest land portion of any of the four subplots. Water occurring between subplots or part of a nonforest condition is not recorded, but should be identified on the plot area sketch on the DRAW page. The coding hierarchy is listed in order from large permanent water to temporary water. This variable can be used for recreation, wildlife, hydrology, and timber availability studies. This water is limited to water that is too small to qualify as its own condition (CONDITION CLASS STATUS = 3 or 4).

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

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 **[QASt]**

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

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 field crew certification plot – paper tally only)
5 Botched plot file (disregard during data processing)
6 Blind check
7 Hot check (production plot)

1.18 CREW NUMBER **[Crew1, Crew2, Crew3, Crew4, Crew5]**
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 may be recorded using 33991, 33992, 33993 or 33994.

Values:

NRS	240001 – 249999
SRS	330001 – 339999
RMRS	220001 – 229999
PNW	260001 - 269999

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.

Southern FIA GPS units should be set to the NAD 83 Datum with WAAS enabled.

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. If the coordinate is corrected back to plot center, it is not necessary to record the azimuth and distance.

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.

Plot center coordinates are collected using the MX internal GPS receiver or the Emtac GPS receiver and Landmark software on the Allegro CX. If either the Allegro GPS, Emtac or Landmark is not functioning, the Garmin 60, Garmin 76 or a comparable GPS unit may be used. Crews must contact the Knoxville office when the internal GPS on the MX or Emtac or Landmark is not functioning for either replacement or assistance.

1.19.3 GPS UNIT **[Unit]**
Record the kind of GPS unit used to collect coordinates. If suitable coordinates cannot be obtained, or are not required, record 0.

Values:

0 GPS coordinates not collected
2 Models capable of field-averaging (i.e. Garmin 60, 62 or 76 series, internal Allegro MX GPS, Emtac)
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 **[GPS#]**
Record the last six digits of the serial number on the GPS unit used.

Values: 000001 to 999999

1.19.5 GPS ENTRY METHOD **[Entry]**
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. This variable is autofilled and locked in MIDAS.

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.

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).

Values:

NAD83 North American Datum of 1983

SRS Note: This variable is autofilled and hidden in MIDAS.

1.19.7 COORDINATE SYSTEM

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

Values:

1 Geographic coordinate system
2 UTM coordinate system

SRS Note: This variable is autofilled and hidden in MIDAS.

1.19.8 Latitude

Record the latitude of the plot center to the nearest hundredth second, as determined by GPS. If the coordinates cannot be corrected and an offset point is used, record the latitude at the offset location.

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 **[LatDg]**

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

Values: 0-90

1.19.8.2 LATITUDE MINUTES **[LatMn]**

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

Values: 0 – 59

1.19.8.3 LATITUDE SECONDS **[LatSe]**

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

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. If the coordinates cannot be corrected and an offset point is used, record the longitude at the offset location.

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 **[LonDg]**

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

Values: 1-180

1.19.9.2 LONGITUDE MINUTES **[LonMn]**

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

Values: 0 – 59

1.19.9.3 LONGITUDE SECONDS **[LonSe]**

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

Values: 0.00 – 59.99

1.19.10 UTM ZONE
1.19.11 EASTING (X) UTM
1.19.12 NORTHING (Y) UTM

1.19.13 Correction For "Offset" 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. Both the Garmin units and Landmark software allow coordinates to be corrected back to plot center.

SRS Note: These two variables should not be used unless coordinates cannot be taken at subplot 1 and the GPS unit does not have a feature that allows the correction of coordinates back to PC. If the values entered are other than 000, they are used to adjust the entered latitude and longitude coordinates during data processing.

1.19.14 AZIMUTH TO PLOT CENTER **[Azi]**
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.

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 **[Dist]**
Record the horizontal distance in feet from the location where coordinates were collected to the actual plot center. If coordinates are collected at plot center or are corrected in the field to plot center, record 000. 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.

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

1.19.16 GPS ELEVATION **[Elev]**
Record the elevation above mean sea level of the plot center, in feet, as determined by GPS. If the coordinates cannot be corrected and an offset point is used, record the elevation at the offset point.

Values: -00100 to +20000

1.19.17 GPS ERROR **[Error]**
Record the error as shown on the GPS unit to the nearest foot up to 999 feet.

Values: 000 - 999

1.19.18 NUMBER OF READINGS **[#Read]**
Record a 3-digit code indicating how many readings were averaged by the GPS unit to calculate the plot coordinates.

Values: 001 to 999

1.19.19 GPS FILENAME (CORE OPTIONAL)
1.20 MACROPLOT BREAKPOINT DIAMETER (CORE OPTIONAL)

1.21 PLOT NOTES **[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.

Values: English language words, phrases and numbers

1.22 P2 Vegetation Sampling Options – Plot-Level Variables
The following options are set by the inventory unit prior to field season and are not set by field crews upon arriving at a plot. Therefore, each unit can customize the PDR program to automatically fill these variables. These variables are included to aid data management and allow various units to be compared appropriately.

1.22.1 P2 VEGETATION SAMPLING STATUS **[VegSt]**
This plot-level variable determines whether P2 Vegetation data will be recorded on the plot, and the land condition class(es) on which it will be recorded. The code used will be determined by regional needs. If P2 VEGETATION SAMPLING STATUS = 0, no further data collection is required within this field guide section.

Values: (This variable is autofilled and locked in MIDAS.)

0 Not sampling P2 Vegetation
1 P2 Vegetation data collected only on accessible forest land conditions (CONDITION CLASS STATUS = 1 and NONFOREST SAMPLING STATUS = 0)
2 P2 Vegetation data collected on all accessible land conditions (CONDITION CLASS STATUS=1 or NONFOREST CONDITION CLASS STATUS = 2)

1.22.2 LEVEL OF DETAIL **[Level]**
This plot-level variable determines whether data are collected for *Vegetation Structure* only or for *Species Composition* as well. If LEVEL OF DETAIL = 3, then a tree species could be recorded twice, but it would have two different SPECIES GROWTH HABITs (see 8.6.1).

Values: (This variable is autofilled and locked in MIDAS.)

1 Collect data for *Vegetation Structure* only; total aerial canopy cover and canopy cover by layer for tally tree species (all sizes), non-tally tree species (all sizes), shrubs/subshrubs/woody vines, forbs, and graminoids.
2 Collect *Vegetation Structure* data (LEVEL OF DETAIL = 1) **plus** understory *Species Composition* data including up to four most abundant species per SPECIES GROWTH HABIT per subplot of: seedlings and saplings of any tree species (tally or non-tally) <5 inches DBH (DRC for woodland species), non-tally tree species ≥5 inches DBH, shrubs/subshrubs/woody vines, forbs, and graminoids.
3 Collect *Vegetation Structure* data, understory *Species Composition* data (LEVEL OF DETAIL = 2), **plus** up to four most abundant tree species (tally or non-tally) ≥5 inches DBH (DRC for woodland species) per SPECIES GROWTH HABIT per subplot.

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

Values: (This variable is autofilled and locked in MIDAS.)

0 Not collecting invasive plant data
1 Invasive plant data collected only on accessible forest land conditions (CONDITION CLASS STATUS = 1)
2 Invasive plant data collected on all accessible land conditions (CONDITION CLASS STATUS =1 or NONFOREST CONDITION CLASS STATUS=2)

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.

Values: (This variable is autofilled and hidden in MIDAS.)

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

The codes in this section define the type of variables and transect configuration used for measuring DWM. The variables will help define the design of previously-collected data and directly feed into compilation of expansion factors for measured DWM. These variables are predefined for an inventory and generally will be downloaded to the PDR.

1.25.1 DWM SAMPLING STATUS (BASE) **[DWMSt]**
Record the code that describes whether DWM data will be recorded and which variables will be recorded. If code = 0, no further data collection is required within this manual section.

Values: This variable is autofilled and locked in MIDAS.

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

1.25.2 DWM NUMBER OF SUBPLOTS (BASE) **[DWM#S]**
Identify the number of subplots on which DWM is measured. When DWM SAMPLING STATUS = 1 or 2, number of subplots = 4. When DWM SAMPLING STATUS = 3, value can range from 1 to 4.

Values: 1 to 4 (This variable is autofilled and locked in MIDAS.)

1.25.3 DWM NUMBER OF TRANSECTS ON SUBPLOT (BASE) **[DWM#T]**
Identify the number of transects per subplot on which DWM is measured. A “transect” is defined as a line starting from subplot center and ending at or beyond the subplot boundary. When DWM SAMPLING STATUS = 1, number of transects per subplot = 2. When DWM SAMPLING STATUS = 2, number of transects per subplot = 2 or 3. When DWM SAMPLING STATUS = 3, value can range from 1 to 3.

Values: 1 to 3 (This variable is autofilled and locked in MIDAS.)

1.25.4 DWM TRANSECT LENGTH (BASE) **[DWMLN]**
Identifies the length of each transect on which DWM is measured. The minimum transect length when DWM SAMPLING STATUS >0 is 24.0 feet, measured to the nearest 0.1 foot. On plots where the core-optional condition classes are defined and measured on the macroplot, transect length can extend into the 58.9 foot macroplot. When DWM SAMPLING STATUS = 1 or 2, transect length equals 24 feet or 58.9 feet; when DWM SAMPLING STATUS = 3, the length can be some specified value between 24 feet and 58.9 feet (if conditions are mapped on the macroplot).

Values: 24.0 to 58.9 feet (This variable is autofilled and locked in MIDAS.)

1.25.5 DWM SUBPLOT LIST (BASE) **[DWMSL]**
Identifies the subplots on which DWM is measured. When DWM SAMPLING STATUS = 1 or 2, subplots = 1234. When DWM SAMPLING STATUS = 3, value can range from 1000 to 4000.

Values: 1000 to 4000 (This variable is autofilled and locked in MIDAS.)

1.25.6 DWM NOTES (BASE) **[Notes]**
Use these fields to record notes pertaining to the Down Woody Materials indicator. If the notes apply only to a specific subplot or other specific aspect of the plot, then make that clear in the notes.

Values: English language words, phrases and numbers

1.26 SRS CYCLE **[CYCLE]**

Record the cycle number of the current plot.

Values: 01 to 99 (Autofilled in MIDAS)

1.27 SRS SUBCYCLE **[SUBCY]**

Record the subcycle of the plot.

Values: 1 to 10 (Autofilled in MIDAS)

1.28 SRS PHASE

Record the phase number of the plot. This is a configuration variable and is used to select plots in MIDAS.

Values:

2	Standard field plot (measured year-round)
3	Standard field plot with forest health variables (measured only during specified time frame)

1.29 SRS PLOT IN CORRECT COUNTY? **[CCor?]**

Record the code that states if the plot center is in the correct county. This item will automatically default to ‘1’ in the data recorder. If plot center lands in a county other than the county that it is assigned to, then enter code ‘0’. A screen will appear where the correct county is entered. This information will be automatically forwarded to FIA office staff when the plot is transmitted.

Values:

0	Plot center is not in the county the plot is assigned to
1	Plot center is in the county the plot is assigned to

1.30 SRS CORRECT COUNTY **[NewCo]**

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

Values: See Appendix 1

1.31 SRS PAST DATE

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

1.31.1 SRS PAST YEAR **[PYear]**

Record the year that the plot was last inventoried.

Values: varies with state or territory

1.31.2 SRS PAST MONTH **[PMon]**

Record the month that the plot was last inventoried.

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

1.31.3 SRS PAST DAY **[PDay]**

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

Values: 01 to 31

1.32 SRS NUMBER OF ACCESSIBLE FOREST LAND CONDITIONS

Record the number of accessible forest land conditions that are sampled on the plot.

Values: 1-9 (paper tally only)

1.33 SRS PLOT ACCESSIBILITY **[PltAc]**

Record the code to describe the accessibility of the plot. The code that is most significant for the plot should be selected. For example, if the plot is located in permanent water and is accessed by boat, the most appropriate code would be “4 – Plot is accessed by boat”

Values:

0	Typical plot for the area
1	Plot suitable for a one-person crew
2	Plot affected by seasonal high water
3	Plot affected by permanent water (beaver pond, tidal swamp, etc.)
4	Plot is accessed by boat
5	Plot access requires long hike
6	Plot has significant permanent thick brush (rhododendron, bay, pocosin, etc.)
7	Plot has significant temporary thick brush (e.g., clearcut)
8	Plot has significant deadfall/windthrow
9	Other (describe in plot notes)

1.34 SRS GPS STATUS **[GPSSt]**

Record the code to describe the status of the GPS coordinates collected.

Values:

1 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

1.35 SRS AUTHORIZATION CODE **[Auth#]**

An authorization code is required for all nonsampled plots in the South. To obtain the code, contact your state coordinator or supervisor. Record the appropriate code in the data recorder.

A lost plot requires a SRS AUTHORIZATION CODE and new PLOT NUMBER for the replacement plot. The code and new plot number is requested from the Knoxville office. To obtain a code and new plot number, the zone supervisor requests the code with the provided justification (why is the plot lost?) and who should receive the code and new plot number for SK3 plot installation. The new plot number is added to the MIDAS state plot list. To account for the lost plot and the new plot, the following steps are followed upon receiving the code and new plot number:

- The plot that was lost is entered as PLOT STATUS = 3 and PLOT NONSAMPLED REASON = 06 in MIDAS. An SRS AUTHORIZATION CODE is required to complete the plot.
- A new plot is established at the DOQ coordinate location as a SAMPLE KIND = 3 with the new PLOT NUMBER received from Knoxville.

If approval is given to install the plot, but a new number has not been received, crews may use a temporary number to establish the plot and change it in MIDAS prior to transmission. A good way to quickly identify the replacement plot is to add 99 to the beginning of the original plot number (i.e. original plot = 201, new temporary number 99201)

- The DOQ and other county materials are updated to reflect the new plot number.

<u>Plots that are denied access or hazardous</u> also require an SRS AUTHORIZATION CODE. The crew contacts their state coordinator or field supervisor with justification to request the code. These plots are entered as PLOT STATUS = 3 and PLOT NONSAMPLED REASON = 02 or 03. NOTE: Plots that are deemed hazardous at the initial visit may not be hazardous at all times of the year. Plots should be examined multiple times throughout the year to determine is the hazard still exists. For example, if a plot cannot be accessed due to high water, then it should be placed on hold until the water level recedes.

Values: 00001 - 9999

2.0 CONDITION CLASS

The Forest Inventory and Analysis (FIA) plot is cluster of four subplots in a fixed pattern. Subplots are never reconfigured or moved in order to confine them to a single condition class; a plot may straddle more than one condition class. Every plot samples at least one condition class: the condition class present at plot center (the center of subplot 1).

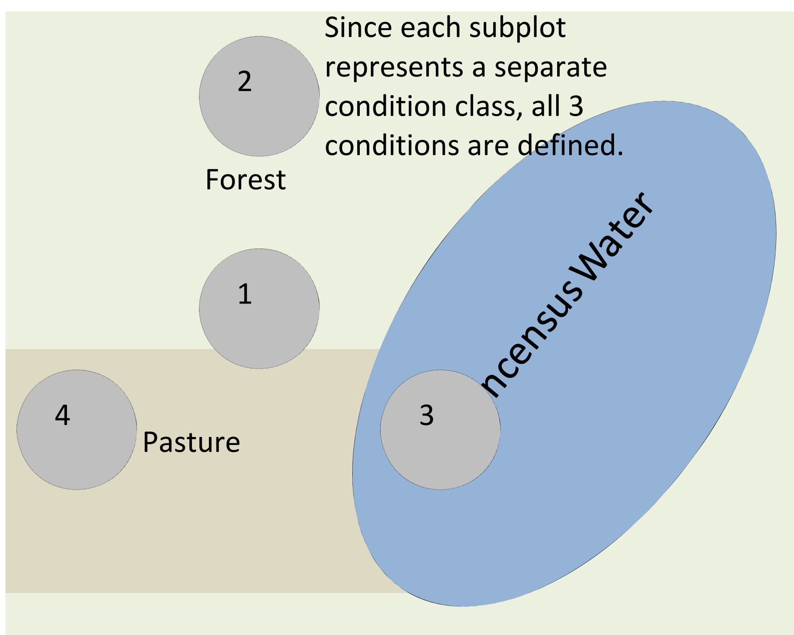
2.1 Determination of Condition Class

2.1.1 Step 1: Delineate the plot area by CONDITION CLASS STATUS

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

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

Accessible forest land defines the population of interest for FIA purposes. This is the area where most of the data collection is conducted. Additionally, nonforest land is sampled in some areas of special interest. If PLOT STATUS = 1, you must delineate between the 5 conditions listed. Otherwise, no delineation is required. For example, if subplot 1 and 2 are forest, subplot 3 is census water and subplot 4 is nonforest pasture, these 3 conditions are recorded. However, on each individual subplot, only delineate between condition 2 – 5 above on subplots that have at least one accessible forest land condition (SUPLOT STATUS = 1). Do not delineate between nonforest condition 2 – 5 above on completely nonforest subplots (SUBPLOT STATUS = 2 or 3). See 4.0 Boundary for illustrations delineating subplots by condition class status. If the plot does not have at least one accessible forestland condition present, do not delineate between CONDITION STATUS 2 – 5. If the plot has forest present but the condition is classified as nonsampled due to a hazard or is denied access and the remaining conditions are not forested, the entire plot should be classified as PLOT STATUS = 3, regardless of where the nonsampled condition occurs.



SRS Figure 1. All conditions are delineated.

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

At time of re-inventory, one additional attribute, PRESENT NONFOREST LAND USE, is used to define new condition classes if the sampled area on a plot has changed from accessible forest land to nonforest land (Note: see Section 2.5.30). This allows tracking of land use changes without requiring mapping of all nonforest land condition classes on all plots.

No other attribute shall be the basis for recognizing contrasting accessible forest land condition classes. For each condition class recognized, several “ancillary attributes” that help describe the condition will be collected, but will not be used for delineation purposes (see Section 2.3.1).

2.1.3 Step 3: When inventorying Nonforest Land, delineate accessible Nonforest Land by 3 delineation variables

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

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

2.2 Condition Class Status Definitions

1. 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:

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

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

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

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

SRS Note: Do not consider evidence of "possible" or future development or conversion when determining accessible forest land. A forest land condition will remain in the sample as forest at the time of the field visit and will be examined during the next cycle to see if it has become nonforest land.

When a forest land condition encroaches into a nonforest land condition, the border between forest and nonforest is often a gradual change in tree cover with no clear and abrupt boundary. In addition, it may be difficult to determine exactly where the forested area meets the minimum cover criteria and where it does not. For these situations, determine where the land clearly meets the 10 percent minimum canopy cover, and where it clearly is less than required cover; divide the zone between these points in half, and determine the side of the zone on which the subplot center is located. Classify the condition class of the subplot based on this line (fig. 2), using the class criteria above.

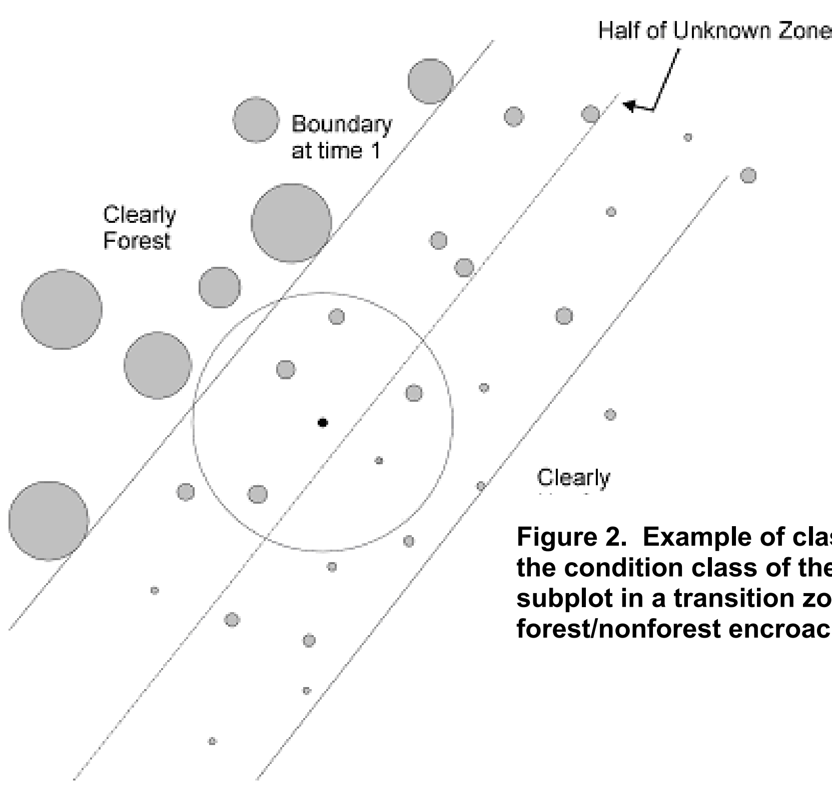


Figure 2. Example of classifying the condition class of the subplot in a transition zone with forest/nonforest encroachment.

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.

<u>Treated strips</u> – 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.

<u>Indistinct boundary due to the condition minimum-width definition</u> – 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 figures 3 and 4. Where the point of the definition change occurs on the subplot, determine only if the subplot center is on the forest or nonforest side of that approximate boundary, and classify the entire subplot based on the condition of the subplot center. If the boundary crosses through the center of the subplot, classify the subplot as the condition it most resembles. If the boundary occurs between subplots, classify each subplot based on its relation to the definitional boundary.

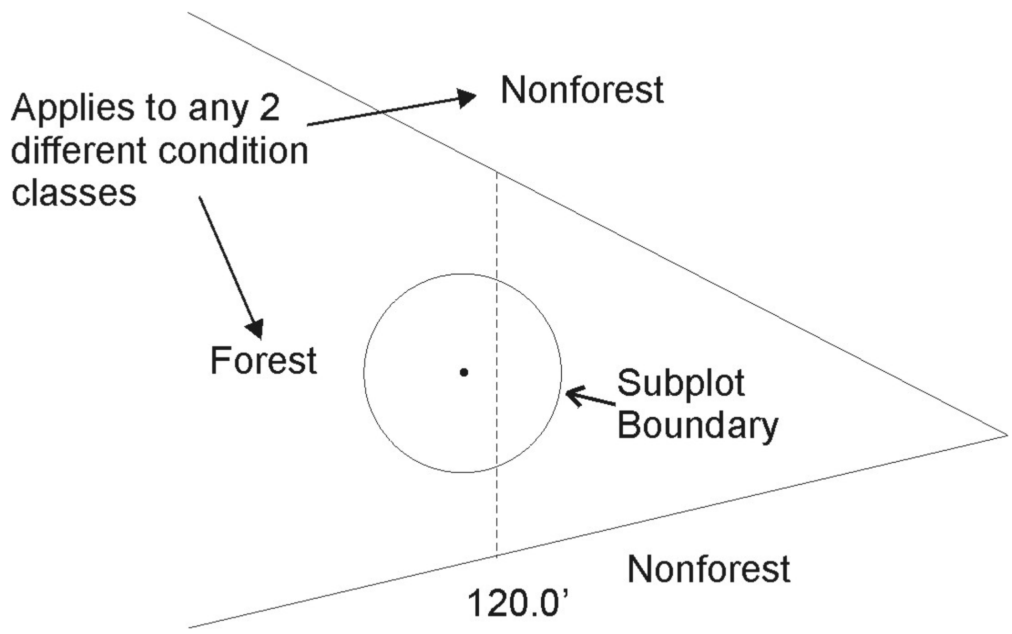


Figure 3. Forest condition narrows within a nonforest land condition. Examine the location of the subplot center in reference to the approximate line where the forest narrows to 120.0 ft wide. In this example, the entire subplot is classified as forest.

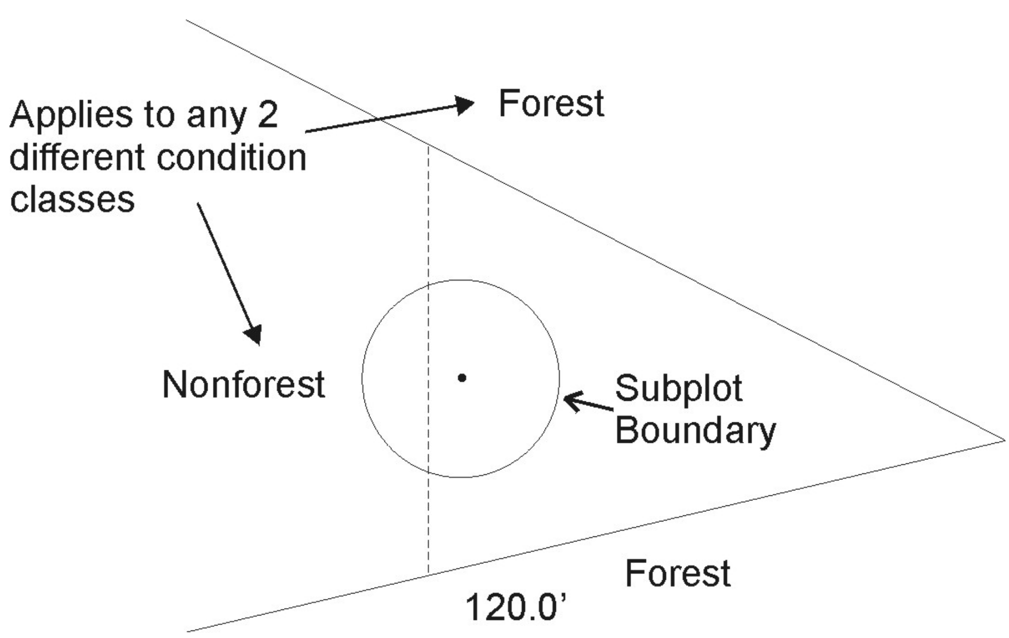


Figure 4. Nonforest land condition narrows within a forest condition. Examine the location of the subplot center in reference to the approximate line where the nonforest narrows to 120.0 ft wide. In this example, the entire subplot is classified as forest.

2. 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 under PRESENT 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 PRESENT 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 PRESENT NONFOREST LAND USE CODE = 20, 40, 42, 43 or 45.

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

4. Census Water
Lakes, reservoirs, ponds, and similar bodies of water 4.5 acres in size and larger; and rivers, streams, canals, etc., more than 200 feet wide (1990 U.S. Census definition). If a subplot center is classified as census water, the entire subplot is classified as this condition.

5. Nonsampled, possibility of forest
See section 2.4.3 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 land, record CONDITION CLASS STATUS = 2, 3 or 4. In cases where a condition is access-denied or hazardous land use and has the possibility of forest, record CONDITION CLASS STATUS = 5. If a subplot center is classified as hazardous, the entire subplot is classified as this condition.

2.3 Condition Class Attributes

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

2.3.1 Forest Land

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

2.5.1	RESERVED STATUS	Attributes where a change causes a separate condition class
2.5.2	OWNER GROUP	
2.5.3	FOREST TYPE	
2.5.4	STAND SIZE CLASS	
2.5.5	REGENERATION STATUS	
2.5.6	TREE DENSITY	
2.5.7	OWNER CLASS	
2.5.13	ARTIFICIAL REGENERATION SPECIES	Ancillary - changes do not delineate a new condition class
2.5.14	STAND AGE	
2.5.15	DISTURBANCE (up to 3 coded)	
2.5.16	DISTURBANCE YEAR (1 per disturbance)	
2.5.21	TREATMENT (up to 3 coded)	
2.5.22	TREATMENT YEAR (1 per treatment)	
2.5.27	PHYSIOGRAPHIC CLASS	
2.5.29	PRESENT NONFOREST LAND USE.	
2.5.25	SRS PRESENT LAND USE	SRS Regional Items
2.5.26	SRS TRACT TOTAL ACRES	
2.5.27	SRS TRACT PERCENT FOREST	
2.5.28	SRS STAND STRUCTURE	
2.5.29	SRS OPERABILITY	
2.5.30	SRS CONDITION SITE CLASS	
2.5.31	SRS FIRE	
2.5.32	SRS GRAZING	
2.5.33	SRS CUTTING TYPE 1, 2, 3	

2.3.2 Nonforest Land

2.4 Delineating Condition Classes Differing In Condition Class Status:

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

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

Within a nonforest land condition class, forested areas or linear strips of trees less than 1.0 acre in size and less than 120.0 feet in width are considered part of the nonforest land condition class. Do not delineate between CONDITION STATUS 2 – 5 when there are no forested conditions (CONDITION STATUS = 1) present on the plot.

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 (figs. 5).

    (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.

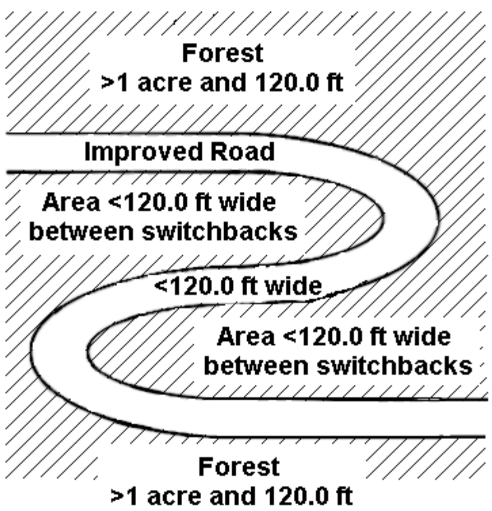
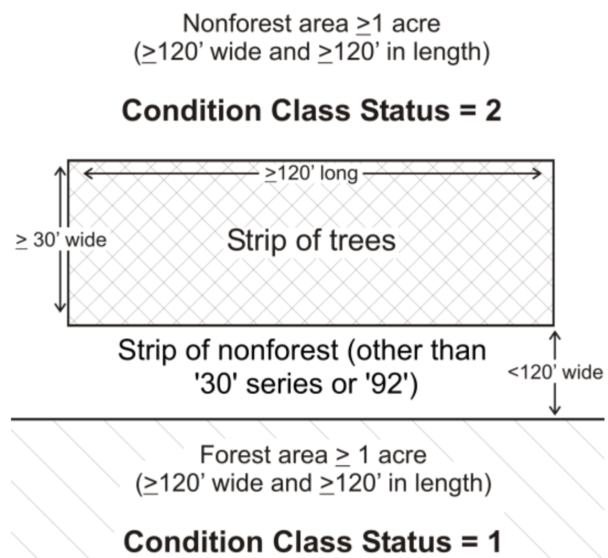


Figure 5. Example of a switchback road. All the cross-hatched area is forest and the improved road is a nonforest condition.



SRS Figure 2. Example of a forest condition crossing a nonforest strip.

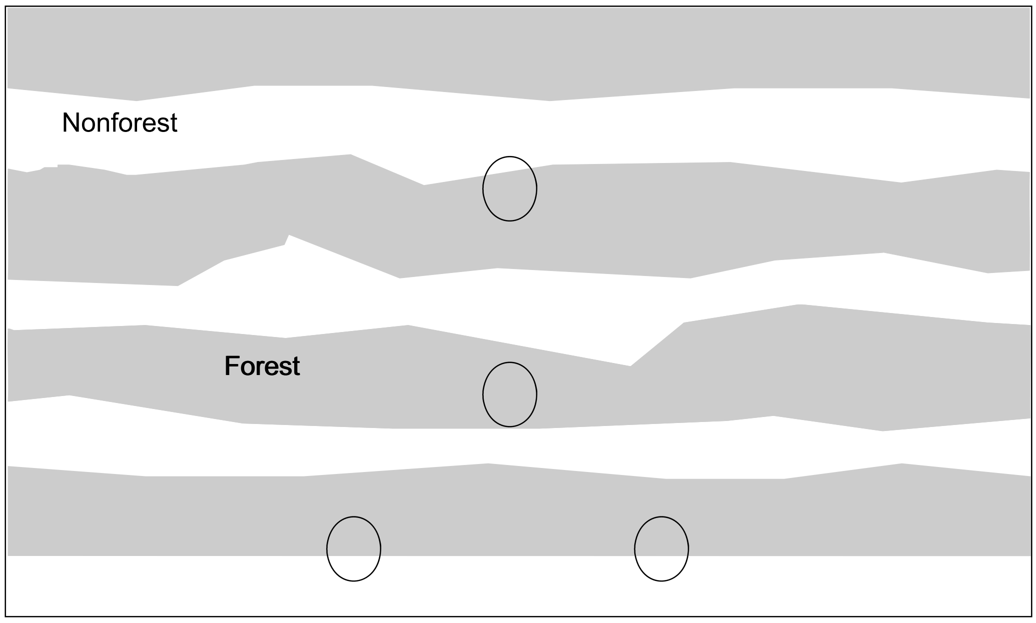
    (b) Maintained rights-of-way: corridors created for railroads, power lines, gas lines, and canals that are periodically treated to limit the establishment and growth of trees and shrubs.

    (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.

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 should still be considered forest **if** it meets the minimum criteria. As shown in Figure 5, improved roads, R.O.W. and noncensus water that are less than 120 feet in width do not necessarily break up a forest condition that is between switchbacks. The switchback rule allows narrow strips such as roads and noncensus water between switchbacks to be classified as forest land. However, the portion of the strip that narrows to less than 30 feet is considered an inclusion of the nonforest land use. The area is disqualified as forest land due to the regional rule that forest land must be at least 30 feet in width. In SRS Figure 2, the strip must be at least 120 feet in length and at least 30 feet wide throughout the entire strip and it must be within 120 feet of the defined forest condition. 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.

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 3. 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 6. Figure 6 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.

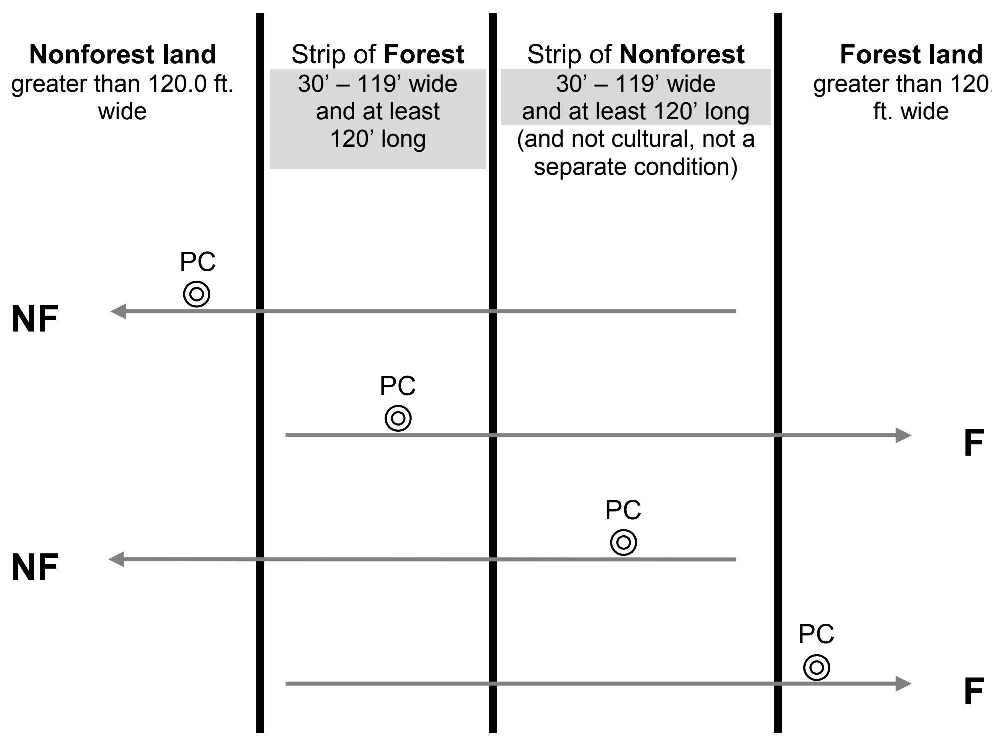


Figure 6. Example of alternating strips of forested and nonforested conditions. PC is the plot center (center of subplot 1).

3. The 120.0 or 30.0-foot minimum width for delineation does not apply when a corner angle is 90 degrees or greater (fig. 7).

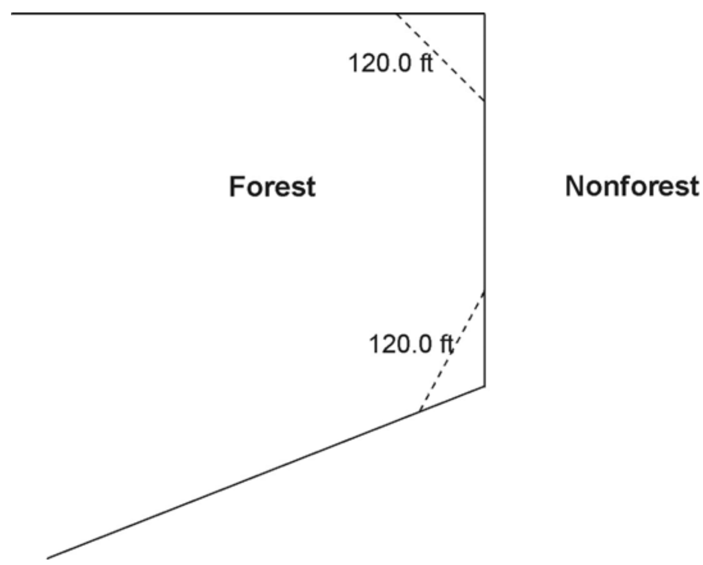
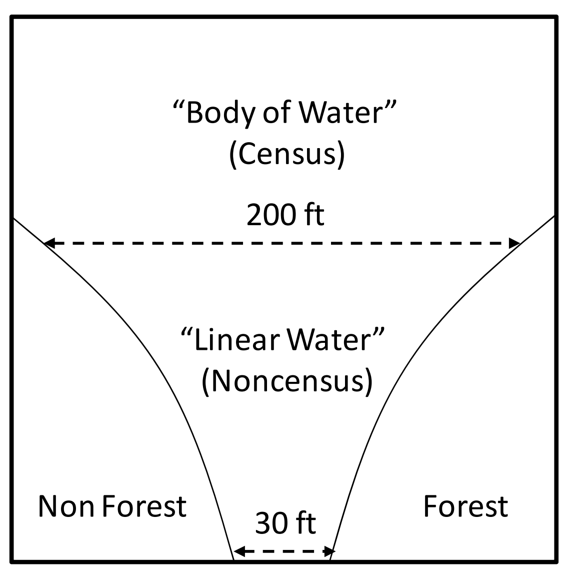


Figure 7. Illustration of the 90 degree corner rule. The dotted lines do not create nonforest land conditions.

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

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.

Values: 1 to 9

2.4.2 CONDITION CLASS STATUS **[CndSt]**

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 CONDITION CLASS STATUS. In situations where a condition is denied access or hazardous, but obviously contains no forest land, record CONDITION CLASS STATUS = 2, 3 or 4. In cases where a condition is access-denied or hazardous land use and has the possibility of forest, record CONDITION CLASS STATUS = 5.

Values:

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

2.4.3 CONDITION NONSAMPLED REASON **[CNSR]**

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

Values:

01 Outside U.S. boundary – Assign this code to condition classes beyond the U.S. border.

02 Denied access area (possible forest land exists on the condition) – 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 (possible forest land exists on the condition) – 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.

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 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 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 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 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 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. SRS Note: Valid only when PLOT NONSAMPLED REASON = 11. This code should **only** be used when the PC falls outside the state boundary. Valid in state border counties only.

11 Ocean – Condition falls in ocean water below mean high tide line.

2.4.4 NONFOREST CONDITION CLASS STATUS

2.4.5 NONFOREST CONDITION NONSAMPLED REASON

2.5 Delineating Condition Classes Within Accessible Forest Land:

Accessible forest land is subdivided into condition classes that are based on differences in RESERVED STATUS, OWNER GROUP, FOREST TYPE, STAND SIZE CLASS, REGENERATION STATUS, and TREE DENSITY. Section 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 to 2.5.6. “Stands” are defined by plurality of stocking for all live trees, saplings, and seedlings that are not overtopped.

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

No other attribute shall be the basis for recognizing contrasting condition classes within accessible forest land. For each condition class recognized, many “ancillary attributes” that help describe the condition will be collected, but will not be used for delineation purposes (see Sections 2.5.7 to 2.5.23).

General instructions for delineating condition classes within accessible forest lands:

1. Distinct boundary within a macroplot (if applicable), subplot, or microplot – Separate condition classes ARE recognized if, within a subplot, two (or more) distinctly different condition classes are present and delineated by a distinct, abrupt boundary. The boundary is referenced; see Section 4.0.

2. Indistinct boundary within a subplot – Separate condition classes are NOT recognized if the prospective condition classes abut along an indistinct transition zone, rather than on an abrupt, obvious boundary. Only one condition is recognized, and the subplot is classified entirely as the condition it most resembles.

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

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

   SRS Note: The most common indistinct boundary is the gradual change between naturally occurring forest types where there is no abrupt change in physiographic class and where species present may be common to multiple forest types. For example, the shortleaf pine/oak forest type has the same associates and similar site conditions as the shortleaf pine type. The difference between the two is the percentage of pine present in the stand. A new condition should only be delineated if there is a notable, distinct change in the percentage of pine present.

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

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

4. Riparian forest area – A riparian forest area is defined as a forest area between 30.0 and 120.0 feet wide, and 1.0 acre or more in size, cumulative, and adjacent to but not necessarily present on both sides of a naturally occurring or artificially created body of water or watercourse with continuous or intermittent flow. Riparian forest areas may be associated with but not limited to streams, rivers, lakes, sloughs, seeps, springs, marsh, bogs, beaver ponds, sink holes, cypress domes and ponds, man-made ditches and canals. A riparian forest area must be associated "within forest" and contain at least one distinct and obvious change in a condition class delineation attribute from its adjacent accessible forest land condition class. Figures 8-13 provide examples of when to delineate riarian forest area as a separate condition class. In these figures, forest type "A" qualifies as its own condition (≥120.0 feet and ≥ 1 acre). The riparian area represented by forest type "B" qualifies as its own condition if the area is between 30.0 and 120.0 feet and is ≥ 1 acre.

   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.

   SRS Note: The body of water illustrated in Figure 9 may also be a delineated forested "wetland" condition like cypress domes, cypress ponds, forested swamps/bogs or a forested beaver pond. The edge of these wetlands (forest type B) may qualify as riparian if it meets the width and acreage criteria.

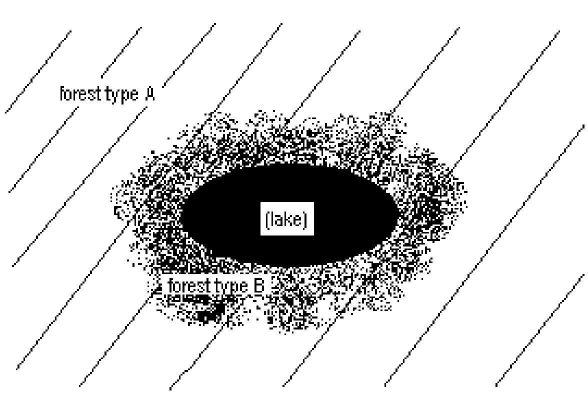


Figure 8. Forest type B is a separate condition class (riparian) if the band of it is between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.

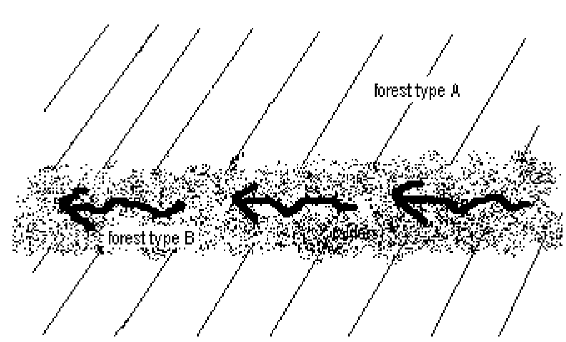


Figure 9. Forest type B is a separate condition class (riparian) if the band of it is between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.

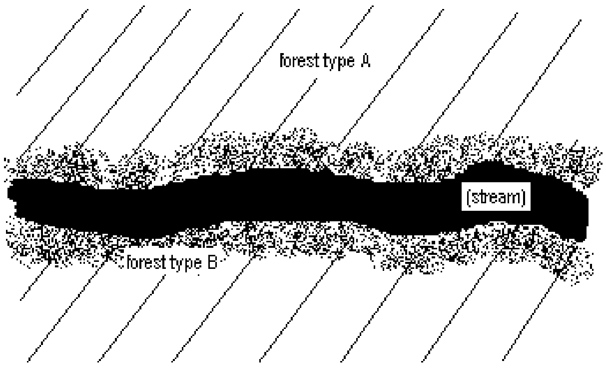


Figure 10. If the stream is < 30.0 feet wide, forest type B is a separate condition class (riparian) if the sum of the two widths of the bands, including the stream falls between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.

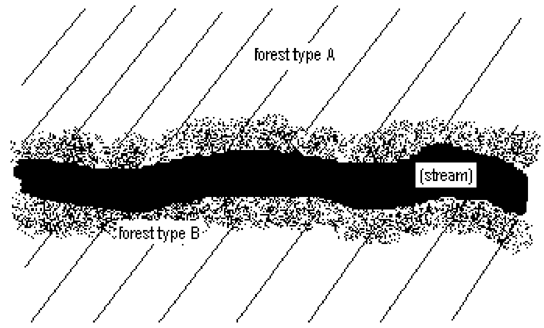


Figure 11. If the stream is > 30.0 feet wide, forest type B is a separate condition class (riparian) if either of the two widths of the bands falls between 30.0 feet and 120.0 feet wide and is ≥ 1.0 acre in size.

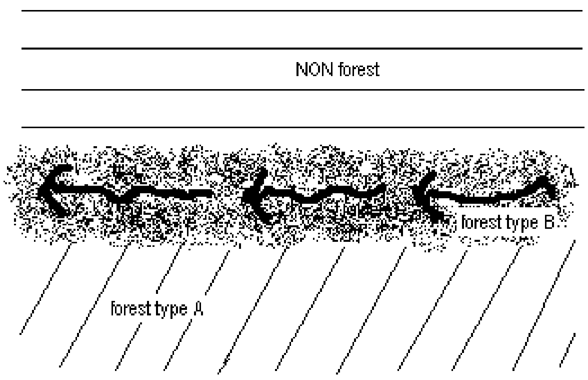


Figure 12. Forest type B is a separate condition class (riparian) if the band of it is between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.

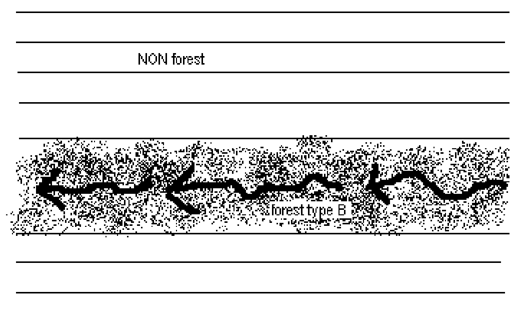
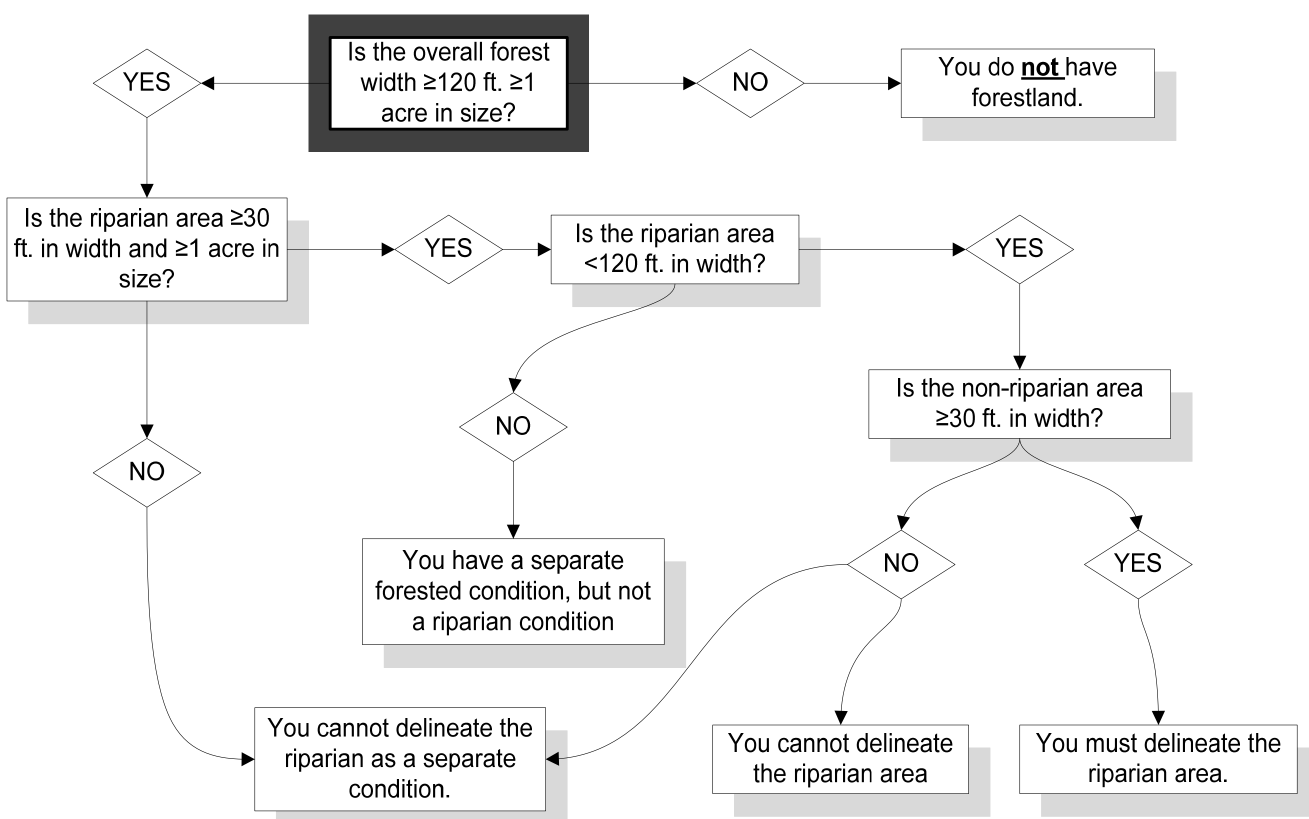


Figure 13. In a nonforested area, a band of forest type B that is < 120.0 feet wide is NOT considered a riparian area. It is not a separate condition class at all.



SRS Figure 5. Riparian delineation decision flowchart.

2.5.1 RESERVED STATUS **[Resrv]**

Record the code that identifies the reserved designation for the condition. Reserved land is withdrawn by law(s) prohibiting the management of land for the production of wood products (not merely controlling or prohibiting wood-harvesting methods). Such authority is vested in a public agency or department, and supersedes rights of ownership. The prohibition against management for wood products cannot be changed through decision of the land manager (management agency) or through a change in land management personnel, but rather is permanent in nature.

Ownership and the name (designation) of an area are critical for determining reserved status. All private lands (OWNGRPCD = 40) are considered not reserved (due to difficulty in determining legal status); this includes in-holdings, where they can be identified. FIA has adopted a default national list of federal land designations which are considered reserved (see appendix 12). 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 core optional procedure, nonforest areas are reserved if forest lands in the same designated area are considered reserved, or if the area would be considered reserved if forestland was present.

Values:

0	Not reserved
1	Reserved

2.5.2 OWNER GROUP **[OwnGr]**

Record the 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 OWNER GROUP only; separate conditions due to changes in OWNER GROUP are recognized only where differences can be clearly identified on the ground when visiting the plot.

Values:

10	Forest Service
20	Other Federal
30	State and Local Government
40	Private

2.5.3 FOREST TYPE **[FTyp]**

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 condition class that are not overtopped. Note: Canopy cover is used to determine whether an area is forest or nonforest. Stocking is used with other variables such as this one.

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

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 **[StSz]**

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

Values:

0 Nonstocked
Meeting the definition of accessible forest land, and one of the following applies:

(a) less than 10 percent stocked by trees, seedlings, and saplings, and not classified as cover trees, or

(b) for several woodland species where stocking standards are not available, less than 10 percent **canopy cover** of trees, seedlings, and saplings .

1 ≤ 4.9 inches (seedlings / saplings)
At least 10 percent stocking (or 10 percent canopy cover if stocking standards are not available) in trees, seedlings, and saplings; and at least 2/3 of the canopy cover is in trees less than 5.0 inches DBH/DRC.

2 5.0 – 8.9 inches (softwoods) / 5.0 – 10.9 inches (hardwoods)
At least 10 percent stocking (or 10 percent canopy cover if stocking standards are not available) in trees, seedlings, and saplings; and at least 1/3 of the canopy cover is in trees greater than 5.0 inches DBH/DRC **and** the plurality of the canopy cover is in softwoods between 5.0 – 8.9 inches diameter and/or hardwoods between 5.0 – 10.9 inches DBH, and/or woodland trees 5.0 – 8.9 inches DRC.

3 9.0 – 19.9 inches (softwoods) / 11.0 – 19.9 inches (hardwoods)
At least 10 percent stocking (or 10 percent canopy cover if stocking standards are not available) in trees, seedlings, and saplings; and at least 1/3 of the canopy cover is in trees greater than 5.0 inches DBH/DRC **and** the plurality of the canopy cover is in softwoods between 9.0 – 19.9 inches diameter and/or hardwoods between 11.0 – 19.9 inches DBH, and for woodland trees 9.0 – 19.9 inches DRC.

4 20.0 – 39.9 inches
At least 10 percent stocking (or 10 percent canopy cover if stocking standards are not available) in trees, seedlings, and saplings; and at least 1/3 of the canopy cover is in trees greater than 5.0 inches DBH/DRC **and** the plurality of the canopy cover is in trees between 20.0 – 39.9 inches DBH.

5 40.0 + inches
At least 10 percent stocking (or 10 percent canopy cover if stocking standards are not available) in trees, seedlings, and saplings; and at least 1/3 of the canopy cover is in trees greater than 5.0 inches DBH/DRC **and** the plurality of the canopy cover is in trees ≥40.0 inches DBH.

The instructions in 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, subplot, or macroplot, recognize only very obvious contrasting stands of different mean diameter with an abrupt boundary. Example: an obvious abrupt boundary exists within the sampled (fixed-radius) area of a subplot and demarcates a STAND SIZE CLASS change. Use tree stocking of all live trees, seedlings, and saplings that are not overtopped to differentiate between stand-size classes; for most woodland forest types (e.g., pinyon, juniper, gambel oak) where stocking standards are not readily available, use percent tree cover to represent stocking.

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

2.5.5 REGENERATION STATUS **[RgSt]**

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

Values:

0 Natural – present stand shows no clear evidence of artificial regeneration. Includes unplanted, recently cut lands
1 Artificial – present stand shows clear evidence of artificial regeneration

The instructions in section 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 **[Dens]**

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

The instructions in 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 stands or stands of sparse and patchy forest.

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

Ancillary (Non-Delineating) Variables

2.5.7 OWNER CLASS **[OwnCl]**

Record the 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 OWNER CLASS. If multiple OWNER CLASSes occur within a condition class (i.e., within an OWNER GROUP), record the OWNER CLASS closest to the center of the lowest numbered subplot in the condition.

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 Army Corp of Engineers)
- 25 Other Federal

Owner Classes within State and Local Government Lands (Owner Group 30)
- 31 State including state public universities
- 32 Local (County, Municipality, etc.) including water authorities
- 33 Other Non Federal Public

Owner Classes within Private lands (Owner Group 40)
- 41 Corporate, including Native Corporations in Alaska and private universities
- 42 Non Governmental Conservation / Natural Resources Organization
  Examples: Nature Conservancy, National Trust for Private Lands, Pacific Forest Trust, Boy Scouts of America, etc.
- 43 Unincorporated Partnerships / Associations / Clubs. Examples: Hunting Clubs that own, **not lease** property, recreation associations, 4H, churches etc..
- 44 Native American (Indian) – within reservation boundaries
- 45 Individual and Family, including trusts, estates, and family partnerships

SRS Note: LLCs and LLPs that are associated with a family name, such as the Jones Family LLC are coded under OWNER GROUP 45. In the absence of any indication that the LLC or LLP is tied to a family, code as OWNER GROUP 41.

2.5.8 OWNER SUB-CLASS (CORE OPTIONAL)
2.5.9 PUBLIC ADMINISTRATIVELY WITHDRAWN STATUS (CORE OPTIONAL)
2.5.10 ADMINISTRATIVELY WITHDRAWN AREA NAME (CORE OPTIONAL)
2.5.11 ADMINISTRATIVELY WITHDRAWN NOTES (CORE OPTIONAL)

2.5.12 RESERVED AREA NAME **[ResNm]**

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.

Values: English language words, phrases, and numbers

2.5.13 ARTIFICIAL REGENERATION SPECIES **[RgSpp]**

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

Values: See Appendix 3

2.5.14 STAND AGE **[StAge]**

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

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

To estimate STAND AGE, select two or three dominant or codominant trees from the overstory. If the overstory covers a wide range of tree sizes and species, try to select the trees accordingly, but it is not necessary to core additional trees in such stands. The variance associated with mean stand age increases with stand heterogeneity, and additional cores are not likely to improve the estimate. Core each tree at the point of diameter measurement and count the rings between the outside edge and the core to the pith. Add in the number of years that passed from germination until the tree reached the point of core extraction to determine the total age of the tree. Unless more specific information is provided at training or by the unit, add 5 years to all eastern species, 5 years to western hardwoods, and 10 years to western softwoods. 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.

Values: 000 to 997, 998, 999

2.5.15 DISTURBANCE 1 **[Dist1]**

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 (including seedlings and saplings) 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.

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 **[DYr1]**
Record the year in which DISTURBANCE 1 occurred. If the disturbance occurs continuously over a period of time, record 9999.

Values: Since the previous plot visit, or the past 5 years for plots visited for the first time; 9999

2.5.17 DISTURBANCE 2 **[Dist2]**
Record the second disturbance here. See DISTURBANCE 1 for coding instructions.

2.5.18 DISTURBANCE YEAR 2 **[DYr2]**
Record the year in which DISTURBANCE 2 occurred. See DISTURBANCE YEAR 1 for coding instructions.

2.5.19 DISTURBANCE 3 **[Dist3]**
Record the third disturbance here. See DISTURBANCE 1 for coding instructions.

2.5.20 DISTURBANCE YEAR 3 **[DYr3]**
Record the year in which DISTURBANCE 3 occurred. See DISTURBANCE YEAR 1 for coding instructions.

2.5.21 TREATMENT 1 **[Trmt1]**
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. SRS Note: Natural regeneration is considered a treatment if the stand meets the criteria below. This attribute is ancillary; that is, contrasting conditions are never delineated based on variation in this attribute.

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

Values: 00 – 50 (Descriptions continue on the next page)

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 fires are considered a disturbance and not a treatment. See Disturbance 30.

2.5.22 TREATMENT YEAR 1 **[TYr1]**
Record the year in which TREATMENT 1 occurred.

Values: Since the previous plot visit, or the past 5 years for plots visited for the first time

2.5.23 TREATMENT 2 **[Trmt2]**
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 **[TYr2]**
Record the year in which TREATMENT 2 occurred. See TREATMENT YEAR 1 for coding instructions.

2.5.25 TREATMENT 3 **[Trmt3]**
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 **[TYr3]**
Record the year in which TREATMENT 3 occurred. See TREATMENT YEAR 1 for coding instructions.

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

Values: 11 – 39 (Descriptions continue on the next page)

Xeric Sites that are normally low or deficient in moisture available to support vigorous tree growth. These areas may receive adequate precipitation, but experience a rapid loss of available moisture due to runoff, percolation, evaporation, etc.

11 Dry Tops - Ridge tops with thin rock outcrops and considerable exposure to sun and wind.

12 Dry Slopes - Slopes with thin rock outcrops and considerable exposure to sun and wind. Includes most steep slopes with a southern or western exposure.

13 Deep Sands - Sites with a deep, sandy surface subject to rapid loss of moisture following precipitation. Typical examples include sand hills, sites along the beach and shores of lakes and streams, and many deserts.

19 Other Xeric - All dry physiographic sites not already described.

Mesic Sites that have moderate but adequate moisture available to support vigorous tree growth except for periods of extended drought. These sites may be subjected to occasional flooding during periods of heavy or extended precipitation.

21 Flatwoods - Flat or fairly level sites outside flood plains. Excludes deep sands and wet, swampy sites.

22 Rolling Uplands - Hills and gently rolling, undulating terrain and associated small streams. Excludes deep sands, all hydric sites, and streams with associated flood plains.

23 Moist Slopes and Coves - Moist slopes and coves with relatively deep, fertile soils. Often these sites have a northern or eastern exposure and are partially shielded from wind and sun. Includes moist mountain tops and saddles.

24 Narrow Flood plains/Bottomlands - Flood plains and bottomlands less than 1/4-mile in width along rivers and streams. These sites are normally well drained but are subjected to occasional flooding during periods of heavy or extended precipitation. Includes associated levees, benches, and terraces within a 1/4 mile limit. Excludes swamps, sloughs, and bogs.

25 Broad Flood plains/Bottomlands - Flood plains and bottomlands 1/4 mile or wider in width along rivers and streams. These sites are normally well drained but are subjected to occasional flooding during periods of heavy or extended precipitation. Includes associated levees, benches, and terraces. Excludes swamps, sloughs, and bogs with year-round water problems.

29 Other Mesic - All moderately moist physiographic sites not already described.

Hydric Sites that generally have a year-round abundance or over-abundance of moisture. Hydric sites are very wet sites where excess water seriously limits both growth and species occurrence.

31 Swamps / Bogs - Low, wet, flat forested areas usually quite extensive that are flooded for long periods of time except during periods of extreme drought. Excludes cypress ponds and small drains.

32 Small Drains - Narrow, stream-like, wet strands of forest land often without a well-defined stream channel. These areas are poorly drained or flooded throughout most of the year and drain the adjacent higher ground.

33 Bays and wet pocosins - Low, wet, boggy sites characterized by peaty or organic soils. May be somewhat dry during periods of extended drought. Examples include the Carolina bays in the southeast US.

34 Beaver ponds

35 Cypress ponds

39 Other hydric - All other hydric physiographic sites.

2.5.28 LAND COVER CLASS **[LCvCl]**

Record this variable for all mapped conditions. As with 2.4.2 CONDITION CLASS STATUS, LAND COVER CLASSes must meet the minimum area and width requirements (except those cases where the condition has been solely defined due to developed land uses, such as roads and rights-of-ways). If the condition is less than 1 acre, then apply the key to the condition. Within larger mapped conditions, evaluate the potential for multiple land cover classes as follows: if no prospective land cover classes meet the minimum width and area requirements, apply the key to the acre area that is within the condition being evaluated and closest to the lowest numbered subplot center associated with the condition. If multiple land cover classes (i.e., those which meet minimum area and width requirements) exist in the condition, assign the first land cover class that is encountered to the condition. As with other condition attributes, inclusions (of less than 1 acre) within the condition should be ignored when assigning the LAND COVER CLASS. Therefore, areas of the inclusion within the acre area are ignored when making the relative cover assessments. Apply the key as a guide and/or to verify the LAND COVER CLASS selection.

Assignment of LAND COVER CLASS code is hierarchical in nature, and should be performed using the following hierarchical key. Following the guidance of the key, codes should be examined in succession, and the first definition which describes the area of the condition should be chosen. For example, if an area has 15% tree cover that is taller than the 50% shrub cover, it is classified as class **01 (Treeland)**. Note: Treeland is not equivalent to Forestland (e.g., a recent clearcut could be Forestland, but would not be Treeland). Vegetative cover, as used below, includes the area of ground covered by the vertical projection of the live plant canopy (or other vegetation components like flowers, basal structures or vines) on the area defined by the condition. If foliage is absent due to senescence or dormancy, the cover should be estimated based on the position of plant remains or other evidence of the foliar distribution during the growing season. If burned, then classify based on the remaining live vegetation, including the canopy cover of remaining live trees and shrubs.

When the land surface of a condition is covered by deep non-permanent snow, ice, or water, and/or a condition is defined as CONDITION CLASS STATUS 5 (denied access or hazardous), field crews should use aerial imagery, local knowledge, and field observations to best determine LAND COVER CLASS.

SRS Note: When determining land cover class, use an aerial view to evaluate the area in question. Vegetation does not have to be rooted in the condition to be included in the cover determination. Any vegetation that originates in or is hanging over the condition may be evaluated.

Also, though they may seem connected, the land cover class is *mostly* independent of the land use/condition status. There are a few land use/cover combinations that are invalid (i.e. 06-Agricultural Vegetation on an Accessible Forestland condition (CONDITION STATUS = 1)), but for the most part, any combination of land cover and land use are allowed. For example, a roadway (CONDITION STATUS = 2) that is completely covered by overhanging trees may be classified as 01-Treeland.

Full Land Cover Class Definitions

- **Dominant**: Refers to the highest (tallest) life form present, typically trees, then shrubs, then herbaceous layers.

- **Predominant**: Refers to the cover class with the highest percent cover in the condition.

- **Vegetated:** Contains at least 10% vegetation cover (modification of NVCS 2008)

- **Sparsely Vegetated:** Does not contain at least 10% vegetation cover

- **Natural vegetation** is defined as vegetation where ecological processes primarily determine species and site characteristics; that is, vegetation comprised of a largely spontaneously growing set of plant species that are shaped by both site and biotic processes. Human activities influence these interactions to varying degrees (e.g., logging, livestock grazing, fire, introduced pathogens), but do not eliminate or dominate the spontaneous processes. Wherever doubt exists as to the naturalness of a vegetation type (e.g., old fields, various forest plantations), it is classified as part of the natural / semi-natural vegetation (NVCS 2008)**.**

- **Semi-natural vegetation** typically encompasses vegetation types where the species composition and/or vegetation growth forms have been altered through anthropogenic disturbances such that no clear natural analogue is known, but they are a largely spontaneous set of plants shaped by ecological processes. Natural (or near-natural) and semi-natural vegetation are part of a continuum of change within natural vegetation that reflects varying degrees of anthropogenic and other disturbances (NVCS 2008). Semi-natural vegetation includes vegetation types where the current structure and/or composition is anthropic, but where it is obvious that natural processes have since resumed (e.g., agricultural lands that have naturally reverted to forest).

- **Anthropic Vegetation** is defined as vegetation with a distinctive structure, composition, and development determined by regular human activity. Developed vegetation has typically been planted or treated, and has relatively distinctive growth form, floristic, or site features when compared to natural vegetation. Distinctive growth form and structural attributes typically include one or more of the following:

a. Dominant herbaceous vegetation that is regularly-spaced and/or growing in rows, often in areas with substantial cover of bare soil for significant periods of the year, usually determined by tillage or chemical treatment.

b. Dominant vegetation with highly-manipulated growth forms or structure rarely found as a result of natural plant development, usually determined by mechanical pruning, mowing, clipping, etc.

c. Dominant vegetation comprised of species not native to the area that have been intentionally introduced to the site by humans and that would not persist without active management by humans (NVCS 2008).

Land Cover Classification Key

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

1. ≥10% vegetative Cover = **Vegetated**, else 2.
   1.1. Areas where the majority of vegetation (≥50% relative cover) has been highly-manipulated = **Anthropic Vegetation**, else 1.2
      1.1.1. Areas that are predominantly covered by vegetation grown for the production of food, non-woody fiber, and/or ornamental horticulture, including land in any stage of annual crop production, and land being regularly cultivated for production of crops from perennial plants = **06 Agricultural Vegetation**
      1.1.2. Other areas predominantly covered by vegetation with highly-manipulated growth forms = **07 Developed, Vegetated**
   1.2. Areas where majority of vegetation (≥50% relative cover) is natural or semi-natural = **Natural/Semi-natural Vegetation**
      1.2.1. Areas on which trees provide 10% or greater canopy cover and are part of the dominant (uppermost) vegetation layer, including areas that have been planted to produce woody crops = **01 Treeland**
      1.2.2. Areas on which shrubs provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer = **02 Shrubland**
      1.2.3. Areas on which herbaceous vegetation provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer = **03 Grassland**
      1.2.4. Areas on which non-vascular vegetation provide 10% or greater cover and are part of the dominant vegetation layer = **04 Non-vascular Vegetation**
      1.2.5. Areas with 10% or greater vegetative cover but no one life form has 10% or more cover = **05 Mixed Vegetation**
2. <10% vegetative cover = **Sparsely Vegetated**
   2.1. Areas persistently and predominantly covered by water (census and noncensus water, permanent snow and ice) and with less that 10% cover of emergent vegetation. = **10 Water**
   2.2. Areas predominantly covered with constructed materials with limited plant life = **09 Developed**
   2.3. Natural areas with limited vegetation. Areas predominantly covered by bare rock, gravel, sand, silt, clay, or other earthen material, with little (<10% cover) or no "green" vegetation present regardless of its inherent ability to support life = **08 Barren**

Values: 01 – 10 (Descriptions continue on the next page)

Codes are >10% vegetative cover:	
01	**Treeland**: Areas on which trees provide 10% or greater canopy cover and are part of the dominant (uppermost) vegetation layer, including areas that have been planted to produce woody crops. Only include tree species that can be tallied in the region, i.e., that are on the regional species list. Example areas include forests, forest plantations, reverting fields with ≥10% tree canopy cover, clearcuts with ≥10% tree canopy cover. This category includes cypress swamps and mangroves (not to be confused with aquatic vegetation).
02	**Shrubland:** Areas on which shrubs or subshrubs provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer, provided these areas do not qualify as Treeland. **Shrub/Subshrub** — a woody plant that generally has several erect, spreading, or prostrate stems which give it a bushy appearance. This includes dwarf shrubs, and low or short woody vines (NVCS 2008) and excludes any species on FIA's tree list. Examples include cranberry bogs and other shrub-dominated wetlands, chaparral, and sagebrush.
03	**Grassland:** Areas on which herbaceous vegetation provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer, provided these areas do not qualify as Treeland or Shrubland. This includes herbs, forbs, and graminoid species. Examples include meadows and prairies. Grazed land is also included, but not if the pasture is improved to such an extent that it meets the requirements for Agricultural Vegetation. This category also includes emergent wetland vegetation like seasonally flooded grasslands, cattail marshes, etc.
04	**Non-vascular Vegetation:** Areas on which non-vascular vegetation provide 10% or greater cover and are part of the dominant vegetation layer, provided these areas do not qualify as Treeland, Shrubland, or Grassland. Examples include mosses, sphagnum moss bogs, liverworts, hornworts, lichens, and algae.
05	**Mixed Vegetation:** Areas with 10% or greater vegetative cover but no one life form has 10% or more cover. That is, these areas do not qualify as Treeland, Shrubland, Grassland, or Non-vascular Vegetation, and thus are a mixture of plant life forms. Examples can include early stages of reverting fields and high deserts.

06	**Agricultural Vegetation:** Areas that are dominated by vegetation grown for the production of crops (food, non-woody fiber and/or ornamental horticulture), including land in any stage of annual crop production, and land being regularly cultivated for production of crops from perennial plants. Agricultural vegetation shows a) rapid turnover in structure, typically at least on an annual basis, either through harvesting and/or planting, or by continual removal of above ground structure (e.g., cutting, haying, or intensive grazing), or b) showing strong linear (planted) features. The herbaceous layer may be bare at various times of the year (NVCS 2008). Examples include row crops and closely sown crops; sod farms, hay and silage crops; orchards (tree fruits and nuts, Christmas trees, nurseries of trees and shrubs), small fruits, and berries; vegetables and melons; unharvested crops; cultivated or improved pasture; idle cropland (can include land in cover and soil-improvement crops and cropland on which no crops were planted) (NRI Field guide). When idle or fallow land ceases to be predominantly covered with manipulated vegetation, then it is no longer Agricultural Vegetation.
07	**Developed, Vegetated:** Areas predominantly covered by vegetation with highly-manipulated growth forms (usually by mechanical pruning, mowing, clipping, etc.), but are not Agricultural. This vegetation type typically contains an almost continuous herbaceous (typically grass) layer, with a closely cropped physiognomy, typically through continual removal of above ground structure (e.g., cutting, mowing), and where tree cover is highly variable, or other highly manipulated planted gardens (NVCS 2008). Examples can include lawns, maintained utility rights-of-way, office parks, and cemeteries.
Codes are < 10% cover	
08	**Barren:** Natural areas of limited plant life (< 10%). Areas generally characterized by bare rock, gravel, sand, silt, clay, or other earthen material, with little or no "green" vegetation present regardless of its inherent ability to support life. Examples include naturally barren areas such as lava fields, gravel bars and sand dunes, as well as areas where land clearance has removed the vegetative cover. Can include the natural material portions of quarries, mines, gravel pits, and cut or burned land <10% vegetation.
09	**Developed:** Areas predominantly covered with constructed materials with limited plant life (< 10%). Examples include completely paved surfaces like roads, parking lots and densely developed urban areas.
10	**Water**: Areas persistently covered and predominated by water and have <10% emergent vegetative cover. Examples include census and noncensus water and permanent snow and ice. For example, only the open water portion of a bog is to be included.

2.5.29 PRESENT NONFOREST LAND USE (Replaced by 2.5.38 – SRS PRESENT LAND USE)

2.5.30 CANOPY COVER SAMPLE METHOD **[CMeth]**

Record the CANOPY COVER SAMPLE METHOD used to determine LIVE CANOPY COVER and LIVE PLUS MISSING CANOPY COVER for the condition. If the ocular method is not used, the appropriate plot-based method should be selected according to the condition's dimensions and shape.

Ocular method - The Ocular method is only used in areas that are obviously 0% LIVE PLUS MISSING CANOPY COVER or obviously greater than 10% LIVE PLUS MISSING CANOPY COVER. In addition to visual inspections of what is on the ground, crews can also use various types of aerial imagery to help determine LIVE CANOPY COVER and LIVE PLUS MISSING CANOPY COVER values using this method. The Ocular method may also be used on condition status 2 plots where access to the nonforest landcover area may be limited or the nonforest condition is a developed non-forest land use. Note that when the Ocular method is used, it is likely to be easier for the observer to ignore subplot boundaries and assess the percentage of tree canopy cover over the condition in question, without regard to the locations of the stems supporting the canopy over the plot.

Subplot method - The Subplot method is used when the ocular method is not appropriate and in cases where the terrain, vegetation, and dimensions of a condition or the size of the field crew DO NOT allow a safe or practical sample using the acre method.

1. To estimate cover using the subplot method, the crew measures the crowns of all live trees, seedlings, and saplings on each of the four 1/24 acre subplots. To estimate total stems per acre, stems ≥5.0 inches diameter are counted on the subplots and stems <5.0 inches diameter are counted only on the four 1/300 acre microplots located 90 degrees and 12.0 feet from the subplot centers. The sample may consist of any combination of regular subplots and/or phantom subplots, provided all subplots fall entirely in the questionable condition.

2. Install phantom subplots as necessary to yield four 1/24-acre sample areas that fall entirely within the questionable condition. Record the location of these phantom or temporary subplots on your four point plot sketch and monument. Establish phantom subplots using the following protocol (fig. 14):

    a. Begin by locating the phantom subplots using the "highest" numbered regular subplot that falls in the questionable condition (e.g., 4 is the highest numbered regular subplot, next 3 and then 2). The phantom subplots are located in the following fashion (1) 120.0 feet at 360 degrees, (2) 120.0 feet at 120 degrees, then (3) 120.0 feet at 240 degrees.
    b. If this fails to yield 4 subplots that fall entirely within the questionable condition, install the remaining phantom subplots off the next highest numbered regular subplot that falls in the questionable condition.
    c. If this fails to produce a suitable location, rotate the phantom subplot off the other phantom subplots in the attempted order of installation until 4 subplots have been located in the questionable condition.

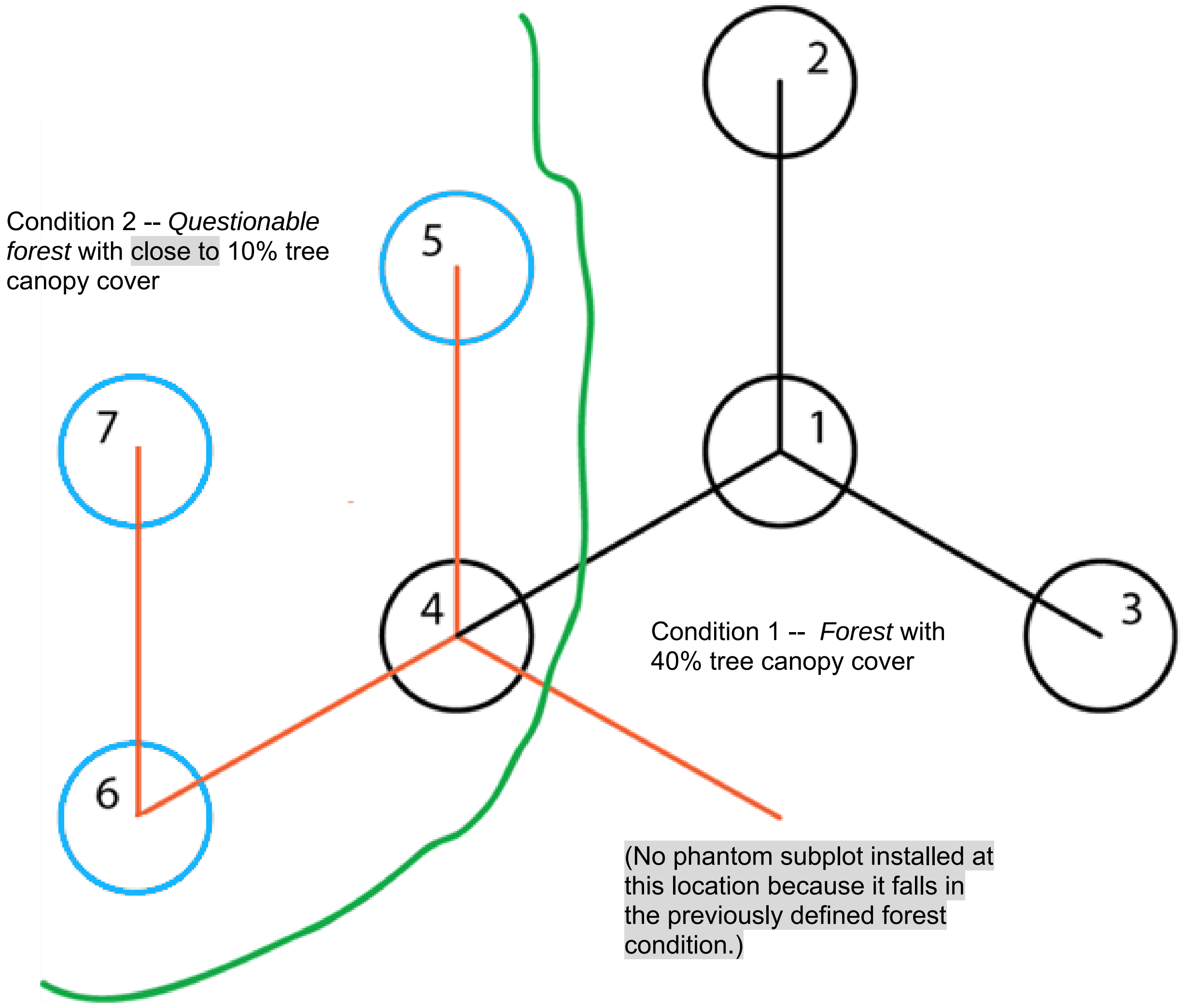


Figure 14. Example of the subplot method phantom subplots.

The Subplot method uses a 1/6-acre sample, so it would require a total of 726 ft^2 of LIVE PLUS MISSING CANOPY COVER to reach 10% threshold and be sampled as accessible forestland.

Acre method - The Acre method is used when the ocular method is not appropriate and when it is safe and practical to sample on the entire acre.

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

Percent Canopy Cover Calculation for Acre method:

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

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

and assuming the canopies to be ellipses:

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

Transition zones and forest/nonforest encroachment – When an accessible forest land condition encroaches into a nonforest condition, the border between forest and nonforest is often a gradual change in tree cover with no clear and abrupt boundary. This may cause difficulties determining exactly where the forested area meets the minimum canopy cover or stem count criteria. For these cases, determine where the land clearly meets the minimum requirements, and where it clearly is less than required. Divide the zone between these points in half, and determine the side of the zone on which the subplot center is located. Classify the condition class of the subplot based on this line.

If the Acre plot falls on or very near a transition, the Acre plot should be moved into the condition identified at plot center (fig. 15).

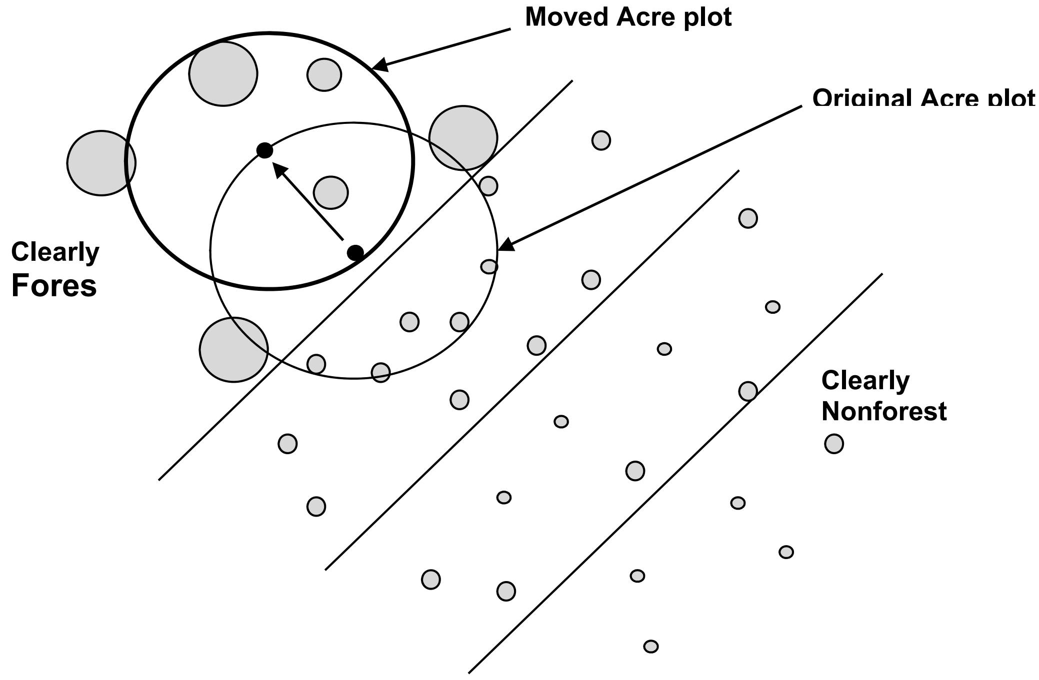


Figure 15. Example of using the Acre plot method when determining CANOPY COVER when the Acre plot is in a transition zone with forest/nonforest encroachment.

For example, at measurement time 1, a clear and distinct boundary existed between the forest and nonforest 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 meets cover / stem count criteria 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 does not clearly meet cover / stem count criteria where it meets the nonforest, 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 classify the entire subplot based on which side of the line the subplot center falls.

Sub-acre method - The Sub-Acre method is *only* used when the ocular method is not appropriate and *only* when the acre or subplot methods cannot be established due to the condition's shape, dimensions or accessibility.

1. Ensure that the canopy cover sample area is representative of the condition in question.
2. Determine if minimum 10% LIVE PLUS MISSING CANOPY COVER is reached. The crew samples all live, dead, and missing tree canopies on the canopy cover sample plot as described above in LIVE PLUS MISSING CANOPY COVER. The 10% threshold is dependent on the sample plot size and respective area in square feet.
3. If the 10% LIVE PLUS MISSING CANOPY COVER threshold is met and there is additional LIVE PLUS MISSING CANOPY COVER on the sub-acre plot, crews can estimate the remaining LIVE PLUS MISSING CANOPY COVER using the ocular method.
4. As with the acre and subplot method, the sub-acre sample plot(s) must fall entirely in the questionable condition.
5. Potential circular plot sizes and appropriate scaling factors (SRS note: crews may also use other methods to determine cover percent in oddly shaped conditions; for example, in a narrow strip, it may be better to use a square or rectangular area as the baseline for the cover calculation rather than a circle.):

Acre Fraction	Radius (ft)	Area (sq ft)	10% Cover (sq ft)
1	117.7	43,560	4356
1/2	83.3	21,780	2178
1/3	68.0	14,520	1452
1/4	58.9	10,890	1089
1/5	52.7	8,712	872
1/6	48.1	7,260	726

Values:

1 Ocular method
2 Subplot method
3 Acre method
4 Sub-acre method

2.5.31 LIVE CANOPY COVER (Replaced by 2.5.46 – SRS LIVE CANOPY COVER)
2.5.32 LIVE PLUS MISSING CANOPY COVER (Replaced by 2.5.47 – SRS LIVE PLUS MISSING CANOPY COVER)

2.5.33 CURRENT AFFORESTATION CODE **[Affor]**

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.

Values:

0 No
1 Yes

2.5.34 PREVIOUS AFFORESTATION CODE **[PrAff]**

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.

Values:

0 No
1 Yes

2.5.35 TOTAL STEMS **[#Stem]**

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

Values: 00000 – 99999

2.5.36 CHAINING CODE **[Chain]**

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.

Values:

0 No
1 Yes

2.5.37 SRS PRESENT LAND USE **[LUse]**

Record the classification that indicates the land for every condition class sampled.

Regional definitions have been developed for the national codes. Use these codes in conjunction with CONDITION CLASS STATUS 2.

Values: 01 – 99 (Descriptions continue on the next page)

01 Accessible timber land [SITE CLASS = 1- 6] (CONDITION CLASS STATUS = 1) - See section 2.2

02 Accessible other forest land [SITE CLASS = 7] (CONDITION CLASS STATUS = 1) - See section 2.2

10 Agricultural land - Land managed for crops, pasture, or other agricultural use. The area must be at least 1.0 acre in size and 120.0 feet wide (with the exception of windbreak/shelterbelt, which has no minimum width). Use the 10 code only for cases not better described by one of the following:

11 Cropland - Land utilized for agricultural crops including silage and feed grains; and bare farm fields resulting from cultivation or harvest.

12 Pasture (improved through cultural practices) - Land maintained and used for grazing with stocking less than 10 percent in live trees (established saplings or larger trees), except that occasional large trees with the obvious function of providing shade for livestock. Evidence of maintenance, besides the degree of grazing, includes condition of fencing, presence of stock ponds or water tanks. Land also periodically brush hogged indicated by seedlings 3 to 4 feet in height and basal scars present on trees.

13 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, (established seedlings or larger trees) regardless of species. A field that is between crop rotations should not be called idle, however, cropland.

14 Orchard - Land utilized for orchards and nursery stock.

15 Christmas tree plantation - Active Christmas tree plantation must show signs of annual shearing. Record tree species used in the plantation in the PLOT NOTES.

16 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]*

17 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]*

SRS Note: If the dimensions of the windbreak or shelterbelt meet the minimum dimensions of forest land (1.0 acre in size and 120.0 feet wide), then the area is considered accessible forest land (CONDITION CLASS STATUS 1).

20 Rangeland - Land primarily composed of grasses, forbs, or shrubs that does not meet minimum stocking of live tally trees. 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.

Rangeland is a type of uncultivated land that is dominated by native plants, mostly grasses, broadleaf plants like wildflowers, and shrubs. Rangeland is basically all land in the world that is not farmland, dense forest, barren desert, or land covered by solid rock, concrete, or glaciers. Rangeland includes grasslands, shrublands, savannas, and open woodlands. The land cultivated with grasses and legumes for livestock forage is generally called pasture land. Pasture land is similar to rangeland in many respects except that it is cultivated and managed primarily by agricultural principles, whereas rangeland is not cultivated and managed by ecological principles. [*Source: A Short Course on RANGELANDS. Rangeland Ecology & Management, University of Idaho.]*

30 Developed - Land used primarily by humans for purposes other than forestry or agriculture. Use the 30 code only for land not better described by one of the following:

31 Cultural: business (industrial/commercial), residential, and other places of intense human activity. - Cultural includes multiple family housing – More than one family household per structure, for example, condominiums, townhouses, row houses and apartment buildings. Single family housing – One family or person per structure. Industrial/commercial – Supply yards, parking lots, shopping centers, factories, etc.

32 Rights-of-way: improved roads, railway, power lines, maintained canal, maintained levees, airports, pipelines, or gas/oil well pads. The following are not considered a R.O.W.:

- A canal that qualifies as census or noncensus water is coded as CONDITION CLASS STATUS 3 or 4.
- A driveway adjacent or within a residential area is not considered a R.O.W unless it's bounded by accessible forest land.
- A farm lane adjacent or within cropland, pasture, idle farmland and other agriculture is not considered a R.O.W.

A rail trail that is part of the "rail banking" program is classified as a R.O.W. The rail banking program, created by a congressional amendment in 1983 [to the 1968 National Trails System Act], allows the temporary, though often long-term, use of a disused rail corridor as a public trail while maintaining the option of reactivating the corridor for rail use. If a rail trail can be documented as being part of this program, then a rail trail is a R.O.W. If not, it is treated as an inclusion of the adjacent land use.

33 Recreation: parks, skiing, golf courses, campgrounds, playing fields, athletic, sports tracks, etc.

34 Mining - 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 stocking 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 stocking is met for accessible forest land or another nonforest land use applies.

40 Other - Land parcels greater than 1.0 acre in size and greater than 120.0 feet wide, which do not fall into one of the uses described above. Examples include undeveloped beaches, barren land (rock, sand), marshes, bogs, ice, and snow. Use the 40 code only for cases not better described by one of the following:

41 Nonvegetated

42 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. Tree species such as black spruce can adapt to bog conditions. If the stocking requirement is met, the land is considered forest land. The decision as to whether the land is productive or unproductive will be made by the field crews.
- Swamps are not always nonforest. Tree species such as cypress and tupelo readily adapt to the swamp conditions. If the stocking requirement is met, the land is considered forest land. The decision of whether the land is productive or unproductive will be made by the field crews.

43 Beach - Sandy or pebbly shore associated with an ocean or lake or sandbars associated with rivers.

45 Nonforest-Chaparral (not applicable in the Southern Region)
(Descriptions continue on the next page)

91 Census Water (CONDITION CLASS STATUS = 4) - See section 2.2

92 Noncensus water (CONDITION CLASS STATUS = 3 - See section 2.2

99 Nonsampled (CONDITION CLASS STATUS = 5) - See section 2.2

2.5.38 SRS TRACT TOTAL ACRES **[Acres]**

Tract size is recorded when the OWNER GROUP is 40. Include both forest and non-forest acres of the parcel. Do not include separate parcels that the landowner may own elsewhere. If more than one private landowner owns a sample location, record the tract size information for the first forest condition for subsequent forest conditions classified as a private, even though they may be a different owner. See Ownership Procedures in Section 0.3.

Tract size often affects whether a forest stand is likely to be managed and the likelihood of its becoming a source of timber supplies. Very small parcels of land in primarily urban settings are often perceived to be unavailable for timber harvest and many users of FIA data have requested that these areas be identified to eliminate them from the resource base when assessing timber availability. Tract size also provides the ability to track timber removals for parcels of different sizes over time.
This variable is not collected in WTX.

Values: 00001-99999

2.5.39 SRS TRACT PERCENT FOREST **[%For]**

Record the percentage of the tract that is forested. See Ownership Procedures in Section 0.3.

This variable is not collected in WTX.

Values: 001-100

2.5.40 SRS STAND STRUCTURE **[Struc]**

Record the code that best describes the predominant canopy structure for the condition. When determining canopy structure, only consider the vertical position of the dominant and codominant trees in the stand. Do not consider trees that are intermediate or overtopped crown class. As a rule of thumb, a different story should comprise 25% of the stand.

This variable is not collected in WTX.

When collected: If CONDITION CLASS STATUS = 1

Values:

0	Non-stocked - The condition is less than 10% stocked.
1	Single-storied - Most of the dominant/codominant tree crowns form a single canopy (i.e., most of the trees are approximately the same height).
2	Multi-storied – Two or more recognizable levels characterize the crown canopy. Dominant/codominant trees of many sizes (diameters and heights) for a multilevel canopy.

2.5.41 SRS OPERABILITY **[Oper]**

This variable focuses on the viability of operating logging equipment in the vicinity of the condition. Record the most limiting class code that occurs on each forest condition.

This variable is not collected in WTX.

Values:

0	No problems
1	Seasonal access due to water conditions in wet weather
2	Mixed wet and dry areas typical of multi-channeled streams punctuated with dry islands
3	Broken terrain, cliffs, gullies, outcroppings, etc., which would severely limit equipment, access or use
4	Year-round water problems (includes islands)
5	Slopes 20 – 40%
6	Slope greater than 40%

2.5.42 SRS CONDITION SITE CLASS **[Site]**

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.

Values: 1-7

Note: Caribbean values will be determined by the SRS PRESENT LAND USE. If SRS PRESENT LAND USE = 01, then SRS CONDITION SITE CLASS = 6. If SRS PRESENT LAND USE =02, then SRS CONDITION SITE CLASS = 7.

2.5.43 SRS CUTTING TYPE 1,2,3 **[Cut1, Cut2, Cut3]**

Record the code indicating the type of cutting that has occurred on the condition.

This variable is not collected in WTX.

Values:

11 Clearcut harvest – The removal of the majority of the merchantable trees in a stand; residual stand stocking is under 50 percent.
12 Partial harvest – Removal primarily consisting of highest quality trees. Residual consists of lower quality trees because of high grading or selection harvest. (Ex. uneven aged, group selection, high grading, species selection)
13 Seed-tree/shelterwood harvest – Crop trees are harvested leaving seed source trees either in a shelterwood or seed tree.
Also includes the final harvest of the seed trees.
14 Commercial thinning – The removal of trees (usually poletimber sized) from poletimber-sized stands leaving sufficient stocking of growing stock trees to feature in future stand development. Also included are thinning in sawtimber-sized stands where poletimber-sized (or log-sized) trees have been removed to improve quality of those trees featured in a final harvest.
15 Timber Stand Improvement (cut trees only) – The cleaning, release, or other stand improvement involving non-commercial cutting applied to an immature stand that leaves sufficient stocking. Use code 50 for herbicide, girdling, and other TSI treatments that **do not involve cutting**. Use code 14 for commercial thinnings.
16 Salvage cutting -- The harvesting of dead or damaged trees or of trees in danger of being killed by insects, disease, flooding, or other factors in order to save their economic value.

2.5.44 SRS SECONDARY LAND USE **[SecLU]**

Record the code that best describes the secondary land use of the condition if applicable.

Values: Use same codes as described in 2.5.25 SRS PRESENT LAND USE

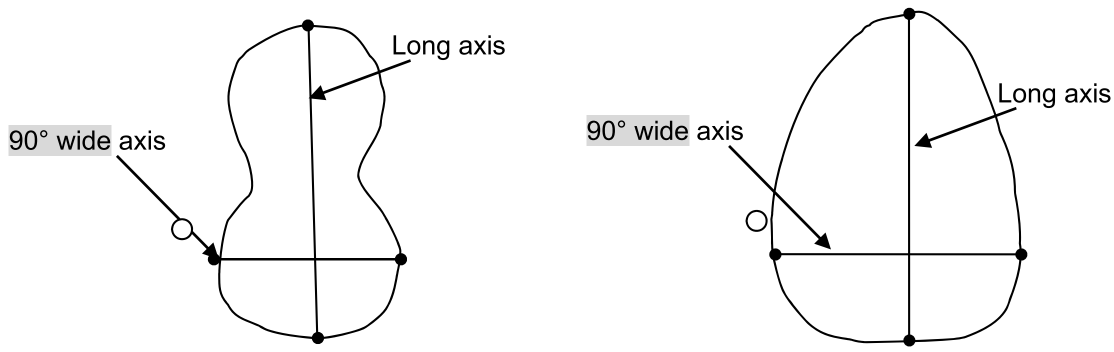
2.5.45 SRS LIVE CANOPY COVER **[LCC]**

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 CANOPY COVER, the crew will measure every crown width within the canopy cover sample area. When the 10% threshold is determined by measuring crown widths, the crew can use the ocular method to determine the total LIVE CANOPY COVER value.

Canopy widths are measured using the ellipse formula for calculation of canopy area. This requires two measurements. The first measurement is the long axis diameter. The second measurement is made at 90 degrees to the first measurement at the widest point of the crown (fig. 16). Canopy area = pi*((long axis diameter/2)*(90 degrees axis diameter/2)).

$$Canopy\ area = \pi\left(\left(\frac{long\ axis\ diameter}{2}\right)\left(\frac{90°\ wide\ axis\ diameter}{2}\right)\right)$$

- Do not include the crown portion of trees, saplings, or seedlings that are vertically overtopped by other trees, saplings or seedlings.
- Only include tree canopy measurements from trees with stems that originate within the sample area, although canopy measurements can extend outside the sample area.
- Occasionally, a branch may protrude abnormally, but the lateral crown line is drawn across the portion of the branch which includes the “normal outline” of the tree.
- For leaning trees, ocularly upright the trees and measure crowns as if the trees were upright.
- The widest or widest 90 points do not have to go through the bole of the tree. They may be offset and should be defined by the widest point of the crown and the widest point perpendicular to the first measurement of the crown, as viewed from above.



SRS Figure 6. Examples of where to measure canopy widths.

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

Values: 00 – 99 (where 99 = 99-100%)

2.5.46 SRS LIVE PLUS MISSING CANOPY COVER **[LMCC]**

Record the percentage of LIVE PLUS MISSING CANOPY COVER for the condition by adding the LIVE CANOPY COVER plus the estimated missing canopy cover that existed prior to disturbance (harvesting, fire, etc.). Include live and dead and removed tally trees, saplings, and seedlings. Dead trees and dead portions of live trees are not considered as missing unless it is part of the condition disturbance. Base the estimate on field observations, aerial photos, historical aerial imagery, and similar evidence of undisturbed conditions. The total of the LIVE PLUS MISSING CANOPY COVER cannot exceed 100%.

SRS Note: Since DISTURBANCE is not collected for CONDITION CLASS STATUS 2 plots, the missing canopy cover is still assessed by means of ground observations and imagery compared to current ground conditions. For example, a pecan orchard damaged by weather (ice, tornado, etc.) may have missing canopy cover associated with it that has occurred since the previous inventory year (SK2) or within the last 5 years (SK1) that has affected more than 1 acre of the condition.

GRANDFATHER CLAUSE:
Due to the forestland definition change, there are some plots in the South that were correctly classified as forest in the previous inventory and have experienced no disturbance or treatment that do not currently meet the requirement to be classified as forest (<10% LIVE PLUS MISSING CANOPY COVER). We want these plots to continue to be classified as forestland, even though they do not meet the canopy cover requirement. In these instances, record the actual LIVE PLUS MISSING CANOPY COVER SRS as measured in the field. The national variable will automatically be populated with 10% to reflect the grandfather status of the plot. LAND USE SRS must be recorded first to correctly auto-populate the national variables. If a change is made to the land use, such as deciding the plot should be classified as nonforest, crews must re-enter the SRS cover variables to trigger the appropriate update in the national variables.

Values: 00 – 99 (where 99 = 99-100%)

2.6 Optional Fuels Variables for DWM Protocol

2.6.1 CONDITION FUELBED TYPE (OPTIONAL)

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.

When a subplot center or microplot center cannot be occupied (i.e., Condition Class Status 4 or 5), no data will be collected from that subplot or microplot; instead, the entire subplot or microplot should be classified according to the condition preventing occupancy.

If a subplot or microplot was installed incorrectly at the previous visit, the current crew must remeasure the subplot and/or microplot in its present location. A plot note is required on the DRAW sheet's SUBPLOT CONDITION AND BOUNDARY SKETCH noting the location of the subplot and/or microplot. For subplots being established for the first time, the horizontal distance tolerance is +/- 7 feet from the QA location. For microplots being established for the first time, the horizontal distance tolerance is +/- 1 foot from the QA location.

Once the subplot is established, determine the condition(s) of the subplot. If a forested condition has been previously defined at another subplot, crews must still examine the forested portion of the subplot for plot level variables (i.e., WATER ON PLOT) and other ancillary condition variables (e.g., SRS FIRE and SRS GRAZING) of the previously defined condition to determine if coding changes are warranted to the ancillary and regional condition data or plot level data.

3.1 SUBPLOT NUMBER

Record the code corresponding to the number of the subplot.

Values:

1 Center subplot
2 North subplot
3 Southeast subplot
4 Southwest subplot

3.2 SUBPLOT/MACROPLOT STATUS **[SubSt]**

Indicate whether or not this subplot currently has at least one accessible forest land condition class. In regions measuring the CORE OPTIONAL macroplot, indicate whether or not this macroplot currently has at least one forested condition class. In situations where a subplot/macroplot is denied access or hazardous, but obviously contains no forest land, record SUBPLOT/MACROPLOT STATUS = 2. In cases where a subplot/macroplot is access-denied or hazardous land use and has the possibility of forest, record SUBPLOT/MACROPLOT STATUS = 3.

Values:

1 Sampled – at least one accessible forest land condition present on subplot
2 Sampled – no accessible forest land condition present on subplot
3 Nonsampled – possibility of forest land
4 Sampled – QA crew did not measure trees, saplings, or seedlings. QA crew did measure all other data items (condition, boundary, and subplot-level data). For use only on check plots (QA STATUS = 2 - 6). Not a legal entry on production plots (QA STATUS = 1 or 7).

3.3 SUBPLOT NONSAMPLED REASON **[SNSR]**

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

Values: 01 – 11 (Descriptions continue on the next page)

01 Outside U.S. boundary – Assign this code to condition classes beyond the U.S. border (Texas border counties only).
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 four subplots that are required for this plot. Used only in conjunction with PLOT NONSAMPLED REASON code 06. Can be either generated by the data recorder or in the office.

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 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 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 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. SRS Note: Valid only when PLOT NONSAMPLED REASON = 11. This code should **only** be used when the PC falls outside the state boundary. Valid in state border counties only.

11 Ocean – Subplot falls in ocean water below mean high tide line.

3.4 NONFOREST SUBPLOT/MACROPLOT STATUS
3.5 NONFOREST SUBPLOT/MACROPLOT NONSAMPLED REASON

3.6 SUBPLOT CENTER CONDITION **[SubCt]**
Record the CONDITION CLASS NUMBER of the condition class at the subplot center.

Values: 1 to 9

3.7 MICROPLOT CENTER CONDITION **[MicCt]**
Record the CONDITION CLASS NUMBER of the condition class at the microplot center.

Values: 1 to 9

3.8 SUBPLOT SLOPE **[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 (regardless of CONDITION CLASS STATUS) 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.

Values: 000 to 155

3.9 SUBPLOT ASPECT **[Asp]**
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.

Values:

000	no aspect, slope < 5 percent
001	1 degree
002	2 degrees
.	.
.	.
360	360 degrees, due north

3.10 SNOW/WATER DEPTH **[SWD]**

Record to the nearest 0.1 foot the average approximate depth of water (e.g., stream or flooded forest land like cypress swamps) 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.

SRS Note: Code this variable whenever there is measureable water or snow cover on the subplot occupied by accessible forest land that affects measurement quality of seedlings or other tree variables. If this variable is coded due to water, WATER ON PLOT is coded.

Values: 0.0 to 9.9

3.11 SUBPLOT/MACROPLOT CONDITION LIST **[CList]**

This is a listing of all condition classes located within the 24.0-foot radius around the subplot center. In regions measuring the CORE OPTIONAL macroplot, this is a listing of all condition classes located within the 58.9-foot radius around the macroplot center. A maximum of four conditions is permitted at any individual subplot / macroplot. If a condition class has already been defined at a previously completed subplot / macroplot, use the same condition class number whenever that condition is encountered. Define new condition classes as they are encountered. If more than one condition class is listed here, boundary data are required. If only one condition class is listed, this condition is automatically assigned to the subplot center and microplot center. If less than four condition classes occur on this subplot, complete the remainder of this field with zeros. For example, if condition 1 is the only condition class on a subplot, record 1000.

Values: 1000 to 9876

3.12 P2 VEG SUBPLOT SAMPLE STATUS **[VegSt]**

Record the code to indicate if the subplot was sampled for P2 Vegetation. A subplot may be sampled for P2 Vegetation but not have any vascular plants present. If there is **any** part of an accessible portion of the subplot where other plot measurements are made but **all** the P2 Vegetation measurements cannot be completed on the subplot (for example, deep snow or water, hazardous weather, time limitation), enter code 2 and do not record **any** P2 Vegetation measurements.

Values:

1 Subplot sampled for P2 Vegetation
2 Subplot not sampled for P2 Vegetation

3.13 VEGETATION NONSAMPLED REASON **[VegNS]**

Record the reason why P2 Vegetation on a subplot cannot be sampled.

Values:

04 Time limitation
05 Lost data (for office use only)
10 Other (for example, snow or water covering vegetation that is supposed to be sampled)

3.14 VEGETATION SUBPLOT NOTES **[Notes]**

Use this field to record notes pertaining to the subplot, and any unusual conditions encountered.

When plant specimens are collected, use this field to record a community type description for each subplot sampled for P2 Vegetation. The community description is intended to fully automate the specimen collection process by providing a description of the community in which this plant was found. Some examples of community descriptions are as follows:

- 25 year aspen boundary of mature trees. very little slope. a lot of light entry
- *acer saccharum* floodplain forest. hummock-hollow microtopography.
- mature mesic hemlock-hardwood forest adjacent to pond

The community type description field is a note that is accessible via Ctrl+E from the P2 Subplot screen for P2VEG.

Values: English language words, phrases, and numbers

3.15 INVASIVE PLANT SUBPLOT SAMPLE STATUS **[InvSt]**

Record the code to indicate whether the subplot was sampled for invasive plants. A subplot may be sampled but not have any invasive plants present. If there is any part of an accessible portion of the subplot where other plot measurements are made but invasive plants cannot be assessed (e.g., because of snow, water, hazardous weather, time limitation), enter code 3 and do not record any invasive plant measurements.

Values:

1 Subplot sampled, invasive plants present
2 Subplot sampled, no invasive plants present
3 Subplot not sampled for invasive plants

3.16 INVASIVE PLANT NONSAMPLED REASON **[InvNS]**
Record the reason why a subplot cannot be sampled for invasive plants.

Values:

4	Time limitation
5	Lost data (office use only)
10	Other (for example, snow or water covering vegetation that is supposed to be sampled)

3.17 INVASIVE PLANT DATA NOTES **[Notes]**
Use this field to record any notes about the condition on the subplot, particularly any unusual conditions encountered.

Values: English language words, phrases, and numbers

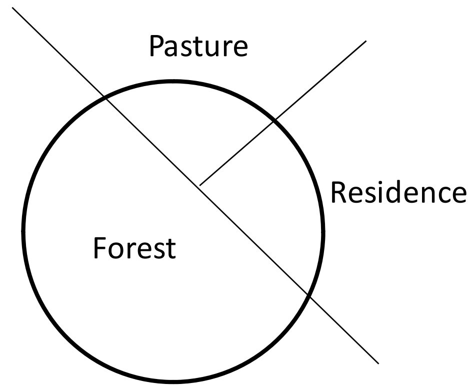
4.0 BOUNDARY REFERENCES

Boundary reference data are used to compute the area for the condition classes sampled on a plot and to remeasure plots. Record all boundaries between condition classes that occur within the sampled (fixed-radius) area on subplots and microplots (and optionally macroplots). Boundaries outside sampled (fixed-radius) areas are not referenced.

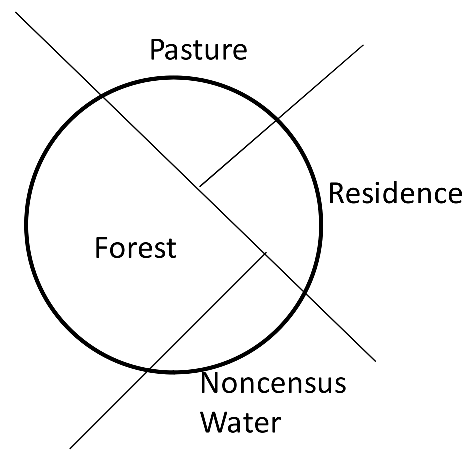
In addition to using the recording procedures described herein, sketch maps of condition class boundaries onto the pre-printed plot diagrams on paper field tally sheets.

Only delineate between condition 2 – 5 above on subplots that have at least one accessible forest land condition (SUPLOT STATUS = 1). Do not delineate between nonforest condition 2 – 5 above on completely nonforest subplots (SUBPLOT STATUS = 2 or 3). See example illustrations below.

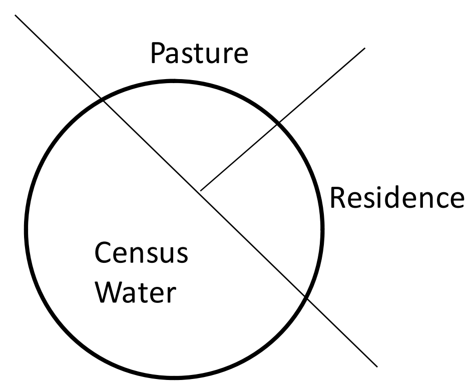
In this example, the forested subplot has two conditions defined: Condition Class Status 1 (SRS LU = 01 or 02) and Condition Class Status 2 (SRS LU = 12). Only the first nonforest land use from the North is defined. Therefore, the residence is not defined as a separate condition class.



In this example, the forested subplot has three conditions defined: Condition Class Status 1 (SRS LU = 01 or 02), Condition Class Status 2 (SRS LU = 12) and Condition Class Status 3 (SRS LU = 92). The residence is still not defined as a separate condition class.



In this example, the subplot has no accessible forestland. The only “nonforest” condition defined is the census water as Condition Class Status 4 (SRS LU = 91)



SRS Figure 7. Delineating subplots with multiple “nonforest” land uses.

4.1 Reference Procedure

Within the sampled area on each microplot, subplot, and macroplot, reference the approximate boundary of each condition class that differs from the condition classes at a subplot center. Trees selected on these fixed-radius plots are assigned to the actual condition in which they lie regardless of the recorded approximate boundary delineated.

Boundary referencing is done by recording azimuths and distances from subplot center to the reference points and/or from microplot center to the reference points (figs. 17 and 18). Each boundary is marked by a maximum of three points - two where the boundary intersects the subplot circumference or microplot circumference, and one "corner" point between the two end points, if necessary. Only the corner point requires a distance, since the distance from the center to the circumference is always equal to the fixed plot radius.

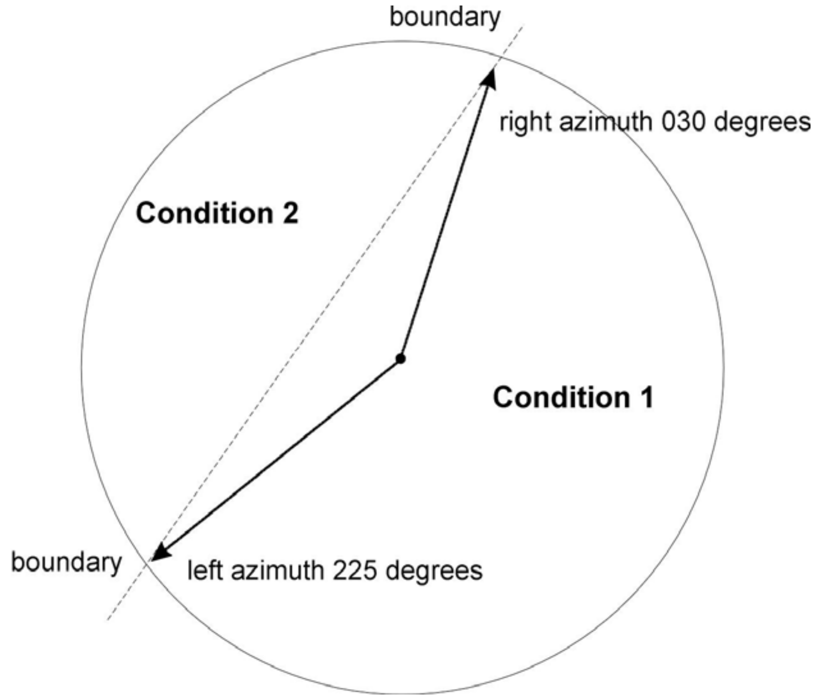


Figure 17. How to measure a straight boundary on a microplot, subplot, or macroplot.

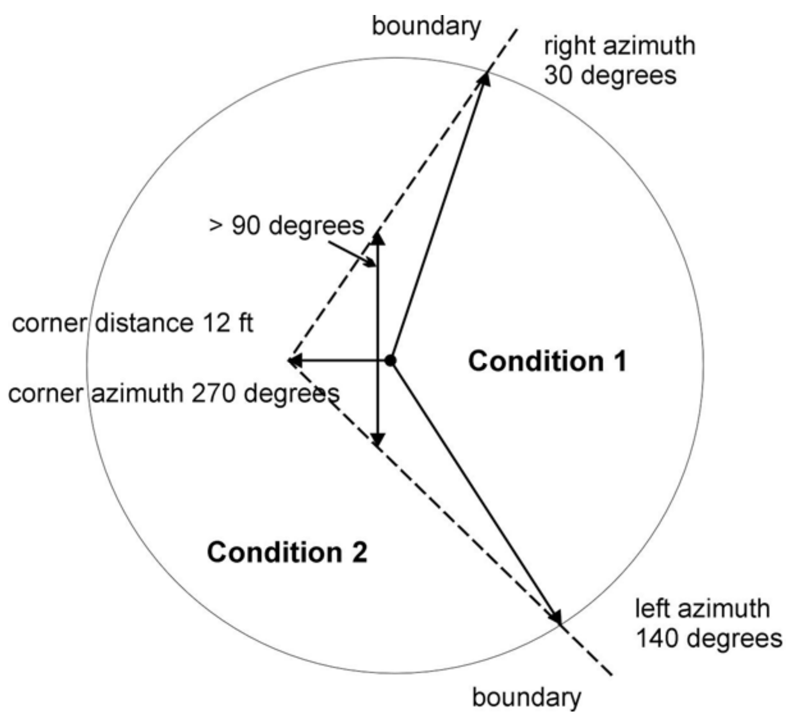


Figure 18. How to measure a boundary with a corner on a subplot or macroplot.

Microplot boundaries are referenced to the microplot center, and macroplot boundaries are referenced to the subplot center in the same manner described for subplots. Note that the larger the plot, the greater likelihood of a need for a boundary corner to record boundaries that are not straight lines.

Refer to Sections 2.1 and 2.4 for general condition class delineation guidelines. The following additional rules apply when referencing a boundary within a subplot, microplot, or macroplot:

1. When a boundary between accessible forest land and nonforest land or between two contrasting accessible forest land condition classes is clearly marked, use that feature to define the boundary. Examples of clear demarcation are a fence line, plowed field edge, sharp ridge line, and water's edge along a stream course, ditch, or canal.

2. When a boundary between forest land and nonforest land is not clearly marked by an obvious feature, the boundary should follow the nonforest side of the stems of the trees at the forest edge.

3. When a boundary between two contrasting forest land condition classes is not clearly marked, map along the stems of the contrasting condition. When the boundary between two contrasting forest land condition classes is separated by a narrow linear inclusion (creek, fire line, narrow meadow, unimproved road), establish the boundary at the far edge of the inclusion relative to subplot center.

4. 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

Record the appropriate values for each boundary mapped on the subplot, microplot, or macroplot as follows:

4.2.1 SUBPLOT NUMBER

Record the code corresponding to the number of the subplot.

Values:

1	Center subplot
2	North subplot
3	Southeast subplot
4	Southwest subplot

4.2.2 PLOT TYPE **[PType]**

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

Values:

1	Subplot boundary
2	Microplot boundary
3	Macroplot boundary (coded only when macroplots are taken)
4	Hectare plot boundary (coded from subplot 1 only)

4.2.3 BOUNDARY CHANGE **[BChg]**

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

Values:

0	No change - boundary is the same as indicated on plot map and/or data collected by a previous crew.
1	Real change - New boundary, or boundary data has been changed or deleted to reflect an actual on-the-ground physical change resulting in a difference from the boundaries recorded.
2	Cruiser error - Boundary has been changed or deleted to correct an error from previous crew.
3	Procedural change - Boundary has been changed or deleted to reflect a change in variable definition.

4.2.4 CONTRASTING CONDITION **[CCond]**

Record the CONDITION CLASS NUMBER of the condition class that contrasts with the condition class located at the subplot center (for boundaries on the subplot or macroplot) or at the microplot center (for boundaries on the microplot), e.g., the condition class present on the other side of the boundary line. See section 3.0 for subplot data.

Values: 1 to 9

4.2.5 LEFT AZIMUTH **[LAzi]**

Record the azimuth from the subplot, microplot, or macroplot center to the farthest left point (facing the contrasting condition) where the boundary intersects the subplot, microplot, or macroplot circumference.

Values: 001 to 360

4.2.6 CORNER AZIMUTH **[CAzi]**

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

Values: 000 to 360

4.2.7 CORNER DISTANCE **[CDis]**

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

Values:

microplot	001 to 007 ft (actual limiting distance is 6.8 ft)
subplot	001 to 024 ft
macroplot	001 to 059 ft (actual limiting distance is 58.9 ft)
hectare	001 to 185 ft

4.2.8 RIGHT AZIMUTH **[RAzi]**
Record the azimuth from subplot, microplot, or macroplot center to the farthest right point (facing the contrasting condition) where the boundary intersects the subplot, microplot, or macroplot circumference.

Values: 001 to 360

5.0 TREE AND SAPLING DATA

Trees at least 5.0 inches in diameter are sampled within the subplot. ‘Tally trees’ are defined as all live and standing dead trees in accessible forest land condition classes 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. ‘Tally saplings’ are defined as all live and standing dead saplings in accessible forest land condition classes 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 AZIMUTH and HORIZONTAL DISTANCE taken) to the subplot center.

For multi-stemmed woodland species, a cumulative DRC is used to compute diameter as described in Sections 5.9 and 5.9.4.

On naturally swelled-butted trees (e.g., baldcypress, pondcypress, swamp tupelo, water tupelo, Carolina ash), total tree length and crown ratio is determined 4.5 feet below the recorded LENGTH TO DIAMETER MEASUREMENT POINT. This point is the base of the tree. Cull, tree class, tree grade are 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.

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

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

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

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

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 DBH qualify as tally trees, provided they meet the size requirement.

The following apply at remeasurement:

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

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 and again on the annular plot.

If a subplot was installed incorrectly at the previous visit, the current crew should remeasure the subplot in its present location. In cases where individual subplots are lost (cannot be relocated) or the subplot numbers were switched, use the following procedures:

- assign the appropriate present CONDITION CLASS STATUS Code(s) to the subplot (usually CONDITION CLASS STATUS = 1 or 2)
- assign TREE STATUS = 0 and RECONCILE = 7 to all downloaded trees (i.e., incorrectly tallied at the previous survey)
- assign RECONCILE codes 3 or 4 (i.e., missed live or missed dead) to all trees on the new subplot.
- assign the next TREE RECORD NUMBER.

5.1 SUBPLOT NUMBER
Record the subplot number where the tree occurs.

Values:
- 1 Center subplot
- 2 North subplot
- 3 Southeast subplot
- 4 Southwest subplot

5.2 TREE RECORD NUMBER [**Tree#]**
Record a code to uniquely and permanently identify each tree on a given subplot. The TREE RECORD NUMBERs must be unique within a 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.

If TREE RECORD NUMBERs are not assigned in the field, record 000.

Note: If this is a Phase 3 plot, match the trees on this point to the hard copy list provided. Record the three-digit FHM tree number assigned to each standing tree.

Values: 000 or 001 to 999

5.3 CONDITION CLASS NUMBER **[Cond#]**
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 (fig. 19).

Values: 1 to 9

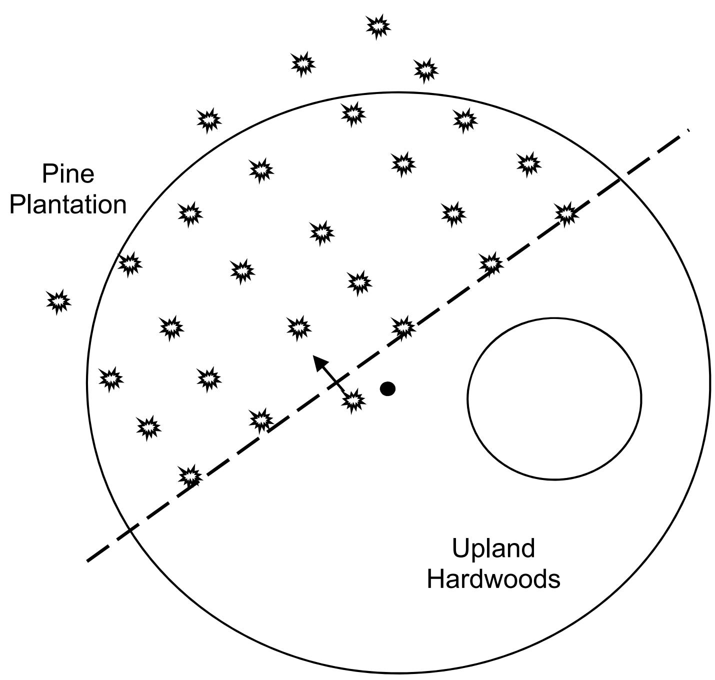


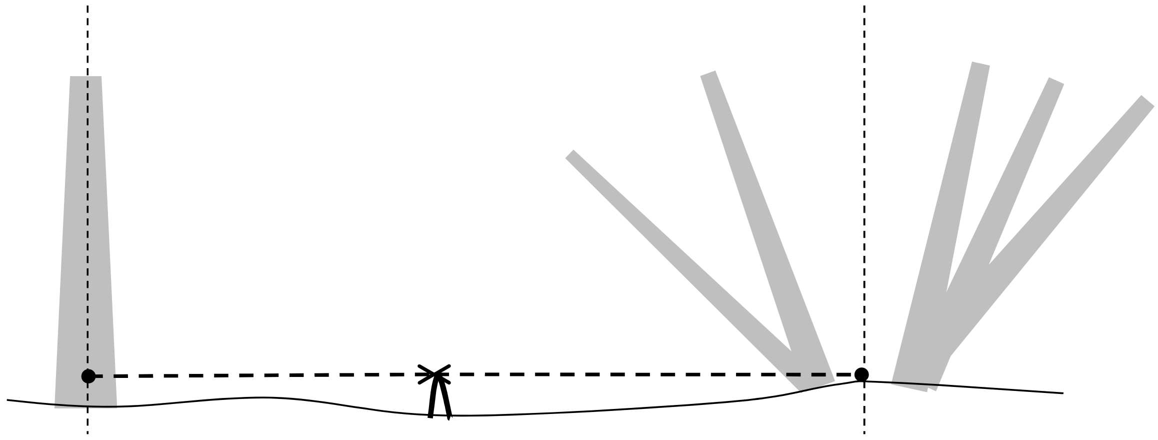
Figure 19. Ragged CONDITION CLASS boundary and tree condition class designation.

5.4 AZIMUTH **[Azi]**
Record the AZIMUTH from the subplot center (for trees greater than or equal to 5.0 inches DBH/DRC) or the microplot center (for trees greater than or equal to 1.0 inch and less than 5.0 inches DBH/DRC), sight the center of the base of each tree with 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 AZIMUTH to the nearest degree. Use 360 for north.

Values: 001 to 360

5.5 HORIZONTAL DISTANCE **[Dist]**
Record the measured 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 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 8. 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.

Values: Microplot: 00.1 to 06.8
Subplot: 00.1 to 24.0
Annular plot: 24.1 to 58.9

5.6 PREVIOUS TREE STATUS **[PStat]**

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

Values:

1 Live Tree – alive at the previous inventory
2 Dead tree – standing dead tree at the previous inventory

5.7 PRESENT TREE STATUS **[TStat]**

Record a current PRESENT TREE STATUS for each tallied tree; this code is used to track the status of sample trees over time: as they first appear, as ingrowth, as they survive, and when they die or are removed. This information is needed to correctly assign the tree's volume to the proper component of volume change.

Values:

0 No status – tree is not presently in the sample (remeasurement plots only). Tree was incorrectly tallied at the previous inventory, currently is not tallied due to definition or procedural change, or is not tallied due to natural causes (physically moved off plot, i.e. erosion, earth movement, etc.). Requires RECONCILE code = 5-9.
1 Live tree – any live tree (new, remeasured or ingrowth)
2 Dead tree – any dead tree (new, remeasured, or ingrowth), regardless of cause of death. Includes all previously standing dead trees that no longer qualify as standing dead, trees killed by silvicultural or land clearing activity and assumed not to have been utilized, as well as dead trees that may have been present at the time of plot establishment but only tallied now due to procedural change
3 Removed – 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.

Note: On remeasured plots, crews must collect new AZIMUTH and 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 AZIMUTH and HORIZONTAL DISTANCE information from the microplot center.

On remeasurement plots, a new tree (ingrowth) may be present at the location of a previously tallied tree that has died and does not qualify as STANDING DEAD. (See variable 5.9.2 DBH, Stump Sprouts.)

5.7.1 RECONCILE **[Reco]**

For remeasurement locations only, record a RECONCILE code for any new tally tree that was not tallied in the previous inventory, and for all no status remeasurement trees (PRESENT TREE STATUS = 0). This code is used to identify the reason a new tree appeared in the inventory, and identify the reason a remeasurement tree no longer qualifies as a tally tree. This information is needed to correctly assign volume information to the proper component of volume change.

Values:

Codes 1-4 are valid for **new trees** on the plot:

1 Ingrowth – either a new tally tree not qualifying as through growth or a new tree on land that was formerly nonforest and now qualifies as forest land (reversion or encroachment).
2 Through growth – new tally tree 5.0 inches DBH/DRC and larger, within the microplot, which was not missed at the previous inventory (i.e. went from seedling to pole-size between surveys).
3 Missed live – a live tree missed at previous inventory and that is live or dead now. Includes currently tallied trees on previously nonsampled conditions.
4 Missed dead – a dead tree missed at previous inventory that is dead now. Includes currently tallied trees on previously nonsampled conditions.

Codes 5-9 are valid for **remeasured trees** that no longer qualify as tally:

5 Shrank – live tree that shrank below threshold diameter on microplot/subplot/ macroplot.
6 Missing (moved) – tree was correctly tallied in previous inventory, but has now moved beyond the radius of the plot due to natural causes (e.g., small earth movement, hurricane). Tree must be either live before and still alive now or dead before and dead now. If tree was live before and now dead, this is a mortality tree and should have PRESENT TREE STATUS = 2 (not 0).
7 Cruiser error – erroneously tallied at previous inventory.
8 Procedural change – tree was tallied at the previous inventory, but is no longer tallied due to a definition or procedural change.
9 Tree was sampled before, but now the area where the tree was located is nonsampled. All trees on the nonsampled area have RECONCILE = 9.

Code 5 is used to indicate live trees that shrink below the diameter threshold on the microplot/subplot/macroplot. For example, if a live remeasurement tree shrinks below the 5.0-inch DBH/DRC, then record the following combination of codes: PREVIOUS TREE STATUS = 1, PRESENT TREE STATUS = 0, RECONCILE = 5. If a live measured tree shrinks below the 5.0-inch threshold on the subplot and is currently greater than or equal to 1.0 inch on the microplot, then record PREVIOUS TREE STATUS = 1, PRESENT TREE STATUS = 1. Record all required items for a tally sapling. Use the tree coding guide in Appendix 8 to determine the national coding method for remeasurement trees.

The following table, which is an abbreviated list from appendix 8, describes how to tally standing dead saplings with respective PRESENT TREE STATUS, RECONCILE CODE, and STANDING DEAD, which are being collected for the first time in Field Guide version 7.0:

Dead Sapling Tally – New plots	**PRESENT TREE STATUS**	**RECONCILE CODE**	**STANDING DEAD**	**CAUSE of DEATH**
Standing dead 1.0 – 4.9 DBH/DRC	2	Null	Auto-populated	Core optional

Dead Sapling Tally – Remeasure plots	**PRESENT TREE STATUS**	**RECONCILE CODE**	**STANDING DEAD**	**CAUSE of DEATH**
Previous live <1.0 and has grown to ≥1.0 and died	2	1	1	10-80
Previous live 1.0+; now standing dead 5.0+ DBH/DRC	2	Null	1	10-80
Previous ≥ 1 inch and <5 inches and was dead and is still standing dead	2	4	1	Null
Previous live 1+ missed; now 1+ DBH/DRC and dead	2	3	1	10-80
Previous live 5.0+ DBH/DRC; now tree shrank <5.0 but ≥1.0 (e.g., bark loss) and is standing dead, located on subplot (not located on microplot).	2	Null	0	10-80
Previous dead 5.0+ DBH/DRC; now tree shrank <5.0 but ≥1.0 (e.g., bark loss) and is standing dead, located on subplot (not located on microplot).	2	Null	0	Null
Previous live 5.0+ DBH/DRC; now tree shrank <5.0 but ≥1.0 (e.g., bark loss) and is standing dead located on the microplot. Note: this dead sapling should be referenced with a new distance and azimuth from the microplot center.	2	Null	1	10-80
Previous dead 5.0+ DBH/DRC; now tree shrank <5.0 but ≥1.0 (e.g., bark loss) and is standing dead located on the microplot. Note: this dead sapling should be referenced with a new distance and azimuth from the microplot center.	2	Null	1	Null

5.7.2 STANDING DEAD **[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 figures 20-22 for examples.

"Unbroken" is defined as at least 50 percent attached to the original source of growth. The degree of lean on dead trees with partially separated (i.e., 1 to 50 percent) boles is measured from the base of the tree to the top of ACTUAL LENGTH.

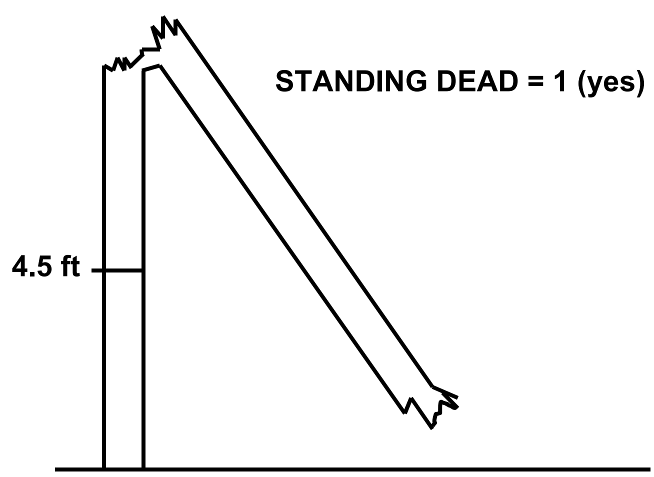
Portions of boles on dead trees that are separated greater than 50 percent (either above or below 4.5 feet), are considered severed and are included in Down Woody Material (DWM) if they otherwise meet DWM tally criteria.

For woodland species (Appendix 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.

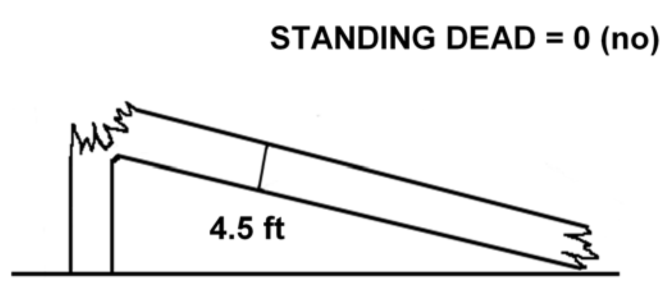
Values:

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 20. 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 21. Example of an unbroken length of < 4.5 feet.

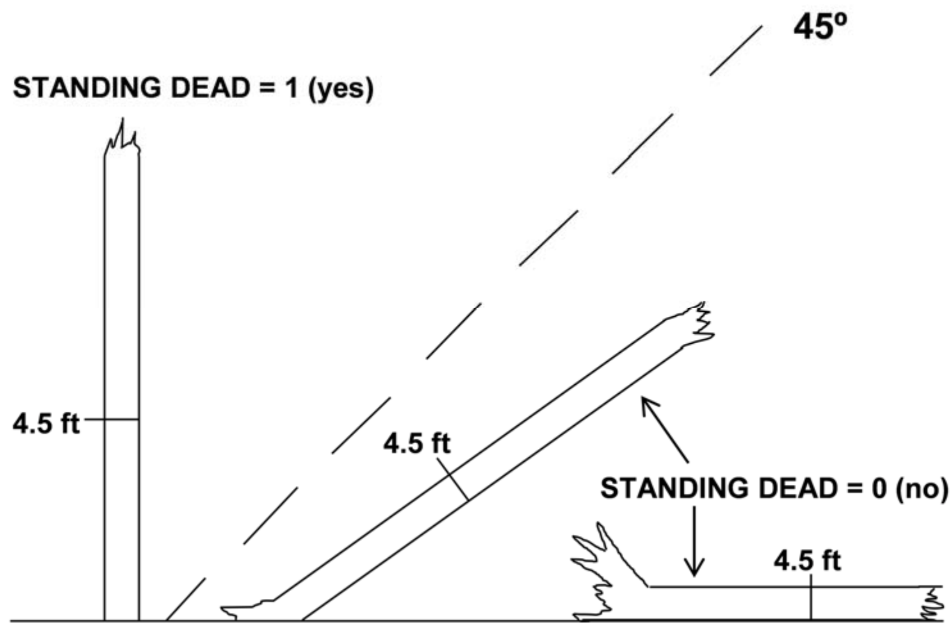


Figure 22. Other examples of dead trees

5.7.3 MORTALITY (CORE OPTIONAL)

5.8 SPECIES **[SPP]**

Record the appropriate SPECIES code from the list in Appendix 3. If the species cannot be determined in the field, tally the tree, but bring branch samples, foliage, cones, flowers, bark, etc. to the supervisor for identification. If possible, collect samples outside the subplots from similar specimens and make a note to correct the SPECIES code later. Use code 0299 for unknown dead conifer, 0998 for unknown dead hardwood when the genus or species codes cannot be used, and 0999 for other or unknown live tree. The generic code should only be used when you are sure the species is on the species list, but you cannot differentiate among acceptable species. This is often the case with standing dead trees on newly established plots. In this case use the sample collections procedures described earlier in this paragraph. The species code list in Appendix 3 includes all tree species tallied in the Continental U.S., Alaska, and the Caribbean. Species designated East/West are commonly found in those regions, although species designated for one region may occasionally be found in another. Species marked as Woodland designate species where DRC is measured instead of DBH. Species that have an “X” in the Core column are tallied in all regions. All other species on the list are “core optional.”

Values: See Appendix 3

5.9 DIAMETER **[Diam]**

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 microplot, those with diameters of 5.0-inches and larger are measured on the 24-foot radius subplots.

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.

SRS Note: Trees are not permanently marked at the point of measurement except DRC stems and these should be marked at the point of measurement with crayon or chalk. If a measurement point is not 4.5 feet, the LENGTH TO DIAMETER MEASUREMENT POINT is a required entry (see 5.24). In addition trees are not marked with a slash or any other mark (unless it’s a witness or a reference tree to a subplot) to indicate tallied trees. Flagging may be used to temporarily mark tally trees. Trees that are checked and are just beyond 24.0 ft. can be marked with a small “x” at the base of the tree facing the pin.

Remeasurement trees:

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 (either because protocols have changed or the previous crew made a mistake). Assign a DIAMETER CHECK code of 2 whenever the point of measurement is moved. When measuring the diameter of a dead tree tallied at a previous survey, always take the measurement at the same location as the previous crew.

Values: 001.0 to 999.9

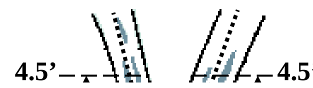
5.9.1 PREVIOUS DIAMETER AT BREAST HEIGHT **[PrDia]**
This is the DBH assigned at the previous survey. It has been downloaded from the previous inventory. Any change made to this field signifies an error at the time of the previous inventory. DIAMETER CHECK should be set to 2 and an explanation is required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

5.9.2 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 or stems in question must be at least 1/3 the diameter of the main stem and must branch out from the main stem at an angle of 45 degrees or less. Forks originate at the point on the bole where the piths intersect. Forked trees are handled differently depending on whether the fork originates below 1.0 foot, between 1.0 and 4.5 feet, or above 4.5 feet.

   - Trees forked below 1.0 foot. Trees forked below 1.0 foot are treated as distinctly separate trees (fig. 23). Distances and azimuths are measured individually to the center of each stem where it splits from the stump (fig. 26 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 (fig. 26-E), the rules in the next paragraph apply.



   - Trees forked between or at 1.0 foot and below 4.5 feet. Trees forked between or at 1.0 foot and below 4.5 feet are also counted as separate trees (fig. 24), but only one distance and azimuth (to the central stump) is recorded for each stem (fig. 26 D-F). Although a single azimuth and distance applies to all, multiple stems should be recorded as they occur in clockwise order (from front to back when one stem is directly in front of another). The DBH of each fork is measured at a point 3.5 feet above the pith intersection. When forks originate from pith intersections between 1.0 and 4.5 feet, the limiting distance is the same for all forks--they are either all on, or all off the plot.

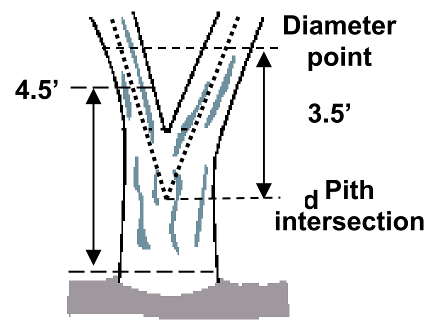


Figure 24.
Forked between 1.0 - 4.5 ft.

   Multiple forks are possible if they all originate from approximately the same point on the main stem and meet the requirements of a fork (at least 1/3 the diameter and angle 45 degrees or less).. In such cases, measure DBH on all stems at 3.5 feet above the common pith intersection (fig. 26-G).

   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).

   Once a stem is tallied as a fork that originated from a pith intersection between 1.0 and 4.5 feet, do not recognize any additional forks that may occur on that stem. Measure the diameter of such stems just below the base of stem separation as shown in figures 26-E and 26-F (i.e., do not move the point of diameter the entire 3.5 feet above the first fork).

   - Trees forked at or above 4.5 feet. Trees forked at or above 4.5 feet count as one single tree (fig. 25). If a fork occurs at or immediately above 4.5 feet, measure diameter below the fork just beneath any swelling that would inflate DBH.

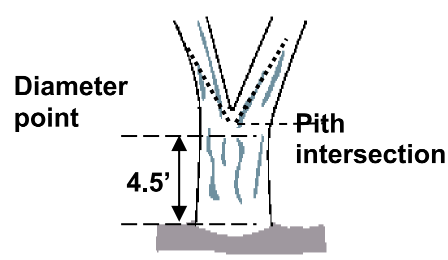


Figure 25. One tree.

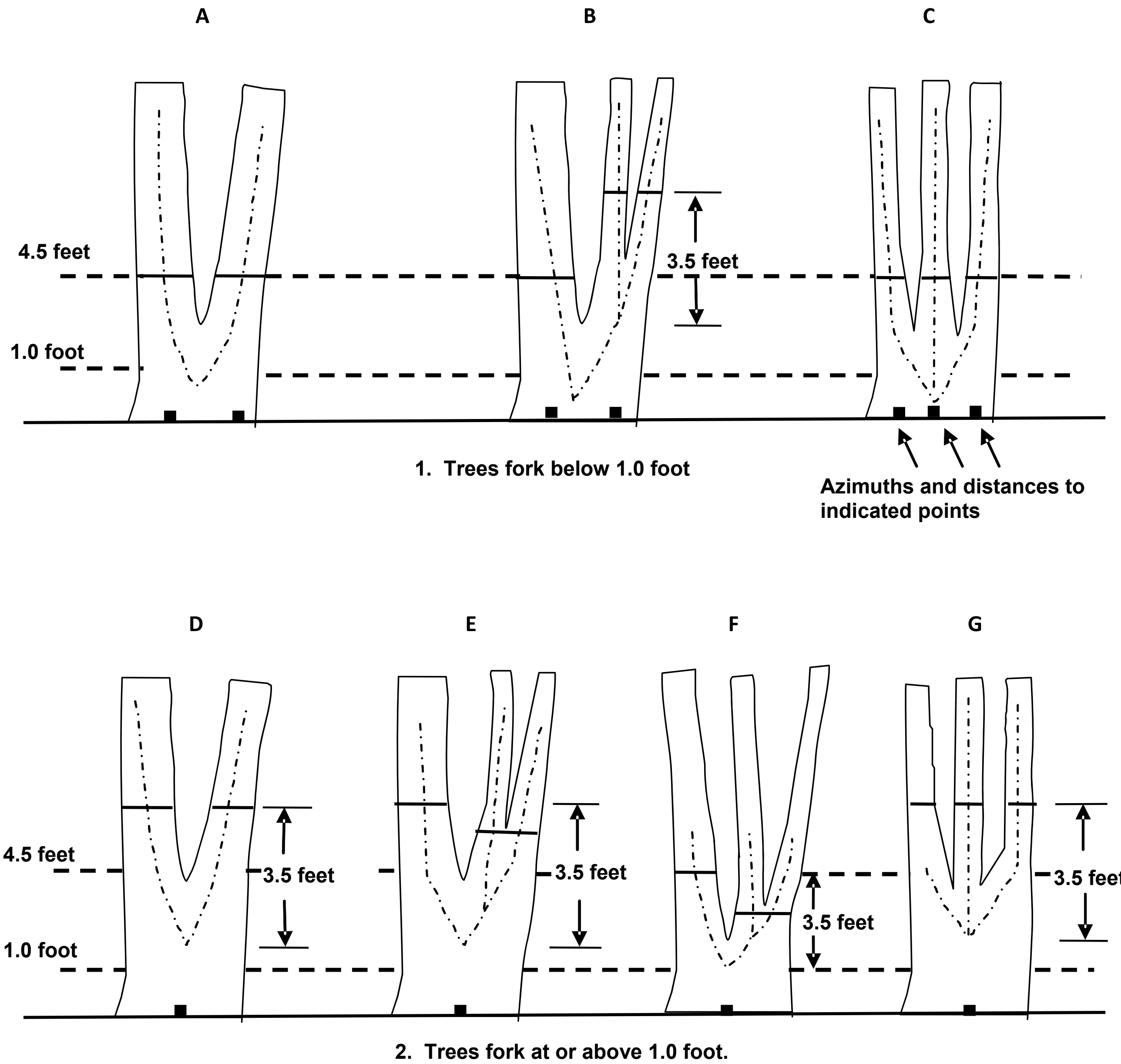
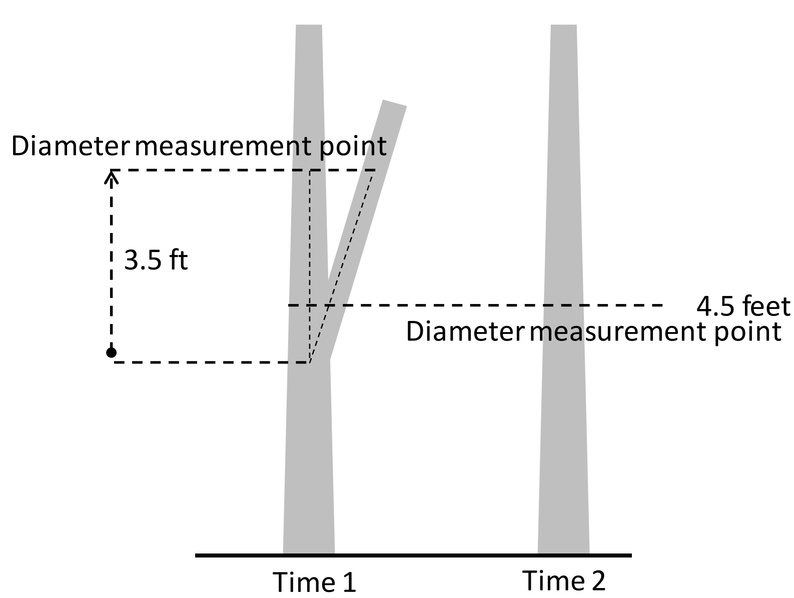
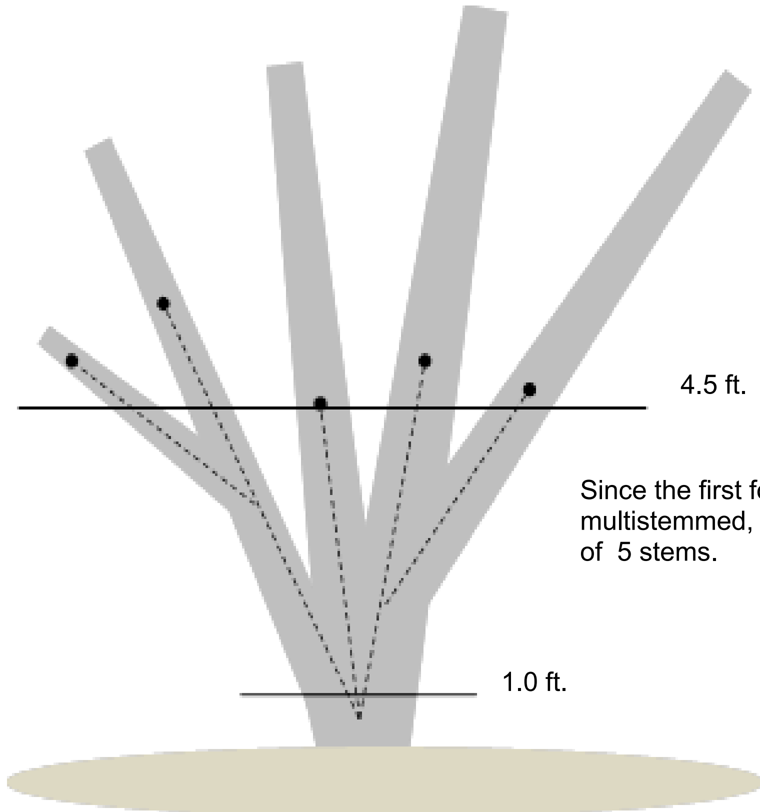


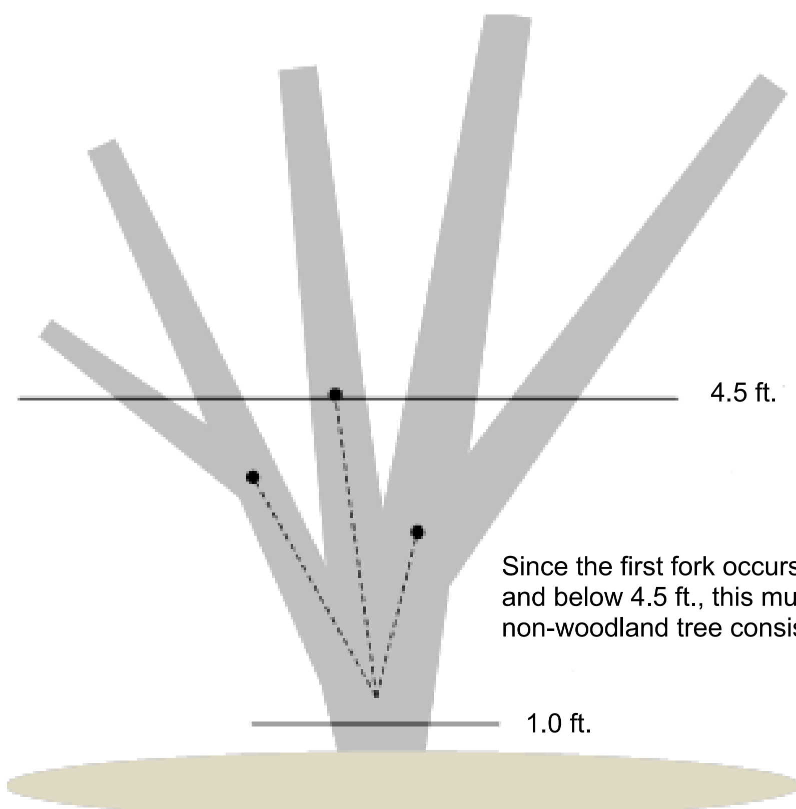
Figure 26. Summary of where to measure DBH, distance, and azimuth on forked trees.

SRS Note: When is a fork no longer considered a fork? If one of the stems that created the fork dies or breaks, the stem is still considered a fork until no evidence of it remains. If no evidence of the second stem is present, the previous high or low diameter location may or may not represent the best location to monitor growth for the tree. This most commonly occurs with saplings that have measureable forks during the sapling stage, but one of the stems that created the fork breaks off or dies as the sapling matures to a tree. If this occurs, the measurement point for the tree should be returned to 4.5 feet <u>unless the old location is within 1 foot of 4.5 feet or the old location is still suitable as a diameter measurement point.</u>



SRS Figure 9. This illustrations depicts the diameter locations of a forked tree at Time 1 and the new diameter location at Time 2 when the fork is no longer evident.





SRS Figure 10. The difference between recognizing the second fork as an additional stem depends on where the first fork occurs.

2. Stump sprouts: Stump sprouts originate between ground level and 4.5 feet on the boles of trees that have died or been cut. Stump sprouts are handled the same as forked trees, with the exception that stump sprouts are not required to be 1/3 the diameter of the dead bole. Stump sprouts originating below 1.0 foot are measured at 4.5 feet from ground line. Stump sprouts originating between 1.0 foot and 4.5 feet are measured at 3.5 feet above their point of occurrence. As with forks, rules for measuring distance and azimuth depend on whether the sprouts originate above or below 1.0 foot. For multi-stemmed woodland species, treat all new sprouts as part of the same new tree.

3. Tree with butt-swell or bottleneck or buttress roots: Measure these trees 1.5 feet above the end of the swell or bottleneck or buttress if the swell, bottleneck or buttress extends 3.0 feet or more above the ground (fig. 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.

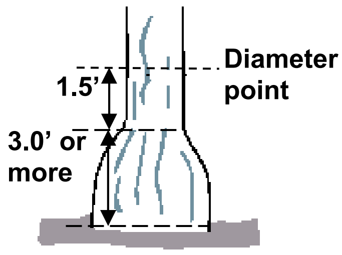
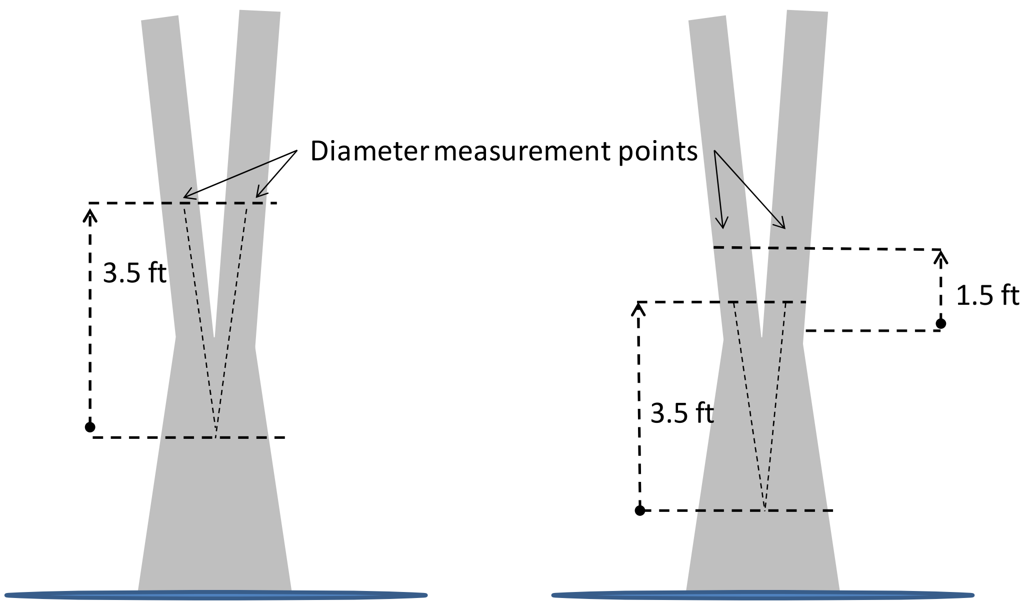


Figure 27. Bottleneck tree.



SRS Figure 11. 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 (fig. 28), bumps, depressions, and branches (fig. 29) at DBH, diameter will be measured immediately above the irregularity at the place it ceases to affect normal stem form.

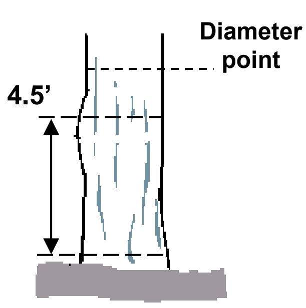


Figure 28. Tree with swelling.

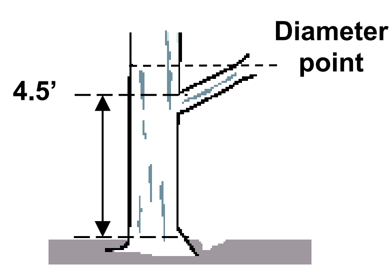


Figure 29. Tree with branch.

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

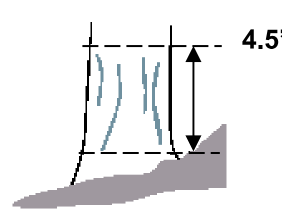


Figure 30. Tree on a slope.

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 (fig. 31).

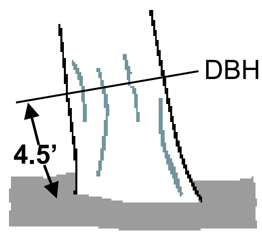


Figure 31. Leaning tree.

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.

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 (fig. 32). 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 (figs. 28 and 29).

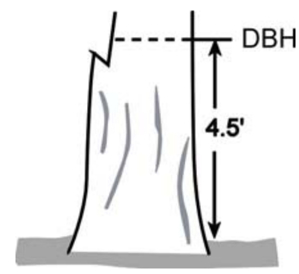


Figure 32. Tree with part of stem missing.

10. Live windthrown tree: Measure from the top of the root collar along the length to 4.5 feet (fig. 33).

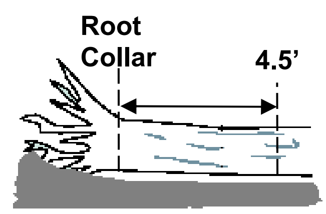


Figure 33. Tree on the ground.

11. Down live tree with tree-form branches growing vertical from main bole: When a down live tree, touching the ground or the main bole is leaning and close to being parallel to the surface of the ground, has vertical (less than 45 degrees from vertical) tree-like branches coming off the main bole, first determine whether or not the pith of the main bole (averaged along the first log of the tree) is above or below the duff layer.

- 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 (fig. 34).

- If the pith intersection of the main down bole and vertical tree-like branch occurs at or between 1.0 feet and below 4.5 feet from the stump along the main bole, treat that branch as a separate tree, and measure DBH 3.5 feet above the pith intersection for both the main bole and the tree-like branch.

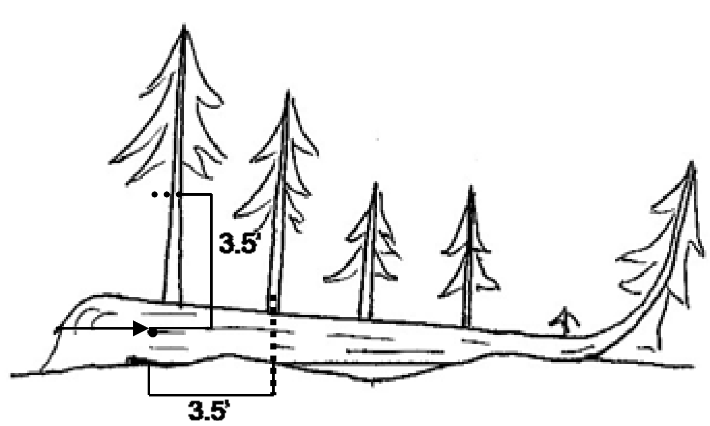


Figure 34. Down tree above duff.

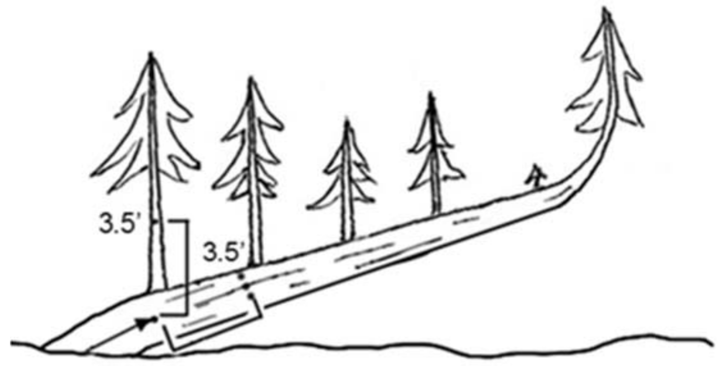


Figure 34a. Leaning tree with vertical forks. In this example, the tree is not on the ground, but the forks along the main stem have grown vertical from the ground. The diameter locations for the two qualifying stems are as shown.

- 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.

- 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 (fig. 35). However, if the top of the main tree bole curves out of the ground towards a vertical angle, treat that portion of that top as an individual tree originating where the pith leaves the duff layer.

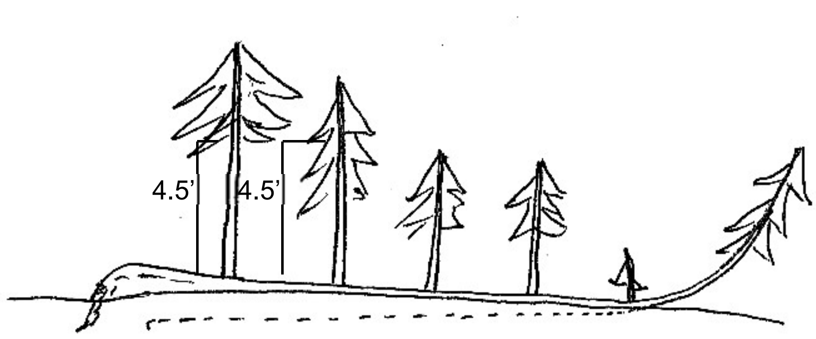


Figure 35. Down tree below duff.

12. <u>Tree with curved bole (pistol butt tree):</u> Measure along the bole on the uphill side (upper surface) of the tree (fig. 36).

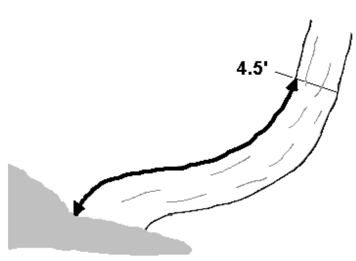
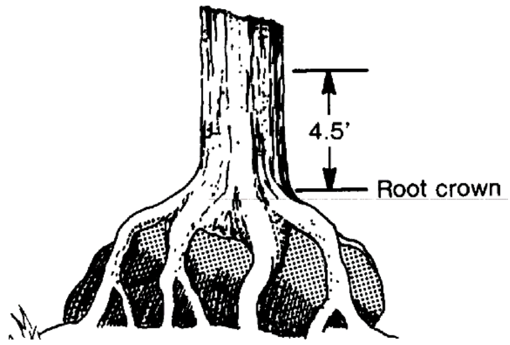


Figure 36. Tree with curved bole (pistol butt tree).

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 Figure 12). [*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 adventitious 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 12. 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 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).

Computing and Recording DRC: For all tally trees requiring DRC, with at least one stem 1 foot in length and at least 1.0 inch in diameter 1 foot up from the stem diameter measurement point, DRC is computed as the square root of the sum of the squared stem diameters. For a single-stemmed DRC tree, the computed DRC is equal to the single diameter measured.

Use the following formula to compute DRC:

$$\text{DRC} = \sqrt{\sum (\text{stem diameter}^2)}$$

Round the result to the nearest 0.1 inch. For example, a multi-stemmed woodland tree with stems of 12.2, 13.2, 3.8, and 22.1 would be calculated as:

$$\begin{aligned}\text{DRC} &= \text{SQRT}\ (12.2^2 + 13.2^2 + 3.8^2 + 22.1^2) \\ &= \text{SQRT}\ (825.93) \\ &= 28.74 \\ &= 28.7\end{aligned}$$

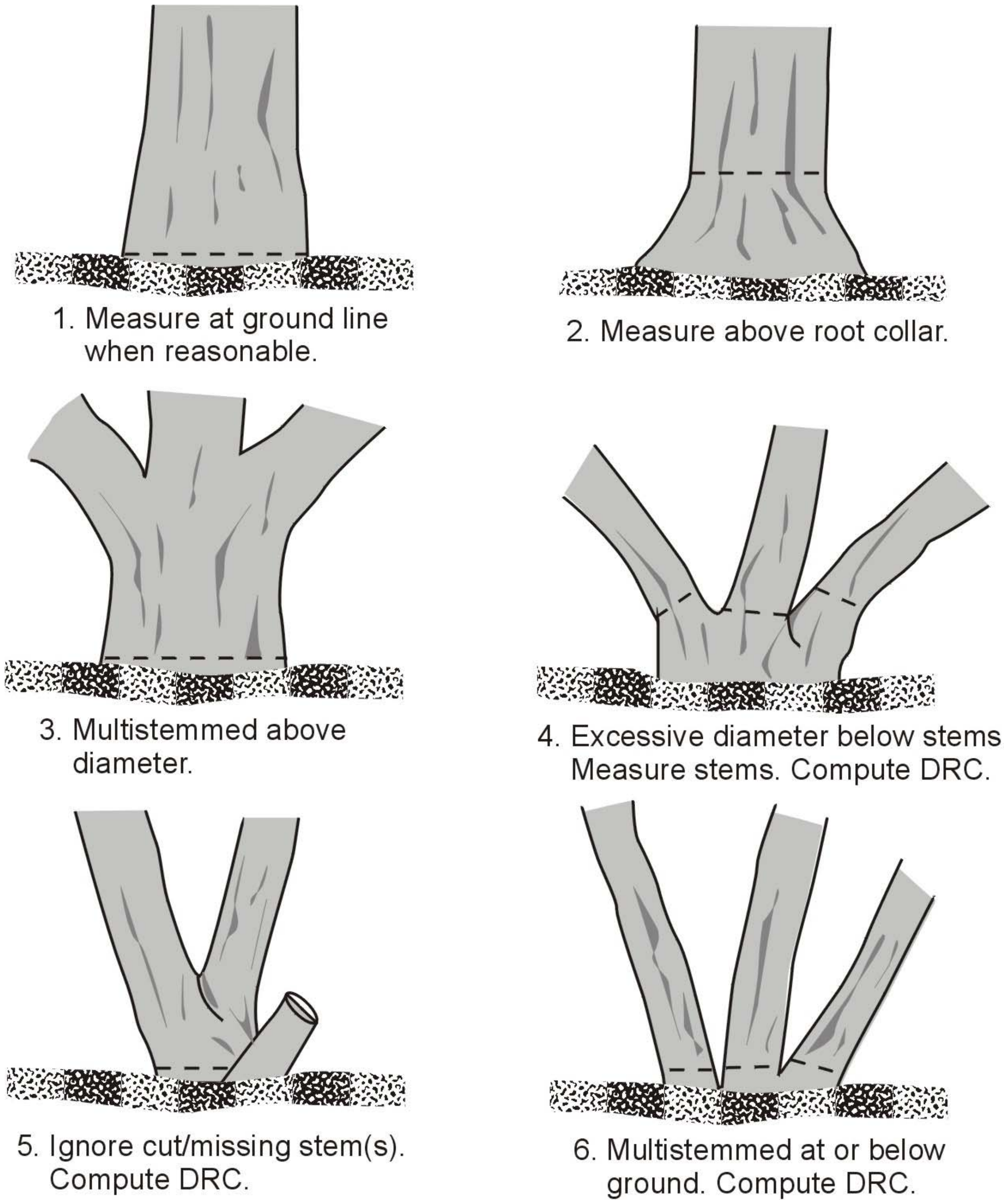


Figure 37. How to measure DRC in a variety of situations.

5.9.4.1 DRC STEM DIAMETER

Record the diameter of each individual qualifying stem on the woodland tree.

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.

Values:

1 live stem
2 dead stem

5.10 PAST NUMBER OF STEMS **[PStem]**

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.

Values: 1 to 99

5.11 CURRENT NUMBER OF STEMS **[#Stem]**

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.

Values: 1 to 99

5.12 DIAMETER CHECK **[DChck]**

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.

Values:

0 Diameter measured accurately (i.e, diameter tape, wedge prism and pentaprism).
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.

5.13 ROTTEN/MISSING CULL **[%ROT]**

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

Record the percentage of rotten and missing cubic-foot volume, to the nearest 1 percent. When estimating volume loss (tree cull), only consider the cull on the merchantable bole/portion of the tree, from a 1-foot stump to a 4-inch DOB top. Do not include any cull estimate above ACTUAL LENGTH. For woodland species, the merchantable portion is between the point of DRC measurement to a 1.5-inch DOB top.

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.

Values: 00 to 99

5.14 TOTAL LENGTH **[ToLen]**

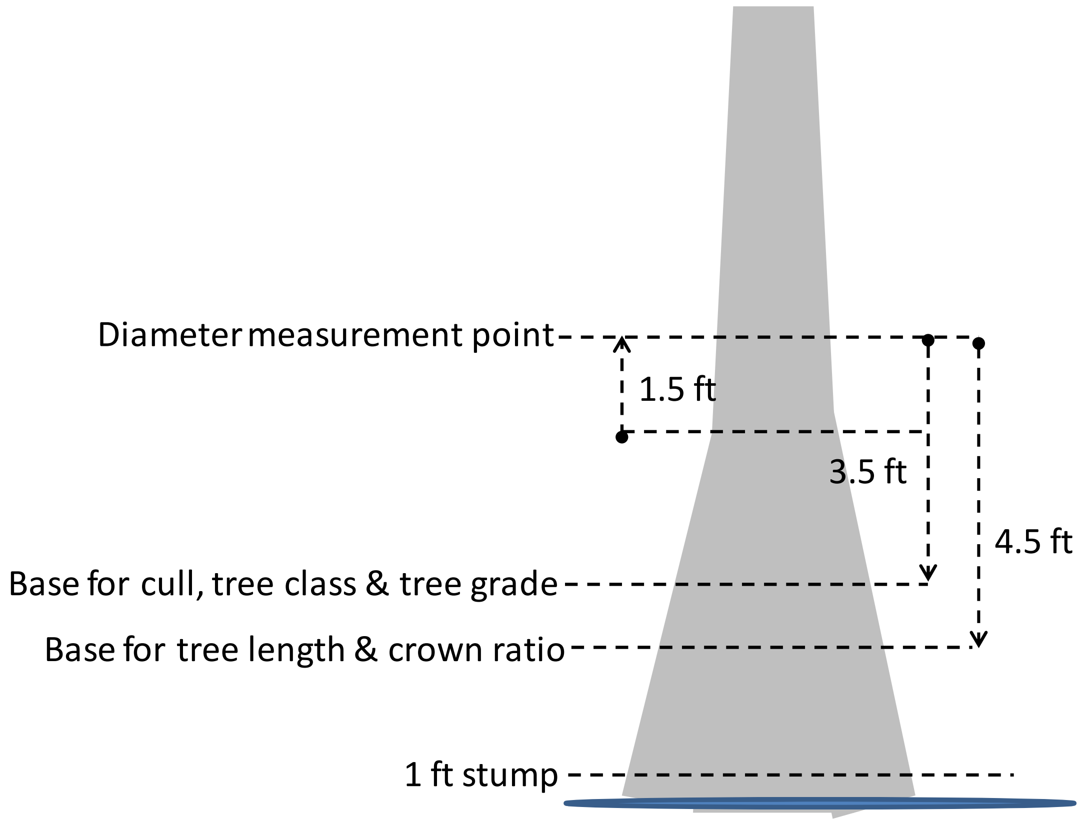
Record the TOTAL LENGTH of the tree, to the nearest 1.0 foot from ground level to the top of the tree. For trees growing on a slope, measure on the uphill side of the tree. If the tree has a missing top (top is broken and completely detached from the tree), estimate what the total length would be if there were no missing top. Forked trees should be treated the same as unforked trees.

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 measure 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 13.

Values: 001 to 400



SRS Figure 13. 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.

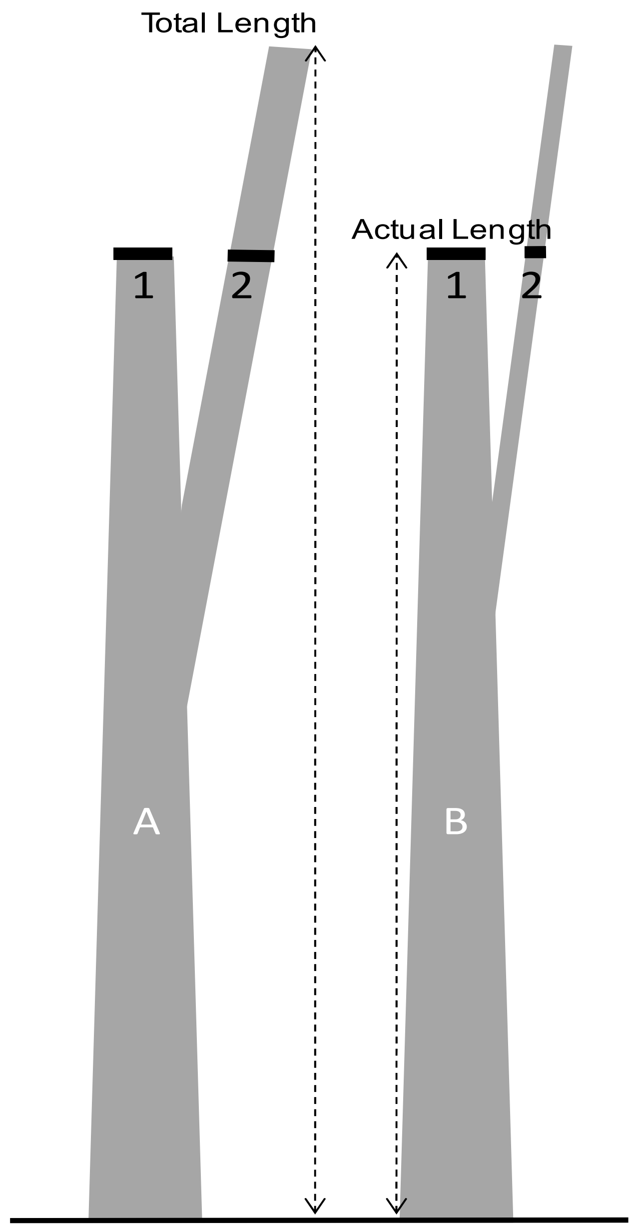
5.15 ACTUAL LENGTH **[AcLen]**

Record for trees with missing tops (top on live trees is completely detached; top on dead trees is greater than 50 percent detached from the tree). If the top is intact, this item may be omitted. Record the ACTUAL LENGTH of the tree to the nearest 1.0 foot from ground level to the break. Use the length to the break for ACTUAL LENGTH until a new leader qualifies as the new top for TOTAL LENGTH; until that occurs, continue to record ACTUAL LENGTH to the break. Trees with previously broken tops are considered recovered (i.e., ACTUAL LENGTH = TOTAL LENGTH) when a new leader (dead or alive) is 1/3 the diameter of the broken top at the point where the top was broken (not where the new leader originates from the trunk). Forked trees should be treated the same as unforked trees.

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.

Values: 001 to 400



SRS Figure 14. Total length v 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.

5.16 LENGTH METHOD **[Meth]**

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

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 CROWN CLASS **[CrCls]**

Rate tree crowns in relation to the sunlight received and proximity to neighboring trees, not its position in the canopy (fig. 38). 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.

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.
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.

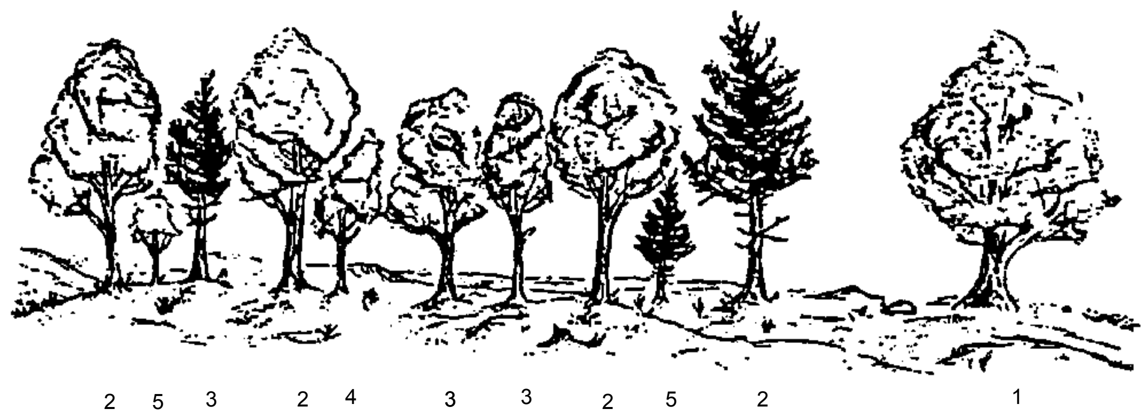


Figure 38. Examples of CROWN CLASS code definitions (numbers are the CROWN CLASS codes).

5.18 UNCOMPACTED LIVE CROWN RATIO (Phase 2 – CORE OPTIONAL, Phase 3 – CORE) **[UCRat]**
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 (fig. 39). 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.

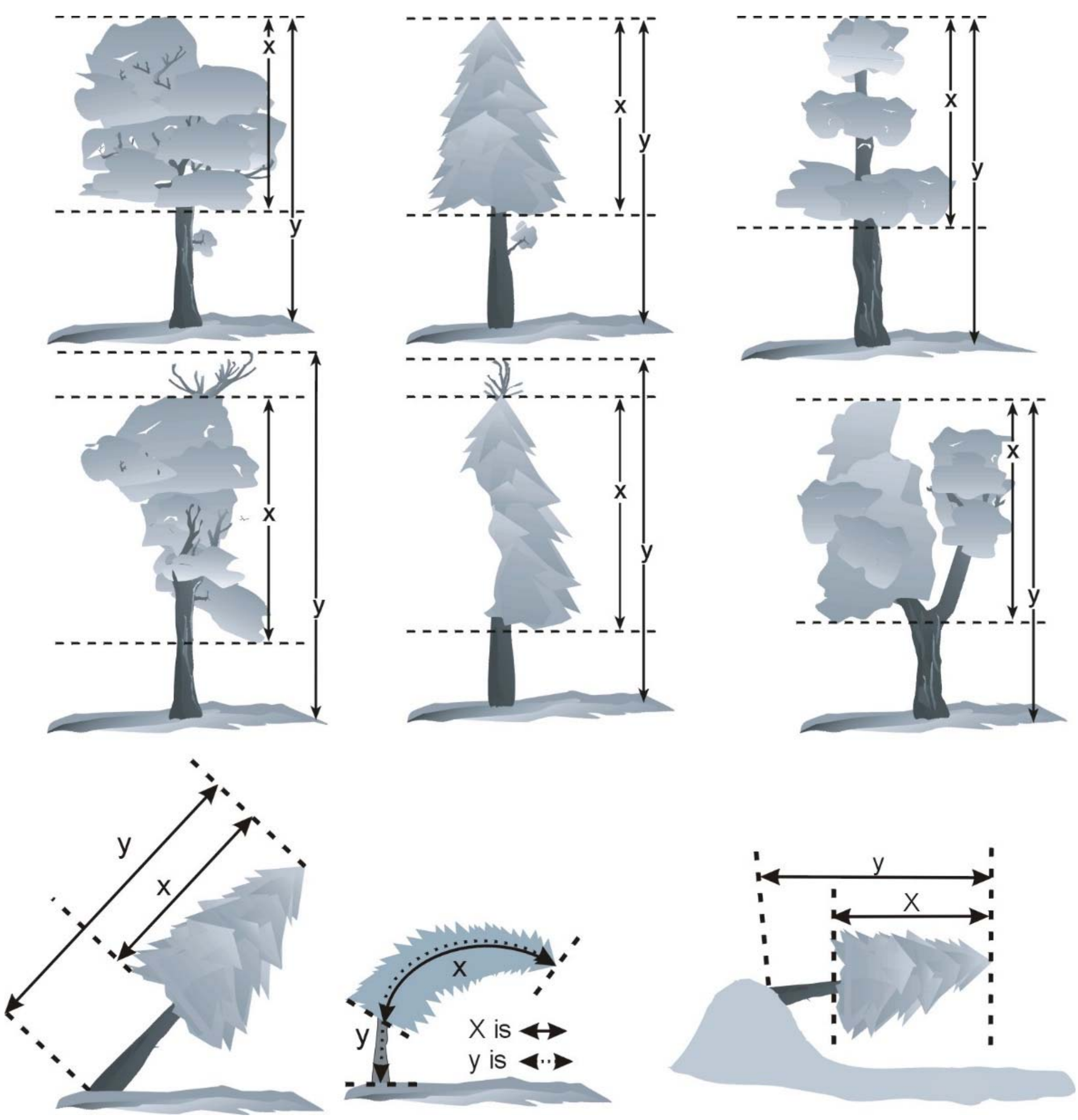


Figure 39. UNCOMPACTED LIVE CROWN RATIO examples.

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 (fig. 40).

Values: 00 to 99 percent

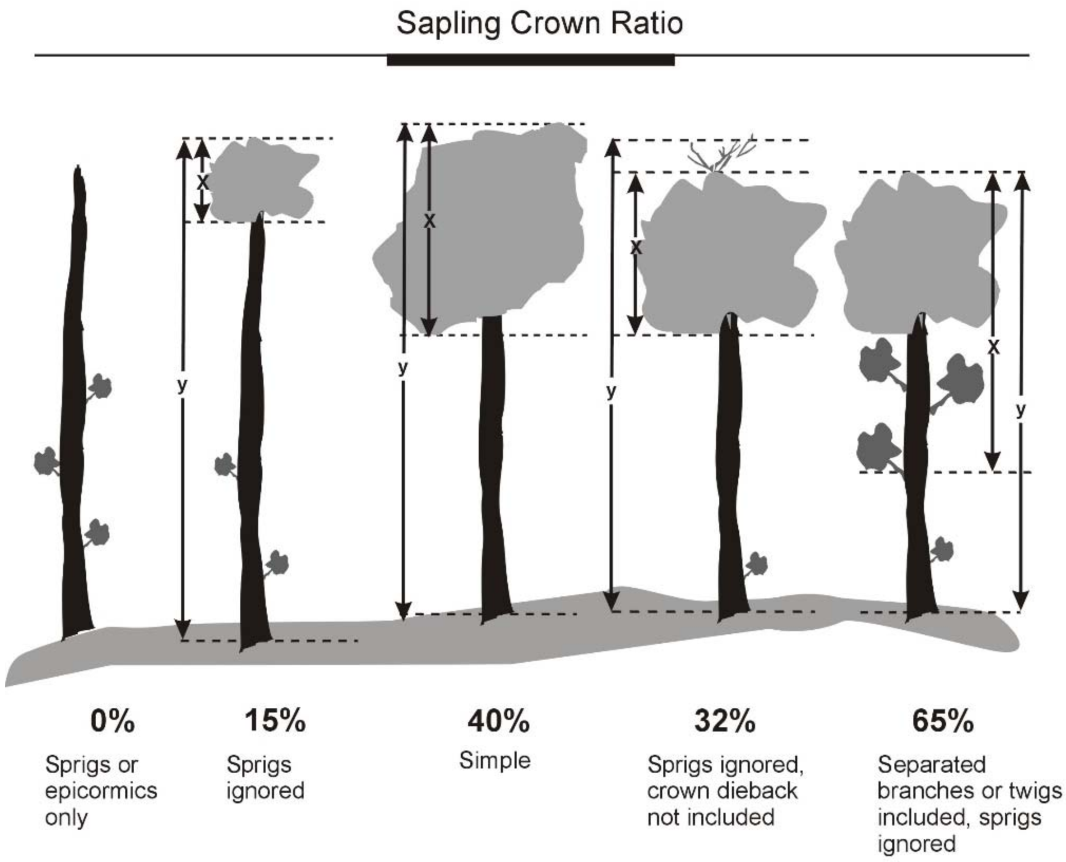


Figure 40. Sapling ratio determination examples.

5.19 COMPACTED CROWN RATIO **[CrRat]**
Record the COMPACTED CROWN RATIO for each live tally tree, 1.0 inch and larger, to the nearest one percent. COMPACTED CROWN RATIO is that portion of the tree supporting live foliage (or in the case of extreme defoliation should be supporting live foliage) and is expressed as a percentage of the actual tree length. To determine COMPACTED CROWN RATIO, ocularly transfer lower live branches to fill in large holes in the upper portion of the tree until a full, even crown is visualized.

Epicormic branches are not considered when estimating the compacted crown ratio. Epicormic branches remain classified as such until they reach the size of regular branches. For trees that had 1.0 inch or larger branches when the epicormic branches formed, epicormic branches are considered regular branches once they reach 1.0 inch in diameter.

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 (fig. 41). Figure 42 shows an example of COMPACTED CROWN RATIO on a leaning tree.

On naturally swelled-butted trees (e.g., baldcypress, pondcypress, water tupelo, swamp tupelo, Carolina ash) crown ratio is determined 4.5 feet below the recorded LENGTH TO DIAMETER MEASUREMENT POINT. This point is the base the tree.

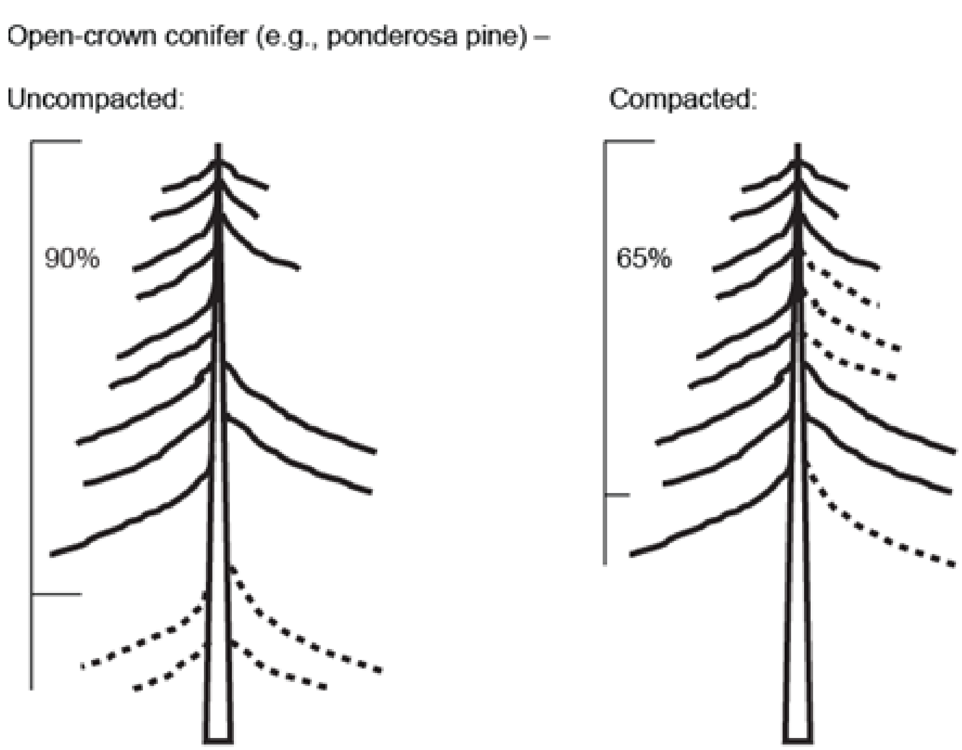


Figure 41a

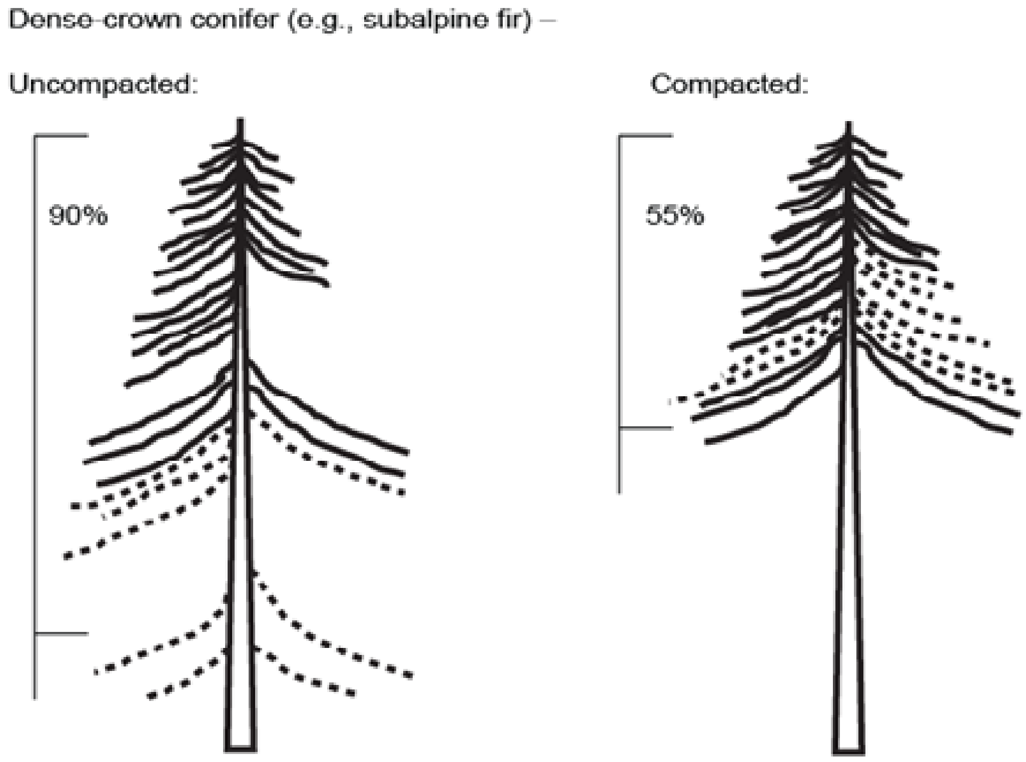


Figure 41b

Figures 41a and 41b. Examples of and comparison between COMPACTED CROWN RATIO and UNCOMPACTED LIVE CROWN RATIO of conifers.

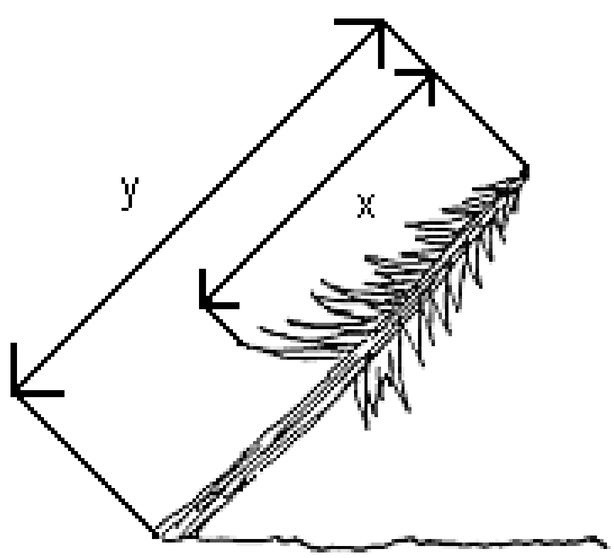


Figure 42. COMPACTED CROWN RATIO on a leaning tree. CROWN RATIO = (x/y)100.

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 (fig. 43).

Values: 00 to 99

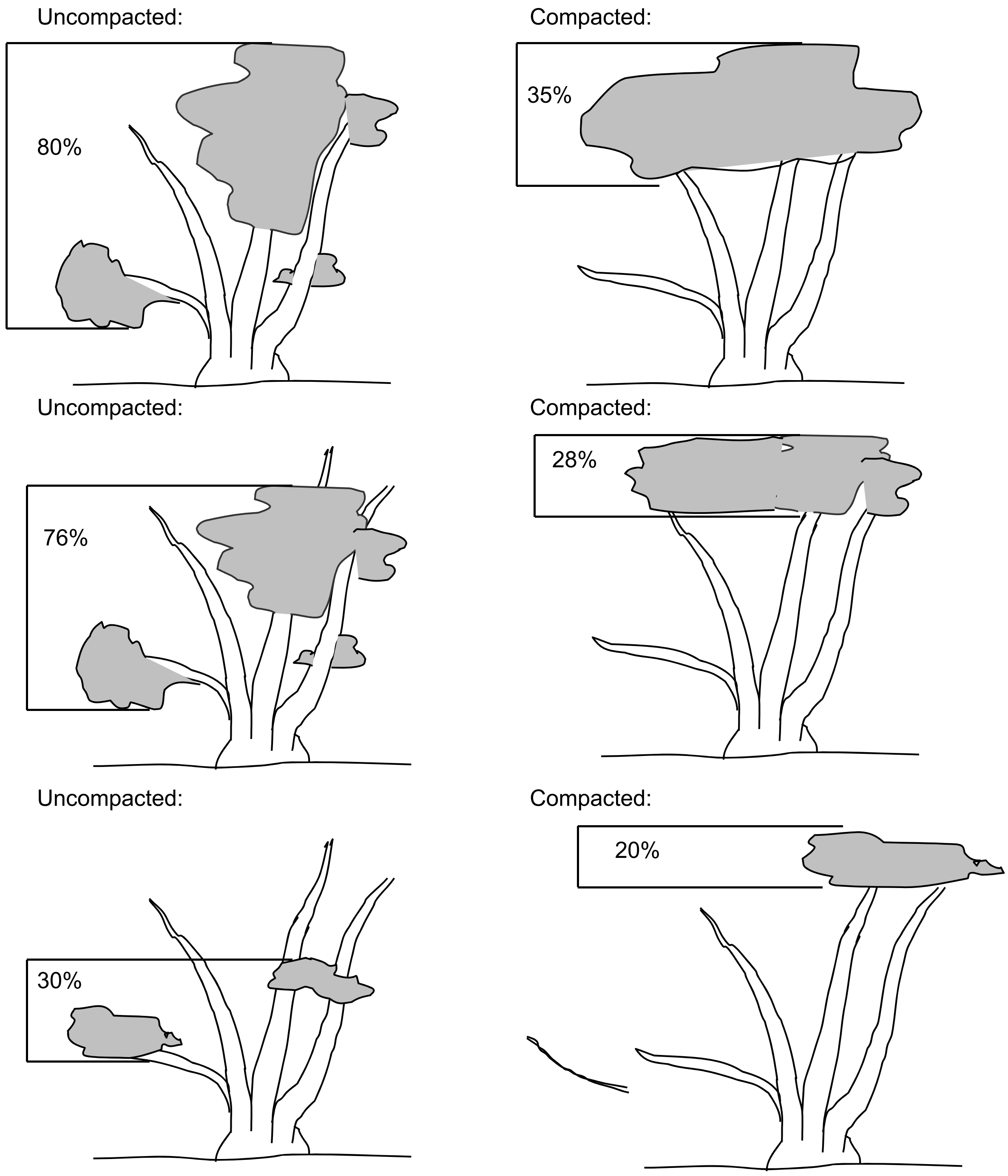


Figure 43. Examples of and comparison between COMPACTED CROWN RATIO and UNCOMPACTED LIVE CROWN RATIO of woodland species.

5.20 Tree Damage (CORE)

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 DAMAGE AGENT 1. Any damage code in appendix 11 may be used for DAMAGE AGENT 1, DAMAGE AGENT 2, or DAMAGE AGENT 3. When no damage is present, record '0'.

5.20.1 DAMAGE AGENT 1 **[Dmg1]**

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). The general agent codes, damage thresholds, and general agent descriptions are listed here. Specific agents within the general categories, if required by your Region, are listed in appendix 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.

Values:

General Agent Damage Codes, Damage Thresholds, and Descriptions. Specific agent codes are in appendix 11.

Code	General Agent	Damage Threshold*	Descriptions
0		No damage	
10000	General insects	Any damage to the terminal leader; damage >20% of the roots or boles with >20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected.	Insect damage that cannot be placed in any of the following insect categories.
11000	Bark beetles	Any evidence of a successful attack (successful attacks generally exhibit boring dust, many pitch tubes and/or fading crowns).	Bark beetles (Dendroctonus, Ips, and other genera) are phloem-feeding insects that bore through the bark and create extensive galleries between the bark and the wood. Symptoms of beetle damage include fading or discolored tree crown (yellow or red), pitch tubes or pitch streaks on the bark, extensive egg galleries in the phloem, boring dust in the bark crevices or at the base of the tree. Bark chipping by woodpeckers may be conspicuous. They inflict damage or destroy all parts of trees at all stages of growth by boring in the bark, inner bark, and phloem. Visible signs of attack include pitch tubes or large pitch masses on the tree, dust and frass on the bark and ground, and resin streaming. Internal tunneling has various patterns. Most have tunnels of uniform width with smaller galleries of variable width radiating from them. Galleries may or may not be packed with fine boring dust.
12000	Defoliators	Any damage to the terminal leader; damage ≥20% of the foliage with ≥50% of the leaf/needle affected.	These are foliage-feeding insects that may reduce growth and weaken the tree causing it to be more susceptible to other damaging agents. General symptoms of defoliation damage include large amounts of missing foliage, browning foliage, extensive branch mortality, or dead tree tops.
13000	Chewing insects Note: this is only collected by IW and SRS	Any damage to the terminal leader; damage ≥20% of the foliage with ≥50% of the leaf/needle affected	Insects, like grasshoppers and cicadas that chew on trees (those insects not covered by defoliators in code 12000).
14000	Sucking insects	Any damage to the terminal leader; damage ≥20% of the foliage with ≥50% of the leaf/needle affected	Adelgids, scales and aphids feed on all parts of the tree. Often they cause galling on branches and trunks. Some appear benign but enable fungi to invade where they otherwise could not (e.g., beech bark disease). The most important ones become conspicuous because of the mass of white, cottony wax that conceals eggs and young nymphs.
15000	Boring insects	Any damage to the terminal leader; damage ≥20% of the roots, stems, or branches.	Most wood boring insects attack only severely declining and dead trees. Certain wood boring insects cause significant damage to trees, especially the exotic Asian longhorn beetle, emerald ash borer, and Sirex wood wasp. Bark beetles have both larval and adult galleries in the phloem and adjacent surface of the wood. Wood borers have galleries caused only by larval feeding. Some, such as the genus Agrilus (including the emerald ash borer) have galleries only in the phloem and surface of the wood. Other wood borers, such as Asian longhorn beetle bore directly into the phloem and wood. Sirex adults oviposit their eggs through the bark, and developing larvae bore directly into the wood of pines.
19000	General diseases	Any damage to the terminal leader; damage >20% of the roots or boles with >20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected.	Diseases that cannot be placed in any of the following disease categories.

Code	General Agent	Damage Threshold*	Descriptions
21000	Root/butt diseases	Any occurrence.	Root disease kills all or a portion of a tree's roots. Quite often, the pathogenic fungus girdles the tree at the root collar. Tree damage includes mortality (often occurring in groups or "centers"), reduced tree growth, and increased susceptibility to other agents (especially bark beetles). General symptoms include resin at the root collar, thin, chlorotic (faded) foliage, and decay of roots. A rot is a wood decay caused by fungi. Rots are characterized by a progression of symptoms in the affected wood. First, the wood stains and discolors, then it begins to lose its structural strength, and finally the wood starts to break down, forming cavities in the stem. Even early stages of wood decay can cause cull due to losses in wood strength and staining of the wood. Rot can lead to mortality, cull, an increased susceptibility to other agents (such as insects), wind throw, and stem breakage.
22000	Cankers (non-rust)	Any occurrence.	A canker -- a sunken lesion on the stem caused by the death of cambium -- may cause tree breakage or kill the portion of the tree above the canker. Cankers may be caused by various agents but are most often caused by fungi. A necrotic lesion begins in the bark of branches, trunk or roots, and progresses inward killing the cambium and underlying cells. The causal agent may or may not penetrate the wood. This results in areas of dead tissue that become deeper and wider. There are two types of cankers, annual and perennial. Annual cankers enlarge only once and do so within an interval briefer than the growth cycle of the tree, usually less than one year. Little or no callus is associated with annual cankers, and they may be difficult to distinguish from mechanical injuries. Perennial cankers are usually the more serious of the two, and grow from year to year with callus forming each year on the canker margin, often resulting in a target shape. The most serious non-rust cankers occur on hardwoods, although branch mortality often occurs on conifers.
22500	Stem decays	Any visual evidence (conks; fruiting bodies; rotten wood)	Rot occurring in the bole/stems of trees above the roots and stump.
23000	Parasitic / Epiphytic plants	Dwarf mistletoes with Hawksworth rating of ≥3; true mistletoes and vines covering ≥ 50% of crown.	Parasitic and epiphytic plants can cause damage to trees in a variety of ways. The most serious ones are dwarf mistletoes, which reduce growth and can cause severe deformities. Vines may damage trees by strangulation, shading, or physical damage. Benign epiphytes, such as lichens or mosses, are not considered damaging agents.
24000	Decline Complexes/ Dieback/Wilts	Damage ≥ 20% dieback of crown area.	Tree disease which results not from a single causal agent but from an interacting set of factors. Terms that denote the symptom syndrome, such as dieback and wilt, are commonly used to identify these diseases.
25000	Foliage diseases	Damage ≥20% of the foliage with ≥50% of the leaf/needle affected.	Foliage diseases are caused by fungi and result in needle shed, growth loss, and, potentially, tree mortality. This category includes needle casts, blights, and needle rusts.
26000	Stem rusts	Any occurrence on the bole or stems (on multi-stemmed woodland species), or on branches ≤1 foot from boles or stems; damage to ≥20% of branches	A stem rust is a disease caused by fungi that kill or deform all or a portion of the stem or branches of a tree. Stem rusts are obligate parasites and host specialization is very common. They infect and develop on fast-growing tissues and cause accelerated growth of infected tissues resulting in galls or cankers. Heavy resinosis is usually associated with infections. Sometimes yellow or reddish-orange spores are present giving a "rusty" appearance. Damage occurs when the disease attacks the cambium of the host, girdling and eventually killing the stem above the attack. Symptoms of rusts include galls (an abnormal and pronounced swelling or deformation of plant tissue that forms on branches or stems) and cankers (a sunken lesion on the stem caused by death of the cambium which often results in the death of tree tops and branches).
27000	Broom rusts	≥50% of crown area affected.	Broom rust is a disease caused by fungi that kill or deform all or a portion of the branches of a tree. Broom rusts are obligate parasites and host specialization is very common. They infect and develop on fast-growing tissues and cause accelerated growth of infected tissues resulting in galls. Symptoms of rusts include galls, an abnormal and pronounced swelling or deformation of plant tissue that forms on branches or stems.

Code	General Agent	Damage Threshold*	Descriptions
30000	Fire	Damage ≥ 20% of bole circumference; >20% of stems on multi-stemmed woodland species affected; ≥20% of crown affected.	Fire damage may be temporary, such as scorched foliage, or may be permanent, such as in cases where cambium is killed around some portion of the bole. The location and amount of fire damage will determine how the damage may affect the growth and survival of the tree. Fire often causes physiological stress, which may predispose the tree to attack by insects of other damaging agents.
41000	Wild animals	Any damage to the terminal leader; damage ≥20% of the roots or boles with> 20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected.	Wild animals from birds to large mammals cause open wounds. Some common types of damage include: sapsucker bird peck, deer rub, bear clawing, porcupine feeding, and beaver gnawing.
42000	Domestic animals	Any damage to the terminal leader; damage ≥20% of the roots or boles with> 20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected.	Open wounds caused by cattle and horses occur on the roots and lower trunk. Soil compaction from the long term presence of these animals in a woodlot can also cause indirect damage.
50000	Abiotic	Any damage to the terminal leader; damage ≥20% of the roots or boles with> 20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected.	Abiotic damages are those that are not caused by other organisms. In some cases, the type and severity of damage may be similar for different types of agents (e.g., broken branches from wind, snow, or ice).
60000	Competition	Overtopped shade intolerant trees that are not expected to survive for 5 years or saplings not expected to reach tree size (5.0 inches DBH/DRC).	Suppression of overtopped shade intolerant species. Trees that are not expected to survive for 5 years or saplings not expected to reach tree size (5.0 inches DBH/DRC).
70000	Human activities	Any damage to the terminal leader; damage ≥20% of the roots or boles with> 20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected.	People can injure trees in a variety of ways, from poor pruning, to vandalism, to logging injury. Signs include open wounds or foreign embedded objects.
71000	Harvest	Removal of ≥10% of cubic volume	Only recorded for woodland species trees that have partial cutting
90000	Other damage	Any damage to the terminal leader; damage ≥20% of the roots or boles with> 20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected.	
99000	Unknown damage	Any damage to the terminal leader; damage ≥20% of the roots or boles with> 20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected.	Use this code only when observed damage cannot be attributed to a general or specific agent.

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

5.20.2 DAMAGE AGENT 2 **[Dmg2]**

Follow procedures described for DAMAGE AGENT 1

Values: See 5.20.1

5.20.3 DAMAGE AGENT 3 **[Dmg3]**

Follow procedures described for DAMAGE AGENT 1

Values: See 5.20.1

5.21 CAUSE OF DEATH **[Cause]**
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.

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 landclearing activity (accidental, random, etc.). TREE NOTES required.
80 Silvicultural or landclearing activity (death caused by harvesting or other silvicultural activity, including girdling, chaining, etc., or to landclearing activity)

5.22 MORTALITY YEAR (CORE OPTIONAL) **[MorYr]**
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.

Values: 1994 or higher

5.23 DECAY CLASS **[Decay]**
Record for each standing dead tally tree, 1.0 inch in diameter and larger, the code indicating the tree's stage of decay. The stage of decay will vary between species based on the properties of the wood, the site conditions and climate.

Values: 1 – 5; 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.

5.24 LENGTH TO DIAMETER MEASUREMENT POINT (CORE OPTIONAL) **[LDiam]**
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.

SRS Note: Diameter measurement points that exceed 15.0 feet require a TREE NOTE recording the LENGTH TO MEASUREMENT POINT applied for the collected diameter.

Values: 00.1 – 15.0

5.25 ROUGH CULL (CORE OPTIONAL)
5.26 DWARF MISTLETOE CLASS (CORE OPTIONAL)

5.27 TREE NOTES **[Notes]**
Record notes pertaining to an individual tree as called for to explain or describe another variable.

Values: English language words, phrases and numbers

5.28 SRS TREE CLASS **[TrCls]**
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 15a.

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. See SRS Figure 15b.

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.

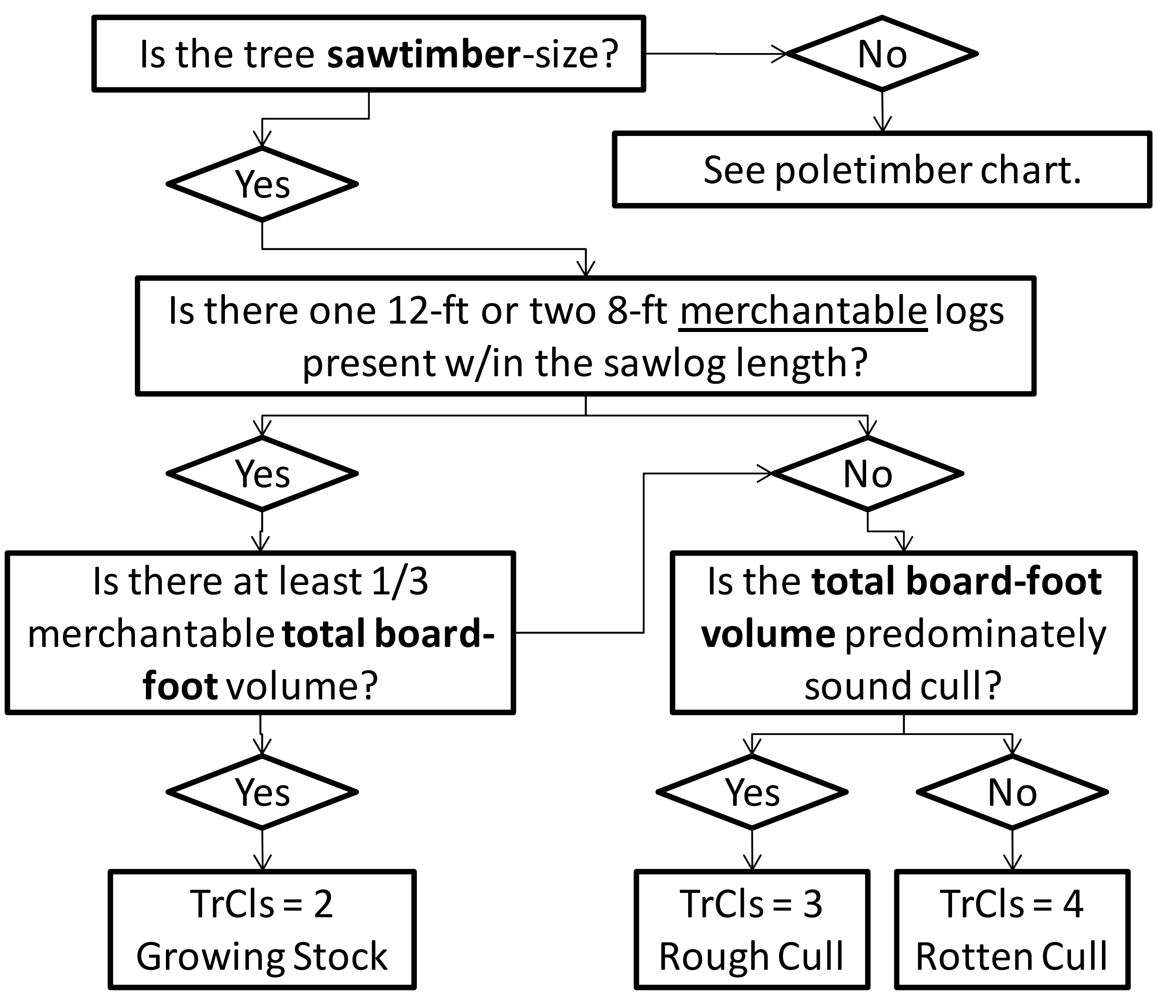
Values: 2 – 4

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.

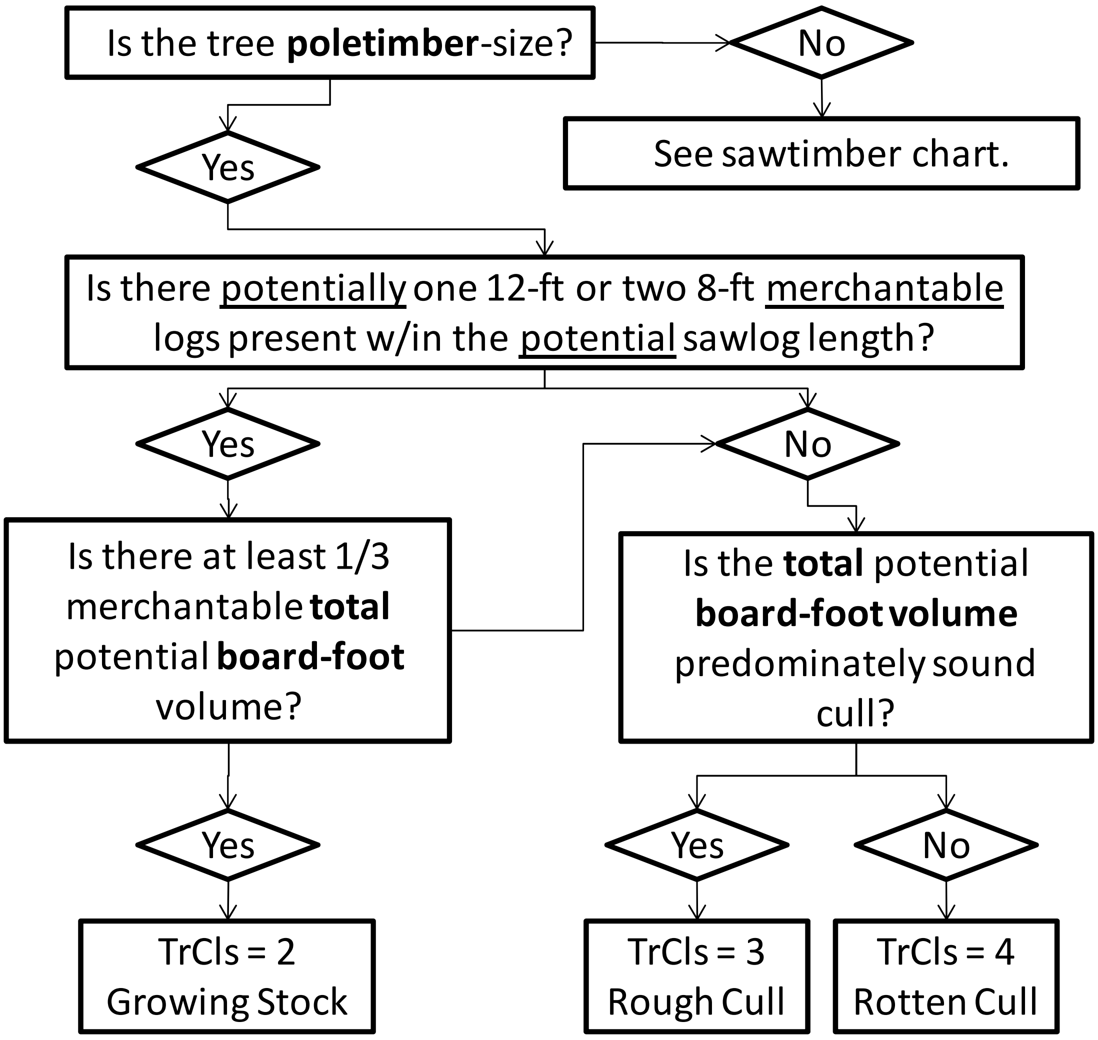
3 Rough cull — Trees that do not contain at least one 12-foot sawlog or two 8-foot logs now or prospectively, primarily because of roughness or poor form. Less than 1/3 of its gross board-foot volume meets size, soundness, and grade requirements and less than 1/2 of the cubic-foot cull is rotten or unsound.

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 15a. Sawtimber-size TREE CLASS flow chart.



SRS Figure 15b. Poletimber-size TREE CLASS flow chart.



5.29 SRS TREE GRADE **[Grade]**

Record the code indicating the grade of the tree. See Supplement A for full description of procedures.

On naturally swelled-butted trees (e.g., baldcypress, pondcypress, water tupelo, swamp tupelo, Carolina ash), TREE GRADE 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.

This variable is not collected in WTX.
Values: 1 to 5

Note: In Caribbean, gradable trees will always be assigned grade ‘5’.

5.30 SRS PERCENT BOARD FOOT CULL **[%BdFt]**

Record the percentage of sound and unsound board-foot volume, to the nearest 1 percent. See Appendix 5 for complete procedures and board foot volume tables.

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.

This variable is not collected in WTX.

Values: 00-67

5.31 SRS DIEBACK SEVERITY **[%Die]**

Record the severity of hardwood crown dieback. Record if 10% or more of the crown area is affected. If no dieback is present, or only a minimal amount that does not meet the 10% requirement, code '0'.
Branches dieback from the tips. Just a few branches are affected at first with whole branches dying in the advanced stages. Frequently associated with stress caused by unfavorable environment, especially drought. Record the severity of hardwood crown dieback. Dieback is only considered when it occurs in the upper and outer portions of the tree. Do not code for overtopped trees (CROWN CLASS 5).

This variable is not collected in WTX.

Values: 0 to 9

Code	Class in percent	Code	Class in percent	Code	Class in percent
0	No dieback or minimal dieback present				
1	10-19	4	40-49	7	70-79
2	20-29	5	50-59	8	80-89
3	30-39	6	60-69	9	90-99

5.32 SRS UTILIZATION CLASS **[Util]**

Record the code to identify the utilization class of removal trees.

Values:

1 Commercial utilization – some portion of the tree removed for commercial purposes. Commercial uses include sawlogs, pulpwood, veneer logs, poles, and other products such as firewood cut by commercial firewood operations.

2 Non-commercial utilization – some portion of the tree removed for non-commercial purposes. Non-commercial uses include domestic firewood use, barn poles, fence posts, domestic landscaping, rough slabs, etc.

5.33 SRS SPECIES CODE **[SpSRS]**

Record the appropriate SRS SPECIES code from the list below. SRS SPECIES should be recorded when SPECIES = 999. If the species is not on the list below, but is a tree species that should be recorded, enter SRS SPECIES code 99 and collect a sample for identification.

Values:

01 Pyrus spp.
02 Pyrus communis (Common pear)
03 Pyrus calleryana (Callery pear)
04 Quercus acutissima (Sawtooth oak)
05 Firmiana simplex (Chinese parasoltree)

5.34 SRS ABNORMAL TERMINATION **[AbTer]**

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).

Values:

0 Stem is not abnormally terminated
1 Stem is abnormally terminated

5.35 SRS SAPLING FUSIFORM **[SapFu]**

For live sapling specie 111, 121 or 131 on the microplot, record the incidence of fusiform occurring on the main stem or on a live branch within 12 inches of the main stem.

Values: See next page

Code	Agent	Description/Threshold
0	None present	
1	Fusiform present	SPECIES 111, 121 or 131 ONLY: Record only those cankers that occur on the main stem or on a live branch within 12 inches of the stem.

6.0 SEEDLING DATA

Regeneration information is obtained by counting live seedlings within the 6.8-foot radius microplot located 90 degrees and 12.0 feet from each subplot center within each of the four subplots. 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 estimated. Only count seedlings occurring in accessible forest land condition classes.

6.1 SUBPLOT NUMBER

Use the same procedures described in Section 3.1.

6.2 SPECIES **[SPP]**

Use the same procedures described in Section 5.8.

Values: See Appendix 3

6.3 CONDITION CLASS NUMBER [**Cond#]**

Use the same procedures described in Section 2.0.

6.4 SEEDLING COUNT **[SCnt]**

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.

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. No additional suckers or sprouts are counted. 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.

Values: 001 through 999

6.5 SRS SPECIES CODE **[SpSRS]**

Record the appropriate SRS SPECIES code from the list below. SRS SPECIES should be recorded when SPECIES = 999. If the species is not on the list below, but is a tree species that should be recorded, enter SRS SPECIES code 99 and collect a sample for identification.

Values:

01	Pyrus spp.
02	Pyrus communis (Common pear)
03	Pyrus calleryana (Callery pear)
04	Quercus acutissima (Sawtooth oak)
05	Firmiana simplex (Chinese parasoltree)

7.0 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.

SRS Note: Site trees are required for all delineated forest conditions when available.

7.1 Site Tree Selection

Select at least one site tree for each accessible forest land condition class where no previous site tree data exist. The absence of site tree data may occur because:

- This is the first visit to the site
- On the previous visit no suitable site tree could be found for the condition
- Since the last visit there has been a change in condition class that renders the previous data incompatible with the current conditions

If a site tree is needed; select tree from a species common to the condition class being sampled, based on the criteria listed below. Select trees off the subplot where possible. Use only trees that have remained in a dominant or co-dominant crown position throughout their entire life span. If possible, trees should be 5.0 inches in diameter, or larger, and at least 20 years old. Trees that are visibly damaged, trees with ring patterns that exhibit signs of suppression, and trees with rotten cores should be rejected. If there are no acceptable site trees, record that in the plot notes and leave this section blank. If a plot has been cut and all suitable site trees have been removed, a site tree may be obtained from an adjacent stand that is similar in site characteristics: forest type, stand origin, physiographic class, slope and aspect.

7.2 Site Tree Data Variables

7.2.1 CONDITION CLASS LIST **[CList]**

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

Values: 1000 to 9876

7.2.2 SPECIES [**SPP]**

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.

Values:

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

Code	**Common Name**	**Region**
	-------------------- Softwood Species --------------------	
0043	Atlantic white-cedar	NE, SO
0107	sand pine	SO
0110	shortleaf pine	NE, NC, SO
0111	slash pine	SO
0121	longleaf pine	SO
0128	pond pine	NE, SO
0129	eastern white pine	NE, NC, SO
0131	loblolly pine	NE, SO
0132	Virginia pine	NE, SO
	-------------------- Hardwood Species --------------------	
0611	sweetgum	NE, NC, SO
0621	yellow-poplar	NE, NC, SO
0742	eastern cottonwood	NE, NC, SO
0802	white oak	NE, NC, SO
0806	scarlet oak	NE, NC, SO

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

Code	Common Name	Region
0812	southern red oak	NE, SO (list continued on next page)
0813	cherrybark oak	NE, SO
0817	shingle oak	NE, NC, SO
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

7.2.3 DIAMETER **[Diam]**
Use the same procedures described in Section 5.9.

Values: 001.0 to 999.9

7.2.4 SITE TREE LENGTH **[Leng]**
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.

Values: 005 to 999

7.2.5 TREE AGE AT DIAMETER **[TrAge]**
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.

Values: 012 to 120 for softwoods; 013 to 120 for hardwoods, and 008 to 120 for longleaf pine

7.2.6 SITE TREE NOTES **[Notes]**
Record notes pertaining to an individual site tree.

Values: English language words, phrases and numbers

7.2.7 SUBPLOT NUMBER (CORE OPTIONAL) **[Sub#]**
Record the subplot number to which the site tree is referenced.

Values:

1	Center subplot
2	North subplot
3	Southeast subplot
4	Southwest subplot

7.2.8 AZIMUTH (CORE OPTIONAL) **[Azi]**
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.

Values: 001 to 360

7.2.9 HORIZONTAL DISTANCE (CORE OPTIONAL) **[Dist]**
Record the measured HORIZONTAL DISTANCE, to the nearest 0.1 foot, from the subplot center to the pith of the tree at the base.

Values: 0001 to 2000

7.2.10 SRS SITE CLASS **[SCla]**
This item will be derived by the data recorder.

Values: 1-7 (calculated by the data recorder)
Site class 1 - 6: ACCESSIBLE FORESTLAND (01)
Site class 7: ACCESSIBLE OTHER FORESTLAND (02)

8.0 PHASE 2 (P2) VEGETATION PROFILE (CORE OPTIONAL)

The Phase 2 (P2) Vegetation data are collected to describe vegetation structure and dominant species composition for vascular plants. The data collected provide a horizontal and vertical estimation of vegetation located within the sample area and provide information about the most abundant species found on the subplot. Information on the abundance, structure, and species composition of understory plant communities has many uses. It can be used to assess wildlife habitat, biomass, forage availability, grazing potential, vegetation competition with tree growth, fuel loadings from understory vegetation, and potential site productivity. The most abundant species provide information to describe plant communities and to predict associated forest stand characteristics. Accurately representing the species present on a site and monitoring their change in abundance in response to forest development, disturbance, or management is therefore important to a wide variety of users. This information is also used to augment forest ecosystem health assessments from P3 plots, in terms of vegetation structure and rates of change of community vascular plant composition.

The P2 Vegetation protocols are core-optional. Each FIA unit determines whether to collect the P2 Vegetation information, and several levels of options must be determined by each unit prior to data collection. Options declared prior to field data collection include P2 VEGETATION SAMPLING STATUS and LEVEL OF DETAIL. P2 VEGETATION SAMPLING STATUS determines if P2 Vegetation is to be collected, and, if so, what lands are included; the unit may choose to collect only on accessible forested conditions or on all accessible conditions found on the plot. The LEVEL OF DETAIL determines if data are collected on structure by growth habit only; or if the most abundant species are also recorded; and whether tally tree species greater than or equal to 5 inches DBH (DRC for woodland species) are included in species records. FIA units collecting species data record information on (up to) the four most abundant species per SPECIES GROWTH HABIT per subplot. The four most abundant species must each have a total aerial canopy cover of at least 3 percent on the subplot and within the SPECIES GROWTH HABIT to be recorded. Most tally tree species greater than or equal to 5 inches DBH/DRC are already measured during tree tally, but some units may choose to also record visual estimates of canopy cover for them. Regardless of the LEVEL OF DETAIL, the protocols for the P2 Vegetation Profile will be implemented in such a way that basic structure and species data can be compared across the nation.

8.1 Vegetation Sampling Design

The core optional P2 Vegetation Profile includes measurements of *Vegetation Structure* (8.4) – canopy cover by layer and total aerial canopy cover of each growth habit – with additional options to collect *Species Composition* (8.5) data on the (up to) 4 most abundant species in each SPECIES GROWTH HABIT.

P2 Vegetation is sampled on accessible condition classes within the 24.0-foot radius subplot. Inventory units implementing the P2 Vegetation Profile determine if they will include accessible forestland conditions, or any accessible land conditions (P2 VEGETATION SAMPLING STATUS). If the area of an accessible condition class is less than 100 percent on a subplot, P2 Vegetation measurements are recorded only on the portion that is in the accessible condition class(es). If multiple accessible condition classes are present on the subplot, separate estimates are made for each accessible condition class on the subplot. Prior to implementation, inventory units must also determine the LEVEL of DETAIL they will collect, so that regional field guides and PDR programs can be customized to ensure quality data is collected in the most efficient manner possible. All units implementing the P2 Vegetation Profile will collect LEVEL OF DETAIL = 1, *Vegetation Structure*. LEVEL OF DETAIL = 2 and 3 are optional and include *Species Composition* data.

The P2 Vegetation Profile is best recorded when all plant species are fully leafed out. However, crews may end up visiting plots early in the season before leaves are fully expanded or late in the season when plants are beginning to senesce. Notes can be added to subplot records indicating unusual phenological conditions. Crews should not collect P2 Vegetation data when snow covers the subplot (see 1.22.1 P2 VEG SUBPLOT SAMPLE STATUS).

8.2 General definitions

Canopy Cover – Canopy cover is defined as the area of ground surface covered by a vertical projection of the canopy of a vascular plant. The canopy is described by a polygon surrounding the outer edges of the foliage (fig. 45), without subtracting any normal spaces occurring between the leaves of plants (Daubenmire 1959[1]). Overlapping crowns are not double-counted (visualize the canopy cover collapsed into a 2-dimensional space); the maximum possible canopy cover is the percentage of the subplot area within the accessible condition.

All canopy cover estimates are focused on foliage within the sampled accessible condition class(es) within the subplot perimeter (24.0-foot radius, horizontal distance). Canopy cover is estimated for each sampled accessible condition of the subplot. If multiple sampled accessible conditions occur on a subplot, treat the condition boundary as a vertical wall on the plot: **plant foliage is included in the condition it is hanging over**, even if the plant is rooted in a different condition. However, the canopy **cover value is always estimated as a percentage of an entire subplot**. That is, if the canopy cover within the accessible condition is about equal to a circle with a radius of 5.3 feet, the canopy cover estimate will always be 5 percent, even if only 30 percent of the subplot is in the accessible condition on which the canopy cover is being measured.

Canopy cover is collected by height layer and as a total (aerial view) across all layers for each growth habit in *Vegetation Structure* (8.4). For each layer, examine the canopy cover of each Structure Growth Habit as if the other growth habits and other layers do not exist. If a Structure Growth Habit does not have foliage in a layer, enter 0 (do not count tree boles as cover). For total aerial canopy cover by Structure Growth Habit, examine each growth habit individually as if the other growth habits do not exist. Total aerial canopy cover is collected for each most abundant species in *Species Composition* (8.5); examine each species individually, as if the other species do not exist**.**

Canopy cover is estimated to the nearest 1 percent. For *Vegetation Structure* assessments, canopy cover >0 and ≤1 percent is coded as 1 percent (i.e,. trace amounts are coded as 1%). For *Species Composition* assessments, a species must have at least 3 percent total aerial canopy cover (i.e. do not round total aerial canopy cover <3% up to 3%).

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

Canopy cover is vertically projected from the outline of the foliage **at the time of plot visit.** All foliage that is or was alive during the current growing season is included in the cover estimates. Canopy cover from broken tops and stems is included, unless completely detached. Do not ocularly upright leaning trees.

See tabulation below for canopy cover to area relationships for a 1/24 acre subplot and figure 45 for additional visual calibrations.

Cover	Area (ft^2)	Square length on side (ft)	Circle radius (ft)
1%	18	4.3	2.4
3%	54	7.4	4.2
5%	90	9.5	5.4
10%	181	13.4	7.6
15%	271	16.5	9.3
20%	362	19.0	10.7
25%	452	21.3	12.0
50%	905	30.1	17.0

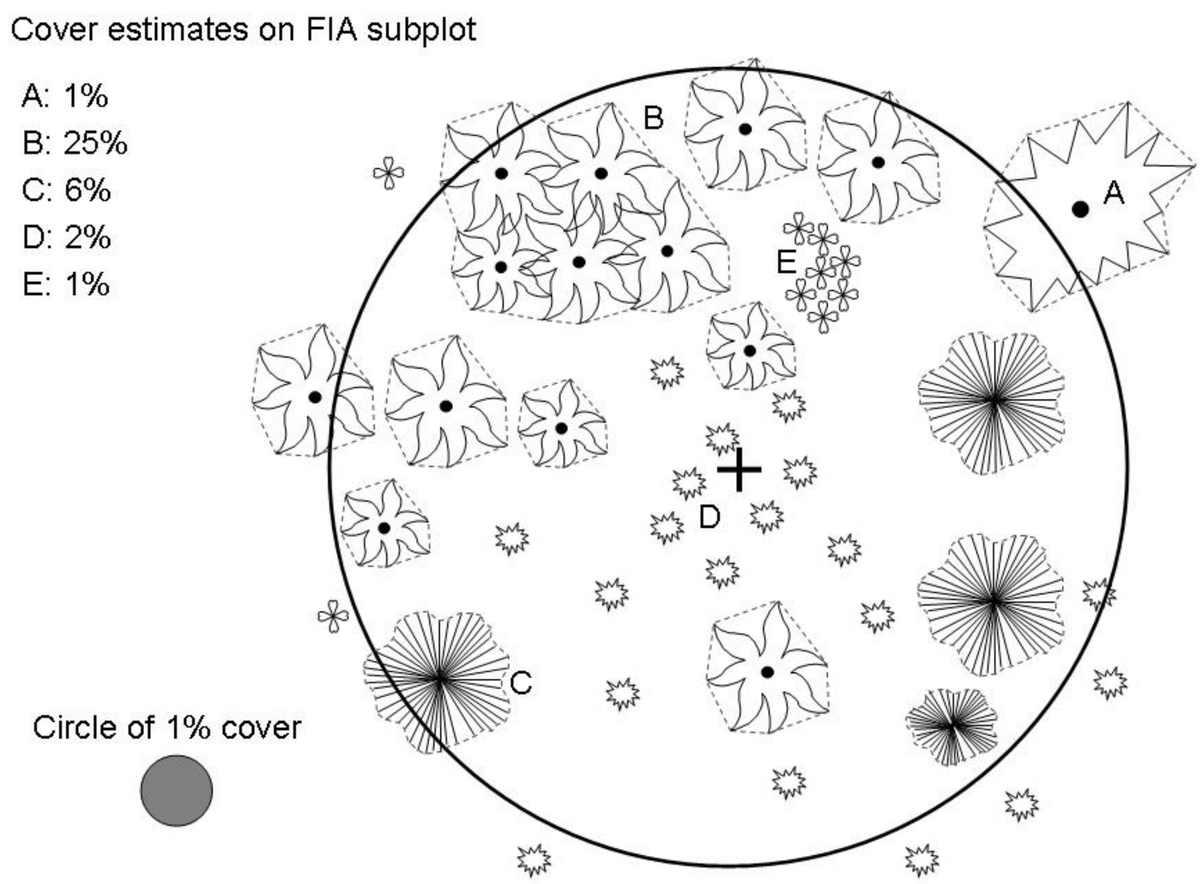


Figure 44. Assessing canopy cover.

Growth Habits – P2 Vegetation data are collected by growth habits at each LEVEL OF DETAIL. In general, growth habits for vascular plants include trees, shrubs/subshrubs/woody vines, forbs, and graminoids.

However, depending on the LEVEL OF DETAIL, **trees** are grouped in different ways. *Vegetation Structure* (8.4) tree Structure Growth Habits are determined by regional core/core-optional tree species lists; *Species Composition* (8.6) tree SPECIES GROWTH HABITs are determined by DBH/DRC. See sections 8.4 and 8.5 for more detail.

Layer Codes – Structure Growth Habits are assessed by layers in *Vegetation Structure* (8.4), and one of the following layer codes will be assigned to individual plant species' SPECIES GROWTH HABITs in *Species Composition* (8.5). Measure the layer height from ground level; see figure 46 for examples of measuring layer heights on sloping and uneven ground.

Layer 1	0 to 2.0 feet
Layer 2	2.1 to 6.0 feet
Layer 3	6.1 to 16.0 feet
Layer 4	Greater than 16 feet

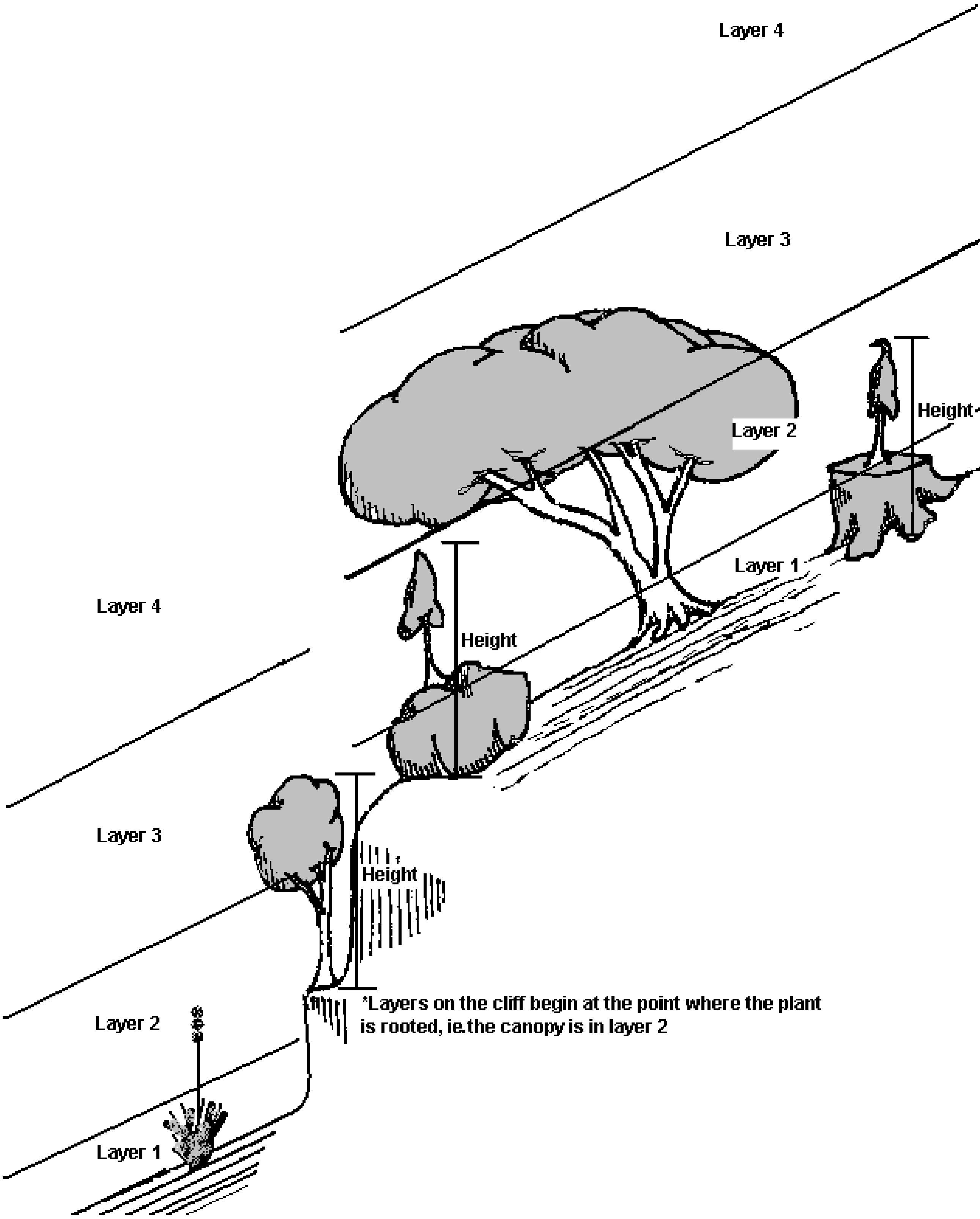


Figure 45. To determine the layer of a plant, measure the height of the layer from the ground.

NRCS PLANTS database – The Natural Resource Conservation Service (NRCS) PLANTS Database provides standardized information about the vascular plants, mosses, liverworts, hornworts, and lichens of the U.S. and its territories. It includes names, plant symbols, checklists, distributional data, species abstracts, characteristics (including growth habits), images, crop information, automated tools, onward Web links, and references:

USDA, NRCS. 2010. The PLANTS Database (http://plants.usda.gov, 1 January 2010). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

FIA currently uses a stable code set downloaded in January of 2010.

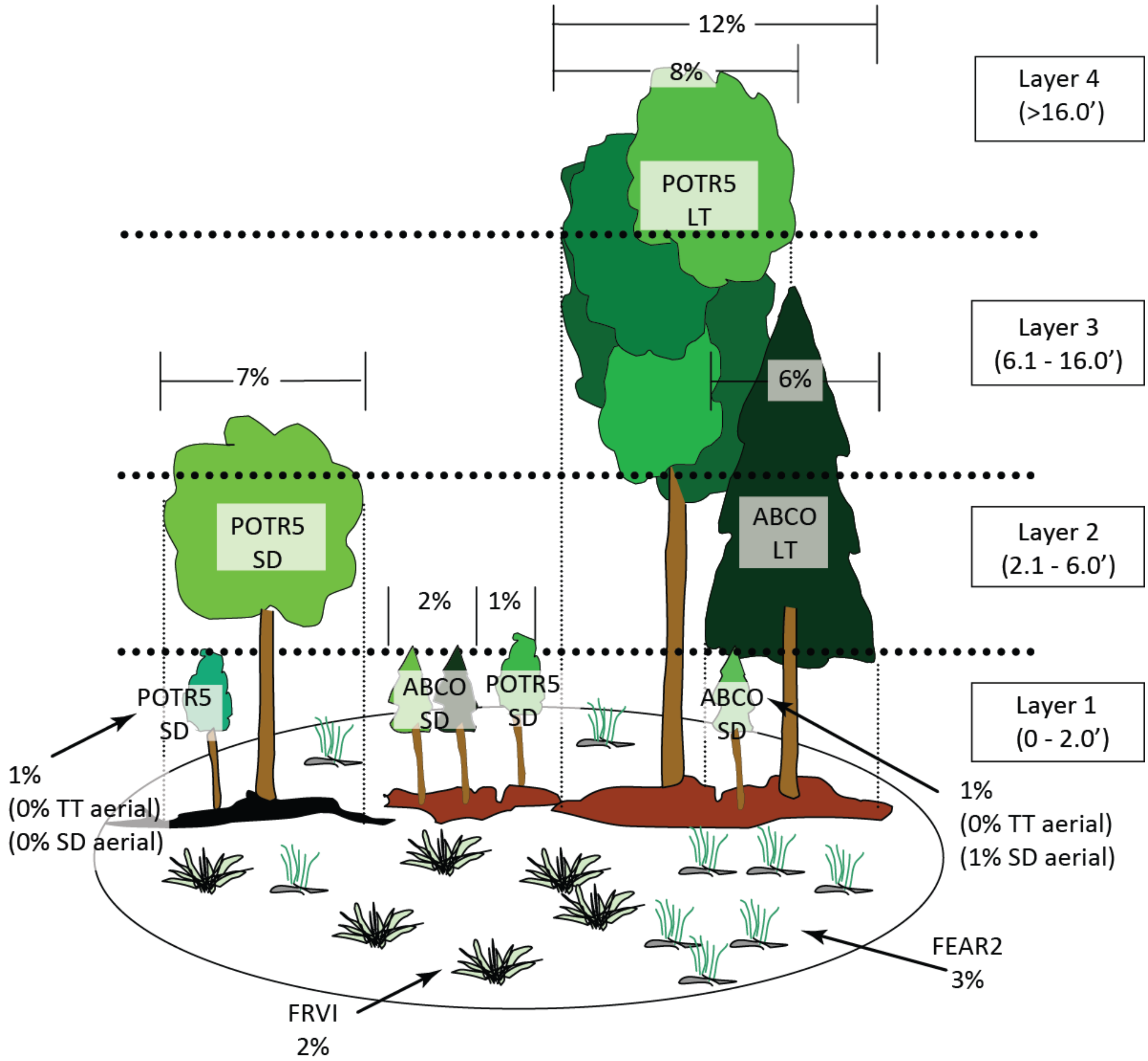


Figure 46. Example of growth habit by layer and species composition.

Table 1-Estimation of canopy cover by layer and aerial view of each Structure Growth Habit in figure 47

Vegetation Structure Growth Habit	Layer 1 (0-2.0 ft)	Layer 2 (2.1-6.0 ft)	Layer 3 (6.1-16.0 ft)	Layer 4 (>16.0 ft)	Aerial
			Percent canopy cover		
Tally tree sp (TT)	005	013	019	008	022
Non-tally tree sp (NT)	000	000	000	000	000
Shrub/Subshrub/Woody Vine (SH)	000	000	000	000	000
Forb (FB)	002	000	000	000	002
Graminoid (GR)	003	000	000	000	003

Table 2-Estimation of total aerial canopy cover by species in figure 47

Level of Detail	Species Growth Habit	Species Code	Cover	Layer
2	GR	FEAR2	003	1
2	SD	ABCO	003	1
2	SD	POTR5	008	3
3	LT	POTR5	008	4
3	LT	ABCO	006	2

Note: FRVI, estimated at 2%, was not recorded, and ABCO and POTR5 are present as two different SPECIES GROWTH HABITs (seedling/sapling and large tree) with at least 3% total aerial canopy cover within the SPECIES GROWTH HABIT on the subplot.

8.3 Vegetation Data Collection Location – Subplot-Level Variables

8.3.1 SUBPLOT NUMBER

Record the code corresponding to the number of the subplot.

Values:

1 Center subplot
2 North subplot
3 Southeast subplot
4 Southwest subplot

8.3.2 CONDITION CLASS NUMBER **[Cond]**

Record the number for the sampled accessible condition class in which the vegetation is found. If multiple sampled accessible conditions occur on the same subplot, data will be collected for each accessible condition separately.

Values: 1 to 9

8.4 Vegetation Structure

In this section, use ocular methods to estimate canopy cover by layer and aerial view cover for each Structure Growth Habit, and record to the nearest percent (canopy cover >0 and <1% is coded as 1%; i.e., trace amounts are coded as 1%.)

Canopy cover by layer:
Estimate the canopy cover in each Structure Growth Habit for each of the four layers. Include Structure Growth Habits with foliage present on the accessible condition and with foliage overhanging the accessible condition. For each layer canopy cover, examine the canopy cover of each Structure Growth Habit as if the other growth habits and other layers do not exist. Do not double-count overlapping crowns within a Structure Growth Habit; visualize the canopy cover within the layer collapsed into a 2-dimensional space. If a Structure Growth Habit does not have foliage in a layer, enter 0 (do not count tree boles as cover).

Aerial View Coverage:
Determine the total aerial canopy cover by Structure Growth Habit. .Examine each Structure Growth Habit individually as if the other growth habits do not exist. Do not double-count overlapping crowns within a Structure Growth Habit (maximum cover = the percentage of the subplot area in the accessible condition.)

The total aerial canopy cover for a Structure Growth Habit must be equal to or greater than the highest canopy cover recorded for an individual layer in that growth habit, but cannot be greater than the sum of the canopy covers recorded for all the layers in that growth habit.

Vegetation Structure Growth Habits:
Apply the definitions that follow based on the species and appearance of the plants **on the subplot-condition** (i.e., do not put the same species in multiple Structure Growth Habits on the same subplot-condition.) If a tree species has been selected as a tally tree species by the particular FIA unit, always record that species in the tally tree species growth habit (TT), even if it grows as a shrub in some environments. Woody plants **not** on the unit's tally tree species list may have a tree growth habit in some environments, and these should be recorded as non-tally tree species (NT). If the growth habit is shrub in another environment, record that species as a shrub (SH). The definitions (adapted from NRCS PLANTS) are:

TT **Tally Tree Species (TT):** All core tree species **and** any core optional tree species selected by a particular FIA unit. Any plant of that species is included, regardless of its shape and regardless of whether it was tallied on the subplot or microplot during tree tally. Seedlings (any length, no minimum), saplings, and mature plants are included.
NT **Non-tally Tree Species (NT):** Tree species not on a particular FIA unit's tree tally list that are woody plants with a single well-defined, dominant main stem, not supported by other vegetation or structures (not vines), and which are, or are expected to become, greater than 13 feet in height. Seedlings (any length, no minimum), saplings, and mature plants are included.
SH **Shrubs/Subshrubs/Woody Vines (SH):** Woody, multiple-stemmed plants of any size, subshrubs (low-growing shrubs under 1.5 feet tall at maturity), and woody vines. Most cacti are included in this category.
FB **Forbs (FB):** Herbaceous, broad-leaved plants; includes non-woody-vines, ferns (does not include mosses and cryptobiotic crusts).
GR **Graminoids (GR):** Grasses and grass-like plants (includes rushes and sedges).

8.4.1 TALLY TREE SPECIES COVER LAYER 1 **[TT%L1]**

Record canopy cover for all tally tree species in layer 1 (0-2.0 feet) to the nearest percent. Canopy cover includes all tally tree species present, regardless of DBH or DRC.

Values: 000-100

8.4.2 TALLY TREE SPECIES COVER LAYER 2 **[TT%L2]**

Record canopy cover for all tally tree species in layer 2 (2.1- 6.0 feet) to the nearest percent. Canopy cover includes all tally tree species present, regardless of DBH or DRC. Follow the same procedures as for TALLY TREE SPECIES COVER LAYER 1.

8.4.3 TALLY TREE SPECIES COVER LAYER 3 **[TT%L3]**
Record canopy cover for all tally tree species in layer 3 (6.1- 16.0 feet) to the nearest percent. Canopy cover includes all tally tree species present, regardless of DBH or DRC. Follow the same procedures as for TALLY TREE SPECIES COVER LAYER 1.

8.4.4 TALLY TREE SPECIES COVER LAYER 4 **[TT%L4]**
Record canopy cover for all tally tree species in layer 4 (16.1 feet and above) to the nearest percent. Canopy cover includes all tally tree species present, regardless of DBH or DRC. Follow the same procedures as for TALLY TREE SPECIES COVER LAYER 1.

8.4.5 TALLY TREE SPECIES COVER – AERIAL VIEW **[TT%Ar]**
Record the total aerial canopy cover for all tally tree species over all layers. Canopy cover includes all tally tree species present, regardless of DBH or DRC. Follow the same procedures as for TALLY TREE SPECIES COVER LAYER 1, but include all layers.

8.4.6 NON-TALLY TREE SPECIES COVER LAYER 1 **[NT%L1]**
Record canopy cover for species **not** on the tally tree species list with tree growth habit in layer 1 (0-2.0 feet) to the nearest percent. Canopy cover includes all non-tally tree species present, regardless of DBH or DRC.

Values: 000-100

8.4.7 NON-TALLY TREE SPECIES COVER LAYER 2 **[NT%L2]**
Record canopy cover for species **not** on the tally tree species list with tree growth form in layer 2 (2.1- 6.0 feet) to the nearest percent. Canopy cover includes all non-tally tree species present, regardless of DBH or DRC. Follow the same procedures as for NON-TALLY TREE SPECIES COVER LAYER 1.

8.4.8 NON-TALLY TREE SPECIES COVER LAYER 3 **[NT%L3]**
Record canopy cover for species **not** on the tally tree species list with tree growth form in layer 3 (6.1- 16.0 feet) to the nearest percent. Canopy cover includes all non-tally tree species present, regardless of DBH or DRC. Follow the same procedures as for NON-TALLY TREE SPECIES COVER LAYER 1.

8.4.9 NON-TALLY TREE SPECIES COVER LAYER 4 **[NT%L4]**
Record canopy cover for species **not** on the tally tree species list with tree growth habit in layer 4 (16.1 feet and above) to the nearest percent. Canopy cover includes all non-tally tree species present, regardless of DBH or DRC. Follow the same procedures as for NON-TALLY TREE SPECIES COVER LAYER 1.

8.4.10 NON-TALLY TREE SPECIES COVER – AERIAL VIEW **[NT%Ar]**
Record the total aerial canopy cover for species **not** on the tally tree species list with tree growth habit over all layers. Canopy cover includes all non-tally tree species present, regardless of DBH or DRC. Follow the same procedures as for NON-TALLY TREE SPECIES COVER LAYER 1, but include all layers.

8.4.11 SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 1 **[SV%L1]**
Record canopy cover for shrubs/subshrubs/woody vines in layer 1 (0-2.0 feet) to the nearest percent.

Values: 000-100

8.4.12 SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 2**[SV%L2]**
Record canopy cover for shrubs/subshrubs/woody vines in layer 2 (2.1-6.0 feet) to the nearest percent. Follow the same procedures as for SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 1.

8.4.13 SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 3 **[SV%L3]**
Record canopy cover for shrubs/subshrubs/woody vines in layer 3 (6.1-16.0 feet) to the nearest percent. Follow the same procedures as for SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 1.

8.4.14 SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 4 **[SV%L4]**
Record canopy cover for shrubs/subshrubs/woody vines in layer 4 (16.1 feet and above) to the nearest percent. Follow the same procedures as for SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 1.

8.4.15 SHRUB, SUBSHRUB, AND WOODY VINE COVER—AERIAL VIEW **[SV%Ar]**
Record the total aerial canopy cover for the shrub/subshrub/woody vine growth habit over all layers. Follow the same procedures as for SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 1, but include all layers.

8.4.16 FORB COVER LAYER 1 **[Fb%L1]**
Record canopy cover for forbs in layer 1 (0-2.0 feet) to the nearest percent.

Values: 000-100

8.4.17 FORB COVER LAYER 2 **[Fb%L2]**
Record canopy cover for forbs in layer 2 (2.1-6.0 feet) to the nearest percent. Follow the same procedures as for FORB COVER LAYER 1.

8.4.18 FORB COVER LAYER 3 **[Fb%L3]**
Record canopy cover for forbs in layer 3 (6.1-16.0 feet) to the nearest percent. Follow the same procedures as for FORB COVER LAYER 1.

8.4.19 FORB COVER LAYER 4 **[Fb%L4]**
Record canopy cover for forbs in layer 4 (16.1 feet and above) to the nearest percent. Follow the same procedures as for FORB COVER LAYER 1.

8.4.20 FORB COVER—AERIAL VIEW **[Fb%Ar]**
Record the total aerial canopy cover for the forb growth habit over all layers. Follow the same procedures as for FORB COVER LAYER 1, but include all layers.

8.4.21 GRAMINOID COVER LAYER 1 **[Gr%L1]**
Record canopy cover for graminoids in layer 1 (0-2.0 feet) to the nearest percent.

Values: 000-100

8.4.22 GRAMINOID COVER LAYER 2 **[Gr%L2]**
Record canopy cover for graminoids in layer 2 (2.1-6.0 feet) to the nearest percent. Follow the same procedures as for GRAMINOID COVER LAYER 1.

8.4.23 GRAMINOID COVER LAYER 3 **[Gr%L3]**
Record canopy cover for graminoids in layer 3 (6.1-16.0 feet) to the nearest percent. Follow the same procedures as for GRAMINOID COVER LAYER 1.

8.4.24 GRAMINOID COVER LAYER 4 **[Gr%L4]**
Record canopy cover for graminoids in layer 4 (16.1 feet and above) to the nearest percent. Follow the same procedures as for GRAMINOID COVER LAYER 1.

8.4.25 GRAMINOID COVER—AERIAL VIEW **[Gr%Ar]**
Record the total aerial canopy cover for the graminoid growth habit over all layers. Follow the same procedures as for GRAMINOID COVER LAYER 1, but include all layers.

8.5 Species Composition

Species are recorded when LEVEL OF DETAIL = 2 or 3. Identify the (up to) four most abundant species within each SPECIES GROWTH HABIT (tree seedlings and saplings, shrubs/subshrubs/woody vines, forbs, graminoids, and large trees) that occupy 3 percent or greater total aerial canopy cover on the subplot and within the SPECIES GROWTH HABIT (do not round total aerial canopy cover <3% up to 3%.) Although up to four species per SPECIES GROWTH HABIT can be recorded, crews should not spend more than 5 minutes searching for additional species when less than four species are not readily observable. The methods described assume that only one field crew member per plot is entering P2 Vegetation Profile data.

When there are multiple accessible conditions within a subplot, the species must be present at 3 percent or more total aerial canopy cover on the full 24-foot radius subplot and within the SPECIES GROWTH HABIT in order to be recorded. If part of the subplot is a non-sampled condition (e.g., nonforest condition, not sampled for P2 Vegetation because 8.3.1 P2 VEGETATION SAMPLING STATUS = 1; or inaccessible condition, not sampled because 2.1.1 CONDITION CLASS STATUS = 5), estimate total aerial canopy cover for the full subplot if possible; otherwise assume the species canopy cover is the same on the non-sampled portion. If a species is present at 3 percent total aerial canopy cover or more on the full subplot and within the SPECIES GROWTH HABIT, record SPECIES GROWTH HABIT, SPECIES CANOPY COVER, and SPECIES VEGETATION LAYER separately for each accessible condition,. SPECIES CANOPY COVER values less than 3 percent for an accessible condition are valid as long as the total aerial canopy cover of the species on the full subplot and within the SPECIES GROWTH HABIT is at least 3 percent. See figure 47 for an example of species total aerial canopy cover estimation. See figure 48 for a *Species Composition* subplot flow.

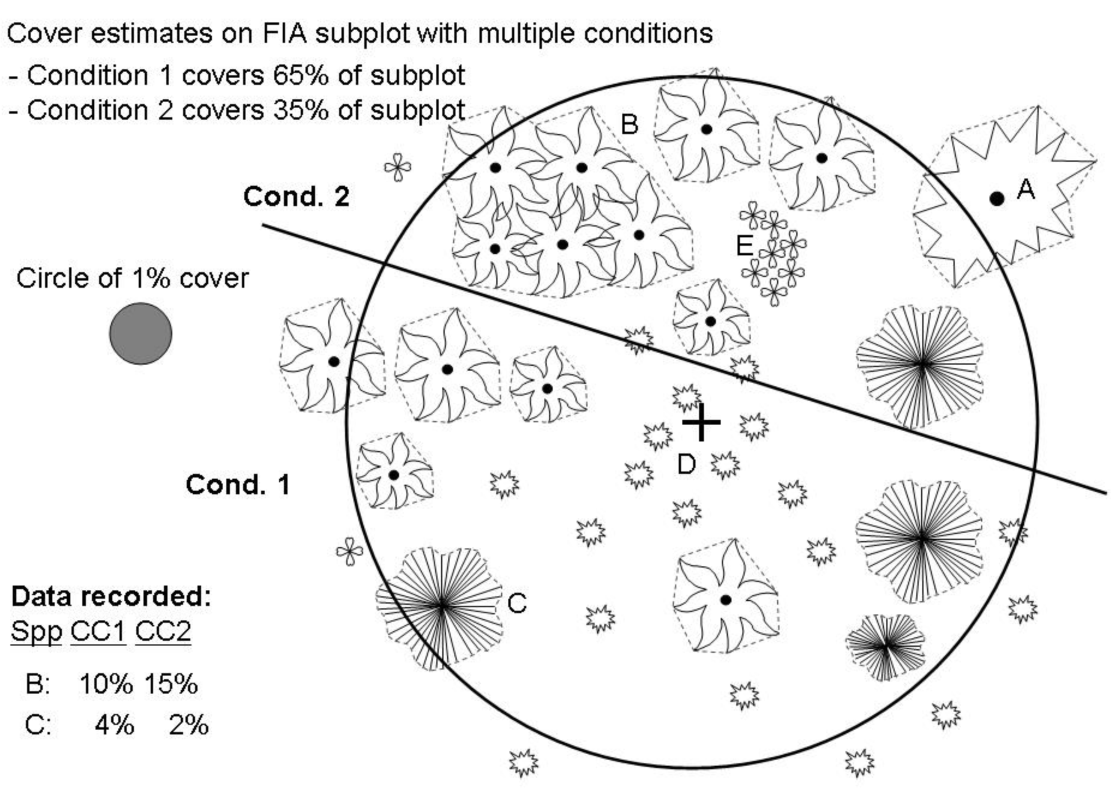


Figure 47. Example of species total aerial canopy cover estimation on a subplot with 2 accessible conditions. See figure 44 for total aerial canopy cover across the subplot. In figure 44, species A, D, and E would be included in estimates of *Vegetation Structure* by Structure Growth Habit, but not recorded for *Species Composition*. Note that species with subplot total aerial canopy cover <3% are not recorded, but that SPECIES CANOPY COVER recorded on an accessible condition can be less than 3%.

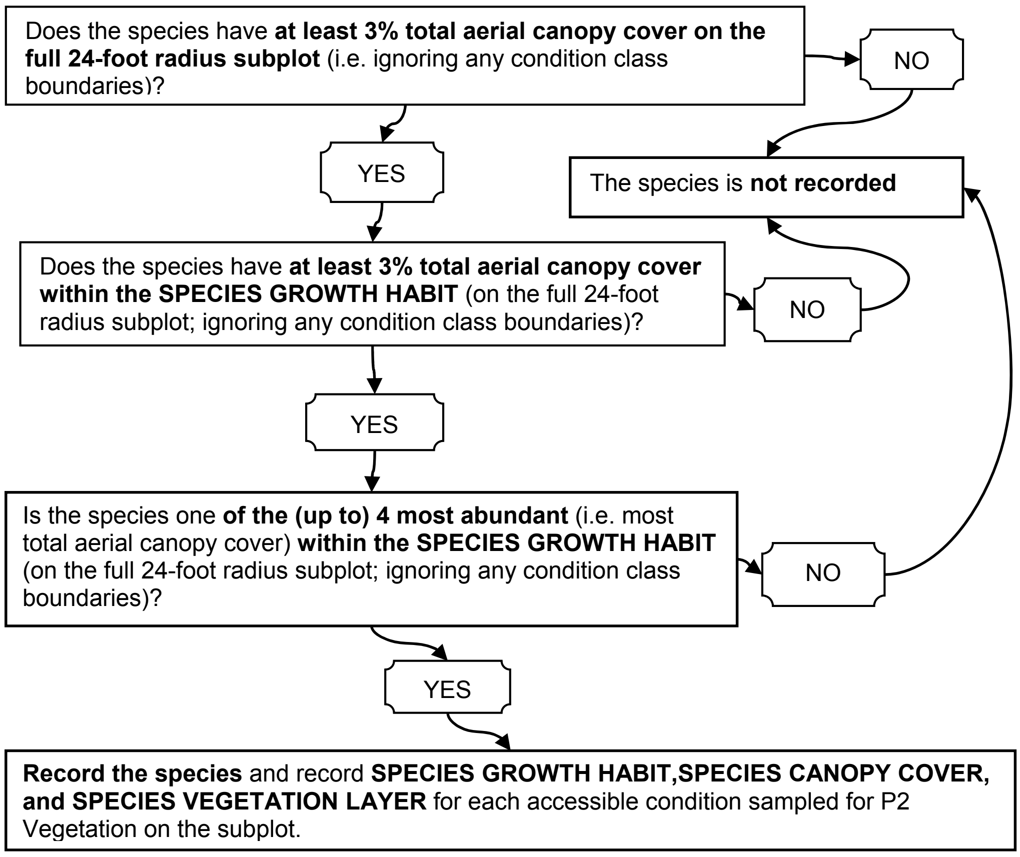


Figure 48. *Species Composition* subplot flow chart.

8.5.1 SPECIES GROWTH HABIT

Record the growth habit of the species. Because many species can exhibit more than one growth habit, it is important to note which growth habit each recorded species is demonstrating on each accessible condition in a subplot (subplot-condition).

Tally tree species[2] are always recorded as seedling/sapling (SD) and/or large tree (LT) SPECIES GROWTH HABITs, even when they exhibit a shrub-like growth habit in some environments.

Non-tally tree species[3] are recorded as seedling/sapling (SD) and/or large tree (LT) SPECIES GROWTH HABITs when they exhibit a tree-like growth habit; and are recorded as shrub (SH) SPECIES GROWTH HABIT when they exhibit a shrub-like growth habit.

A species may be recorded with a different SPECIES GROWTH HABIT on a different subplot-condition on the same subplot. If a species has more than one growth habit on an accessible condition in a subplot, record the one SPECIES GROWTH HABIT that is most prevalent within the subplot-condition (except for tally and non-tally tree species).

For tally and non-tally tree species, both tree SPECIES GROWTH HABITs (SD and LT) are coded for the same species within the subplot-condition the species has a total aerial canopy cover of at least 3% in each SPECIES GROWTH HABIT.

Values:

SD Seedlings and Saplings: Small trees less than 5 inches DBH or DRC (refer to field guide sections 5.9.2 and 5.9.4), including tally and non-tally tree species. Seedlings of any length are included (i.e., no minimum.) Up to four species are recorded if individual species total aerial canopy cover is at least 3% on the subplot and within the SPECIES GROWTH HABIT.

SH Shrubs/Subshrubs/Woody Vines: Woody, multiple-stemmed plants of any size, subshrubs (low-growing shrubs under 1.5 feet tall at maturity), and woody vines. Most cacti are included in this category. Subshrub species are usually included in this category. However, there are many species that can exhibit either subshrub or forb/herb growth habits. Each FIA region will develop a list of common species that can exhibit either growth habits (according to the NRCS PLANTS database) with regional guidance as to which growth habit the species should normally be assigned, while still allowing species assignments to different growth habits when the species is obviously present in a different growth habit. Up to four species are recorded if individual species total aerial canopy cover is at least 3% on the subplot and within the SPECIES GROWTH HABIT.

FB Forbs: Herbaceous, broad-leaved plants; includes non-woody-vines, ferns (does not include mosses and cryptobiotic crusts). Up to four species are recorded if individual species total aerial canopy cover is at least 3% on the subplot and within the SPECIES GROWTH HABIT.

GR Graminoids: Grasses and grass-like plants (includes rushes and sedges). Up to four species are recorded if individual species total aerial canopy cover is at least 3% on the subplot and within the SPECIES GROWTH HABIT

LT Large Trees: Large trees greater than or equal to 5 inches DBH or DRC (refer to field guide sections 5.9.2. and 5.9.4). For LEVEL OF DETAIL = 2,include only non-tally tree species; for LEVEL OF DETAIL = 3, include tally and non-tally tree species. Up to four species of large trees (DBH or DRC at least 5 inches) are recorded if individual species aerial canopy cover is at least 3% on the subplot and within the SPECIES GROWTH HABIT.

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[2] All core tree species **and** any core optional tree species selected by a particular FIA unit.
[3] Tree species not on a particular FIA unit's tree tally list that are woody plants with a single well-defined dominant stem, not supported by other vegetation or structures (not vines), and which are, or are expected to become, greater than 13 feet in height.

8.5.2 SPECIES CODE

Record a code for each most abundant (see section 8.5) vascular plant species. Species codes must be the standardized codes in the Natural Resource Conservation Service (NRCS) PLANTS database (currently January 2010 version). Identification to species only is expected. However, if subspecies information is known, enter the appropriate NRCS code. For graminoids, genus and unknown codes are acceptable, but do not lump species of the same genera or unknown code. For example, if several unknown CAREX species are present, only record the individual most abundant species.

If a plant cannot be identified quickly and confidently, assign a NRCS PLANTS genus or unknown code appropriate to the species. Collect a specimen away from the subplot unless the species is locally sparse or another SPECIMEN NOT COLLECTED REASON CODE (8.5.8) applies. A species is “locally sparse” if 5 or fewer plants are present in the entire plot (4 subplots) and immediate surrounding area. A species may be sparse and still meet the criteria for inclusion in species composition, but this will be rare. See appendix 10, Unknown Specimen Collection.

Acceptable unknown codes

Code	Common Name
2FERN	Fern or Fern Ally
2FORB	Forb (herbaceous, not grass nor grasslike)
2FD	Forb, dicot
2FM	Forb, monocot
2GRAM	Graminoid (grass or grasslike)
2GA	Grass, annual
2GP	Grass, perennial
2GL	Grass-like, (sedges and rushes)
2PLANT	Plant
2SHRUB	Shrub (>0.5m)
2SUBS	Subshrub (<0.5m)
2TREE	Tree
2VH	Vine, herbaceous
2VW	Vine, woody

Values: Accepted NRCS species code when the species is known, or an accepted NRCS genus or unknown code when the species is not known

8.5.3 UNIQUE SPECIES NUMBER

When any code is entered for the first time on a plot, it is assigned UNIQUE SPECIES NUMBER = 1. If more than one unidentified species is discovered that is described by the same genus or unknown code, the next sequential number is assigned. If a recorded unidentified species is encountered again elsewhere on the plot, the field crew records the species with the same genus or unknown code with the same unique species number.

Values: 1-99, assigned in sequential numbers

8.5.4 SPECIES CANOPY COVER

For each species recorded, estimate and record the total aerial canopy cover present on the subplot-condition to the nearest 1 percent. Examine each species individually as if the other species do not exist. When recording SPECIES CANOPY COVER for seedlings and saplings (SPECIES GROWTH HABIT = SD), do not include any canopy cover from trees greater than or equal to 5 inches DBH (DRC for woodland species), regardless of how close to the ground the canopy cover extends A separate estimate is made for the SPECIES CANOPY COVER of trees greater than or equal to 5 inches DBH/DRC (SPECIES GROWTH HABIT = LT).

Values: 001-100

8.5.5 SPECIES VEGETATION LAYER

For each individual species recorded, assign one of the vegetation layers. These layers illustrate the vertical diversity of the most abundant species found on the subplot.

Assign each plant species record to only one of the vegetation layers per SPECIES GROWTH HABIT per subplot-condition. If a plant species is found in more than one layer, assign the species to the layer where most of the canopy cover occurs. If a species occupies multiple layers equally, assign the highest of the equally occupied layers. If a plant has a seed head that grows much taller than the rest of the plant, record the layer that the main part of the plant is in, not the top of the seed head.

Values: 1-4

1 0 to 2.0 feet
2 2.1 to 6.0 feet
3 6.1 to 16.0 feet
4 Greater than 16 feet

8.5.6 SPECIMEN OFFICIALLY COLLECTED

Record a code to indicate whether or not a specimen was collected for each species, genus or unknown code entered as a new unique species.
Values:

0 No, a specimen was not collected
1 Yes, a specimen was collected

8.5.7 SPECIMEN LABEL NUMBER
Record the label number for the collected specimen. Pre-numbered labels are provided to each crew by the regional coordinator or auto-generated with the data collection software.

Values: 1 to 99999, as pre-printed and assigned by region or auto-generated in the PDR

8.5.8 P2 SPECIMEN NOT COLLECTED REASON CODE
Record the code that describes why a specimen has not been collected.

Values:

01	Species is locally sparse (fewer than 5 individual plants in area of the plot)
02	Species has no mature foliage or reproductive parts present, so is unlikely to be identifiable if collected.
03	Hazardous situation
04	Time limitation
05	Wilderness or reserved land where plant collections are not allowed
06	Specimen collected for immediate/local identification
07	Not required by inventory unit
10	Other (explain in notes)

8.5.9 VEGETATION SPECIES NOTES **[Notes]**
Notes may be entered for any species encountered, but are required for each new species that is not identified. Enter text that describes the species. This text may be used in the specimen label and unknown report.

Values: English language words, phrases, and numbers

9.0 INVASIVE PLANTS

The objectives of the Phase 2 (P2) invasive plants protocol are to document abundance and monitor changes in abundance of selected species over time. Combined with other plot data and other datasets, 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 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.

9.1 Invasive species sample design

Phase 2 sampling of invasive species is most often focused on accessible forest condition classes within the 24.0-foot radius subplot. If the total area of all accessible forest land condition classes is less than 100 percent on a subplot, **invasive species measurements are done only on the portion that is in accessible forest land condition classes**. If multiple accessible forested condition classes are present on the subplot, separate estimates are made for each condition class on the subplot. Canopy cover estimates are only made for the area within accessible forest condition(s)—for example, vegetation cover over-hanging a nonforest road condition <u>is not included</u> in the estimate.

However, each FIA unit has the **option to also sample invasive species on accessible nonforest land conditions (condition status 2)**, where desired or funded by specific landowners (e.g., on some National Forests in the West). Where this is done, estimates of invasive species abundance are maintained separately on forest and nonforest conditions.

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 not 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 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 24.0-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 SUBPLOT NUMBER

Record the code corresponding to the number of the subplot.

Values:

1 Center subplot
2 North subplot
3 Southeast subplot
4 Southwest subplot

9.4 CONDITION CLASS NUMBER [Cond]

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.

Values: 1-9

9.5 SPECIES CODE [SppCd]

Record the code for any species listed in your region's invasive plant species list that is found rooted in or overhanging (and rooted out of) the measured condition within the subplot. Species codes must be the standardized codes in the Natural Resource Conservation Service (NRCS) PLANTS database January 2010 version maintained by the FIA IM group (USDA, NRCS. 2010. The PLANTS database [http://plants.usda.gov/plants]. National Plant Data Center, Baton Rouge, LA 70874-4490).

In many of the invasive plant ID guides used by FIA units, some species are grouped together in the ID descriptions, and it may be difficult to distinguish between them with the information provided. In addition, some plants may be hybrids of listed species. Enter the code for the most likely species in the group, or the first one in the group if you are not sure.

If a species is suspected of being a listed invasive but cannot be identified quickly and confidently, and the FIA unit's protocols require specimen collection, assign a NRCS PLANTS unknown code. A subset of acceptable unknown codes that can be used is listed below. Collect a specimen unless the species is locally sparse. A species is "locally sparse" if five or fewer plants are present in the entire plot (4 subplots) and immediate surrounding area.

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

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.

9.6 UNIQUE SPECIES NUMBER **[Uniq#]**
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.

Values: 1-99, assigned in sequential numbers

9.7 SPECIES CANOPY COVER **[Cx% (where x = conditions 1-9)]**
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 7.6 feet on the full subplot, or 10 percent cover. On condition class #1 it covers an area equal to a circle of 2.4 feet radius and is recorded as 1 percent cover. The remainder, 9 percent cover, is recorded for condition #2. If the species is only present on condition class #1 with an area equal to a circle of 2.4-feet radius it is recorded as 1 percent. The proportion of the subplot in each condition does not matter.

If cover is greater than 0 but less than 1.5 percent, record as 1 percent cover. For species of moderate cover, it may be easiest to divide the subplots into quarters, estimate canopy cover of each quarter separately, and then add them together. The following area-cover sizes may be useful in developing estimates for an entirely forested subplot:

Subplot radius = 24.0 feet, Subplot area = 1809 ft^2			
Cover	Area (ft^2)	Length of a side of a square(ft)	Radius of circular area(ft)
1%	18	4.3	2.4
3%	54	7.4	4.1
5%	90	9.5	5.3
10%	181	13.4	7.6
20%	362	19	10.7

Values: 001 to 100

9.8 INVASIVE SPECIMEN COLLECTED
9.9 SPECIMEN LABEL NUMBER

9.10 INVASIVE PLANT NOTES **[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.

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.

10. 0 DOWN WOODY MATERIALS (PHASE 2 – CORE OPTIONAL)

10.0 Introduction

Down woody materials (DWM) are important components of forest ecosystems across the country. DWM is dead material on the ground in various stages of decay. Wildlife biologists, ecologists, mycologists, foresters, and fuels specialists are some of the people interested in DWM because it helps describe the:

- Quality and status of wildlife habitats.
- Structural diversity within a forest.
- Fuel loading and fire behavior.
- Carbon sequestration – the amount of carbon tied up in dead wood.
- Storage and cycling of nutrients and water – important for site productivity.

Down wood components and fuels estimated by the FIA program are coarse wood, slash, fine wood, and litter and duff depth. The DWM protocol includes the following three suites of measurement options:

<u>OPTION I. BASE</u>:
The BASE option provides a minimum set of variables necessary to produce estimates for volume, biomass, carbon, and fuel load per acre on a broad scale. Base variables are required any time DWM is measured, and are labeled "BASE" in this chapter. Measurements include:

<u>OPTION I: BASE Variables</u>

- <u>BASE Layout</u>: DWM SAMPLING STATUS, DWM NUMBER OF SUBPLOTS, DWM NUMBER OF TRANSECTS ON SUBPLOT, DWM TRANSECT LENGTH, DWM NOTES
- <u>BASE Transect Line Segmenting</u>: SUBPLOT NUMBER,TRANSECT, SEGMENT CONDITION CLASS NUMBER, SEGMENT BEGINNING DISTANCE (HD), SEGMENT ENDING DISTANCE (HD), DWM TRANSECT SEGMENT SAMPLE STATUS, DWM TRANSECT NONSAMPLED REASON
- <u>BASE CWD</u>: SUBPLOT NUMBER, TRANSECT, CWD CONDITION CLASS, PIECE ON SUBPLOT OR ANNULAR PLOT?, CWD DECAY CLASS, SPECIES, DIAMETER AT POINT OF INTERSECTION, DIAMETER OF HOLLOW AT POINT OF INTERSECTION, CWD LENGTH >=3 FEET
- <u>BASE Pile</u>: PILE SUBPLOT NUMBER, PILE TRANSECT, PILE CONDITION CLASS NUMBER, PILE BEGINNING DISTANCE, PILE ENDING DISTANCE, COMPACTED HEIGHT OF CWD IN PILE, PILE DECAY CLASS, PILE SPECIES
- <u>BASE FWD</u>: FWD SUBPLOT NUMBER, FWD TRANSECT, FWD CONDITION CLASS NUMBER, FWD TRANSECT SEGMENT SAMPLE STATUS, FWD TRANSECT NONSAMPLED REASON, SMALL FWD COUNT, MEDIUM FWD COUNT, LARGE FWD COUNT, HIGH COUNT REASON
- <u>BASE Duff/Litter Depth</u>: DUFF/LITTER SUBPLOT NUMBER, DUFF/LITTER TRANSECT, DUFF/LITTER CONDITION CLASS NUMBER, DUFF/LITTER SAMPLE STATUS, DUFF/LITTER NONSAMPLED REASON, DUFF DEPTH, LITTER DEPTH, DUFF AND LITTER METHOD

<u>OPTION II. WILDLIFE/ECOLOGICAL</u>
This option includes all the BASE Option variables plus additional CWD structural variables. These additional measurements allow users to quantify wildlife habitat. This option is required when measuring P3 DWM.

<u>OPTION II: WILDLIFE / ECOLOGICAL</u>

- BASE Layout Variables
- BASE Transect Line Segmenting Variables
- BASE CWD Variables plus the following variables required for P3 DWM:CWD HORIZONTAL DISTANCE, DIAMETER AT SMALL END, DIAMETER AT LARGE END, CWD TOAL LENGTH
- BASE Pile Variables
- BASE FWD Variables
- BASE Duff/Litter Depth Variables

<u>OPTION III. RAPID ASSESSMENT (CUSTOMIZED PROTOCOL)</u>:
Rapid assessments may be desired to quantify down wood abundance in specific instances (for example, following a hurricane or volcanic eruption). Because information needs and funds will vary depending on the situation, a rapid assessment option is available where the transect configuration (number of transects and subplots and transect length) can be defined by the FIA unit. However, the base variables needed to estimate biomass are still required for rapid assessments.

Additional variables found to be useful by FIA units in the past are also defined in this protocol to ensure consistency if additional information is desired by different FIA units. FIA units may also choose to classify the fuelbed conditions that determine fire behavior on each condition class using standardized national fuel models. These variables are labeled "OPTIONAL" in this chapter.

<u>ADDITIONAL OPTIONAL VARIABLES</u>

- <u>Optional CWD Variables</u> (for all OPTIONs): IS THE PIECE HOLLOW?, PIECE INCLINATION, CWD HISTORY, PERCENT OF LOG CHARRED BY FIRE, LARGE END DIAMETER CLASS
- <u>Optional Fuels Variable: CONDITION FUELBED TYPE (Scott and Burgan 2005; RMRS-GTR-153)</u>

DWM is sampled on accessible forest conditions intersected by a transect, and on accessible nonforest conditions if they are being measured on the plot (NONFOREST CONDITION CLASS STATUS = 2). If a transect crosses a condition boundary, the boundary locations on the transect are recorded. All DWM in the inventory is sampled using the line intersect sampling method (also called planar intercept method). In this method, transects are established, and individual pieces of Coarse Woody Debris (CWD, ≥3 inches diameter and ≥0.5 foot long) or Fine Woody Debris (FWD, <3 inches diameter) are tallied if the central axis of the piece is intersected by the plane of the transect.
Note: DWM is a CORE OPTIONAL indicator on all Phase 2 plots. When measured on Phase 2 plots, all the BASE data items must be measured and other data items can be added as desired (designated as P2 OPTIONAL on data items.) However, DWM is a CORE indicator on all Phase 3 plots, and both BASE and WILDLIFE/ECOLOGICAL data items must be measured (see table 3).
Table 3. DWM Protocol Options Variables

OPTION I: BASE	OPTION II: WILDLIFE / ECOLOGICAL	ADDITIONAL OPTIONAL VARIABLES
REQUIRED: BASE Layout Variables	**REQUIRED:** BASE Layout Variables	
REQUIRED: BASE Transect Line Segmenting Variables	**REQUIRED:** BASE Transect Line Segmenting Variables	
REQUIRED: BASE CWD Variables **P2 OPTIONAL:** CWD HORIZONTAL DISTANCE, DIAMETER AT SMALL END, DIAMETER AT LARGE END, CWD TOTAL LENGTH	**REQUIRED:** BASE CWD Variables, CWD HORIZONTAL DISTANCE, DIAMETER AT SMALL END, DIAMETER AT LARGE END, CWD TOTAL LENGTH, IS THE PIECE HOLLOW?	**OPTIONAL CWD Variables (for all OPTIONs):** IS THE PIECE HOLLOW?, PIECE INCLINATION, CWD HISTORY, PERCENT OF LOG CHARRED BY FIRE, LARGE END DIAMETER CLASS
REQUIRED: BASE Pile Variables	**REQUIRED:** BASE Pile Variables	
REQUIRED: BASE FWD Variables	**REQUIRED:** BASE FWD Variables	
REQUIRED: BASE Duff/Litter Depth Variables	**REQUIRED:** BASE Duff/Litter Depth Variables	
		Optional Fuels Variable: Photo-series (Scott & Burgan 2005 RMRS-GTR-153)

10.1 Definition of Down Woody Materials

Coarse Woody Debris – In this inventory, CWD includes downed, dead tree and shrub boles, large limbs, and other woody pieces that are ≥3 inches in diameter and severed from their original source of growth. CWD **also** includes dead tally species trees or single-stemmed woodland species trees (either self-supported by roots, severed from roots, or uprooted and supported by other objects) that are leaning >45 degrees from vertical and not considered part of the standing tree inventory. Portions of dead trees that are separated greater than 50 percent (either above or below 4.5 feet), are considered severed and are included in the CWD inventory (see discussion and diagrams in section 5.7.2 - Standing Dead). For multi-stemmed woodland species (Appendix 3) such as juniper, only tally stems that are dead and detached. Include as CWD all dead multi-stemmed woodland tree stems that do not qualify as standing dead if they meet the size requirements for CWD pieces. Also included are non-machine processed round wood such as fence posts and cabin logs.

CWD is measured primarily using intersect diameter. In rare instances when pieces are in a pile and it is impossible to estimate the size of individual pieces, use the pile protocol.

CWD does not include:

1. Woody pieces <3.0 inches in diameter at the point of intersection with the transect.
2. Dead trees leaning 0 to 45 degrees from vertical (see discussion and diagrams in section 5.7.2 - Standing Dead).
3. Dead shrubs, self-supported by their roots.
4. Trees showing any sign of life.
5. Stumps that are rooted in the ground (i.e., not uprooted).
6. Dead foliage, bark or other non-woody pieces that are not an integral part of a bole or limb. (Bark attached to a portion of a piece is an integral part).
7. Roots or main bole below the root collar.

Fine Woody Debris – In this inventory, FWD includes downed, dead branches, twigs, and small tree or shrub boles <3 inches in diameter that are not attached to a living or standing dead source. FWD can be connected to a larger branch, as long as this branch is on the ground and not connected to a standing dead or live tree. Only the woody branches, twigs, and fragments that intersect the transect are counted. FWD can be connected to a down, dead tree bole or down, dead shrub. FWD can be twigs from shrubs and vines. FWD must be no higher than 6 feet above the ground to be counted.

FWD does not include:

1) Woody pieces ≥3.0 inches in diameter at the point of intersection with the transect.
2) Dead branches connected to a <u>live</u> tree or shrub; or to a standing dead tree or dead shrub.
3) Dead foliage (i.e., pine or fir needles, or leaf petioles).
4) Bark fragments or other non-woody pieces that are not an integral part of a branch, twig, or small bole.
5) Small pieces of decomposed wood (i.e., chunks of cubical rot)

10.2 Locating and Establishing Line Transects

Transects are established on each subplot if the subplot center is accessible (i.e., not census water, access denied, or hazardous), and there is at least one forest or measured nonforest land condition class mapped within the 24.0-foot radius subplot (CONDITION CLASS STATUS = 1 or (NONFOREST CONDITION CLASS STATUS = 2)). Transects begin at the subplot center and extend 24.0 feet to the edge of the subplot. The location of condition class boundaries are recorded along the transect, starting at the subplot center and working towards the fixed radius plot boundary. It is extremely important to lay out the transect in a straight line to avoid biasing the selection of pieces and to allow the remeasurement of transect lines and tally pieces for QA purposes.

Transect lines should be marked with a pin or small piece of flagging at the end of the line (24.0 feet, horizontal distance) to help the QA staff identify the path of the transect during the check-plot procedure. Because the tolerance for the transect azimuth is +/- 2 degrees, the line might have been laid down in a slightly different direction from the check-plot crew. This could affect the location of diameter measurements for CWD pieces as well as identifying whether a CWD piece is a valid tally piece. It is also helpful to mark the point where the FWD transect begins (14 feet, horizontal distance).

10.2.1 CWD Transects

Two transects are established that originate at the subplot center and extend out 24.0 feet horizontal distance (the radius of the subplot) (fig. 50). This transect configuration was chosen to avoid sampling bias on sloped land, where it is possible that CWD may be oriented in one direction. This configuration of transects should pick up CWD logs that are lying parallel to the slope, perpendicular to the slope, and across slope. On plots where the macroplot is measured and mapped for condition classes, FIA units have the option of extending transects up to 58.9 feet from subplot center. In addition, an optional third transect on each subplot provides the ability to add or retain transect length on P3 plots.

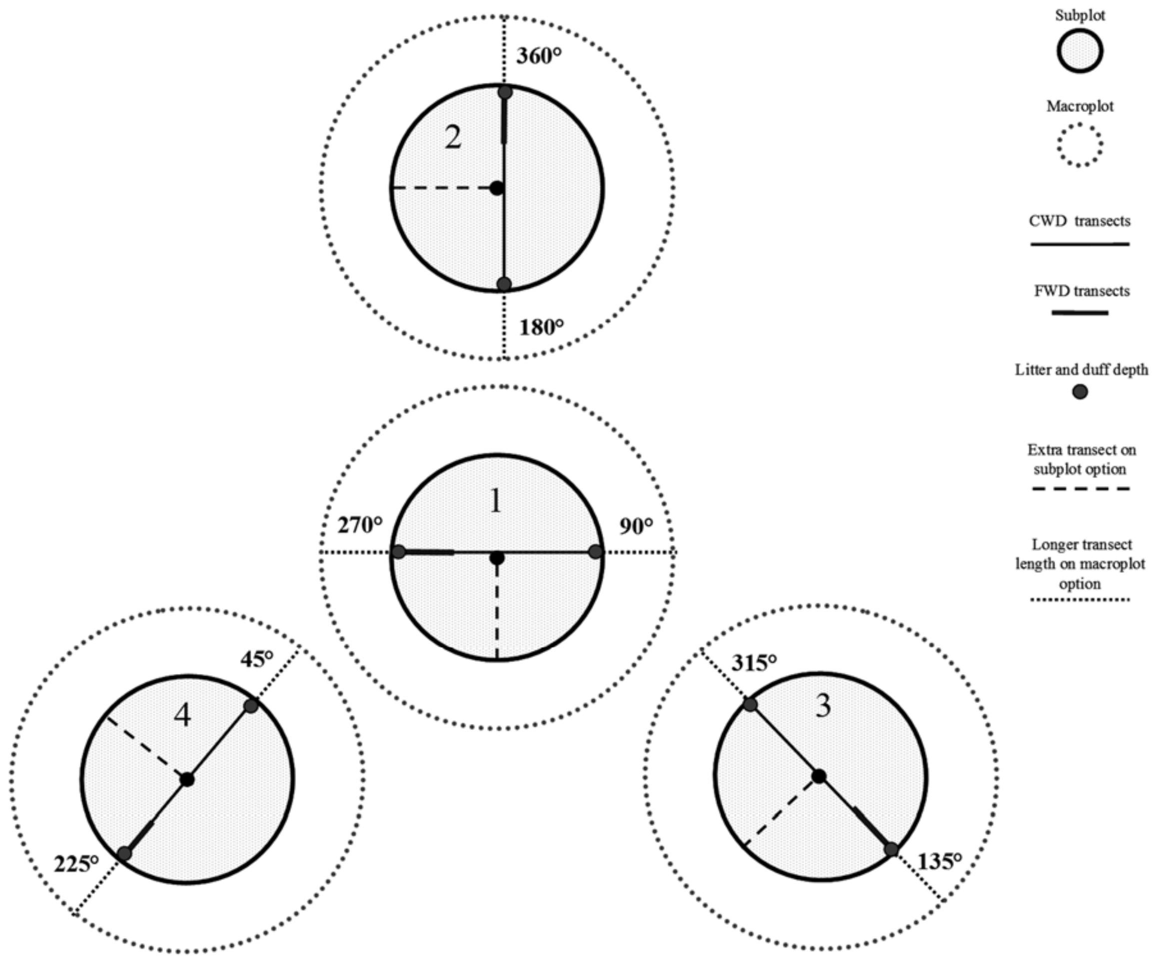


Figure 49. Plot layout for sampling CWD, FWD, and litter and duff depth. CWD transects include two 24-foot transects per subplot (starting at subplot center designated by its azimuth as labeled), optional extension onto condition mapped macroplots, and optional third transect for CWD.

10.2.2 FWD Transects

On a portion of one CWD transect on each subplot, FWD is tallied within 3 size classes. Because FWD is generally present in high densities, a shorter transect will pick up an acceptable amount of tally. The transect begins at 14 feet (horizontal distance) from the subplot center and extends out either 6 or 10 feet (horizontal distance) depending on the FWD size class, as follows:

Category of FWD	Size Class	Diameter range	Transect length (horizontal distance)	Transect location (horizontal distance)
Small FWD	1	0 in to 0.24 in	6 feet	14 to 20 feet
Medium FWD	2	0.25 in to 0.9 in	6 feet	14 to 20 feet
Large FWD	3	1.0 in to 2.9 in	10 feet	14 to 24 feet

It is helpful to have a size gauge available until your eye is ‘trained’ to recognize the 3 FWD size classes. Examples include a plastic or cardboard card with 3 notches cut for each size class, or a set of 3 dowels representing each size class.

10.3 Transect Line Segmenting

Transect lines are segmented to determine the length of transect that occurs within each mapped condition class intersecting the line. These lengths determine the expansion factors for the measured DWM. It is important that any changes or corrections to condition identity, location and size mapped on the subplot/macroplot spatially match the segmentation done on the transects. A segment is a length of transect that is in one condition. Segments are identified by recording the BEGINNING DISTANCE and ENDING DISTANCE from subplot center towards the end of the transect.

If any part of the transect segment is in a measured condition but the CWD is not measurable (e.g., snow or water), do not measure any DWM (CWD, FWD, or duff/litter depth) on that transect segment and set DWM TRANSECT SEGMENT SAMPLE STATUS = 0.

Starting at the subplot center and working towards the fixed radius plot boundary, each segment of transect line in a different condition class is delineated and recorded as a separate record. The horizontal BEGINNING DISTANCE and ENDING DISTANCE are recorded for each condition class encountered (fig. 51). The first record for each transect will have a BEGINNING DISTANCE of 0 feet. If only one condition class occurs on the transect line, only one segment is recorded. The last segment on all transects must have an ENDING DISTANCE of 24.0 feet horizontal distance if sampling the subplot, or up to DWM TRANSECT LENGTH if sampling on the macroplot. All condition segments on the transect must be defined and all transect length recorded and accounted for, either by condition, or by DWM TRANSECT SEGMENT SAMPLE STATUS.

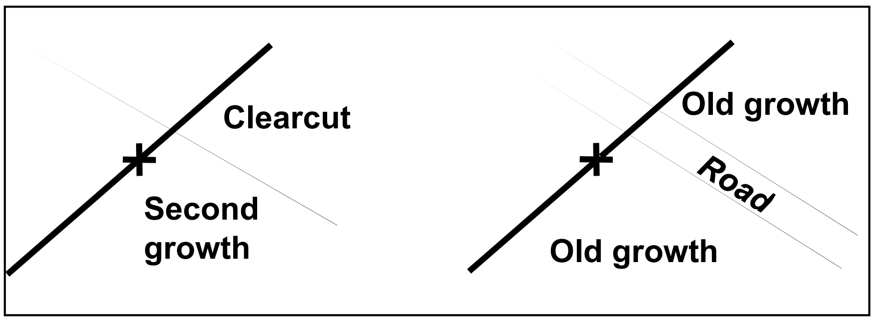


Figure 50. Transects are installed across condition class boundaries.

10.3.1 SUBPLOT NUMBER (BASE)
Record the code indicating the subplot center from which the transect originates.

Values:

1 Center subplot
2 North subplot
3 Southeast subplot
4 Southwest subplot

10.3.2 TRANSECT (BASE)
Record the transect azimuth (degrees) on which a condition class is being delineated. These transects, when being installed, have a tolerance of +/- 2 degrees.

Values:

Subplot	Transect direction (degrees) from center of subplot	Subplot	Transect direction (degrees) from center of subplot
1	090	3	135
	270		315
	180 (Extra optional transect)		225 (Extra optional transect)
2	360	4	045
	180		225
	270 (Extra optional transect)		315 (Extra optional transect)

10.3.3 SEGMENT CONDITION CLASS NUMBER (BASE) **[Cond]**
Record the code indicating the number of the condition class for the transect segment. Use the same code assigned to the condition class on the subplot or elsewhere on the plot. The first segment recorded for each transect will have the same CONDITION CLASS NUMBER as assigned to the subplot center.

Values: 1 to 9

10.3.4 SEGMENT BEGINNING DISTANCE (BASE) **[BegHD]**
Record the location (using horizontal distance to nearest 0.1 foot) on the transect line where the transect intersects the boundary with the adjacent condition class nearer to the subplot center. The first record for each transect will have a BEGINNING DISTANCE of 0 ft. Each subsequent record will have a BEGINNING DISTANCE equal to the ENDING DISTANCE of the previous record.

Values: 00.0 to 58.9 horizontal feet

10.3.5 SEGMENT ENDING DISTANCE (BASE) **[EndHD]**
Record the location (using horizontal distance to nearest 0.1 foot) on the transect line where the transect exits the condition class being delineated and intersects the boundary with a different condition class further away from the subplot center. If no other condition classes are encountered, record the location (using horizontal distance) of the end of the transect line.

Values: 00.1 to 58.9 horizontal feet

10.3.6 DWM TRANSECT SEGMENT SAMPLE STATUS (BASE) **[SegSt]**
Record the sample status for the transect segment. If any part of the segment is in an accessible condition that would be measured (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2), but the CWD is not measurable due to an obstruction such as snow or water, do not measure DWM on any part of the transect segment, and set code to 0 for that segment. In all other situations, set the code to 1. For conditions on which DWM would not be measured regardless (CONDITION CLASS STATUS = 3 or NONFOREST CONDITION CLASS STATUS = 2), will automatically be coded 1; those conditions should be identified in the transect segmenting.

Values:

0 Transect segment not sampled
1 Transect segment sampled

10.3.7 DWM TRANSECT SEGMENT NONSAMPLED REASON (BASE) **[SegNS]**
Record the reason that DWM cannot be measured on the transect.

Values:

04 Time Limitation
05 Lost data (office use only)
10 Other (for example, snow or water covering CWD that is supposed to be sampled). "Note required" when using this code.

10.4 Sampling Methods for COARSE WOODY DEBRIS (CWD)

10.4.1 Tally Rules for Coarse Woody Debris (CWD)

1. Coarse woody debris (CWD) is sampled on accessible forest conditions, and on accessible nonforest conditions if they are being measured on the plot (i.e., NONFOREST CONDITION CLASS STATUS = 2). Tally CWD by starting at the subplot center and working towards the fixed radius plot boundary. Measurements should **not** be taken along transects moving inward toward subplot center. Tally a piece if its central longitudinal axis intersects the transect, and the condition class is measured at the point of intersection (fig. 52). The entire piece is assigned to this condition.

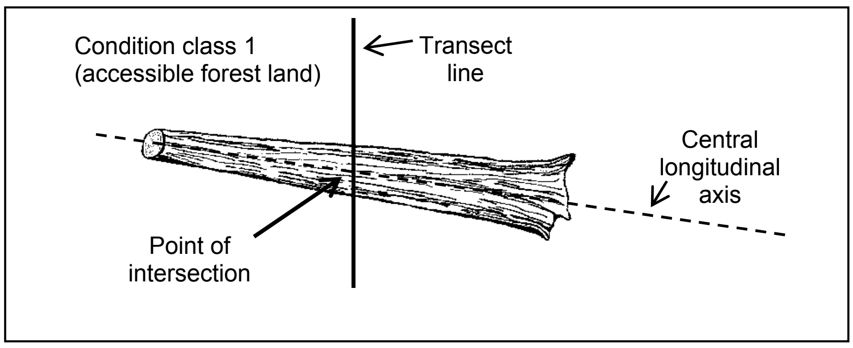


Figure 51. Tally rules for CWD.

2. Tally dead trees and tall stumps that are leaning > 45 degrees from vertical. Do not tally live trees or standing dead trees and tall stumps that are still upright and leaning < 45 degrees from vertical. Follow the same rules for down trees as outlined in section 5.0 'Tree and Sapling Data' for determining what qualifies as standing and down dead trees and portions/tops of trees. Most CWD will be laying on the ground.
Note: In order to avoid double counting or totally missing trees or portions in either protocol, once a decision is made on whether a tree or portion/top of a tree is considered standing or down it is important to include it in either one or the other protocol (standing tree or CWD), but not both. See additional diagrams in section 5.7.2 – Standing Dead.

3. The minimum length for any tally piece is 0.5 feet and it needs to meet the minimum transect diameter guidelines.
4.
5. Decay class of the piece determines whether or not the piece is tallied (see section 10.4.3.6).

   For decay classes 1 to 4: tally a piece if it is ≥3.0 inches in diameter at the point of intersection with the transect (fig. 53).
   For decay class 5: tally a piece if it is ≥5.0 inches in diameter at the point of intersection and ≥5.0 inches high from the uphill side of the ground. The reason for treating decay class 5 pieces differently is because they are difficult to identify, especially when heavily decomposed. Only pieces that still have some shape and log form are tallied—humps of decomposed wood that are becoming part of the duff layer are not tallied.

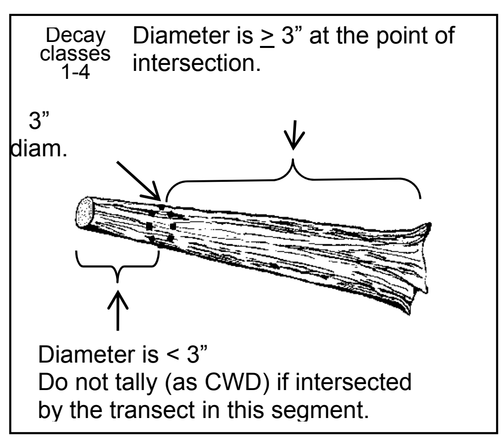


Figure 52. Tally rules for CWD decay classes 1-4.

6. Tally pieces created by natural causes (examples: natural breakage or uprooting) or by human activities such as cutting. In some cases it may be impossible to measure or estimate individual pieces—for example when CWD pieces are in machine-piled slash piles or windrows, or are part of jumble from flooding, landslide or avalanche. In these situations, piles are described using the instructions in section 10.6 'Sampling Residue Piles'. Because biomass estimates from piles have great uncertainty associated with them, pieces should be measured individually if at all possible.

7. Tally a piece only if the point of intersection occurs above the ground. If one end of a piece is buried in the litter, duff, or mineral soil, the piece ends at the point where it is no longer visible. Measure the diameter and length at this point.

8. If the central longitudinal axis of a piece is intersected more than once on a transect line or if it is intersected by two transect lines, tally the piece each time it is intersected (uncommon situation, see fig. 54).

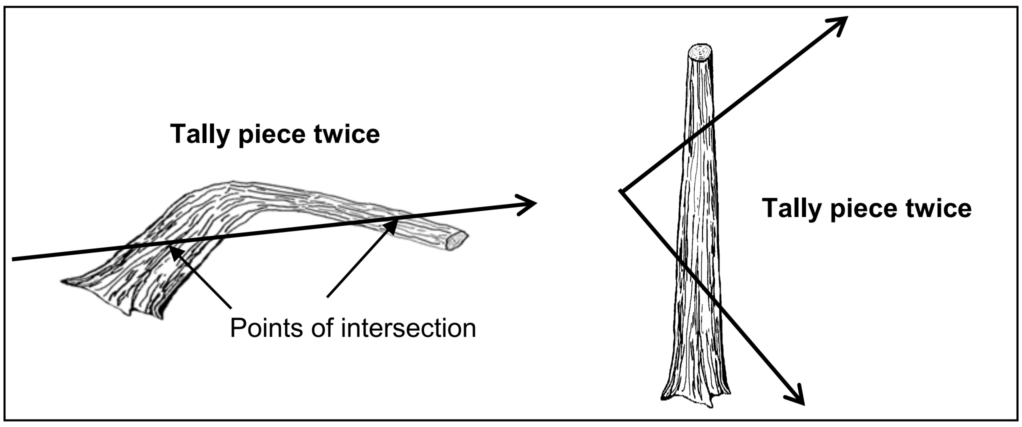


Figure 53. CWD tally rules: intersections.

9. Tally a piece only once if the subplot center falls directly on the central longitudinal axis of the piece. Tally the piece on the smallest azimuth degree transect.

10. If a piece is fractured across its diameter or length, and would pull apart at the fracture if pulled from either end or sides, treat it as two separate pieces. If judged that it would not pull apart, tally as one piece. Tally only the piece intersected by the transect line.

11. Do not tally a piece if it intersects the transect on the root side of the root collar. Do not tally roots.

12. When the transect crosses a forked down tree bole or large branch connected to a down tree, tally each qualifying piece separately. To be tallied, each individual piece must meet the minimum diameter requirements.

13. In the case of forked trees, consider the "main bole" to be the piece with the largest diameter at the fork. Variables for this fork such as TOTAL LENGTH and DECAY CLASS should pertain to the entire main bole. For smaller forks or branches connected to a main bole (even if the main bole is not a tally piece), variables pertain only to that portion of the piece up to the point where it attaches to the main bole (see figure 55).

14. If a transect intersects a non-measured condition (e.g., a road when NONFOREST CONDITION CLASS STATUS = 5, or an inaccessible condition class, or a non-sampled code for CWD), CWD is not tallied.

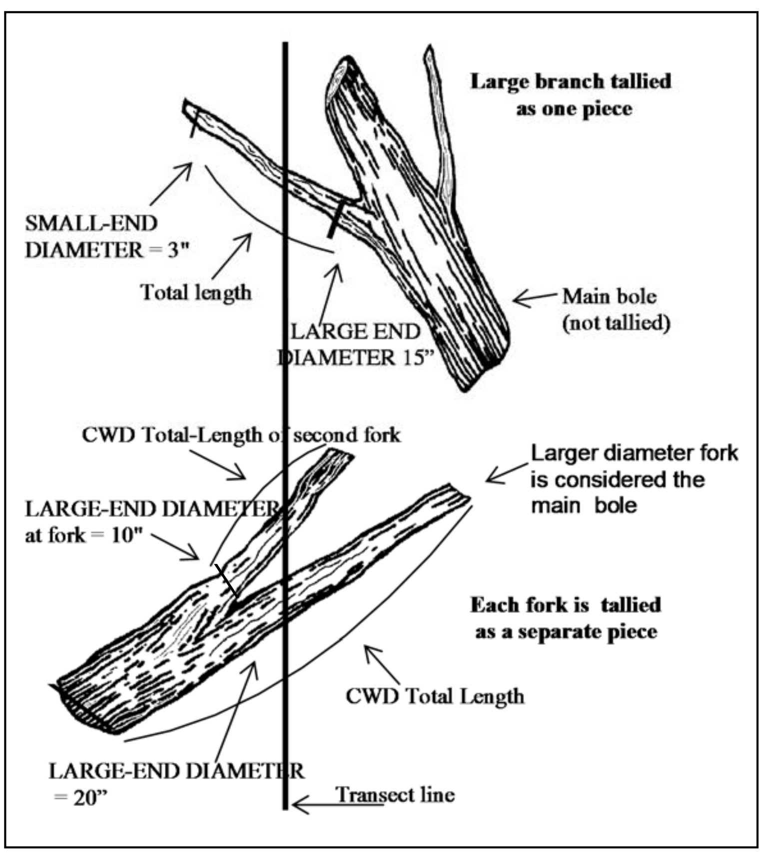


Figure 54. CWD tally rules for forked trees.

10.4.2 Marking CWD (OPTIONAL)

Marking CWD is highly recommended if allowed by the land owner—wax crayon is a good option or nails can be used as well. Marked CWD is an aid to future crews returning to the plot for a QA check.

10.4.3 Recording Procedures for CWD

10.4.3.1 SUBPLOT NUMBER (BASE)
Record the code indicating the number of the subplot center from which the transect originates.

Values:

1 Center subplot
2 North subplot
3 Southeast subplot
4 Southwest subplot

10.4.3.2 TRANSECT (BASE)
Record the azimuth of the transect on which the CWD piece is sampled.

Values:

Subplot	Transect direction (degrees) from center of subplot	Subplot	Transect direction (degrees) from center of subplot
1	090	3	135
	270		315
	180 (Extra optional transect)		225 (Extra optional transect)
2	360	4	045
	180		225
	270 (Extra optional transect)		315 (Extra optional transect)

10.4.3.3 CWD CONDITION CLASS (BASE) **[Cond]**

Record the condition class number for each CWD piece at the point where the central longitudinal axis of the piece intersects the transect. If there is only one condition on the plot all CWD pieces will be assigned to CWD condition class = 1. If more than one condition has been identified and/or mapped on the plot/subplot, record the appropriate condition based on the location of the transect diameter measurement. All CWD pieces require a condition class and only classes that have been identified and/or mapped are valid. If extending the transect onto the macroplot the entire macroplot needs to be mapped for conditions.

Values: 1 to 9

10.4.3.4 PIECE ON SUBPLOT OR ANNULAR PLOT? (BASE) **[SubAn]**
Identify whether point of transect intersection with piece is on the subplot or macroplot. If not extending transects onto annular plots all pieces will be assigned code = 1.

Values:

1 Central longitudinal axis of piece intersects the transect on the subplot (<= 24.0 horizontal feet)
2 Central longitudinal axis of piece intersects the transect on the macroplot (24.1 – 58.9 horizontal feet)

10.4.3.5 CWD HORIZONTAL DISTANCE (WILDLIFE OPTION) **[HDist]**
Record the horizontal distance from the subplot center to the point where the transect intersects the longitudinal center of the piece. If two or more pieces have the same horizontal distances, record the top piece first. CWD HORIZONTAL DISTANCE may be useful for verifying condition class, for QA checks, or for studies of different transect lengths.

Values: 00.0 to 58.9

10.4.3.6 CWD DECAY CLASS (BASE) **[Decay]**
Record a 1-digit code indicating the decay class of the piece. Code the decay class that predominates along the observed length of the piece. Use the guide below to determine CWD DECAY CLASS.

Values:

Decay Class	Structural Integrity	Texture of Rotten Portions	Color of Wood	Invading Roots	Branches and Twigs
1	Sound, freshly fallen, intact logs	Intact, no rot; conks of stem decay absent	Original color	Absent	If branches are present, fine twigs are still attached and have tight bark
2	Sound	Mostly intact; sapwood partly soft (starting to decay) but can't be pulled apart by hand	Original color	Absent	If branches are present, many fine twigs are gone and remaining fine twigs have peeling bark
3	Heartwood sound; piece supports its own weight	Hard, large pieces; sapwood can be pulled apart by hand or sapwood absent	Reddish-brown or original color	Sapwood only	Branch stubs will not pull out
4	Heartwood rotten; piece does not support its own weight, but maintains its shape	Soft, small blocky pieces; a metal pin can be pushed into heartwood	Reddish or light brown	Through-out	Branch stubs pull out
5	None, piece no longer maintains its shape, it spreads out on ground	Soft; powdery when dry	Red-brown to dark brown	Through-out	Branch stubs and pitch pockets have usually rotted down

Note: CWD DECAY CLASS 5 pieces can be difficult to identify because they often blend into the duff and litter layers. They must still resemble a log; therefore, the first tally rule is that they must be >5.0 inches in diameter and > 5.0 inches from the surface of the ground. Decomposed logs that are slightly elevated 'humps' on the ground are not tallied.

CWD DECAY CLASS: The chart above was developed primarily for Douglas-fir in the Pacific Northwest. At the present time, there are no other charts available to use to describe decay classes for other species or locations. Concentrate on the structural integrity and texture when estimating a decay class for CWD logs.

If a log is case hardened (hard, intact outer sapwood shell) but the heartwood is rotten, code this log as a CWD DECAY CLASS 2. CWD DECAY CLASS 1 should be reserved for 'freshly fallen' logs that are completely intact (i.e., recent windfalls, or harvest).

10.4.3.7 SPECIES (BASE) **[SPP]**

Record the code indicating the species of the piece. Since CWD pieces are not necessarily always tally species, record the most detailed available species code (see appendix 3). Some species codes are only genus specific (e.g., Prunus), or hardwood-softwood specific. Search for the species code that has the most detail for the identified piece. For shrubs or vines enter unknown softwood (0299) or hardwood (0998).

Species identification may be uncertain for some pieces. The piece's bark (either attached or sloughed and laying beside the piece), branching pattern (if the branches are still present), or heartwood smell (particularly if cedars, Douglas-fir, or western hemlock) may provide clues. On remeasurement plots, see what tree species were tallied in past inventories. One way to distinguish hardwoods from softwoods is by the type of decay present. Hardwoods usually have a white or grayish stringy rot, while softwoods usually have a reddish-brown blocky rot. If it is not possible to identify the species, attempt to estimate if it is softwood or hardwood. Enter code 0299 for unknown dead conifer or 0998 for unknown dead hardwood. If all else fails, enter the unknown SPECIES code (0999).

Values: See species codes in appendix 3

10.4.3.8 Diameters

If possible, the best way to measure diameter is to wrap the tape perpendicular to the longitudinal axis at the point of transect intersection (fig. 56). If that is not possible it is useful to carry a steel carpenters retracting tape to measure diameters. Other methods include wrapping a tape around the bole if possible, holding a straight-edge ruler above the piece, or using calipers.

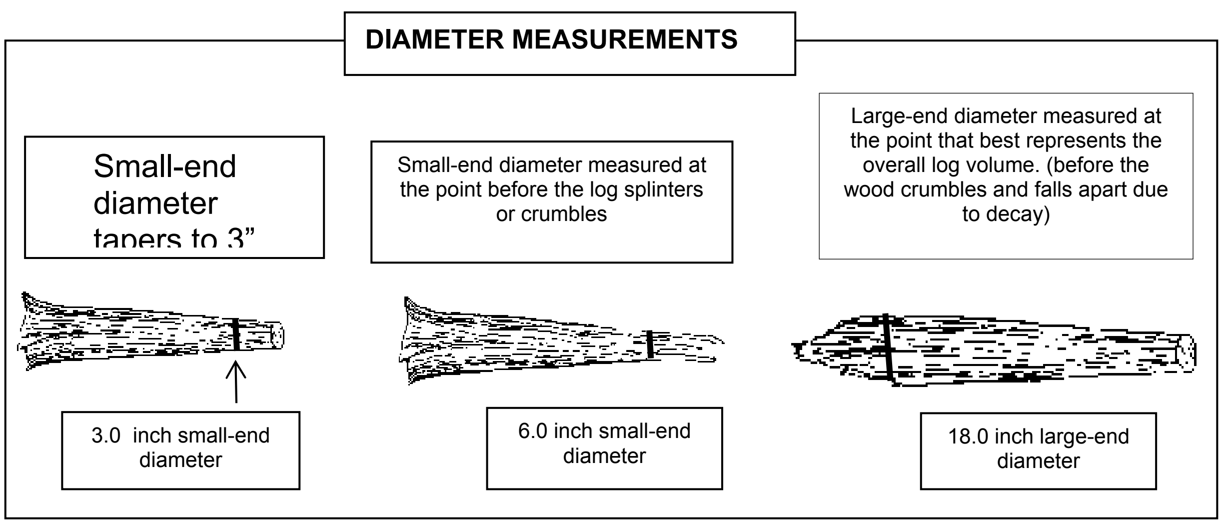


Figure 55. Diameter measurements

For pieces that cannot be taped and are not round in cross-section because of missing chunks of wood or "settling" due to decay, measure the diameter in two directions and take an average. Estimate the longest and shortest axis of the cross-section ("A" and "B" in figure 57), and enter the average in the diameter field. This technique applies to intersect, small-end, and large-end diameters .

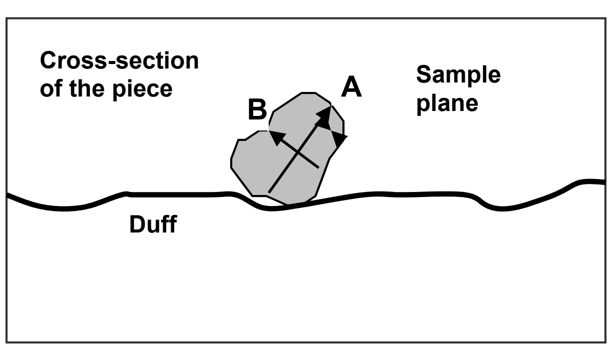


Figure 56. Estimating the diameter of pieces that are not round in cross-section.

If the transect intersects the log at the decayed or splintered end (fig. 58), record the diameter at this location as the intersect diameter. Record the large end and small end diameters on the same side of the transect diameter as illustrated. Record the small end diameter as 3 inches if it tapers below 3 inches. If the splintered end appears to be two separate pieces (i.e., a major split located just at the end) – in this situation treat it as one log and take a diameter around the end (take two measurements if it is odd shaped.

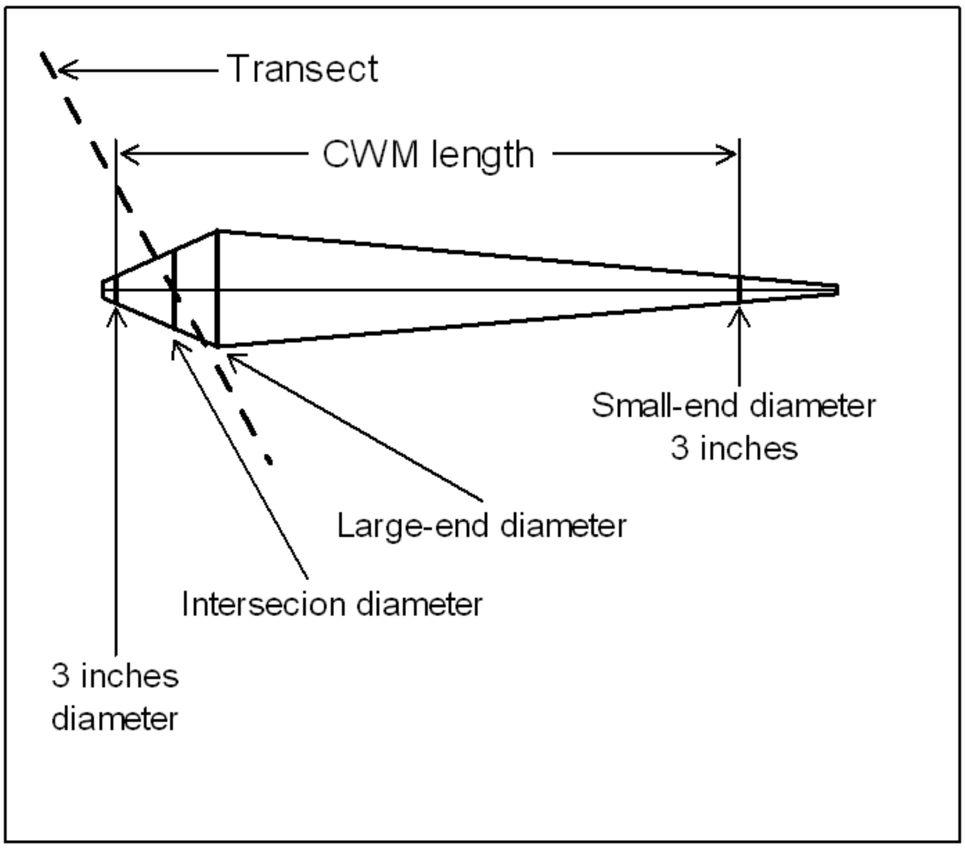


Figure 57. Example of decayed end intersecting the transect

10.4.3.8.1 DIAMETER AT POINT OF INTERSECTION (BASE) **[TrDia]**
Record the piece's diameter at the point where the transect intersects the longitudinal center of the piece. Record the diameter to the nearest inch. If the diameter is close to 3 inches, measure the diameter to the nearest 0.1 inch to determine if the piece is actually >3.0 inches and a valid tally piece.

Values: 003 to 200 inches

10.4.3.8.2 DIAMETER OF HOLLOW AT POINT OF INTERSECTION (BASE) **[HoDia]**
Record the diameter of hollow at the point of intersection. This variable contributes to reducing bias in biomass estimate and only applies to the point of intersection. If it can be ascertained that the piece is hollow at the transect diameter location, measure or estimate the diameter of hollow to the nearest inch, otherwise record as 0. Diameter of hollow must be less than the transect diameter. Note: Record a hollow diameter only when it is obvious that a piece is hollow at the point of intersection (a hole or crack in the piece, evidence of hollow as observed from the end, etc.). Unlike 10.4.3.10, there is no hollow size requirement for this variable.

Values: 000, 001 to 200 inches

10.4.3.8.3 DIAMETER AT THE SMALL END (WILDLIFE OPTION)
Record the diameter at the piece's small end. The diameter is recorded to the nearest inch. The DIAMETER AT THE SMALL END occurs either at (1) the actual end of the piece, if the end has a diameter >3.0 inches, or (2) at the point where the piece tapers down to 3.0 inches in diameter. If the end is splintered or decomposing (sloughing off), measure the diameter at the point where it best represents the overall log volume. Use the same measuring procedures described in 10.4.3.8 (see figure 56).

Values: 003 to 200 inches

10.4.3.8.4 DIAMETER AT THE LARGE END (WILDLIFE OPTION)
Record the diameter at the piece's large end. The diameter is recorded to the nearest inch. The large end will occur either at a broken or sawn end, at a fracture, or at the root collar. If the end is splintered or decomposing (sloughing off), measure the diameter at the point where it best represents the overall log volume. Use the same measuring procedures used for 10.4.3.8.

Values: 003 to 250 inches

10.4.3.9 Length Measurements

Measure the length of the piece (to the nearest foot) along its centerline, either to the end of the piece or to the point where the diameter reaches 3 inches. If the piece tapers at both sides, due to decay or breakage, the length is measured for the 3-inch diameter cutoff at both ends, regardless of where the large end-diameter may be (see fig. 58). No length is recorded for pieces <3 feet long.

10.4.3.9.1 CWD LENGTH >= 3 FEET (BASE) **[Len3]**
Record the code that indicates whether the CWD TOTAL LENGTH is less than 3 feet long (and at least 0.5 foot long). Distinguished length orientation by direction of the pith. Note: the diameter of a small piece may be larger than its length. Total length of the log is measured between the physical ends of the log.

Values: 1 to 2

1	CWD TOTAL LENGTH ≥3 feet
2	CWD TOTAL LENGTH ≥0.5 foot and < 3 feet

10.4.3.9.2 CWD TOTAL LENGTH (WILDLIFE OPTION)

Record the total length of the piece to the nearest foot. For DECAY CLASS = 5, DIAMETER AT THE SMALL END and DIAMETER AT THE LARGE END are not recorded for a log, therefore the length is measured between the two physical ends of the log. For curved logs, measure along the curve. CWD TOTAL LENGTH is recorded to the nearest foot.

Values: 003 to 250 feet

10.4.3.10 IS THE PIECE HOLLOW? (OPTIONAL)

Record the code indicating whether or not the piece is hollow (see figure 59). This definition of hollow is different from the definition used in 10.6.3.8.2 DIAMETER OF HOLLOW AT POINT OF INTERSECTION. This variable provides information for wildlife assessment.

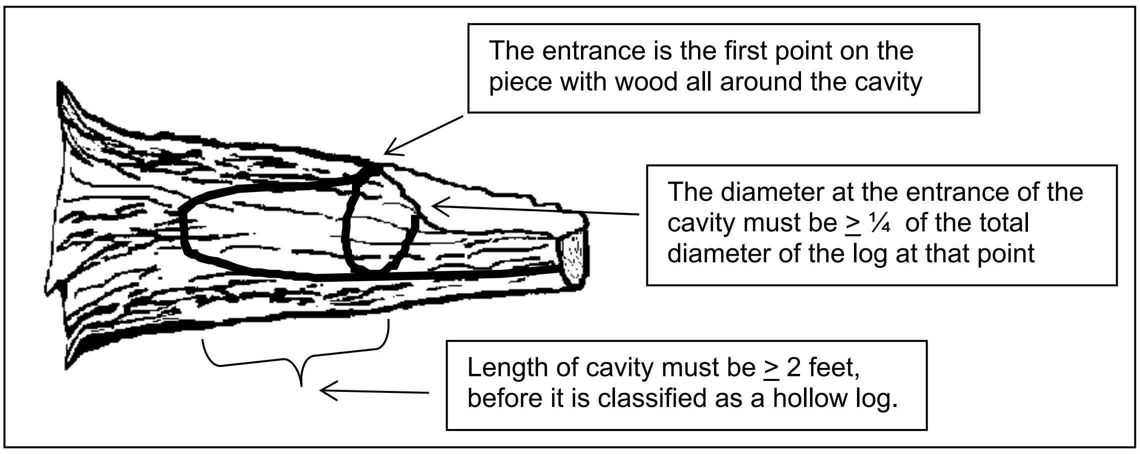


Figure 58. Determining if the piece is hollow.

Values:

0 Does not meet criteria for being a hollow log

1 A piece is considered hollow if a cavity extends at least 2 feet along the central longitudinal axis of the piece, and the diameter of the entrance to the cavity is at least 1/4 of the diameter of the piece where the entrance occurs. The entrance occurs at the point where the circumference of the cavity is whole -- the point where wood is present completely around the circumference of the cavity. The length of the cavity begins at this point. This definition of hollow is different from the definition used in 10.4.3.8.2 DIAMETER OF HOLLOW AT POINT OF INTERSECTION.

10.4.3.11 PIECE INCLINATION (OPTIONAL)

Record the inclination from horizontal of the piece in degrees. Measure the inclination with a clinometer. Inclination from horizontal should be estimated rapidly by setting a clinometer along the top of the log, adjusting if necessary to match the angle between the location of the large end diameter and the location of the small end diameter, and reading the inclination from the face of the clinometer in degrees.

Values: 00 to 90 degrees

10.4.3.12 CWD HISTORY (OPTIONAL)

Record the code that indicates whether or not the piece of CWD is on the ground as a result of harvesting operations or as a result of natural circumstances. One objective of this item is to identify those pieces that are considered logging residue. If the piece appears to have fallen to the ground as a result of natural causes such as decomposition or windfall, enter a code of 1. This category would include blown out tops, snapped off boles, wind-fallen trees on clearcut edges, and trees that basically collapsed and fell over due to decomposition.

If the piece is on the ground as a result of recent (since last annual remeasurement; if the plot is new, the time between the panel remeasurements) harvesting activity, either because the tree was cut down with a chainsaw (or other device) or pushed over by harvesting equipment (bulldozer), enter a code of 2. A code of 2 would be considered logging residue (usually you are in the middle of a recent clearcut).

If the piece is on the ground as a result of older (more than 15 years) harvesting activity, enter a code of 3. This would be a situation where you tally an old decomposing log that has a sawn end – if it appears that the log was cut and left on site, then enter a code of "3".

If a piece is on the ground as a result of incidental harvest (such as a standing tree was cut for firewood or small clearing), enter a code of "4". Incidental harvest involves a few trees and is not a part of a major organized harvesting operation.

If the crew cannot decide the history of the CWD log, classify it as "unknown", and give it a code of "5".

Values:

1 CWD piece is on the ground as a result of natural causes
2 CWD piece is on the ground as a result of major recent harvest activity (<= 15 yrs old)
3 CWD piece is on the ground as a result of older harvest activity (> 15 yrs old)
4 CWD piece is on the ground as a result of an incidental harvest (such as firewood cutting)
5 Exact Reason Unknown

10.4.3.13 PERCENT OF LOG CHARRED BY FIRE (OPTIONAL)

Record a code that represents the percentage of the log's surface area that has been charred by fire. Only examine the visible surface of the log. These data will be used by wildlife biologists to determine the impact fire has had on wildlife habitat. Wildlife tend to avoid charred logs because fire seals the wood making it slow to rot and hard to excavate.

Values:

0	None of the log is charred by fire
1	Up to 1/3 of the log is charred by fire
2	1/3 to 2/3 of the log is charred by fire
3	2/3 or more of the log is charred by fire

10.4.3.14 LARGE END DIAMETER CLASS (OPTIONAL)

Estimate the appropriate class code for the large end diameter for each CWD piece. If the large end diameter is close to a class breaking point it may be necessary to directly measure the diameter. Use the same established rules for determining the large end diameter point (see figure 58).

Values:

1	3.0 to 4.9 inches
2	5.0 to 8.9 inches
3	9.0 to 14.9 inches
4	15.0 to 20.9 inches
5	21.0 to 39.9 inches
6	40.0+ inches

10.5 SAMPLING RESIDUE PILES

A pile is an accumulation of large woody material in which individual pieces are impossible to tally separately. Piles may be created by human activity or natural causes. However, loose piles created by windthrow, landslides, fires or other natural causes, or by thinning or logging operations, should be tallied using the regular CWD protocols unless it is physically impossible to separate individual pieces. The pile protocol should only be used as a last resort, when the regular CWD protocols cannot be used.

Piles are tallied only if intersected by a transect and located in an accessible forest condition class (CONDITION CLASS STATUS = 1) or a measurable nonforest condition (NONFOREST CONDITION CLASS STATUS = 2). An estimate of the length and depth of the pile, species composition and decay class are recorded:

1. Tally individual pieces along the transect until it is not possible to measure them separately and record the horizontal transect distance to this point. Then, record the horizontal transect distance to the point where individual pieces can again be tallied separately (see figure 60).

2. If the pile straddles two condition classes, assign it to the condition class that is closest to subplot center along the transect.

3. Estimate the average height of the pile along the transect. Visually compact the pile to estimate the height of wood, excluding air, rocks, debris and pieces of wood less than 3 inches in diameter at the plane of intersection with the transect. There is a tendency to overestimate the proportion of the cross-section of the pile made of wood. Note that when packing perfect circles of equal diameter, the maximum attainable packing ratio is less than 90% (see figure 61).

4. Record the predominant species in the pile. If it is not possible to identify the species, or if there is an even mixture of several species, record the genus, or hardwood / softwood code.

5. Record the predominant decay class of the pieces in the pile.

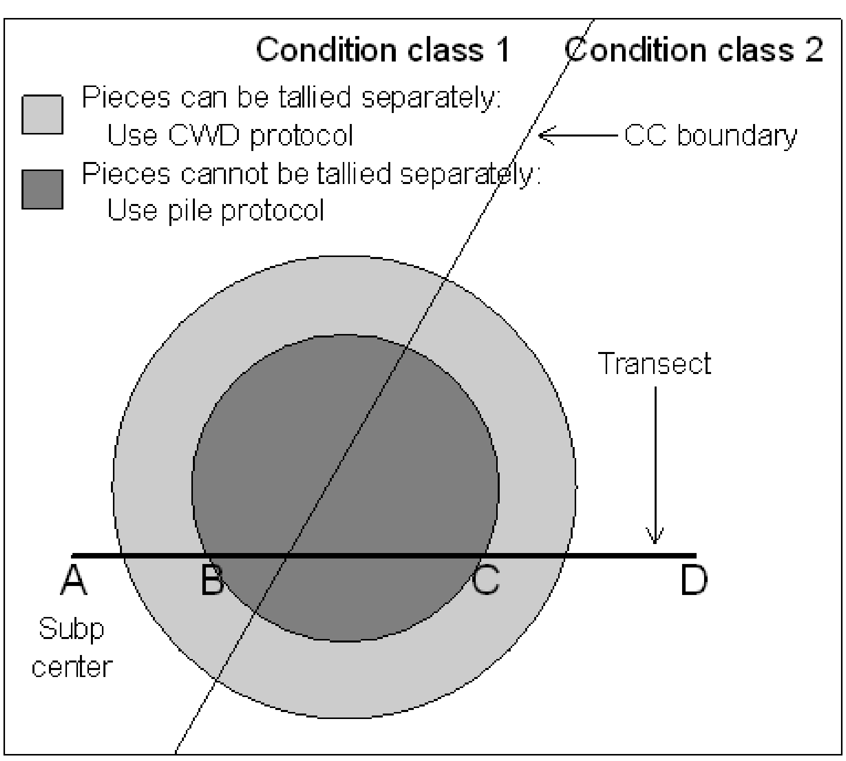


Figure 59. Example for measuring a pile. Pieces can be identified and tallied separately between points A-B and C-D, so the CWD protocols are used, even though part of the transect may be within the pile. Between points B and C, pieces cannot be tallied separately and the pile protocol is used. Enter the horizontal distance at B as the pile beginning distance, the horizontal distance at C as the pile ending distance, and estimate the compacted height of wood, predominant species, and predominant decay class between B and C. Assign the entire pile to condition class 1.

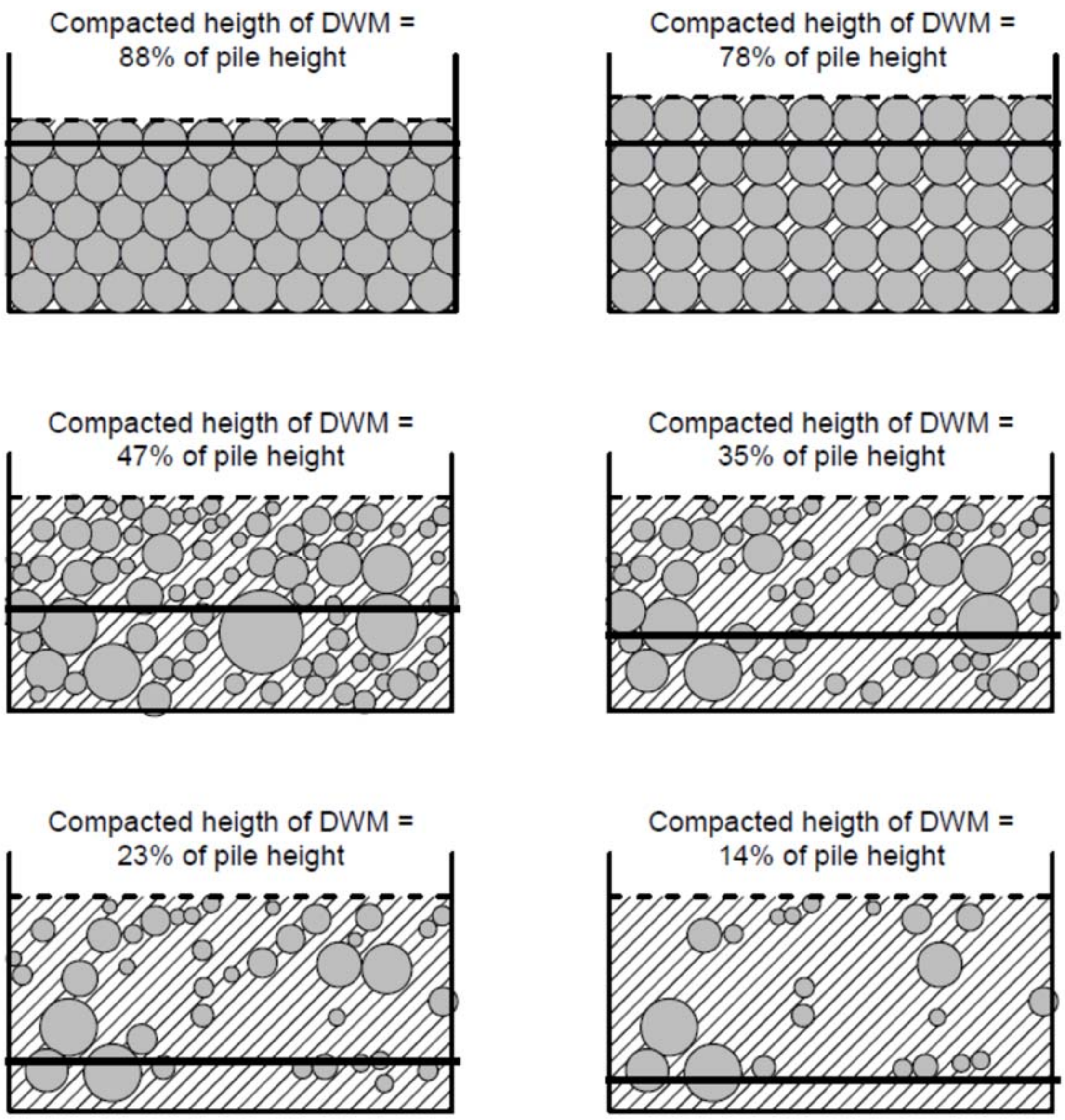


Figure 60. Calculating compacted height of CWD. The dashed line represents the height of the pile, the solid, thick line the compacted height of wood. Grey circles are cross sections of woody pieces greater than 3 inches of diameter and the fill represents debris, air and smaller pieces of wood.

10.5.1 PILE SUBPLOT NUMBER (BASE)

Record the code indicating the number of the subplot center from which the transect originates.

Values:

1 Center subplot
2 North subplot
3 Southeast subplot
4 Southwest subplot

10.5.2 PILE TRANSECT (BASE)

Record the azimuth of the transect on which the pile is sampled.

Values:

Subplot	Transect direction (degrees) from center of subplot	Subplot	Transect direction (degrees) from center of subplot
	090		135
1	270	3	315
	180 (Extra optional transect)		225 (Extra optional transect)
	360		045
2	180	4	225
	270 (Extra optional transect)		315 (Extra optional transect)

10.5.3 PILE CONDITION CLASS NUMBER (BASE) **[Cond]**

Record the code indicating the number of the condition class. If the pile straddles two condition classes, assign it to the one closest to subplot center along the transect.

Values: 1 to 9

10.5.4 PILE BEGINNING DISTANCE (BASE) **[BegHD]**

Record the horizontal length of the transect to the beginning of the pile (to the nearest 0.1 foot), defined as the point when pieces cannot be tallied individually. If the pile occupies subplot center, record 00.0 for the beginning distance.

Values: 00.0 to 58.8 feet

10.5.5 PILE ENDING DISTANCE (BASE) **[EndHD]**
Record the horizontal length of the transect to the end of the pile, defined as the point when pieces can be tallied individually again. If the transect ends within the pile, record DWM TRANSECT LENGTH.

Values: 00.1 to 58.9 feet

10.5.6 COMPACTED HEIGHT OF CWD IN PILE (BASE) **[PileH]**
Record average height of wood pieces greater than 3 inches in diameter at the intersection of the transect with the pile. Record value to the nearest foot. Visually compact the pile to estimate the height of wood, excluding air, debris and pieces of wood less than 3 inches in diameter at the point of intersection with the transect. If the transect starts or ends within a pile, only consider the portion of cross-section of the pile above the measured transect.

Values: 1 to 99 feet

10.5.7 PILE DECAY CLASS (BASE) **[Decay]**
Record a 1-digit code indicating the predominant decay class in the pile. Use the guide below to determine CWD DECAY CLASS.

Values:

Decay Class	Structural Integrity	Texture of Rotten Portions	Color of Wood	Invading Roots	Branches and Twigs
1	Sound, freshly fallen, intact logs	Intact, no rot; conks of stem decay absent	Original color	Absent	If branches are present, fine twigs are still attached and have tight bark
2	Sound	Mostly intact; sapwood partly soft (starting to decay) but can't be pulled apart by hand	Original color	Absent	If branches are present, many fine twigs are gone and remaining fine twigs have peeling bark
3	Heartwood sound; piece supports its own weight	Hard, large pieces; sapwood can be pulled apart by hand or sapwood absent	Reddish-brown or original color	Sapwood only	Branch stubs will not pull out
4	Heartwood rotten; piece does not support its own weight, but maintains its shape	Soft, small blocky pieces; a metal pin can be pushed into heartwood	Reddish or light brown	Through-out	Branch stubs pull out
5	None, piece no longer maintains its shape, it spreads out on ground	Soft; powdery when dry	Red-brown to dark brown	Through-out	Branch stubs and pitch pockets have usually rotted down

10.5.8 PILE SPECIES (BASE) **[Spp]**
Record the code indicating the predominant species / species group in the pile. If it is not possible to identify the species, or if there is an even mixture of several species, record the genus, or hardwood / softwood code.

Values: See species codes in appendix 3

10.6 Sampling Methods for Fine Woody Debris (FWD)

1. Fine Woody Debris (FWD) is only sampled on accessible forest land conditions (CONDITION CLASS STATUS = 1) and measurable nonforest conditions (NONFOEST CONDITION CLASS STATUS = 2) intersected by the transect. FWD is tallied on the outer portion of the following transects: 270°on subplot 1, 360°on subplot 2, 135°on subplot 3, and 225°on subplot 4. The length of FWD transects is measured in horizontal distance, starting at 14.0 feet and extending for 6.0 or 10.0 feet depending on FWD size class.
2. If the start of the FWD transect segment is in a measured condition (see item 1 above) but a portion of the transect segment is not visible due to the presence of snow or standing water, consider the entire transect segment not measurable. In this situation, do not sample anything on the transect segment--set FWD TRANSECT SEGMENTSAMPLE STATUS code = 0 and record the reason in FWD TRANSECT SEGMENT NONSAMPLED REASON.
3. Only sample FWD that intersects the transect in a plane from the ground to a height of 6 feet.
4. FWD is sampled in three size classes, along transect azimuths described in item 1 above (see section 10.2 for details on transects). Pieces in two FWD size classes (0.01 to 0.24 inches and 0.25 to 0.9 inches) are counted on a 6-foot transect, from 14 to 20 feet horizontal distance. Pieces in the largest size class (1.0 to 2.9 inches) are counted on a 10-foot transect, from 14 to 24 feet. These transects overlap. Note: individual diameters are not recorded for FWD.
5. Count a piece of FWD if it intersects the transect. Be sure to count only woody material such as a twig, branch, wood fragment, or small shrub or tree bole Do not count material that is actually litter, such as pine or fir needles, non-woody parts (e.g., petiole and rachis) of a shrub or tree, etc.
6. Accumulate the number of pieces counted within each size class and enter the total count on one record for the subplot. If there is no tally on a transect, enter zeros for the count. If the transect is not measured (FWD TRANSECT SAMPLE STATUS = 0) the count is null.
7. Accurate counts of FWD can be conducted efficiently up to about 50 pieces for small and medium size classes, and up to 20 pieces for the large size class. After that, crews can begin estimating counts in a systematic fashion. Transects that fall on very dense FWD where counting is nearly impossible, can be sub-sampled and calculated. For example, an accurate count can be conducted on a 2.0-foot section of the transect and then multiplied by 3 to provide an estimate for the 6 foot transect, as long as the crew feels that the remaining transect has a similar density of FWD pieces.

8. If a transect intersects a large pile of material such as a wood rat's nest, recently fallen tree (with many attached fine branches), or a residue pile, crews should estimate a count based on # 7 above, but also enter a code indicating that this is an unusual situation (see section 10.3.7). In the case of a residue pile on the transect, estimate a count by looking at the transect just before and after the pile along with assessing what's inside the pile, and enter a count for the whole transect.
9. If rocks or logs are present along the transect (14- to 24-foot section) include any FWD that is present on top of these things in the respective FWD counts. If the obstructions are so large (huge boulder) that the top surface cannot be seen, assume the count is zero in this area, and continue counting if there is transect line beyond the boulder.
10. If a transect crosses a condition class boundary, record the condition class number and enter a count for each condition on separate records. Transect lengths within each condition class will be obtained from the transect segmenting data entered for the plot.

10.6.1 FWD SUBPLOT NUMBER (BASE)
Record the code indicating the subplot center from which the transect originates.

Values:

1 Center subplot
2 North subplot
3 Southeast subplot
4 Southwest subplot

10.6.2 FWD TRANSECT (BASE)
Record the azimuth (degrees) of the transect on which FWD is sampled.

Values: degrees

Subplot	Transect direction (degrees) from center of subplot
1	270
2	360
3	135
4	225

10.6.3 FWD CONDITION CLASS NUMBER (BASE) **[Cond]**
Record the code indicating the number of the condition class at the start of the transect (14.0 feet horizontal distance from subplot center).

Values: 1 to 9

10.6.4 FWD TRANSECT SEGMENT SAMPLE STATUS (BASE) **[FWDSt]**
Record the sample status for FWD on the transect. There may be situations where the CWD is measurable, but the FWD is hidden from view by snow or water and not measurable. If any part of the FWD transect segment is on a measured condition but the FWD is not measurable, do not count any FWD and set the STATUS code to 0 and the FWD TRANSECT NONSAMPLED REASON code to 10.

In all other situations, set the code to 1. Conditions on which FWD would not be measured regardless (CONDITION CLASS STATUS = 3 or CONDITION CLASS STATUS = 2 AND NONFOREST CONDITION CLASS STATUS = 5) should always be coded 1.

Values:

0 FWD transect segment not sampled
1 FWD transect segment sampled

10.6.5 FWD TRANSECT SEGMENT NONSAMPLED REASON (BASE) **[FWDNS]**
Record the reason that FWD cannot be measured on the transect.

Values:

04 Time Limitation
05 Lost data (office use only)
10 Other (for example, snow or water covering CWD that is supposed to be sampled). "Note required" when using this code.

10.6.6 SMALL FWD COUNT (BASE) **[SmCnt]**
Record the number of pieces counted in this size class (0.01 to 0.24-inch diameter) along the transect segment. An accurate count should be conducted up to 50 pieces. If the count exceeds 50, the transect can be sub-sampled to estimate a total count for the transect length (see 10.6, #8).

Values: 000 to 999 pieces

10.6.7 MEDIUM FWD COUNT (BASE) **[MdCnt]**
Record the number of pieces counted in this size class (0.25 to 0.99-inch diameter) along the transect segment. An accurate count should be conducted up to 50 pieces. If the count exceeds 50, the transect can be sub-sampled to estimate a total count for the transect segment (see 10.6, # 8).

Values: 000 to 999 pieces

10.6.8 LARGE FWD COUNT (BASE) **[LgCnt]**
Record the number of pieces counted in this size class (1.0 to 2.9 inch diameter) along the transect segment. An accurate count should be conducted up to 20 pieces. If the count exceeds 20, the transect can be sub-sampled to estimate a total count for the transect segment (see 10.6, # 8).

Values: 000 to 500 pieces

10.6.9 HIGH COUNT REASON (BASE) **[HiRea]**
Enter a code that applies to the situation encountered on the transect. Enter a code if any of the counts on the transect are greater than 100 pieces.

Values:

1 High count is due to an overall high density of FWD across the transect
2 Wood Rat's nest located on transect
3 Tree or shrub laying across transect
4 Other reason
5 Residue pile

10.7 DUFF AND LITTER DEPTH MEASUREMENTS

Depth measurements are sampled in accessible forest land conditions (and accessible nonforest conditions, where nonforest conditions are measured). The depth of the duff layer and litter layer are important components of carbon tracking and fire models that estimate fire behavior, fire spread, fire effects, and smoke production. These measurements are taken at the 24-foot location on each transect. If an object such as a rock, log, or residue pile is present at the sample point, depths will be estimated by examining the surface of the object or the area surrounding the object. In the office, an average depth will be calculated and stored with other information about the condition class on the plot.

10.7.1 Definitions

1. Litter is the layer of freshly fallen leaves, needles, twigs (<0.25 inch in diameter), cones, detached bark chunks, dead moss, dead lichens, detached small chunks of rotted wood, dead herbaceous stems, and flower parts (detached and not upright). Litter is the loose plant material found on the top surface of the forest floor which is undecomposed or only partially decomposed organic material. The components of the litter layer can still be readily identified (e.g., plant leaves, twigs, and peat, etc.).
   Litter is flash fuel – so think about it as the loose material that is exposed to the air, capable of igniting quickly and carrying a fire across the surface of the forest floor.
   Litter does not include bark that is still attached to a down log, or rotten chunks of wood that are still inside a decaying log or log end (i.e., if a decayed log end has a lot of rotten cubes or pieces laying on a log surface and exposed to air, they are considered part of the log and not litter – fire would burn differently if it hit a pile of rotten punky wood chips cradled by the unrotted sapwood shell). If these rotten chunks have spilled out to the ground and are actually on the ground surface, then they would be included in the litter layer.
   Litter does not include animal manure.
2. Duff is the layer just below litter located just above the A-horizon (or uppermost soil mineral horizon). Duff is a dark soil layer dominated by organic material derived from the decomposition of plant and animal litter (pine straw, leaves, twigs, etc) and deposited on top of an organic or mineral surface. This layer is distinguished from the litter layer in that the original organic material has undergone sufficient decomposition that the source of this material (e.g., individual plant parts) can no longer be identified. You should see no recognizable plant parts. When moss is present, the top of the duff layer is just below the green portion of the moss.
   If peat is present in your part of the country, record it with the duff layer. Peat is an accumulation of partially decayed vegetation matter that forms under conditions of poor drainage such as those found in wetlands or bogs. A layer of peat develops when dead plant material is inhibited from decaying fully because of acidic or anaerobic conditions. In some areas of the U.S. the depth of this layer can be extensive.

10.7.2 Overview of Measurements

Depth measurements will be taken at the 24-foot (horizontal distance) location on each transect. If a log, rock, or residue pile occurs at the sample location, record the depth of the litter on top and below these objects and estimate the duff depth as close to the object as possible. Examine the area around the object to develop an average depth for these layers.
DUFF/LITTER SAMPLE STATUS identifies whether or not the duff and litter depth could be measured or reasonably estimated. Examples of situations where measurement is not possible include the presence of snow or standing water at the sample location. In this case, the STATUS code is set to 0 with the DUFF/LITTER NONSAMPLED REASON code set to 10.
The DUFF AND LITTER METHOD variable has three options for indicating if duff and litter were measured or estimated at each sample location. The default value for this variable is 1, indicating that both depths were measured and recorded. A code of 2 means that litter depth was measured, but duff depth was estimated and a code of 3 indicates that both duff and litter depths were estimated.
Carefully expose a shallow profile of the forest floor by digging out an area at the sample point using a knife, hatchet, or other tool. Estimate the depth of each layer with a ruler to the nearest 0.1 inch. As you dig the hole for this measurement, if you encounter a subsurface rock, root, or buried log – stop the depth measurement at this point. If there is a log, rock, or residue pile on the surface at the sample point, and there appears to be duff and litter under it (or litter on top of it), record a reasonable estimate for each depth. Most likely, the area immediately adjacent to the obstruction will have to be examined to determine an average depth. Depths of zero are perfectly valid: for example if the point falls on bedrock or on top of a log that it resting on mineral soil.
As a general rule, duff depth should rarely exceed a few inches (except when a peat layer is present). Crews should be absolutely sure they are measuring deep duff depths, instead of mineral soil layers or parts of the litter layer. Duff can easily weigh more than 6 times that of litter. If unsure of the bottom of the duff layer, crews should feel the texture of the suspect material in their hand. Rub the soil between your fingers. Does it crumble (duff) or feel more like modeling clay (mineral). If the layer includes a substantial amount of peat, stop the measurement at 2 feet.

The height of the litter should be measured at the top of the loose material located at the sample point on the transect (or nearby if an obstruction exists). Try to preserve the conditions of this location by walking around this point, so the QA staff will measure the same height as the original crew.

10.7.3 DUFF/LITTER SUBPLOT NUMBER (BASE)
Record the code indicating the number of the subplot center from which the transect originates.

Values:

1 Center subplot
2 North subplot
3 Southeast subplot
4 Southwest subplot

10.7.4 DUFF/LITTER TRANSECT (BASE)
Record the azimuth (degrees) of the transect on which duff/litter is sampled.

Values:

Subplot	Transect direction (degrees) from center of subplot
1	090
	270
2	360
	180
3	135
	315
4	045
	225

10.7.5 DUFF/LITTER CONDITION CLASS NUMBER (BASE) **[Cond]**
Record the code indicating the number of the condition class at the sample point (24.0 feet horizontal distance from subplot center)

Values: 1 to 9

10.7.6 DUFF/LITTER SAMPLE STATUS (BASE) **[DLSt]**
Record the sample status for duff and litter depth on the transect. There may be situations where the CWD is measurable (e.g., shallow depth of snow or water), but the duff and litter are not measurable. If the measurement point is on a measured condition but the duff/litter is not measurable, do not measure duff/litter and set code to 0 with the DUFF/LITTER NONSAMPLED REASON code set to 10.

In all other situations (including where duff and litter depth = 0), set the code to 1. For example, conditions on which duff/litter would not be measured regardless (CONDITION CLASS STATUS = 3 or NONFOREST CONDITION CLASS STATUS = 5) should always be coded 1.

Values:

0 Duff and litter point not sampled
1 Duff and litter point sampled

10.7.7 DUFF/LITTER NONSAMPLED REASON (BASE) **[DLNS]**
Record the reason that duff/litter cannot be measured on the transect.

Values:

04 Time Limitation
05 Lost data (office use only)
10 Other (for example, snow or water covering measurement point that is supposed to be sampled). “Note required” when using this code

10.7.8 DUFF DEPTH (BASE) **[DuDep]**
Record the code indicating the depth of the duff layer to the nearest 0.1 inch. Record 24.0 inches when DUFF DEPTH is >24.0 inches and enter Code #4 (Litter depth was measured, duff (peat) depth exceeds 24.0 inches) for 10.9.8 DUFF AND LITTER METHOD.

Values: 00.0 to 24.0 inches

10.7.9 LITTER DEPTH (BASE) **[LiDep]**
Record the code indicating the depth of the litter layer to the nearest 0.1 inch.

Values: 00.0 to 99.9 inches

10.7.10 DUFF AND LITTER METHOD (BASE) **[Meth]**

Record the code indicating whether duff and litter depths were measured or estimated.

Values:

1	Both duff and litter depth were measured
2	Litter depth was measured, duff depth (≤ 24.0 inches) was estimated
3	Both duff and litter depth were estimated
4	Litter depth was measured, duff (peat) depth exceeds 24.0 inches (note required)

10.8 References

Scott, J.E.; Burgan, R.H. 2005. Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model. General Technical Report RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72 p.

10.9 Contact Information

Contact information for the National Advisor for this indicator is: Chris Woodall, USDA Forest Service, Northern Research Station, 1992 Folwell Ave, St. Paul, MN 55108, cwoodall@fs.fed.us, http://www.ncrs.fs.fed.us/4801/national-programs/indicators/dwm/ (Note: this web address may be revised in the future. Please visit the Northern Research Station web site for an updated link www.nrs.fs.fed.us .)

APPENDICES and REGIONAL SUPPLEMENTS

1. State and County, Parish or Borough FIPS Codes

   These are the standard federal 2- and 3-digit codes for States and Counties, Parishes, or Boroughs, respectively.

2. FIA Forest Type Codes

   These are the codes that correspond to the National FIA forest typing algorithm. Units may choose to also add local forest type groupings.

3. FIA Tree Species Codes

   This list includes all species deemed to be tally trees with woodland trees measured for DRC indicated.

4. SRS Site Class Curves

5. Determination of Stocking Values for Land Use Classification

6. Glossary

7. Tolerance / MQO / Value / Units Table

8. Tree Coding Guide

9. Invasive Plant List

10. Unknown Plant Specimen Collection

11. Damage Codes

12. Reserved and Administratively Withdrawn Status by Owner and Land Designation

A. Cull and Tree Grading Procedures, Charts and Tables

B. Miscellaneous Tables

C. SRS Plot Monumentation

Appendix 1. State and County, Parish or Borough FIPS Codes

(01) Alabama

County	Unit	County	Unit	County	Unit
(001) Autauga	3	(047) Dallas	3	(093) Marion	4
(003) Baldwin	1	(049) DeKalb	6	(095) Marshall	6
(005) Barbour	3	(051) Elmore	3	(097) Mobile	1
(007) Bibb	4	(053) Escambia	1	(099) Monroe	2
(009) Blount	5	(055) Etowah	5	(101) Montgomery	3
(011) Bullock	3	(057) Fayette	4	(103) Morgan	6
(013) Butler	3	(059) Franklin	6	(105) Perry	4
(015) Calhoun	5	(061) Geneva	3	(107) Pickens	4
(017) Chambers	3	(063) Greene	4	(109) Pike	3
(019) Cherokee	5	(065) Hale	4	(111) Randolph	5
(021) Chilton	3	(067) Henry	3	(113) Russell	3
(023) Choctaw	2	(069) Houston	3	(115) St. Clair	5
(025) Clarke	2	(071) Jackson	6	(117) Shelby	5
(027) Clay	5	(073) Jefferson	5	(119) Sumter	2
(029) Cleburne	5	(075) Lamar	4	(121) Talladega	5
(031) Coffee	3	(077) Lauderdale	6	(123) Tallapoosa	3
(033) Colbert	6	(079) Lawrence	6	(125) Tuscaloosa	4
(035) Conecuh	2	(081) Lee	3	(127) Walker	5
(037) Coosa	5	(083) Limestone	6	(129) Washington	1
(039) Covington	1	(085) Lowndes	3	(131) Wilcox	2
(041) Crenshaw	3	(087) Macon	3	(133) Winston	5
(043) Cullman	5	(089) Madison	6		
(045) Dale	3	(091) Marengo	2		

UNIT 1 SOUTHWEST SOUTH

Baldwin	003	Escambia	053	Washington	129
Covington	039	Mobile	097		

UNIT 2 SOUTHWEST NORTH

Choctaw	023	Marengo	091	Sumter	119
Clarke	025	Monroe	099	Wilcox	131
Conecuh	035				

UNIT 3 SOUTHEAST

Autauga	001	Crenshaw	041	Lee	081
Barbour	005	Dale	045	Lowndes	085
Bullock	011	Dallas	047	Macon	087
Butler	013	Elmore	051	Mongomery	101
Chambers	017	Geneva	061	Pike	109
Chilton	021	Henry	067	Russell	113
Coffee	031	Houston	069	Tallapoosa	123

UNIT 4 WEST CENTRAL

Bibb	007	Hale	065	Perry	105
Fayette	057	Lamar	075	Pickens	107
Greene	063	Marion	093	Tuscaloosa	125

UNIT 5 NORTH CENTRAL

Blount	009	Coosa	037	St. Clair	115
Calhoun	015	Cullman	043	Shelby	117
Cherokee	019	Etowah	055	Talladega	121
Clay	027	Jefferson	073	Walker	127
Cleburne	029	Randolph	111	Winston	133

UNIT 6 NORTH

Colbert	033	Lauderdale	077	Madison	089
De Kalb	049	Lawrence	079	Marshall	095
Franklin	059	Limestone	083	Morgan	103
Jackson	071				


Lauderdale
Limestone
6
Madison
Jackson
Colbert
Franklin
Lawrence
Morgan
Marshall
De Kalb
Marion
Winston
Cullman
Cherokee
Etowah
Blount
Lamar
Fayette
Walker
St Clair
Calhoun
5
Jefferson
Cleburne
4
Talladega
Pickens
Tuscaloosa
Shelby
Clay
Randolph
Bibbs
Coosa
Chambers
Greene
Chilton
Tallapoosa
Hale
Perry
Lee
Elmore
Autauga
Sumter
Macon
Dallas
Montgomery
Russell
Marengo
Choctaw
Lowndes
3
Bullock
Wilcox
2
Barbour
Pike
Clarke
Butler
Crenshaw
Monroe
Henry
Washington
Conecuh
Dale
Coffee
Covington
Houston
Escambia
Geneva
1
Mobile
Baldwin

(05) Arkansas

County		Unit	County		Unit	County		Unit
(001)	Arkansas	1	(051)	Garland	4	(101)	Newton	5
(003)	Ashley	3	(053)	Grant	3	(103)	Ouachita	3
(005)	Baxter	5	(055)	Greene	2	(105)	Perry	4
(007)	Benton	5	(057)	Hempstead	3	(107)	Phillips	1
(009)	Boone	5	(059)	Hot Spring	3	(109)	Pike	3
(011)	Bradley	3	(061)	Howard	3	(111)	Poinsett	2
(013)	Calhoun	3	(063)	Independence	5	(113)	Polk	4
(015)	Carroll	5	(065)	Izard	5	(115)	Pope	5
(017)	Chicot	1	(067)	Jackson	2	(117)	Prairie	1
(019)	Clark	3	(069)	Jefferson	1	(119)	Pulaski	4
(021)	Clay	2	(071)	Johnson	5	(121)	Randolph	5
(023)	Cleburne	5	(073)	Lafayette	3	(123)	St. Francis	2
(025)	Cleveland	3	(075)	Lawrence	2	(125)	Saline	4
(027)	Columbia	3	(077)	Lee	1	(127)	Scott	4
(029)	Conway	5	(079)	Lincoln	1	(129)	Searcy	5
(031)	Craighead	2	(081)	Little River	3	(131)	Sebastian	4
(033)	Crawford	5	(083)	Logan	4	(133)	Sevier	3
(035)	Crittenden	2	(085)	Lonoke	1	(135)	Sharp	5
(037)	Cross	2	(087)	Madison	5	(137)	Stone	5
(039)	Dallas	3	(089)	Marion	5	(139)	Union	3
(041)	Desha	1	(091)	Miller	3	(141)	Van Buren	5
(043)	Drew	3	(093)	Mississippi	2	(143)	Washington	5
(045)	Faulkner	5	(095)	Monroe	1	(145)	White	5
(047)	Franklin	5	(097)	Montgomery	4	(147)	Woodruff	2
(049)	Fulton	5	(099)	Nevada	3	(149)	Yell	4

UNIT 1 SOUTH DELTA

Arkansas	001	Lee	077	Phillips	107
Chicot	017	Lincoln	079	Prairie	117
Desha	041	Lonoke	085		
Jefferson	069	Monroe	095		

UNIT 2 NORTH DELTA

Clay	021	Greene	055	Poinsett	111
Craighead	031	Jackson	067	St. Francis	123
Crittenden	035	Lawrence	075	Woodruff	147
Cross	037	Mississippi	093		

UNIT 3 SOUTHWEST

Ashley	003	Drew	043	Miller	091
Bradley	011	Grant	053	Nevada	099
Calhoun	013	Hempstead	057	Ouachita	103
Clark	019	Hot Spring	059	Pike	109
Cleveland	025	Howard	061	Sevier	133
Columbia	027	Lafayette	073	Union	139
Dallas	039	Little River	081		

UNIT 4 OUACHITA

Garland	051	Polk	113	Scott	127
Logan	083	Pulaski	119	Sebastian	131
Montgomery	097	Saline	125	Yell	149
Perry	105				

UNIT 5 OZARK

Baxter	005	Franklin	047	Pope	115
Benton	007	Fulton	049	Randolph	121
Boone	009	Independence	063	Searcy	129
Carroll	015	Izard	065	Sharp	135
Cleburne	023	Johnson	071	Stone	137
Conway	029	Madison	087	Van Buren	141
Crawford	033	Marion	089	Washington	143
Faulkner	045	Newton	101	White	145


Benton
Carroll
Boone
Marion
Baxter
Fulton
Randolph
Clay
Washington
Madison
Newton
Searcy
5
Stone
Izard
Sharp
Lawrence
Greene
Independence
Craighead
Mississippi
Crawford
Franklin
Johnson
Pope
Van Buren
Cleburne
Jackson
Poinsett
2
Sebastian
Logan
Conway
Faulkner
White
Woodruff
Cross
Crittender
St. Francis
Yell
Perry
Scott
4
Saline
Pulaski
Lonoke
Prairie
Lee
Monroe
Polk
Montgomery
Garland
Phillips
Hot Spring
Grant
Jefferson
1
Arkansas
Pike
Sevier
Howard
Clark
Dallas
Lincoln
Cleveland
3
Desha
Little River
Hempstead
Nevada
Ouachita
Calhoun
Bradley
Drew
Miller
Lafayette
Columbia
Union
Ashley
Chicot

(12) Florida

County		Unit	County		Unit	County		Unit
(001)	Alachua	1	(047)	Hamilton	1	(093)	Okeechobee	3
(003)	Baker	1	(049)	Hardee	3	(095)	Orange	3
(005)	Bay	2	(051)	Hendry	4	(097)	Osceola	3
(007)	Bradford	1	(053)	Hernando	3	(099)	Palm Beach	4
(009)	Brevard	3	(055)	Highlands	3	(101)	Pasco	3
(011)	Broward	4	(057)	Hillsborough	3	(103)	Pinellas	3
(013)	Calhoun	2	(059)	Holmes	2	(105)	Polk	3
(015)	Charlotte	4	(061)	Indian River	3	(107)	Putnam	1
(017)	Citrus	3	(063)	Jackson	2	(109)	St. Johns	1
(019)	Clay	1	(065)	Jefferson	2	(111)	St. Lucie	3
(021)	Collier	4	(067)	Lafayette	1	(113)	Santa Rosa	2
(023)	Columbia	1	(069)	Lake	3	(115)	Sarasota	3
(025)	Dade	4	(071)	Lee	4	(117)	Seminole	3
(027)	DeSoto	3	(073)	Leon	2	(119)	Sumter	3
(029)	Dixie	1	(075)	Levy	1	(121)	Suwannee	1
(031)	Duval	1	(077)	Liberty	2	(123)	Taylor	1
(033)	Escambia	2	(079)	Madison	1	(125)	Union	1
(035)	Flagler	1	(081)	Manatee	3	(127)	Volusia	1
(037)	Franklin	2	(083)	Marion	1	(129)	Wakulla	2
(039)	Gadsden	2	(085)	Martin	4	(131)	Walton	2
(041)	Gilchrist	1	(087)	Monroe	4	(133)	Washington	2
(043)	Glades	4	(089)	Nassau	1			
(045)	Gulf	2	(091)	Okaloosa	2			

UNIT 1 NORTHEAST

Alachua	001	Flagler	035	Nassau	089
Baker	003	Gilchrist	041	Putnam	107
Bradford	007	Hamilton	047	St. Johns	109
Clay	019	Lafayette	067	Suwannee	121
Columbia	023	Levy	075	Taylor	123
Dixie	029	Madison	079	Union	125
Duval	031	Marion	083	Volusia	127

UNIT 2 NORTHWEST

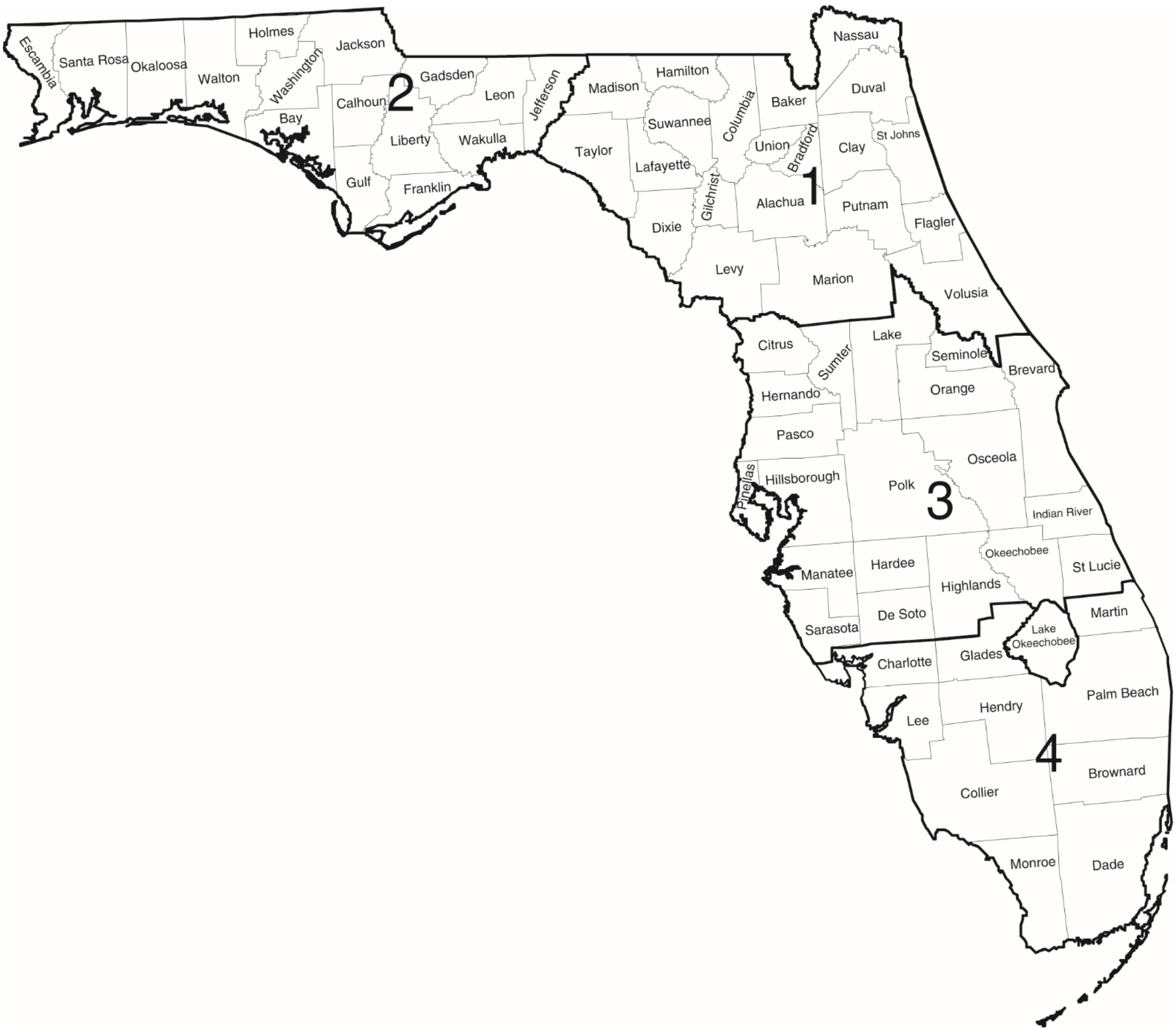
Bay	005	Holmes	059	Santa Rosa	113
Calhoun	013	Jackson	063	Wakulla	129
Escambia	033	Jefferson	065	Walton	131
Franklin	037	Leon	073	Washington	133
Gadsden	039	Liberty	077		
Gulf	045	Okaloosa	091		

UNIT 3 CENTRAL

Brevard	009	Indian River	061	Pinellas	103
Citrus	017	Lake	069	Polk	105
De Soto	027	Manatee	081	St. Lucie	111
Hardee	049	Okeechobee	093	Sarasota	115
Hernando	053	Orange	095	Seminole	117
Highlands	055	Osceola	097	Sumter	119
Hillsborough	057	Pasco	101		

UNIT 4 SOUTH

Broward	011	Glades	043	Martin	085
Charlotte	015	Hendry	051	Monroe	087
Collier	021	Lee	071	Palm Beach	099
Dade	025				


1
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Escambia
Santa Rosa
Okaloosa
Walton
Holmes
Washington
Bay
Jackson
Calhoun
Gulf
Gadsden
Liberty
Franklin
Leon
Wakulla
Jefferson
Madison
Taylor
Hamilton
Suwannee
Lafayette
Dixie
Columbia
Gilchrist
Baker
Union
Bradford
Alachua
Levy
Marion
Nassau
Duval
Clay
St Johns
Putnam
Flagler
Volusia
Citrus
Sumter
Hernando
Pasco
Pinellas
Hillsborough
Lake
Seminole
Orange
Brevard
Osceola
Polk
Indian River
Okeechobee
St Lucie
Manatee
Hardee
Highlands
Sarasota
De Soto
Martin
Lake Okeechobee
Charlotte
Glades
Palm Beach
Lee
Hendry
Collier
Brownard
Monroe
Dade

(13) Georgia

County		Unit	County		Unit	County		Unit	County		Unit
(001)	Appling	1	(083)	Dade	5	(163)	Jefferson	3	(245)	Richmond	3
(003)	Atkinson	1	(085)	Dawson	5	(165)	Jenkins	1	(247)	Rockdale	4
(005)	Bacon	1	(087)	Decatur	2	(167)	Johnson	1	(249)	Schley	3
(007)	Baker	2	(089)	DeKalb	4	(169)	Jones	3	(251)	Screven	1
(009)	Baldwin	3	(091)	Dodge	1	(171)	Lamar	3	(253)	Seminole	2
(011)	Banks	4	(093)	Dooly	2	(173)	Lanier	2	(255)	Spalding	4
(013)	Barrow	4	(095)	Dougherty	3	(175)	Laurens	1	(257)	Stephens	5
(015)	Bartow	5	(097)	Douglas	4	(177)	Lee	3	(259)	Stewart	3
(017)	Ben Hill	2	(099)	Early	2	(179)	Liberty	1	(261)	Sumter	3
(019)	Berrien	2	(101)	Echols	1	(181)	Lincoln	3	(263)	Talbot	3
(021)	Bibb	3	(103)	Effingham	1	(183)	Long	1	(265)	Taliaferro	3
(023)	Bleckley	3	(105)	Elbert	4	(185)	Lowndes	2	(267)	Tattnall	1
(025)	Brantley	1	(107)	Emanuel	1	(187)	Lumpkin	5	(269)	Taylor	3
(027)	Brooks	2	(109)	Evans	1	(189)	McDuffie	3	(271)	Telfair	1
(029)	Bryan	1	(111)	Fannin	5	(191)	McIntosh	1	(273)	Terrell	3
(031)	Bulloch	1	(113)	Fayette	4	(193)	Macon	3	(275)	Thomas	2
(033)	Burke	3	(115)	Floyd	5	(195)	Madison	4	(277)	Tift	2
(035)	Butts	3	(117)	Forsyth	4	(197)	Marion	3	(279)	Toombs	1
(037)	Calhoun	3	(119)	Franklin	4	(199)	Meriwether	4	(281)	Towns	5
(039)	Camden	1	(121)	Fulton	4	(201)	Miller	2	(283)	Treutlen	1
(043)	Candler	1	(123)	Gilmer	5	(205)	Mitchell	2	(285)	Troup	4
(045)	Carroll	4	(125)	Glascock	3	(207)	Monroe	3	(287)	Turner	2
(047)	Catoosa	5	(127)	Glynn	1	(209)	Montgomery	1	(289)	Twiggs	3
(049)	Charlton	1	(129)	Gordon	5	(211)	Morgan	3	(291)	Union	5
(051)	Chatham	1	(131)	Grady	2	(213)	Murray	5	(293)	Upson	3
(053)	Chattahoochee	3	(133)	Greene	3	(215)	Muscogee	3	(295)	Walker	5
(055)	Chattooga	5	(135)	Gwinnett	4	(217)	Newton	4	(297)	Walton	4
(057)	Cherokee	5	(137)	Habersham	5	(219)	Oconee	4	(299)	Ware	1
(059)	Clarke	4	(139)	Hall	4	(221)	Oglethorpe	4	(301)	Warren	3
(061)	Clay	3	(141)	Hancock	3	(223)	Paulding	4	(303)	Washington	3
(063)	Clayton	4	(143)	Haralson	4	(225)	Peach	3	(305)	Wayne	1
(065)	Clinch	1	(145)	Harris	3	(227)	Pickens	5	(307)	Webster	3
(067)	Cobb	4	(147)	Hart	4	(229)	Pierce	1	(309)	Wheeler	1
(069)	Coffee	1	(149)	Heard	4	(231)	Pike	3	(311)	White	5
(071)	Colquitt	2	(151)	Henry	4	(233)	Polk	4	(313)	Whitfield	5
(073)	Columbia	3	(153)	Houston	3	(235)	Pulaski	3	(315)	Wilcox	2
(075)	Cook	2	(155)	Irwin	2	(237)	Putnam	3	(317)	Wilkes	3
(077)	Coweta	4	(157)	Jackson	4	(239)	Quitman	3	(319)	Wilkinson	3
(079)	Crawford	3	(159)	Jasper	3	(241)	Rabun	5	(321)	Worth	2
(081)	Crisp	2	(161)	Jeff Davis	1	(243)	Randolph	3			

UNIT 1 SOUTHEAST

Appling	001	Chatham	051	Jeff Davis	161	Screven	251
Atkinson	003	Clinch	065	Jenkins	165	Tattnall	267
Bacon	005	Coffee	069	Johnson	167	Telfair	271
Brantley	025	Dodge	091	Laurens	175	Toombs	279
Bryan	029	Echols	101	Liberty	179	Treutlen	283
Bulloch	031	Effingham	103	Long	183	Ware	299
Camden	039	Emanuel	107	McIntosh	191	Wayne	305
Candler	043	Evans	109	Montgomery	209	Wheeler	309
Charlton	049	Glynn	127	Pierce	229		

UNIT 2 SOUTHWEST

Baker	007	Crisp	081	Lanier	173	Tift	277
Ben Hill	017	Decatur	087	Lowndes	185	Turner	287
Berrien	019	Dooly	093	Miller	201	Wilcox	315
Brooks	027	Early	099	Mitchell	205	Worth	321
Colquitt	071	Grady	131	Seminole	253		
Cook	075	Irwin	155	Thomas	275		

UNIT 3 CENTRAL

Baldwin	009	Hancock	141	Monroe	207	Sumter	261
Bibb	021	Harris	145	Morgan	211	Talbot	263
Bleckley	023	Houston	153	Muscogee	215	Taliaferro	265
Burke	033	Jasper	159	Peach	225	Taylor	269
Butts	035	Jefferson	163	Pike	231	Terrell	273
Calhoun	037	Jones	169	Pulaski	235	Twiggs	289
Chattahoochee	053	Lamar	171	Putnam	237	Upson	293
Clay	061	Lee	177	Quitman	239	Warren	301
Columbia	073	Lincoln	181	Randolph	243	Washington	303
Crawford	079	McDuffie	189	Richmond	245	Webster	307
Dougherty	095	Macon	193	Schley	249	Wilkes	317
Glascock	125	Marion	197	Stewart	259	Wilkinson	319
Greene	133						

UNIT 4 NORTH CENTRAL

Banks	011	Douglas	097	Haralson	143	Oconee	219
Barrow	013	Elbert	105	Hart	147	Oglethorpe	221
Carroll	045	Fayette	113	Heard	149	Paulding	223
Clarke	059	Forsyth	117	Henry	151	Polk	233
Clayton	063	Franklin	119	Jackson	157	Rockdale	247
Cobb	067	Fulton	121	Madison	195	Spalding	255
Coweta	077	Gwinnett	135	Meriwether	199	Troup	285
Dekalb	089	Hall	139	Newton	217	Walton	297

UNIT 5 NORTH

Bartow	015	Fannin	111	Murray	213	Walker	295
Catoosa	047	Floyd	115	Pickens	227	White	311
Chattooga	055	Gilmer	123	Rabun	241	Whitfield	313
Cherokee	057	Gordon	129	Stephens	257		
Dade	083	Habersham	137	Towns	281		
Dawson	085	Lumpkin	187	Union	291		

(21) Kentucky

County		Unit	County		Unit	County		Unit	County		Unit
(001)	Adair	5	(061)	Edmonson	6	(121)	Knox	3	(181)	Nicholas	4
(003)	Allen	6	(063)	Elliott	2	(123)	Larue	5	(183)	Ohio	6
(005)	Anderson	4	(065)	Estill	3	(125)	Laurel	3	(185)	Oldham	4
(007)	Ballard	7	(067)	Fayette	4	(127)	Lawrence	2	(187)	Owen	4
(009)	Barren	6	(069)	Fleming	4	(129)	Lee	3	(189)	Owsley	3
(011)	Bath	4	(071)	Floyd	1	(131)	Leslie	1	(191)	Pendleton	4
(013)	Bell	3	(073)	Franklin	4	(133)	Letcher	1	(193)	Perry	1
(015)	Boone	4	(075)	Fulton	7	(135)	Lewis	2	(195)	Pike	1
(017)	Bourbon	4	(077)	Gallatin	4	(137)	Lincoln	4	(197)	Powell	2
(019)	Boyd	2	(079)	Garrard	4	(139)	Livingston	7	(199)	Pulaski	5
(021)	Boyle	4	(081)	Grant	4	(141)	Logan	6	(201)	Robertson	4
(023)	Bracken	4	(083)	Graves	7	(143)	Lyon	7	(203)	Rockcastle	3
(025)	Breathitt	3	(085)	Grayson	5	(145)	McCracken	7	(205)	Rowan	2
(027)	Breckinridge	5	(087)	Green	5	(147)	McCreary	3	(207)	Russell	5
(029)	Bullitt	5	(089)	Greenup	2	(149)	McLean	6	(209)	Scott	4
(031)	Butler	6	(091)	Hancock	5	(151)	Madison	4	(211)	Shelby	4
(033)	Caldwell	6	(093)	Hardin	5	(153)	Magoffin	2	(213)	Simpson	6
(035)	Calloway	7	(095)	Harlan	1	(155)	Marion	5	(215)	Spencer	4
(037)	Campbell	4	(097)	Harrison	4	(157)	Marshall	7	(217)	Taylor	5
(039)	Carlisle	7	(099)	Hart	5	(159)	Martin	1	(219)	Todd	6
(041)	Carroll	4	(101)	Henderson	6	(161)	Mason	4	(221)	Trigg	7
(043)	Carter	2	(103)	Henry	4	(163)	Meade	5	(223)	Trimble	4
(045)	Casey	5	(105)	Hickman	7	(165)	Menifee	2	(225)	Union	6
(047)	Christian	6	(107)	Hopkins	6	(167)	Mercer	4	(227)	Warren	6
(049)	Clark	4	(109)	Jackson	3	(169)	Metcalfe	5	(229)	Washington	4
(051)	Clay	3	(111)	Jefferson	4	(171)	Monroe	6	(231)	Wayne	5
(053)	Clinton	5	(113)	Jessamine	4	(173)	Montgomery	4	(233)	Webster	6
(055)	Crittenden	6	(115)	Johnson	2	(175)	Morgan	2	(235)	Whitley	3
(057)	Cumberland	5	(117)	Kenton	4	(177)	Muhlenberg	6	(237)	Wolfe	2
(059)	Daviess	6	(119)	Knott	1	(179)	Nelson	5	(239)	Woodford	4

UNIT 1 EASTERN

Floyd	071	Leslie	131	Perry	193
Harlan	095	Letcher	133	Pike	195
Knott	119	Martin	159		

UNIT 2 NORTHERN CUMBERLAND

Boyd	019	Lawrence	127	Morgan	175
Carter	043	Lewis	135	Powell	197
Elliott	063	Magoffin	153	Rowan	205
Greenup	089	Menifee	165	Wolfe	237
Johnson	115				

UNIT 3 SOUTHERN CUMBERLAND

Bell	013	Jackson	109	McCreary	147
Breathitt	025	Knox	121	Owsley	189
Clay	051	Laurel	125	Rockcastle	203
Estill	065	Lee	129	Whitley	235

UNIT 4 BLUEGRASS

Anderson	005	Gallatin	077	Montgomery	173
Bath	011	Garrard	079	Nicholas	181
Boone	015	Grant	081	Oldham	185
Bourbon	017	Harrison	097	Owen	187
Boyle	021	Henry	103	Pendleton	191
Bracken	023	Jefferson	111	Robertson	201
Campbell	037	Jessamine	113	Scott	209
Carroll	041	Kenton	117	Shelby	211
Clark	049	Lincoln	137	Spencer	215
Fayette	067	Madison	151	Trimble	223
Fleming	069	Mason	161	Washington	229
Franklin	073	Mercer	167	Woodford	239

UNIT 5 PENNYROYAL

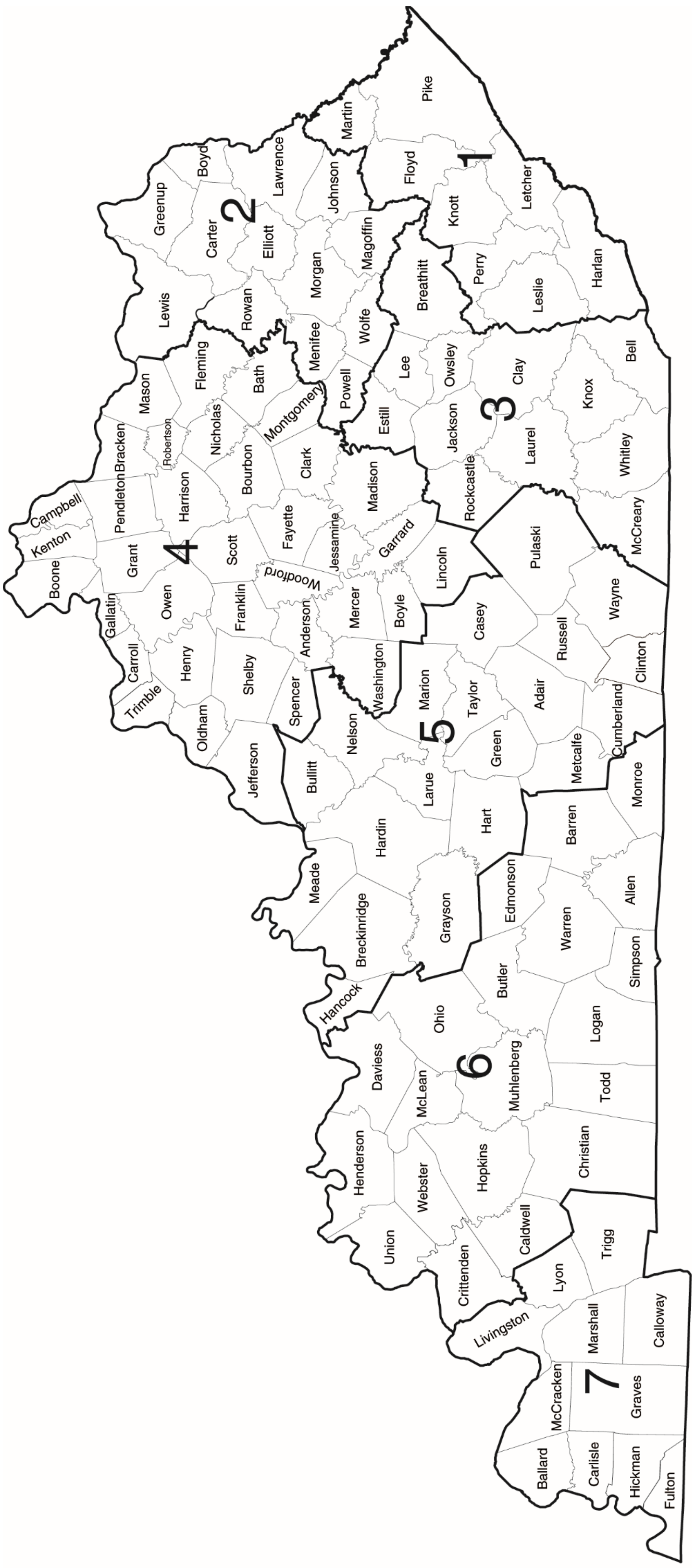
Adair	001	Green	087	Metcalfe	169
Breckinridge	027	Hancock	091	Nelson	179
Bullitt	029	Hardin	093	Pulaski	199
Casey	045	Hart	099	Russell	207
Clinton	053	Larue	123	Taylor	217
Cumberland	057	Marion	155	Wayne	231
Grayson	085	Meade	163		

UNIT 6 WESTERN COALFIELD

Allen	003	Edmonson	061	Ohio	183
Barren	009	Henderson	101	Simpson	213
Butler	031	Hopkins	107	Todd	219
Caldwell	033	Logan	141	Union	225
Christian	047	McLean	149	Warren	227
Crittenden	055	Monroe	171	Webster	233
Daviess	059	Muhlenberg	177		

UNIT 7 WESTERN

Ballard	007	Graves	083	McCracken	145
Calloway	035	Hickman	105	Marshall	157
Carlisle	039	Livingston	139	Trigg	221
Fulton	075	Lyon	143		



(22) Louisiana

County		Unit	County		Unit	County		Unit
(001)	Acadia	2	(045)	Iberia	2	(089)	St. Charles	2
(003)	Allen	3	(047)	Iberville	2	(091)	St. Helena	4
(005)	Ascension	2	(049)	Jackson	5	(093)	St. James	2
(007)	Assumption	2	(051)	Jefferson	2	(095)	St. John the	2
(009)	Avoyelles	2	(053)	Jefferson Davis	3	(097)	St. Landry	2
(011)	Beauregard	3	(055)	Lafayette	2	(099)	St. Martin	2
(013)	Bienville	5	(057)	Lafourche	2	(101)	St. Mary	2
(015)	Bossier	5	(059)	La Salle	3	(103)	St. Tammany	4
(017)	Caddo	5	(061)	Lincoln	5	(105)	Tangipahoa	4
(019)	Calcasieu	3	(063)	Livingston	4	(107)	Tensas	1
(021)	Caldwell	5	(065)	Madison	1	(109)	Terrebonne	2
(023)	Cameron	2	(067)	Morehouse	1	(111)	Union	5
(025)	Catahoula	1	(069)	Natchitoches	3	(113)	Vermilion	2
(027)	Claiborne	5	(071)	Orleans	2	(115)	Vernon	3
(029)	Concordia	1	(073)	Ouachita	5	(117)	Washington	4
(031)	De Soto	5	(075)	Plaquemines	2	(119)	Webster	5
(033)	East Baton	4	(077)	Pointe Coupee	2	(121)	West Baton	2
(035)	East Carroll	1	(079)	Rapides	3	(123)	West Carroll	1
(037)	East	4	(081)	Red River	5	(125)	West Feliciana	2
(039)	Evangeline	3	(083)	Richland	1	(127)	Winn	5
(041)	Franklin	1	(085)	Sabine	3			
(043)	Grant	3	(087)	St. Bernard	2			

UNIT 1 NORTH DELTA

Catahoula	025	Franklin	041	Richland	083
Concordia	029	Madison	065	Tensas	107
E. Carroll	035	Morehouse	067	W. Carroll	123

UNIT 2 SOUTH DELTA

Acadia	001	Lafayette	055	St.John Baptist	095
Ascension	005	Lafourche	057	St. Landry	097
Assumption	007	Orleans	071	St. Martin	099
Avoyelles	009	Plaquemines	075	St. Mary	101
Cameron	023	Pointe Coupee	077	Terrebonne	109
Iberia	045	St. Bernard	087	Vermilion	113
Iberville	047	St. Charles	089	W. Baton Rouge	121
Jefferson	051	St. James	093	W. Feliciana	125

UNIT 3 SOUTHWEST

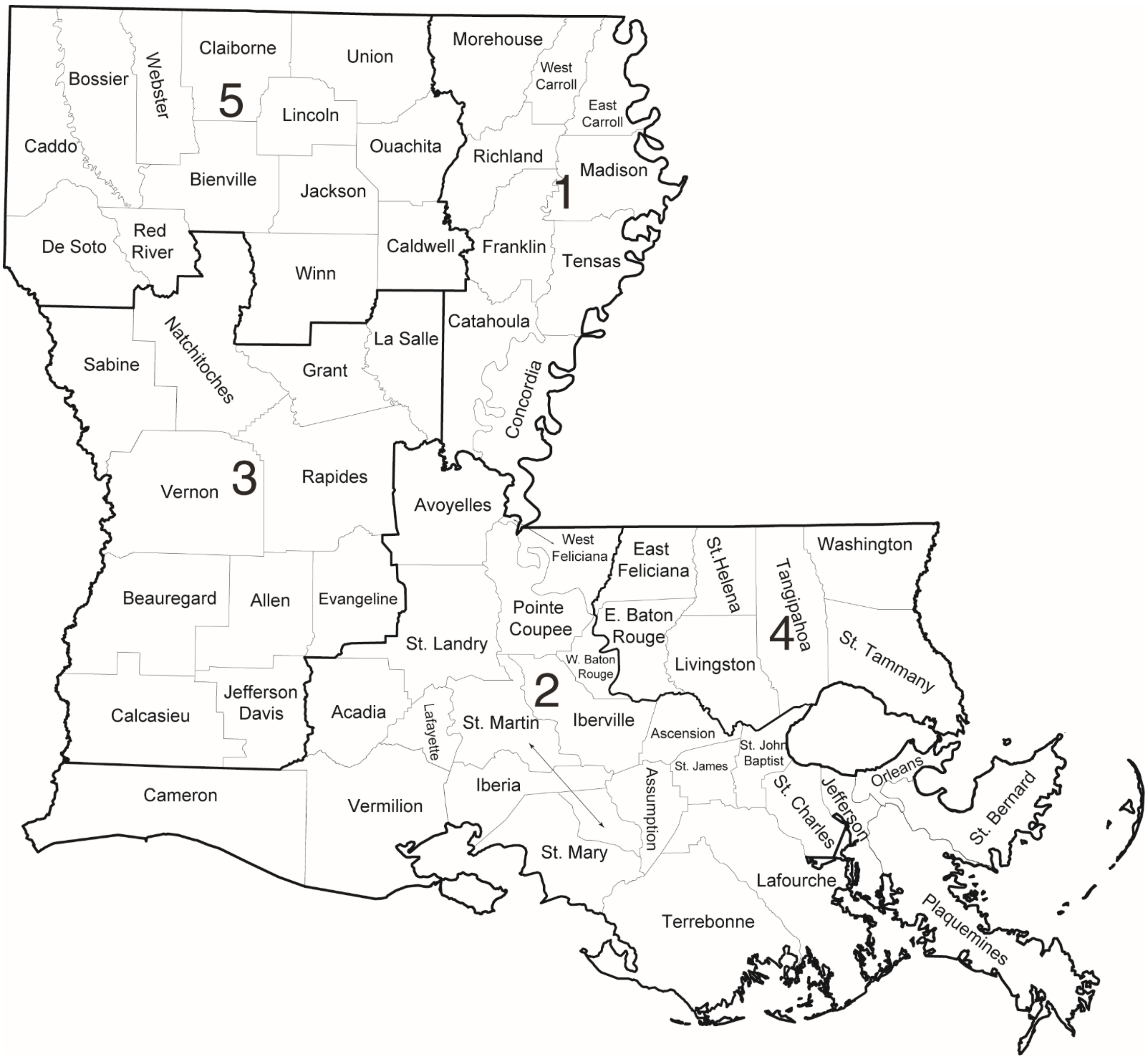
Allen	003	Grant	043	Rapides	079
Beauregard	011	Jefferson Davis	053	Sabine	085
Calcasieu	019	La Salle	059	Vernon	115
Evangeline	039	Natchitoches	069		

UNIT 4 SOUTHEAST

E. Baton Rouge	033	St. Helena	091	Tangipahoa	105
E. Feliciana	037	St. Tammany	103	Washington	117
Livingston	063				

UNIT 5 NORTHWEST

Bienville	013	De Soto	031	Red River	081
Bossier	015	Jackson	049	Union	111
Caddo	017	Lincoln	061	Webster	119
Caldwell	021	Ouachita	073	Winn	127
Claiborne	027				


Claiborne
Union
Morehouse
Bossier
Webster
West Carroll
5
Lincoln
East Carroll
Caddo
Ouachita
Richland
Madison
Bienville
Jackson
1
Red River
De Soto
Caldwell
Franklin
Tensas
Winn
Natchitoches
Catahoula
La Salle
Sabine
Grant
Concordia
Vernon
3
Rapides
Avoyelles
West Feliciana
East Feliciana
St.Helena
Washington
Tangipahoa
Beauregard
Allen
Evangeline
Pointe Coupee
E. Baton Rouge
4
St. Tammany
St. Landry
W. Baton Rouge
Livingston
2
Jefferson Davis
Calcasieu
Acadia
Lafayette
St. Martin
Iberville
Ascension
St. John Baptist
St. James
Orleans
Cameron
Iberia
Assumption
St. Charles
Jefferson
St. Bernard
Vermilion
St. Mary
Lafourche
Terrebonne
Plaquemines

(28) Mississippi

County		Unit	County		Unit	County		Unit
(001)	Adams	5	(057)	Itawamba	2	(113)	Pike	5
(003)	Alcorn	2	(059)	Jackson	4	(115)	Pontotoc	2
(005)	Amite	5	(061)	Jasper	3	(117)	Prentiss	2
(007)	Attala	3	(063)	Jefferson	5	(119)	Quitman	1
(009)	Benton	2	(065)	Jefferson Davis	4	(121)	Rankin	3
(011)	Bolivar	1	(067)	Jones	4	(123)	Scott	3
(013)	Calhoun	2	(069)	Kemper	3	(125)	Sharkey	1
(015)	Carroll	2	(071)	Lafayette	2	(127)	Simpson	3
(017)	Chickasaw	2	(073)	Lamar	4	(129)	Smith	3
(019)	Choctaw	2	(075)	Lauderdale	3	(131)	Stone	4
(021)	Claiborne	5	(077)	Lawrence	4	(133)	Sunflower	1
(023)	Clarke	3	(079)	Leake	3	(135)	Tallahatchie	1
(025)	Clay	2	(081)	Lee	2	(137)	Tate	2
(027)	Coahoma	1	(083)	Leflore	1	(139)	Tippah	2
(029)	Copiah	5	(085)	Lincoln	5	(141)	Tishomingo	2
(031)	Covington	4	(087)	Lowndes	2	(143)	Tunica	1
(033)	DeSoto	2	(089)	Madison	5	(145)	Union	2
(035)	Forrest	4	(091)	Marion	4	(147)	Walthall	4
(037)	Franklin	5	(093)	Marshall	2	(149)	Warren	1
(039)	George	4	(095)	Monroe	2	(151)	Washington	1
(041)	Greene	4	(097)	Montgomery	2	(153)	Wayne	4
(043)	Grenada	2	(099)	Neshoba	3	(155)	Webster	2
(045)	Hancock	4	(101)	Newton	3	(157)	Wilkinson	5
(047)	Harrison	4	(103)	Noxubee	3	(159)	Winston	3
(049)	Hinds	5	(105)	Oktibbeha	2	(161)	Yalobusha	2
(051)	Holmes	1	(107)	Panola	2	(163)	Yazoo	1
(053)	Humphreys	1	(109)	Pearl River	4			
(055)	Issaquena	1	(111)	Perry	4			

UNIT 1 DELTA

Bolivar	011	Leflore	083	Tunica	143
Coahoma	027	Quitman	119	Warren	149
Holmes	051	Sharkey	125	Washington	151
Humphreys	053	Sunflower	133	Yazoo	163
Issaquena	055	Tallahatchie	135		

UNIT 2 NORTH

Alcorn	003	Itawamba	057	Pontotoc	115
Benton	009	Lafayette	071	Prentiss	117
Calhoun	013	Lee	081	Tate	137
Carroll	015	Lowndes	087	Tippah	139
Chickasaw	017	Marshall	093	Tishomingo	141
Choctaw	019	Monroe	095	Union	145
Clay	025	Montgomery	097	Webster	155
De Soto	033	Oktibbeha	105	Yalobusha	161
Grenada	043	Panola	107		

UNIT 3 CENTRAL

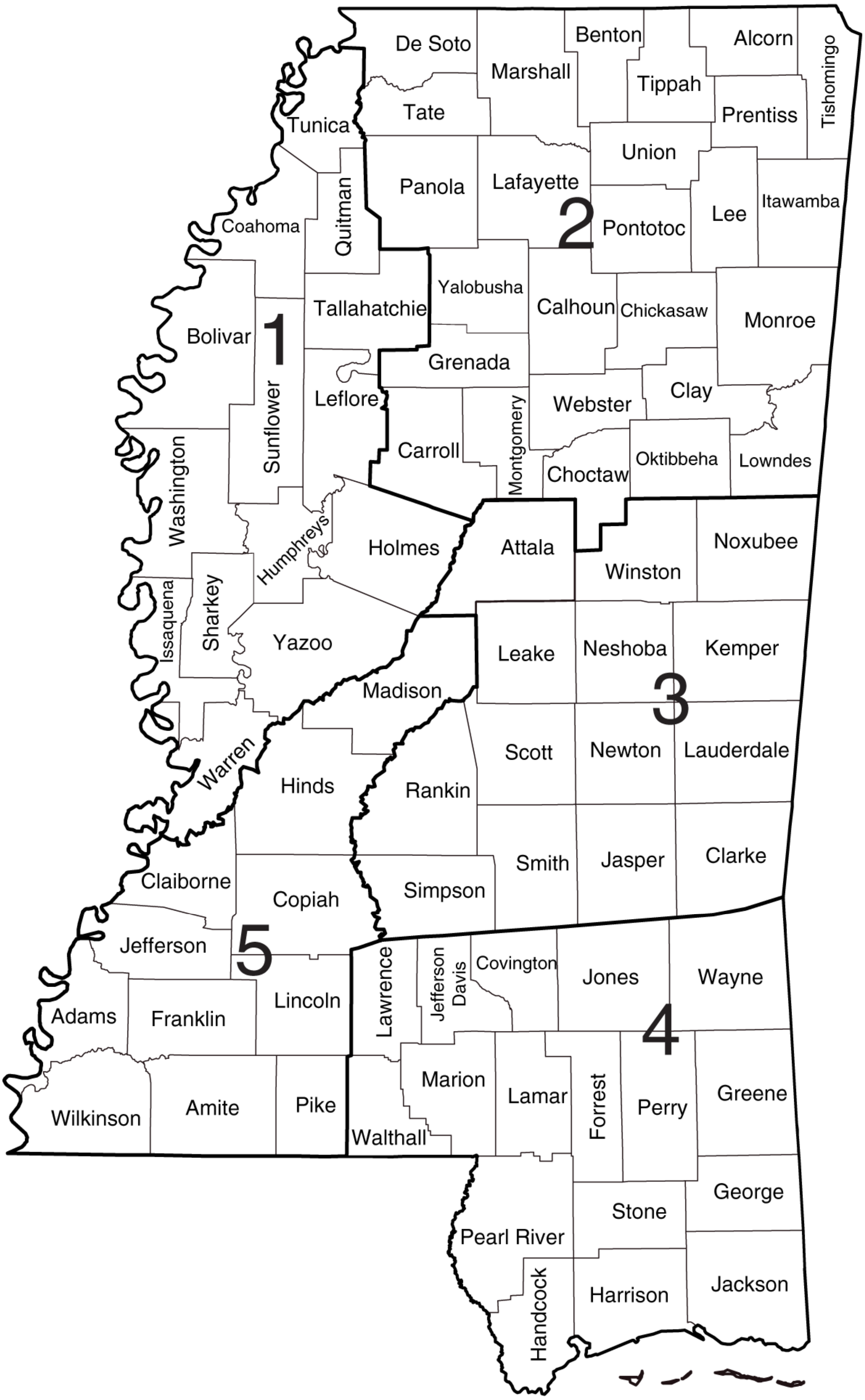
Attala	007	Leake	079	Scott	123
Clarke	023	Neshoba	099	Simpson	127
Jasper	061	Newton	101	Smith	129
Kemper	069	Noxubee	103	Winston	159
Lauderdale	075	Rankin	121		

UNIT 4 SOUTH

Covington	031	Jackson	059	Pearl River	109
Forrest	035	Jefferson Davis	065	Perry	111
George	039	Jones	067	Stone	131
Greene	041	Lamar	073	Walthall	147
Hancock	045	Lawrence	077	Wayne	153
Harrison	047	Marion	091		

UNIT 5 SOUTHWEST

Adams	001	Franklin	037	Madison	089
Amite	005	Hinds	049	Pike	113
Claiborne	021	Jefferson	063	Wilkinson	157
Copiah	029	Lincoln	085		


De Soto
Marshall
Benton
Tippah
Alcorn
Tishomingo
Tunica
Tate
Prentiss
Union
Panola
Lafayette
2
Pontotoc
Lee
Itawamba
Coahoma
Quitman
Tallahatchie
Yalobusha
Calhoun
Chickasaw
Monroe
Bolivar
1
Sunflower
Grenada
Leflore
Webster
Clay
Washington
Carroll
Montgomery
Choctaw
Oktibbeha
Lowndes
Humphreys
Holmes
Attala
Winston
Noxubee
Issaquena
Sharkey
Yazoo
Leake
Neshoba
Kemper
Madison
3
Warren
Scott
Newton
Lauderdale
Hinds
Rankin
Smith
Jasper
Clarke
Claiborne
Copiah
Simpson
Jefferson
5
Lawrence
Jefferson Davis
Covington
Jones
Wayne
Adams
Franklin
Lincoln
4
Marion
Lamar
Forrest
Perry
Greene
Wilkinson
Amite
Pike
Walthall
George
Stone
Pearl River
Handcock
Harrison
Jackson

(37) North Carolina

County	Unit	County	Unit	County	Unit	County	Unit
(001) Alamance	3	(051) Cumberland	1	(101) Johnston	1	(151) Randolph	3
(003) Alexander	3	(053) Currituck	2	(103) Jones	1	(153) Richmond	1
(005) Alleghany	4	(055) Dare	2	(105) Lee	1	(155) Robeson	1
(007) Anson	3	(057) Davidson	3	(107) Lenoir	1	(157) Rockingham	3
(009) Ashe	4	(059) Davie	3	(109) Lincoln	3	(159) Rowan	3
(011) Avery	4	(061) Duplin	1	(111) McDowell	4	(161) Rutherford	3
(013) Beaufort	2	(063) Durham	3	(113) Macon	4	(163) Sampson	1
(015) Bertie	2	(065) Edgecombe	2	(115) Madison	4	(165) Scotland	1
(017) Bladen	1	(067) Forsyth	3	(117) Martin	2	(167) Stanly	3
(019) Brunswick	1	(069) Franklin	3	(119) Mecklenburg	3	(169) Stokes	3
(021) Buncombe	4	(071) Gaston	3	(121) Mitchell	4	(171) Surry	3
(023) Burke	4	(073) Gates	2	(123) Montgomery	3	(173) Swain	4
(025) Cabarrus	3	(075) Graham	4	(125) Moore	1	(175) Transylvania	4
(027) Caldwell	4	(077) Granville	3	(127) Nash	2	(177) Tyrrell	2
(029) Camden	2	(079) Greene	1	(129) New Hanover	1	(179) Union	3
(031) Carteret	2	(081) Guilford	3	(131) Northampton	2	(181) Vance	3
(033) Caswell	3	(083) Halifax	2	(133) Onslow	1	(183) Wake	3
(035) Catawba	3	(085) Harnett	1	(135) Orange	3	(185) Warren	3
(037) Chatham	3	(087) Haywood	4	(137) Pamlico	2	(187) Washington	2
(039) Cherokee	4	(089) Henderson	4	(139) Pasquotank	2	(189) Watauga	4
(041) Chowan	2	(091) Hertford	2	(141) Pender	1	(191) Wayne	1
(043) Clay	4	(093) Hoke	1	(143) Perquimans	2	(193) Wilkes	4
(045) Cleveland	3	(095) Hyde	2	(145) Person	3	(195) Wilson	2
(047) Columbus	1	(097) Iredell	3	(147) Pitt	2	(197) Yadkin	3
(049) Craven	2	(099) Jackson	4	(149) Polk	3	(199) Yancey	4

UNIT 1 SOUTHERN COASTAL PLAIN

Bladen	017	Hoke	093	Onslow	133
Brunswick	019	Johnston	101	Pender	141
Columbus	047	Jones	103	Richmond	153
Cumberland	051	Lee	105	Robeson	155
Duplin	061	Lenoir	107	Sampson	163
Greene	079	Moore	125	Scotland	165
Harnett	085	New Hanover	129	Wayne	191

UNIT 2 NORTHERN COASTAL PLAIN

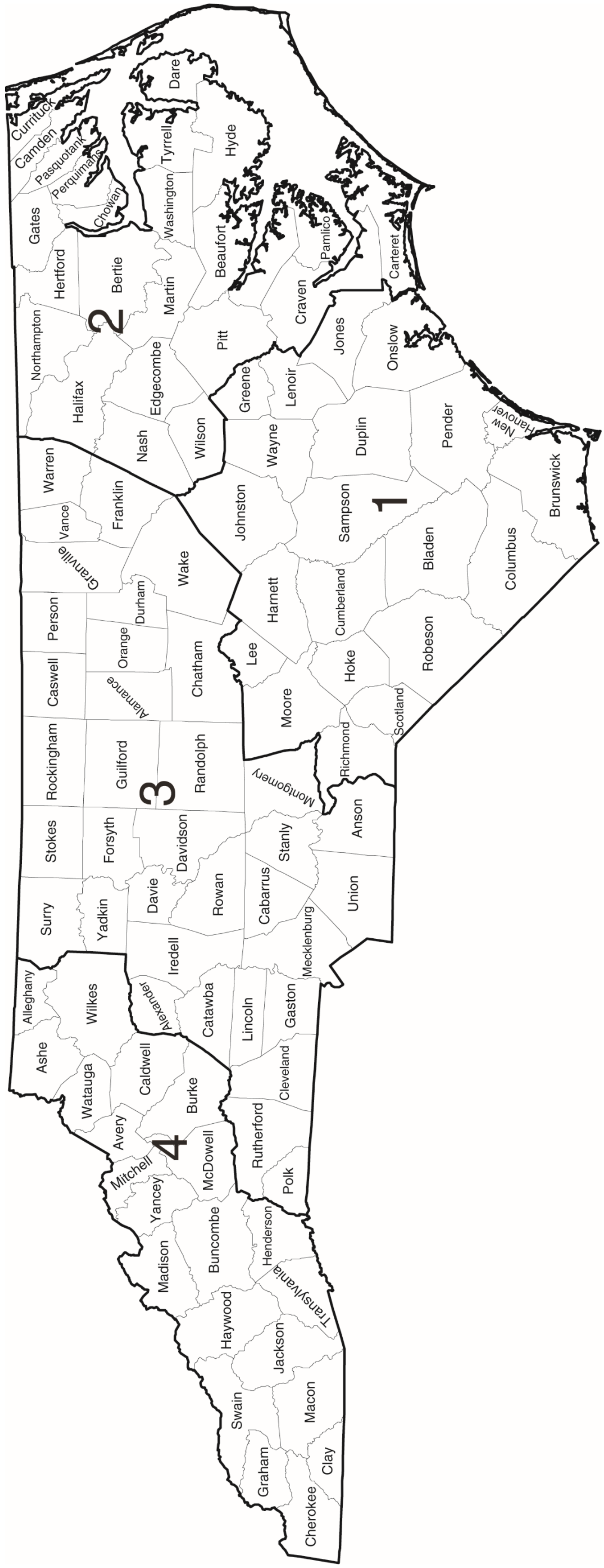
Beaufort	013	Edgecombe	065	Pamlico	137
Bertie	015	Gates	073	Pasquotank	139
Camden	029	Halifax	083	Perquimans	143
Carteret	031	Hertford	091	Pitt	147
Chowan	041	Hyde	095	Tyrrell	177
Craven	049	Martin	117	Washington	187
Currituck	053	Nash	127	Wilson	195
Dare	055	Northampton	131		

UNIT 3 PIEDMONT

Alamance	001	Franklin	069	Rockingham	157
Alexander	003	Gaston	071	Rowan	159
Anson	007	Granville	077	Rutherford	161
Cabarrus	025	Guilford	081	Stanly	167
Caswell	033	Iredell	097	Stokes	169
Catawba	035	Lincoln	109	Surry	171
Chatham	037	Mecklenburg	119	Union	179
Cleveland	045	Montgomery	123	Vance	181
Davidson	057	Orange	135	Wake	183
Davie	059	Person	145	Warren	185
Durham	063	Polk	149	Yadkin	197
Forsyth	067	Randolph	151		

UNIT 4 MOUNTAINS

Alleghany	005	Clay	043	Madison	115
Ashe	009	Graham	075	Mitchell	121
Avery	011	Haywood	087	Swain	173
Buncombe	021	Henderson	089	Transylvania	175
Burke	023	Jackson	099	Watauga	189
Caldwell	027	McDowell	111	Wilkes	193
Cherokee	039	Macon	113	Yancey	199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Currituck
Camden
Pasquotank
Perquimans
Chowan
Gates
Dare
Tyrrell
Washington
Hyde
Beaufort
Pamlico
Carteret
Hertford
Bertie
Martin
Craven
Northampton
Halifax
Edgecombe
Pitt
Jones
Onslow
Greene
Lenoir
Nash
Wilson
Wayne
Duplin
Pender
New Hanover
Warren
Franklin
Vance
Granville
Johnston
Sampson
Bladen
Brunswick
Columbus
Wake
Durham
Person
Orange
Caswell
Alamance
Chatham
Harnett
Cumberland
Lee
Hoke
Robeson
Moore
Scotland
Richmond
Rockingham
Guilford
Randolph
Montgomery
Anson
Stokes
Forsyth
Davidson
Stanly
Union
Surry
Yadkin
Davie
Rowan
Cabarrus
Iredell
Mecklenburg
Alleghany
Wilkes
Alexander
Catawba
Lincoln
Gaston
Ashe
Caldwell
Watauga
Burke
Cleveland
Avery
McDowell
Rutherford
Mitchell
Yancey
Polk
Madison
Buncombe
Henderson
Transylvania
Haywood
Jackson
Swain
Macon
Graham
Clay
Cherokee

(40) Oklahoma

County		Unit	County		Unit	County		Unit
(001)	Adair	2	(053)	Grant	7	(105)	Nowata	3
(003)	Alfalfa	7	(055)	Greer	5	(107)	Okfuskee	4
(005)	Atoka	1	(057)	Harmon	5	(109)	Oklahoma	4
(007)	Beaver	6	(059)	Harper	6	(111)	Okmulgee	4
(009)	Beckham	5	(061)	Haskell	1	(113)	Osage	3
(011)	Blaine	5	(063)	Hughes	4	(115)	Ottawa	2
(013)	Bryan	1	(065)	Jackson	5	(117)	Pawnee	3
(015)	Caddo	5	(067)	Jefferson	5	(119)	Payne	3
(017)	Canadian	5	(069)	Johnston	4	(121)	Pittsburg	1
(019)	Carter	4	(071)	Kay	7	(123)	Pontotoc	4
(021)	Cherokee	2	(073)	Kingfisher	5	(125)	Pottawatomie	4
(023)	Choctaw	1	(075)	Kiowa	5	(127)	Pushmataha	1
(025)	Cimarron	6	(077)	Latimer	1	(129)	Roger Mills	5
(027)	Cleveland	4	(079)	Le Flore	1	(131)	Rogers	3
(029)	Coal	1	(081)	Lincoln	4	(133)	Seminole	4
(031)	Comanche	5	(083)	Logan	4	(135)	Sequoyah	2
(033)	Cotton	5	(085)	Love	4	(137)	Stephens	5
(035)	Craig	3	(087)	McClain	4	(139)	Texas	6
(037)	Creek	3	(089)	McCurtain	1	(141)	Tillman	5
(039)	Custer	5	(091)	McIntosh	2	(143)	Tulsa	3
(041)	Delaware	2	(093)	Major	7	(145)	Wagoner	3
(043)	Dewey	5	(095)	Marshall	4	(147)	Washington	3
(045)	Ellis	6	(097)	Mayes	2	(149)	Washita	5
(047)	Garfield	7	(099)	Murray	4	(151)	Woods	7
(049)	Garvin	4	(101)	Muskogee	2	(153)	Woodward	7
(051)	Grady	5	(103)	Noble	7			

UNIT 1 SOUTHEAST

Atoka	005	Haskell	061	McCurtain	089
Bryan	013	Latimer	077	Pittsburg	121
Choctaw	023	Le Flore	079	Pushmataha	127
Coal	029				

UNIT 2 NORTHEAST

Adair	001	McIntosh	091	Ottawa	115
Cherokee	021	Mayes	097	Sequoyah	135
Delaware	041	Muskogee	101		

UNIT 3 NORTHCENTRAL

Craig	035	Pawnee	117	Tulsa	143
Creek	037	Payne	119	Wagoner	145
Nowata	105	Rogers	131	Washington	147
Osage	113				

UNIT 4 SOUTHCENTRAL

Carter	019	Logan	083	Oklahoma	109
Cleveland	027	Love	085	Okmulgee	111
Garvin	049	McClain	087	Pontotoc	123
Hughes	063	Marshall	095	Pottawatomie	125
Johnston	069	Murray	099	Seminole	133
Lincoln	081	Okfuskee	107		

UNIT 5 SOUTHWEST

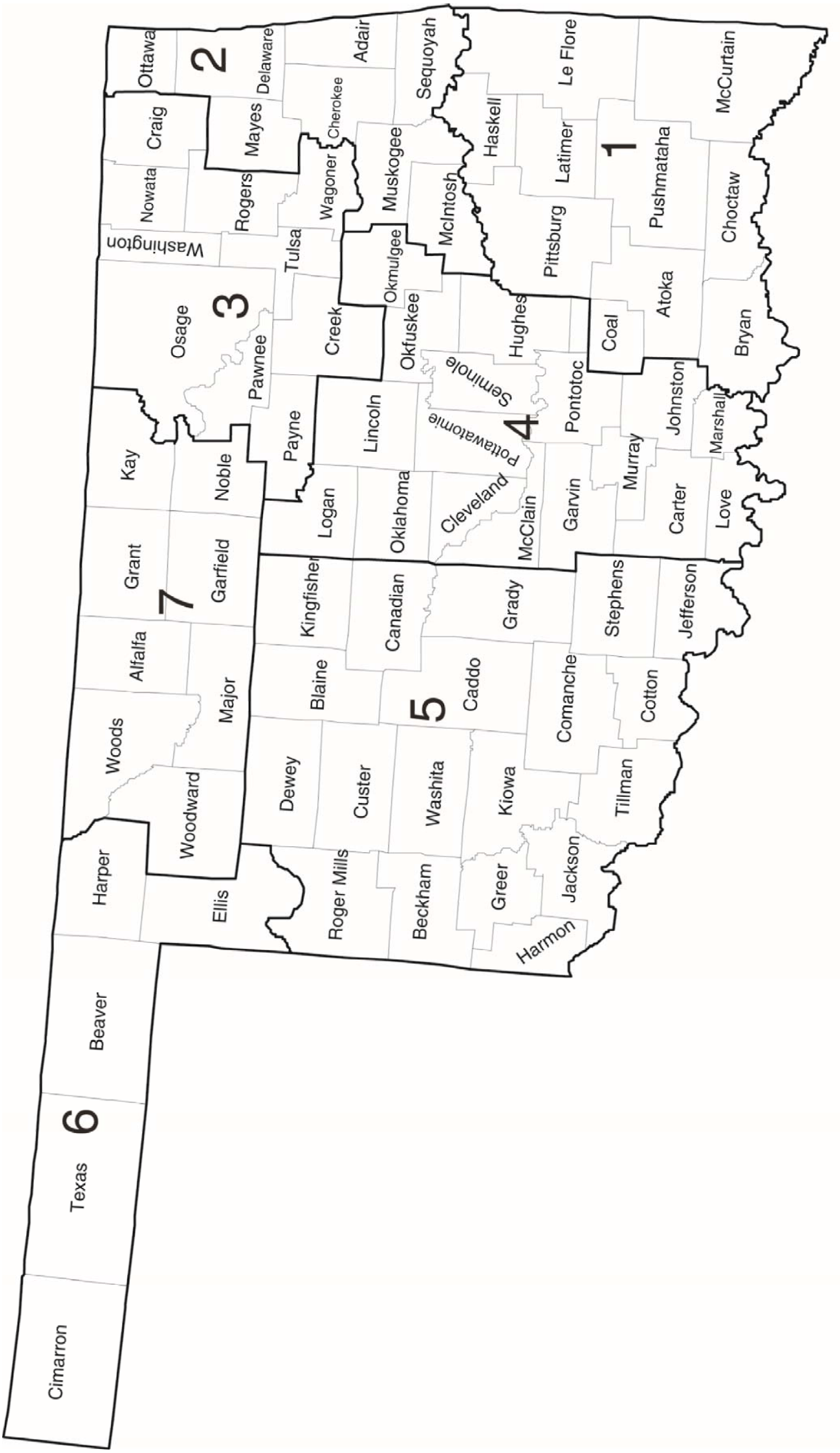
Beckham	009	Dewey	043	Kingfisher	073
Blaine	011	Grady	051	Kiowa	075
Caddo	015	Greer	055	Roger Mills	129
Canadian	017	Harmon	057	Stephens	137
Comanche	031	Jackson	065	Tillman	141
Cotton	033	Jefferson	067	Washita	149
Custer	039				

UNIT 6 HIGH PLAINS

Beaver	007	Ellis	045	Texas	139
Cimarron	025	Harper	059		

UNIT 7 GREAT PLAINS

Alfalfa	003	Kay	071	Woods	151
Garfiled	047	Major	093	Woodward	153
Grant	053	Noble	103		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Ottawa
Delaware
Adair
Sequoyah
Le Flore
McCurtain
Craig
Mayes
Cherokee
Muskogee
Haskell
Latimer
Pushmataha
Nowata
Rogers
Wagoner
McIntosh
Pittsburg
Choctaw
Washington
Tulsa
Okmulgee
Atoka
Osage
Creek
Okfuskee
Hughes
Coal
Bryan
Pawnee
Seminole
Pontotoc
Johnston
Payne
Lincoln
Pottawatomie
Marshall
Kay
Noble
Murray
Logan
Oklahoma
Cleveland
McClain
Garvin
Carter
Love
Grant
Garfield
Kingfisher
Canadian
Grady
Stephens
Jefferson
Alfalfa
Major
Blaine
Caddo
Comanche
Cotton
Woods
Dewey
Custer
Washita
Kiowa
Tillman
Woodward
Harper
Ellis
Roger Mills
Beckham
Greer
Jackson
Harmon
Beaver
Texas
Cimarron

(45) South Carolina

County		Unit	County		Unit	County		Unit
(001)	Abbeville	3	(033)	Dillon	2	(065)	McCormick	3
(003)	Aiken	1	(035)	Dorchester	1	(067)	Marion	2
(005)	Allendale	1	(037)	Edgefield	3	(069)	Marlboro	2
(007)	Anderson	3	(039)	Fairfield	3	(071)	Newberry	3
(009)	Bamberg	1	(041)	Florence	2	(073)	Oconee	3
(011)	Barnwell	1	(043)	Georgetown	2	(075)	Orangeburg	1
(013)	Beaufort	1	(045)	Greenville	3	(077)	Pickens	3
(015)	Berkeley	2	(047)	Greenwood	3	(079)	Richland	2
(017)	Calhoun	1	(049)	Hampton	1	(081)	Saluda	3
(019)	Charleston	2	(051)	Horry	2	(083)	Spartanburg	3
(021)	Cherokee	3	(053)	Jasper	1	(085)	Sumter	2
(023)	Chester	3	(055)	Kershaw	2	(087)	Union	3
(025)	Chesterfield	2	(057)	Lancaster	3	(089)	Williamsburg	2
(027)	Clarendon	2	(059)	Laurens	3	(091)	York	3
(029)	Colleton	1	(061)	Lee	2			
(031)	Darlington	2	(063)	Lexington	1			

UNIT 1 SOUTHERN COASTAL PLAIN

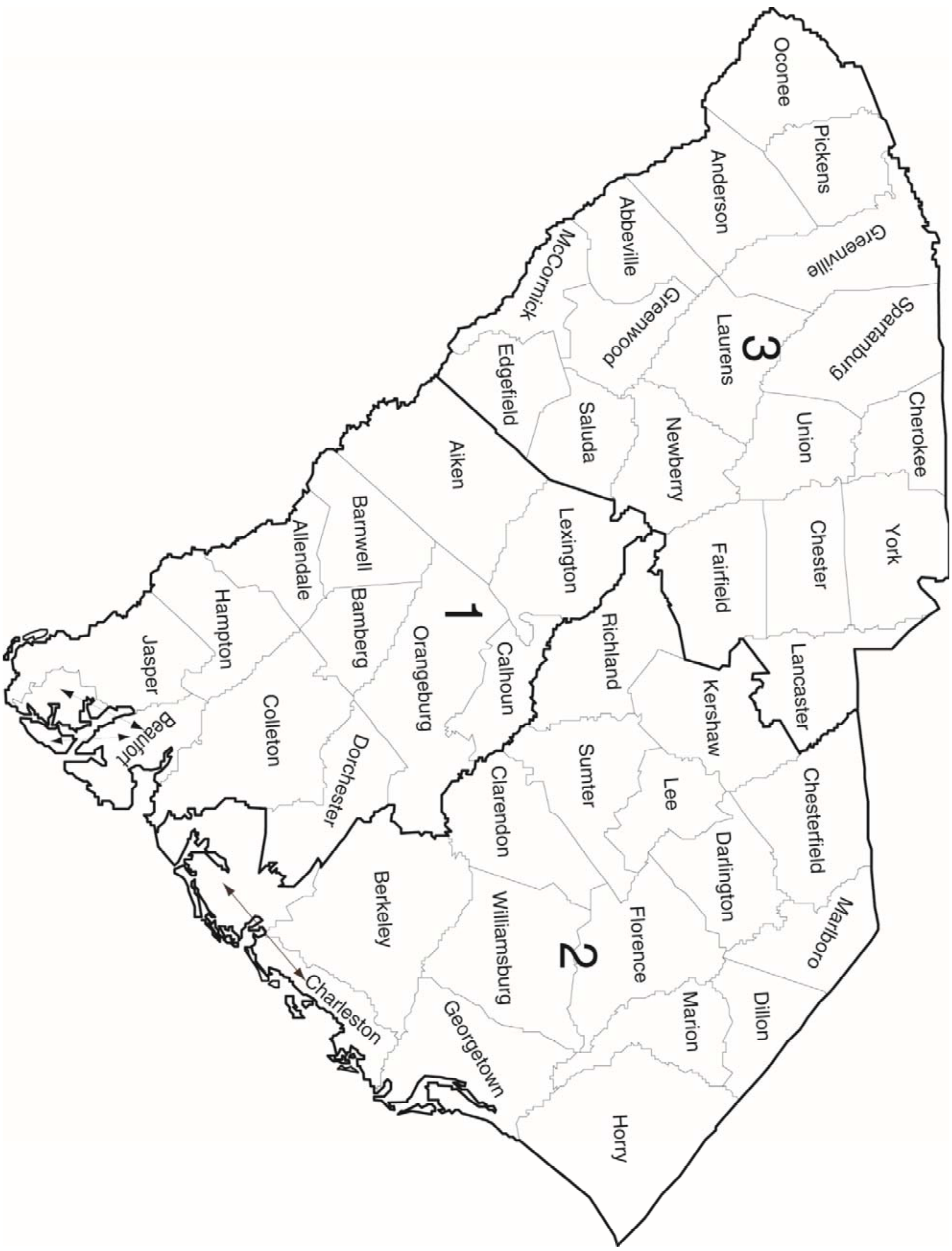
Aiken	003	Beaufort	013	Hampton	049
Allendale	005	Calhoun	017	Jasper	053
Bamberg	009	Colleton	029	Lexington	063
Barnwell	011	Dorchester	035	Orangeburg	075

UNIT 2 NORTHERN COASTAL PLAIN

Berkeley	015	Florence	041	Marion	067
Charleston	019	Georgetown	043	Marlboro	069
Chesterfield	025	Horry	051	Richland	079
Clarendon	027	Kershaw	055	Sumter	085
Darlington	031	Lee	061	Williamsburg	089
Dillon	033				

UNIT 3 PIEDMONT

Abbeville	001	Greenville	045	Oconee	073
Anderson	007	Greenwood	047	Pickens	077
Cherokee	021	Lancaster	057	Saluda	081
Chester	023	Laurens	059	Spartanburg	083
Edgefield	037	McCormick	065	Union	087
Fairfield	039	Newberry	071	York	091


Oconee
Pickens
Anderson
Greenville
Abbeville
McCormick
Greenwood
Laurens
Spartanburg
3
Edgefield
Saluda
Newberry
Union
Cherokee
Aiken
Lexington
Fairfield
Chester
York
Barnwell
Allendale
Bamberg
1
Orangeburg
Calhoun
Richland
Lancaster
Kershaw
Hampton
Jasper
Beaufort
Colleton
Dorchester
Clarendon
Sumter
Lee
Chesterfield
Darlington
Marlboro
Berkeley
Williamsburg
2
Florence
Marion
Dillon
Charleston
Georgetown
Horry

(47) Tennessee

County		Unit	County		Unit	County		Unit	County		Unit
(001)	Anderson	5	(049)	Fentress	4	(097)	Lauderdale	1	(145)	Roane	5
(003)	Bedford	3	(051)	Franklin	4	(099)	Lawrence	2	(147)	Robertson	3
(005)	Benton	2	(053)	Gibson	1	(101)	Lewis	2	(149)	Rutherford	3
(007)	Bledsoe	4	(055)	Giles	3	(103)	Lincoln	3	(151)	Scott	4
(009)	Blount	5	(057)	Grainger	5	(105)	Loudon	5	(153)	Sequatchie	4
(011)	Bradley	5	(059)	Greene	5	(107)	McMinn	5	(155)	Sevier	5
(013)	Campbell	4	(061)	Grundy	4	(109)	McNairy	1	(157)	Shelby	1
(015)	Cannon	3	(063)	Hamblen	5	(111)	Macon	3	(159)	Smith	3
(017)	Carroll	1	(065)	Hamilton	5	(113)	Madison	1	(161)	Stewart	2
(019)	Carter	5	(067)	Hancock	5	(115)	Marion	4	(163)	Sullivan	5
(021)	Cheatham	3	(069)	Hardeman	1	(117)	Marshall	3	(165)	Sumner	3
(023)	Chester	1	(071)	Hardin	2	(119)	Maury	3	(167)	Tipton	1
(025)	Claiborne	5	(073)	Hawkins	5	(121)	Meigs	5	(169)	Trousdale	3
(027)	Clay	3	(075)	Haywood	1	(123)	Monroe	5	(171)	Unicoi	5
(029)	Cocke	5	(077)	Henderson	1	(125)	Montgomery	3	(173)	Union	5
(031)	Coffee	3	(079)	Henry	1	(127)	Moore	3	(175)	Van Buren	4
(033)	Crockett	1	(081)	Hickman	2	(129)	Morgan	4	(177)	Warren	4
(035)	Cumberland	4	(083)	Houston	2	(131)	Obion	1	(179)	Washington	5
(037)	Davidson	3	(085)	Humphreys	2	(133)	Overton	4	(181)	Wayne	2
(039)	Decatur	2	(087)	Jackson	3	(135)	Perry	2	(183)	Weakley	1
(041)	DeKalb	3	(089)	Jefferson	5	(137)	Pickett	4	(185)	White	4
(043)	Dickson	3	(091)	Johnson	5	(139)	Polk	5	(187)	Williamson	3
(045)	Dyer	1	(093)	Knox	5	(141)	Putnam	4	(189)	Wilson	3
(047)	Fayette	1	(095)	Lake	1	(143)	Rhea	5			

UNIT 1 WEST

Carroll	017	Hardeman	069	McNairy	109
Chester	023	Haywood	075	Madison	113
Crockett	033	Henderson	077	Obion	131
Dyer	045	Henry	079	Shelby	157
Fayette	047	Lake	095	Tipton	167
Gibson	053	Lauderdale	097	Weakley	183

UNIT 2 WEST CENTRAL

Benton	005	Houston	083	Perry	135
Decatur	039	Humphreys	085	Stewart	161
Hardin	071	Lawrence	099	Wayne	181
Hickman	081	Lewis	101		

UNIT 3 CENTRAL

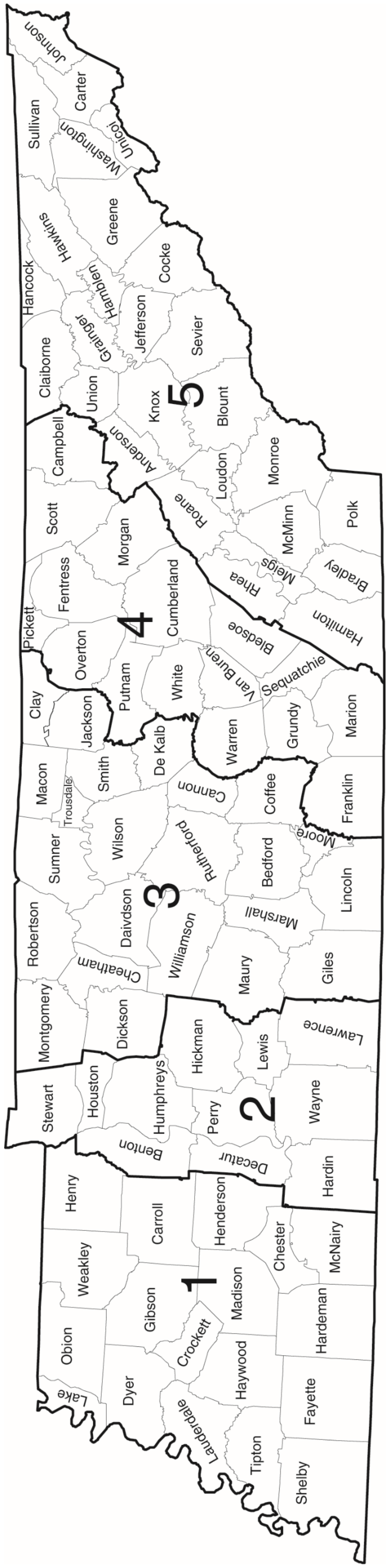
Bedford	003	Giles	055	Robertson	147
Cannon	015	Jackson	087	Rutherford	149
Cheatham	021	Lincoln	103	Smith	159
Clay	027	Macon	111	Sumner	165
Coffee	031	Marshall	117	Trousdale	169
Davidson	037	Maury	119	Williamson	187
De Kalb	041	Montgomery	125	Wilson	189
Dickson	043	Moore	127		

UNIT 4 PLATEAU

Bledsoe	007	Marion	115	Sequatchie	153
Campbell	013	Morgan	129	Van Buren	175
Cumberland	035	Overton	133	Warren	177
Fentress	049	Pickett	137	White	185
Franklin	051	Putnam	141		
Grundy	061	Scott	151		

UNIT 5 EAST

Anderson	001	Hamilton	065	Monroe	123
Blount	009	Hancock	067	Polk	139
Bradley	011	Hawkins	073	Rhea	143
Carter	019	Jefferson	089	Roane	145
Claiborne	025	Johnson	091	Sevier	155
Cocke	029	Knox	093	Sullivan	163
Grainger	057	Loudon	105	Unicoi	171
Greene	059	McMinn	107	Union	173
Hamblen	063	Meigs	121	Washington	179


Johnson
Carter
Sullivan
Unicoi
Washington
Greene
Hawkins
Hancock
Cocke
Hamblen
Grainger
Jefferson
Sevier
Claiborne
Union
Knox
5
Blount
Campbell
Anderson
Monroe
Loudon
Polk
Scott
Roane
McMinn
Morgan
Meigs
Bradley
Fentress
Cumberland
Rhea
Pickett
4
Hamilton
Bledsoe
Overton
Van Buren
Sequatchie
Putnam
White
Clay
Jackson
Marion
Grundy
Warren
De Kalb
Smith
Macon
Trousdale
Cannon
Coffee
Franklin
Wilson
Rutherford
Moore
Sumner
Bedford
Lincoln
3
Robertson
Daivdson
Marshall
Williamson
Cheatham
Giles
Maury
Montgomery
Dickson
Lawrence
Hickman
Lewis
Houston
Humphreys
Stewart
Perry
2
Wayne
Benton
Decatur
Hardin
Henry
Carroll
Henderson
Chester
McNairy
Weakley
1
Madison
Gibson
Hardeman
Crockett
Obion
Haywood
Dyer
Lake
Lauderdale
Fayette
Tipton
Shelby

(48) Texas – East

County		Unit	County		Unit	County		Unit
(001)	Anderson	2	(241)	Jasper	1	(403)	Sabine	1
(005)	Angelina	1	(245)	Jefferson	1	(405)	San Augustine	1
(037)	Bowie	2	(289)	Leon	1	(407)	San Jacinto	1
(063)	Camp	2	(291)	Liberty	1	(419)	Shelby	2
(067)	Cass	2	(313)	Madison	1	(423)	Smith	2
(071)	Chambers	1	(315)	Marion	2	(449)	Titus	2
(073)	Cherokee	2	(339)	Montgomery	1	(455)	Trinity	1
(159)	Franklin	2	(343)	Morris	2	(457)	Tyler	1
(183)	Gregg	2	(347)	Nacogdoches	2	(459)	Upshur	2
(185)	Grimes	1	(351)	Newton	1	(467)	Van Zandt	2
(199)	Hardin	1	(361)	Orange	1	(471)	Walker	1
(201)	Harris	1	(365)	Panola	2	(473)	Waller	1
(203)	Harrison	2	(373)	Polk	1	(499)	Wood	2
(213)	Henderson	2	(387)	Red River	2			
(225)	Houston	1	(401)	Rusk	2			

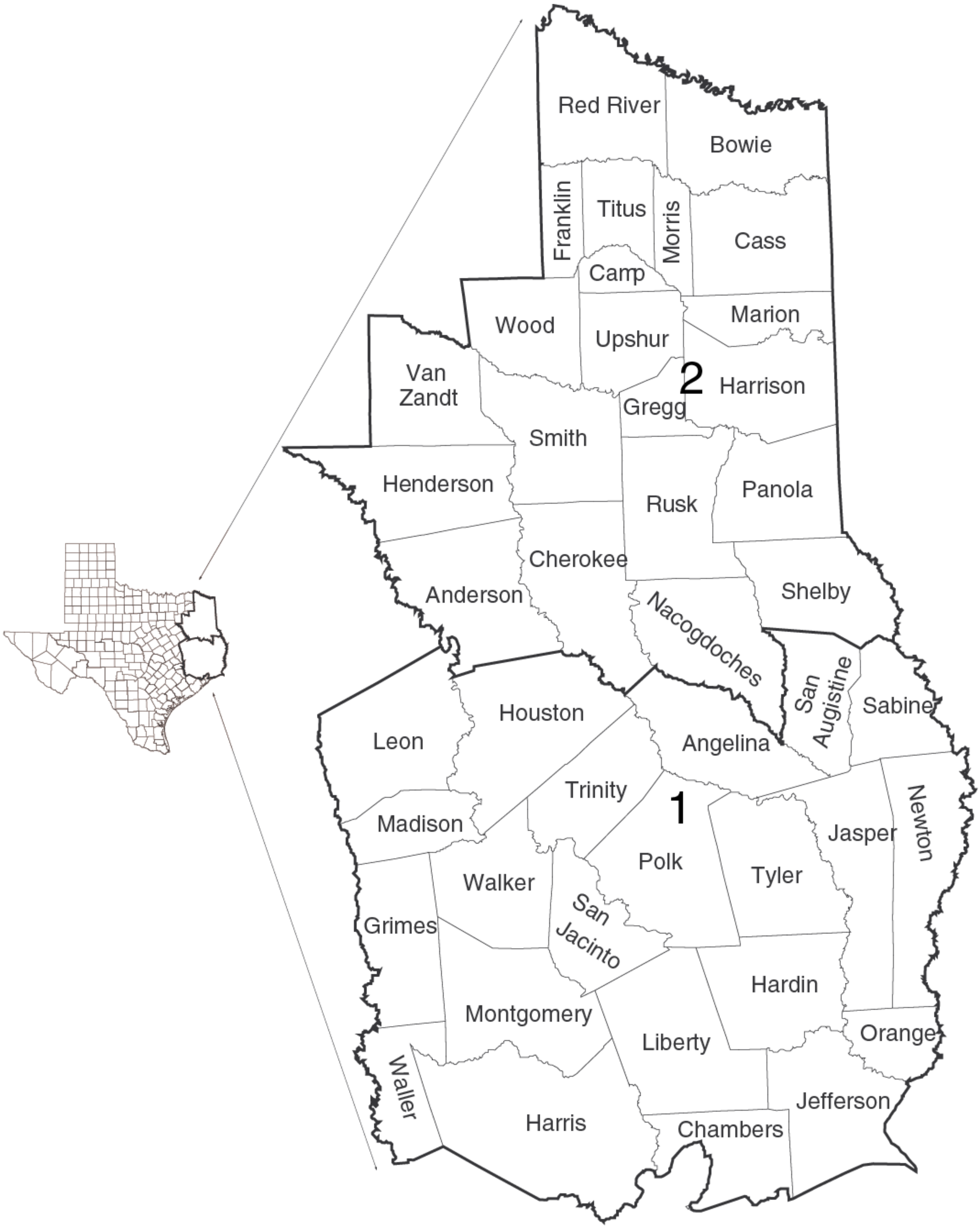
UNIT 1 SOUTHEAST

Angelina	005	Leon	289	San Augustine	405
Chambers	071	Liberty	291	San Jacinto	407
Grimes	185	Madison	313	Trinity	455
Hardin	199	Montgomery	339	Tyler	457
Harris	201	Newton	351	Walker	471
Houston	225	Orange	361	Waller	473
Jasper	241	Polk	373		
Jefferson	245	Sabine	403		

UNIT 2 NORTHEAST

Anderson	001	Harrison	203	Rusk	401
Bowie	037	Henderson	213	Shelby	419
Camp	063	Marion	315	Smith	423
Cass	067	Morris	343	Titus	449
Cherokee	073	Nacogdoches	347	Upshur	459
Franklin	159	Panola	365	Van Zandt	467
Gregg	183	Red River	387	Wood	499

East


Red River
Bowie
Franklin
Titus
Morris
Cass
Camp
Wood
Upshur
Marion
Van Zandt
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Harrison
Gregg
Smith
Henderson
Rusk
Panola
Cherokee
Anderson
Shelby
Nacogdoches
San Augistine
Sabine
Houston
Leon
Angelina
Trinity
1
Madison
Jasper
Newton
Polk
Tyler
Walker
San Jacinto
Grimes
Hardin
Montgomery
Liberty
Orange
Waller
Jefferson
Harris
Chambers

(48) Texas – West

County		Unit	County		Unit	County		Unit	County		Unit
(003)	Andrews	6	(121)	Denton	3	(247)	Jim Hogg	4	(375)	Potter	6
(007)	Aransas	4	(123)	De Witt	3	(249)	Jim Wells	4	(377)	Presidio	7
(009)	Archer	6	(125)	Dickens	6	(251)	Johnson	3	(379)	Rains	3
(011)	Armstrong	6	(127)	Dimmit	4	(253)	Jones	6	(381)	Randall	6
(013)	Atascosa	4	(129)	Donley	6	(255)	Karnes	4	(383)	Reagan	6
(015)	Austin	3	(131)	Duval	4	(257)	Kaufman	3	(385)	Real	5
(017)	Bailey	6	(133)	Eastland	5	(259)	Kendall	5	(389)	Reeves	7
(019)	Bandera	5	(135)	Ector	7	(261)	Kenedy	4	(391)	Refugio	4
(021)	Bastrop	3	(137)	Edwards	5	(263)	Kent	6	(393)	Roberts	6
(023)	Baylor	6	(139)	Ellis	3	(265)	Kerr	5	(395)	Robertson	3
(025)	Bee	4	(141)	El Paso	7	(267)	Kimble	5	(397)	Rockwall	3
(027)	Bell	5	(143)	Erath	5	(269)	King	6	(399)	Runnels	5
(029)	Bexar	5	(145)	Falls	3	(271)	Kinney	5	(409)	San Patricio	4
(031)	Blanco	5	(147)	Fannin	3	(273)	Kleberg	4	(411)	San Saba	5
(033)	Borden	6	(149)	Fayette	3	(275)	Knox	6	(413)	Schleicher	5
(035)	Bosque	5	(151)	Fisher	6	(277)	Lamar	3	(415)	Scurry	6
(039)	Brazoria	4	(153)	Floyd	6	(279)	Lamb	6	(417)	Shackelford	6
(041)	Brazos	3	(155)	Foard	6	(281)	Lampasas	5	(421)	Sherman	6
(043)	Brewster	7	(157)	Fort Bend	4	(283)	La Salle	4	(425)	Somervell	5
(045)	Briscoe	6	(161)	Freestone	3	(285)	Lavaca	3	(427)	Starr	4
(047)	Brooks	4	(163)	Frio	4	(287)	Lee	3	(429)	Stephens	5
(049)	Brown	5	(165)	Gaines	6	(293)	Limestone	3	(431)	Sterling	6
(051)	Burleson	3	(167)	Galveston	4	(295)	Lipscomb	6	(433)	Stonewall	6
(053)	Burnet	5	(169)	Garza	6	(297)	Live Oak	4	(435)	Sutton	5
(055)	Caldwell	3	(171)	Gillespie	5	(299)	Llano	5	(437)	Swisher	6
(057)	Calhoun	4	(173)	Glasscock	6	(301)	Loving	7	(439)	Tarrant	3
(059)	Callahan	5	(175)	Goliad	3	(303)	Lubbock	6	(441)	Taylor	6
(061)	Cameron	4	(177)	Gonzales	3	(305)	Lynn	6	(443)	Terrell	7
(065)	Carson	6	(179)	Gray	6	(307)	McCulloch	5	(445)	Terry	6
(069)	Castro	6	(181)	Grayson	3	(309)	McLennan	5	(447)	Throckmorton	6
(075)	Childress	6	(187)	Guadalupe	3	(311)	McMullen	4	(451)	Tom Green	6
(077)	Clay	3	(189)	Hale	6	(317)	Martin	6	(453)	Travis	5
(079)	Cochran	6	(191)	Hall	6	(319)	Mason	5	(461)	Upton	7
(081)	Coke	6	(193)	Hamilton	5	(321)	Matagorda	4	(463)	Uvalde	5
(083)	Coleman	5	(195)	Hansford	6	(323)	Maverick	4	(465)	Val Verde	5
(085)	Collin	3	(197)	Hardeman	6	(325)	Medina	5	(469)	Victoria	4
(087)	Collingsworth	6	(205)	Hartley	6	(327)	Menard	5	(475)	Ward	7
(089)	Colorado	3	(207)	Haskell	6	(329)	Midland	6	(477)	Washington	3
(091)	Comal	5	(209)	Hays	5	(331)	Milam	3	(479)	Webb	4
(093)	Comanche	5	(211)	Hemphill	6	(333)	Mills	5	(481)	Wharton	4
(095)	Concho	5	(215)	Hidalgo	4	(335)	Mitchell	6	(483)	Wheeler	6
(097)	Cooke	3	(217)	Hill	3	(337)	Montague	3	(485)	Wichita	6
(099)	Coryell	5	(219)	Hockley	6	(341)	Moore	6	(487)	Wilbarger	6
(101)	Cottle	6	(221)	Hood	5	(345)	Motley	6	(489)	Willacy	4
(103)	Crane	7	(223)	Hopkins	3	(349)	Navarro	3	(491)	Williamson	5
(105)	Crockett	5	(227)	Howard	6	(353)	Nolan	6	(493)	Wilson	4
(107)	Crosby	6	(229)	Hudspeth	7	(355)	Nueces	4	(495)	Winkler	7
(109)	Culberson	7	(231)	Hunt	3	(357)	Ochiltree	6	(497)	Wise	3
(111)	Dallam	6	(233)	Hutchinson	6	(359)	Oldham	6	(501)	Yoakum	6
(113)	Dallas	3	(235)	Irion	6	(363)	Palo Pinto	5	(503)	Young	3
(115)	Dawson	6	(237)	Jack	3	(367)	Parker	3	(505)	Zapata	4
(117)	Deaf Smith	6	(239)	Jackson	4	(369)	Parmer	6	(507)	Zavala	4
(119)	Delta	3	(243)	Jeff Davis	7	(371)	Pecos	7			

UNIT 3

Austin	015	Ellis	139	Kaufman	257
Bastrop	021	Falls	145	Lamar	277
Brazos	041	Fannin	147	Lavaca	285
Burleson	051	Fayette	149	Lee	287
Caldwell	055	Freestone	161	Limestone	293
Clay	077	Goliad	175	Milam	331
Guadalupe	187	Grayson	181	Montague	337
Collin	085	Hill	217	Navarro	349
Colorado	089	Hopkins	223	Parker	367
Cooke	097	Hunt	231	Rains	379
Dallas	113	Hopkins	223	Robertson	395
Delta	119	Hunt	231	Tarrant	439
Denton	121	Jack	237	Washington	477
De Witt	123	Johnson	251	Wise	497
				Young	503

UNIT 4

Aransas	007	Hildalgo	215	Nueces	355
Atascosa	013	Jackson	239	Refugio	391
Bee	025	Jim Hogg	247	San Patricio	409
Brazoria	039	Jim Wells	249	Starr	427
Brooks	047	Karnes	255	Victoria	469
Calhoun	057	Kenedy	261	Webb	479
Cameron	061	Kleberg	273	Wharton	481
Dimmit	127	La Salle	283	Willacy	489
Duval	131	Live Oak	297	Wilson	493
Fort Bend	157	Matagorda	321	Zapata	505
Frio	163	Maverick	323	Zavala	507
Galveston	167	McMullen	311		

UNIT 5

Bandera	019	Edwards	137	Medina	325
Bell	027	Erath	143	Menard	327
Bexar	029	Gillespie	171	Mills	333
Blanco	031	Hamilton	193	Palo Pinto	363
Bosque	035	Hays	209	Real	385
Brown	049	Hood	221	Runnels	399
Burnet	053	Kendall	259	San Saba	411
Callahan	059	Kerr	265	Schleicher	413
Coleman	083	Kimble	267	Somervell	425
Comal	091	Kinney	271	Stephens	429
Comanche	093	Lampasas	281	Sutton	435
Concho	095	Llano	299	Travis	453
Coryell	099	Mason	319	Uvalde	463
Crockett	105	McCulloch	307	Val Verde	465
Eastland	133	McLennan	309	Williamson	491

UNIT 6

Andrews	003	Glasscock	173	Motley	345
Archer	009	Gray	179	Nolan	353
Armstrong	011	Hale	189	Ochiltree	357
Bailey	017	Hall	191	Oldham	359
Baylor	023	Hansford	195	Parmer	369
Borden	033	Hardeman	197	Potter	375
Briscoe	045	Hartley	205	Randall	381
Carson	065	Haskell	207	Reagan	383
Castro	069	Hemphill	211	Roberts	393
Childress	075	Hockley	219	Scurry	415
Cochran	079	Howard	227	Shackelford	417
Coke	081	Hutchinson	233	Sherman	421
Collingsworth	087	Irion	235	Sterling	431
Cottle	101	Jones	253	Stonewall	433
Crosby	107	Kent	263	Swisher	437
Dallam	111	King	269	Taylor	441
Dawson	115	Knox	275	Terry	445
Deaf Smith	117	Lamb	279	Throckmorton	447
Dickens	125	Lipscomb	295	Tom Green	451
Donley	129	Lubbock	303	Wheeler	483
Fisher	151	Lynn	305	Wichita	485
Floyd	153	Martin	317	Wilbarger	487
Foard	155	Midland	329	Yoakum	501
Gaines	165	Mitchell	335		
Garza	169	Moore	341		

UNIT 7

Brewster	043	Hudspeth	229	Reeves	389
Crane	103	Jeff Davis	243	Terrell	443
Culberson	109	Loving	301	Upton	461
Ector	135	Pecos	371	Ward	475
El Paso	141	Presidio	377	Winkler	495

West


Dallam
Sherman
Hansford
Ochiltree
Lipscomb
Hartley
Moore
Hutchinson
Roberts
Hemphill
Oldham
Potter
Carson
Gray
Wheeler
Deaf Smith
Randall
Armstrong
Donley
Collingsworth
Parmer
Castro
Swisher
Briscoe
Hall
Childress
Hardeman
Wilbarger
Wichita
Bailey
Lamb
Hale
Floyd
Motley
Cottle
Foard
Clay
Montague
Cooke
Grayson
Fannin
Lamar
Cochran
Hockley
Lubbock
Crosby
Dickens
King
Knox
Baylor
Archer
6
Yoakum
Terry
Lynn
Garza
Kent
Stonewall
Haskell
Throck morton
Young
Jack
Wise
Denton
Collin
Hunt
Delta
Hopkins
Gaines
Dawson
Borden
Scurry
Fisher
Jones
Shackelford
Stephens
Palo Pinto
Parker
Tarrant
Dallas
Rock Wall
Rains
3
Kaufman
El Paso
Andrews
Martin
Howard
Mitchell
Nolan
Taylor
Callahan
Eastland
Hood
Erath
Johnson
Ellis
Hudspeth
Loving
Winkler
Ector
Midland
Glasscock
Sterling
Coke
Runnels
Coleman
Brown
Comanche
Bosque
Hill
Navarro
Culberson
Reeves
Ward
Crane
Upton
Reagan
Irion
Tom Green
Concho
McCulloch
Mills
Hamilton
Coryell
McLennan
Limestone
Freestone
Jeff Davis
7
Pecos
Crockett
Schleicher
Menard
San Saba
Lampasas
Bell
Falls
Robertson
Presidio
Brewster
Terrell
Sutton
Kimble
Mason
Llano
Burnet
Williamson
Milam
Brazos
Val Verde
Edwards
5
Gillespie
Blanco
Travis
Lee
Burleson
Washington
Kerr
Kendall
Hays
Bastrop
Real
Bandera
Comal
Caldwell
Fayette
Austin
Guadalupe
Kinney
Uvalde
Medina
Bexar
Gonzales
Lavaca
Colorado
Fort Bend
Galveston
Wilson
Wharton
Bazoria
Maverick
Zavala
Frio
Atascosa
Karnes
Dewitt
Jackson
Matagorda
Victoria
Goliad
Calhoun
Dimmit
La Salle
McMullen
Live Oak
Bee
Refugio
Aransas
4
San Patricio
Webb
Duval
Jim Wells
Nueces
Kleberg
Zapata
Jim Hogg
Brooks
Kenedy
Starr
Hidalgo
Willacy
Cameron

(51) Virginia

County		Unit	County		Unit	County		Unit
(001)	Accomack	1	(071)	Giles	5	(143)	Pittsylvania	2
(003)	Albemarle	3	(073)	Gloucester	1	(145)	Powhatan	2
(005)	Alleghany	4	(075)	Goochland	3	(147)	Prince Edward	2
(007)	Amelia	2	(077)	Grayson	5	(149)	Prince George	1
(009)	Amherst	3	(079)	Greene	3	(153)	Prince William	3
(011)	Appomattox	2	(081)	Greensville	1	(155)	Pulaski	5
(013)	Arlington	3	(083)	Halifax	2	(157)	Rappahannock	3
(015)	Augusta	4	(085)	Hanover	1	(159)	Richmond	1
(017)	Bath	4	(087)	Henrico	1	(161)	Roanoke	4
(019)	Bedford	2	(089)	Henry	2	(163)	Rockbridge	4
(021)	Bland	5	(091)	Highland	4	(165)	Rockingham	4
(023)	Botetourt	4	(093)	Isle Of Wight	1	(167)	Russell	5
(025)	Brunswick	1	(095)	James City	1	(169)	Scott	5
(027)	Buchanan	5	(097)	King And Queen	1	(171)	Shenandoah	4
(029)	Buckingham	2	(099)	King George	1	(173)	Smyth	5
(031)	Campbell	2	(101)	King William	1	(175)	Southampton	1
(033)	Caroline	1	(103)	Lancaster	1	(177)	Spotsylvania	3
(035)	Carroll	5	(105)	Lee	5	(179)	Stafford	3
(036)	Charles City	1	(107)	Loudoun	3	(181)	Surry	1
(037)	Charlotte	2	(109)	Louisa	3	(183)	Sussex	1
(041)	Chesterfield	1	(111)	Lunenburg	2	(185)	Tazewell	5
(043)	Clarke	4	(113)	Madison	3	(187)	Warren	4
(045)	Craig	4	(115)	Mathews	1	(191)	Washington	5
(047)	Culpeper	3	(117)	Mecklenburg	2	(193)	Westmoreland	1
(049)	Cumberland	2	(119)	Middlesex	1	(195)	Wise	5
(051)	Dickenson	5	(121)	Montgomery	5	(197)	Wythe	5
(053)	Dinwiddie	1	(125)	Nelson	3	(199)	York	1
(057)	Essex	1	(127)	New Kent	1	(550)	Chesapeake city	1
(059)	Fairfax	3	(131)	Northampton	1	(650)	Hampton city	1
(061)	Fauquier	3	(133)	Northumberland	1	(700)	Newport News city	1
(063)	Floyd	5	(135)	Nottoway	2	(800)	Suffolk city	1
(065)	Fluvanna	3	(137)	Orange	3	(810)	Virginia Beach city	1
(067)	Franklin	2	(139)	Page	4			
(069)	Frederick	4	(141)	Patrick	2			

UNIT 1 COASTAL PLAIN

Accomack	001	Henrico	087	Northampton	131
Brunswick	025	Isle of Wight	093	Northumberland	133
Caroline	033	James City	095	Prince George	149
Charles City	036	King and Queen	097	Richmond	159
Chesapeake City	550	King George	099	Southampton	175
Chesterfield	041	King William	101	Suffolk City	800
Dinwiddie	053	Lancaster	103	Surry	181
Essex	057	Mathews	115	Sussex	183
Gloucester	073	Middlesex	119	Virginia Beach City	810
Greensville	081	New Kent	127	Hampton City	650
Newport News City	700	Westmoreland	193	York	199
Hanover	085				

UNIT 2 SOUTHERN PIEDMONT

Amelia	007	Cumberland	049	Nottoway	135
Appomattox	011	Franklin	067	Patrick	141
Bedford	019	Halifax	083	Pittsylvania	143
Buckingham	029	Henry	089	Powhatan	145
Campbell	031	Lunenburg	111	Prince Edward	147
Charlotte	037	Mecklenburg	117		

UNIT 3 NORTHERN PIEDMONT

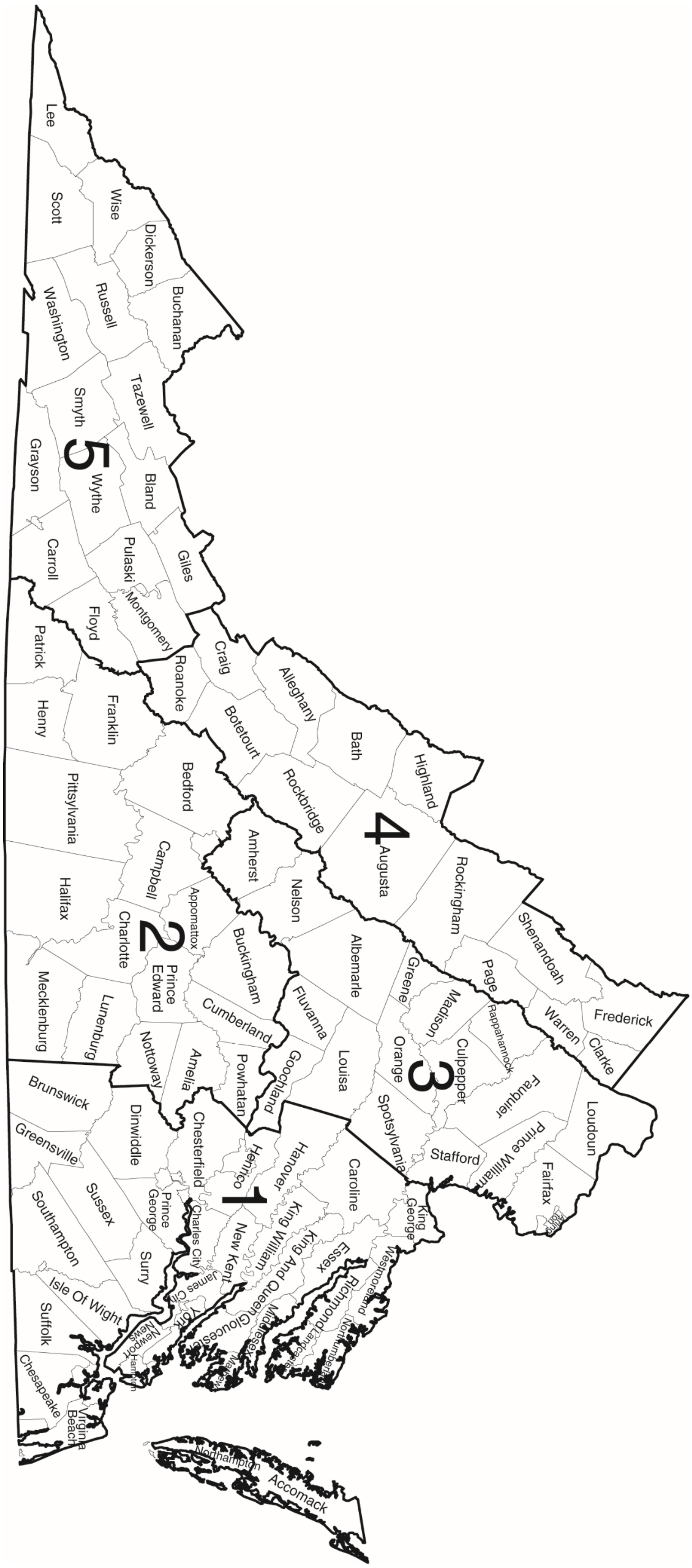
Albemarle	003	Fluvanna	065	Nelson	125
Amherst	009	Goochland	075	Orange	137
Arlington	013	Greene	079	Prince William	153
Culpeper	047	Loudoun	107	Rappahannock	157
Fairfax	059	Louisa	109	Spotsylvania	177
Fauquier	061	Madison	113	Stafford	179

UNIT 4 NORTHERN MOUNTAINS

Alleghany	005	Craig	045	Rockbridge	163
Augusta	015	Frederick	069	Rockingham	165
Bath	017	Highland	091	Shenandoah	171
Botetourt	023	Page	139	Warren	187
Clarke	043	Roanoke	161		

UNIT 5 SOUTHERN MOUNTAINS

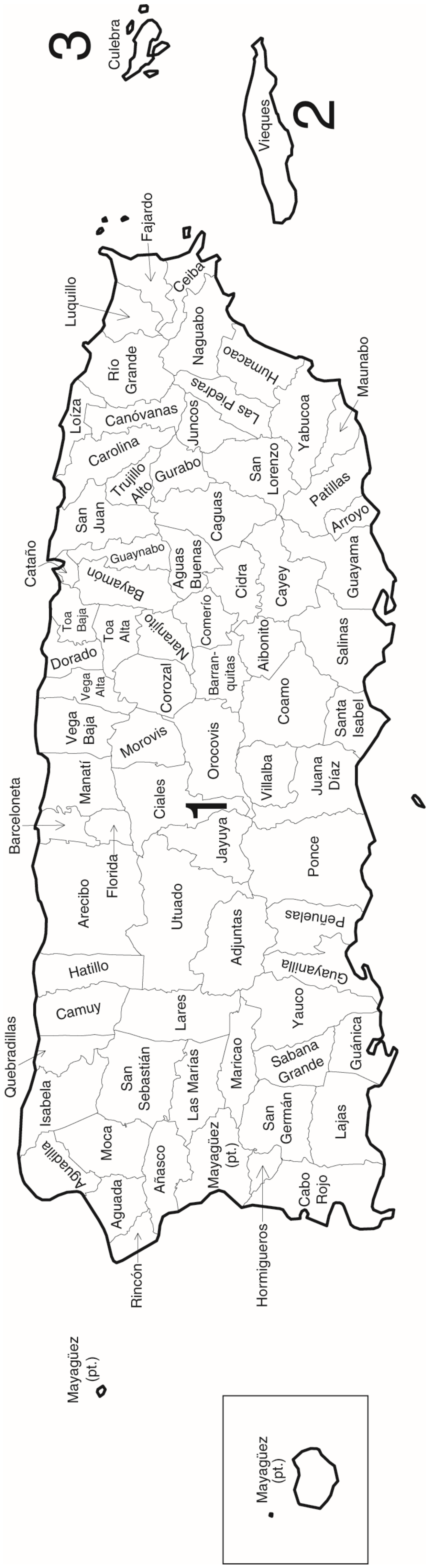
Bland	021	Grayson	077	Smyth	173
Buchanan	027	Lee	105	Tazewell	185
Carroll	035	Montgomery	121	Washington	191
Dickenson	051	Pulaski	155	Wise	195
Floyd	063	Russell	167	Wythe	197
Giles	071	Scott	169		



(72) Puerto Rico

County/Municipio		Unit	County/Municipio		Unit	County/Municipio		Unit
(001)	Adjuntas	1	(053)	Fajardo	1	(103)	Naguabo	1
(003)	Aguada	1	(054)	Florida	1	(105)	Naranjito	1
(005)	Aguadilla	1	(055)	Guánica	1	(107)	Orocovis	1
(007)	Aguas Buenas	1	(057)	Guayama	1	(109)	Patillas	1
(009)	Aibonito	1	(059)	Guayanilla	1	(111)	Peñuelas	1
(011)	Añasco	1	(061)	Guaynabo	1	(113)	Ponce	1
(013)	Arecibo	1	(063)	Gurabo	1	(115)	Quebradillas	1
(015)	Arroyo	1	(065)	Hatillo	1	(117)	Rincón	1
(017)	Barceloneta	1	(067)	Hormigueros	1	(119)	Río Grande	1
(019)	Barranquitas	1	(069)	Humacao	1	(121)	Sabana Grande	1
(021)	Bayamón	1	(071)	Isabela Municipio	1	(123)	Salinas	1
(023)	Cabo Rojo	1	(073)	Jayuya	1	(125)	San Germán	1
(025)	Caguas	1	(075)	Juana Díaz	1	(127)	San Juan	1
(027)	Camuy	1	(077)	Juncos	1	(129)	San Lorenzo	1
(029)	Canóvanas	1	(079)	Lajas	1	(131)	San Sebastián	1
(031)	Carolina	1	(081)	Lares	1	(133)	Santa Isabel	1
(033)	Cataño	1	(083)	Las Marías	1	(135)	Toa Alta	1
(035)	Cayey	1	(085)	Las Piedras	1	(137)	Toa Baja	1
(037)	Ceiba	1	(087)	Loíza	1	(139)	Trujillo Alto	1
(039)	Ciales	1	(089)	Luquillo	1	(141)	Utuado	1
(041)	Cidra	1	(091)	Manatí	1	(143)	Vega Alta	1
(043)	Coamo	1	(093)	Maricao	1	(145)	Vega Baja	1
(045)	Comerío	1	(095)	Maunabo	1	(147)	Vieques	2
(047)	Corozal	1	(097)	Mayagüez	1	(149)	Villalba	1
(049)	Culebra	3	(099)	Moca	1	(151)	Yabucoa	1
(051)	Dorado	1	(101)	Morovis	1	(153)	Yuaco	1

Unit 1 – Mainland Puerto Rico
Unit 2 – Vieques
Unit 3 – Culebra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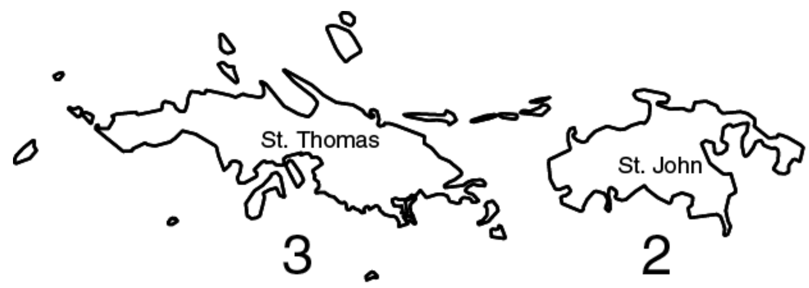
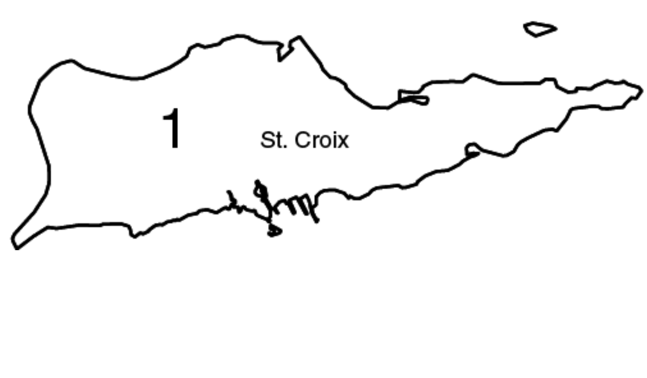
3
Culebra
Vieques
Fajardo
Luquillo
Ceiba
Naguabo
Humacao
Maunabo
Río Grande
Loíza
Canóvanas
Las Piedras
Yabucoa
Juncos
Carolina
Trujillo Alto
Gurabo
San Lorenzo
Patillas
San Juan
Caguas
Arroyo
Cataño
Guaynabo
Aguas Buenas
Guayama
Bayamón
Cidra
Cayey
Toa Baja
Toa Alta
Naranjito
Comerío
Dorado
Aibonito
Salinas
Vega Alta
Corozal
Barran-quitas
Coamo
Santa Isabel
Vega Baja
Morovis
Orocovis
Villalba
Juana Díaz
Barceloneta
Manatí
Ciales
Jayuya
Ponce
Florida
Arecibo
Utuado
Adjuntas
Peñuelas
Hatillo
Guayanilla
Camuy
Lares
Yauco
Quebradillas
San Sebastián
Las Marías
Maricao
Sabana Grande
Guánica
Isabela
Moca
Mayagüez (pt.)
San Germán
Lajas
Aguadilla
Añasco
Cabo Rojo
Aguada
Rincón
Hormigueros
Mayagüez (pt.)
Mayagüez (pt.)

(79) U.S. Virgin Islands

County/Island		Unit
(010)	St. Croix	1
(020)	St. John	2
(030)	St. Thomas	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
	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

East	West	Code	Species Type
			Lodgepole Pine Group
	W	281	Lodgepole pine
			Hemlock / Sitka Spruce Group
	W	301	Western hemlock
	W	304	Western redcedar
	W	305	Sitka spruce
			Western Larch Group
	W	321	Western larch
			Redwood Group
	W	341	Redwood
	W	342	Giant sequoia
			Other Western Softwoods Group
	W	361	Knobcone pine
	W	362	Southwestern white pine
	W	363	Bishop pine
	W	364	Monterey pine
	W	365	Foxtail pine / bristlecone pine
	W	366	Limber pine
	W	367	Whitebark pine
	W	368	Misc. western softwoods
	W	369	Western juniper
			California Mixed Conifer Group
	W	371	California mixed conifer
			Exotic Softwoods Group
E		381	Scotch pine
E	W	383	Other exotic softwoods
E		384	Norway spruce
E		385	Introduced larch
			Other Softwoods Group
		391	Other softwoods
			Oak / Pine Group
E		401	Eastern white pine / N. red oak / white ash
E		402	Eastern redcedar / hardwood
E		403	Longleaf pine / oak
E		404	Shortleaf pine / oak
E		405	Virginia pine / southern red oak
E		406	Loblolly pine / hardwood
E		407	Slash pine / hardwood
E		409	Other pine / hardwood
			Oak / Hickory Group
E		501	Post oak / blackjack oak
E		502	Chestnut oak
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

East	West	Code	Species Type
			Elm / Ash / Cottonwood Group
E		701	Black ash / American elm / red maple
E		702	River birch / sycamore
E	W	703	Cottonwood
E	W	704	Willow
E		705	Sycamore / pecan / American elm
E		706	Sugarberry / hackberry / elm / green ash
E		707	Silver maple / American elm
E		708	Red maple / lowland
E	W	709	Cottonwood / willow
	W	722	Oregon ash
			Maple / Beech / Birch Group
E		801	Sugar maple / beech / yellow birch
E		802	Black cherry
E		805	Hard maple / basswood
E		809	Red maple / upland
			Aspen / Birch Group
E	W	901	Aspen
E	W	902	Paper birch
E		903	Gray birch
E	W	904	Balsam poplar
E	W	905	Pin cherry
			Alder / Maple Group
	W	911	Red alder
	W	912	Bigleaf maple
			Western Oak Group
	W	921	Gray pine
	W	922	California black oak
	W	923	Oregon white oak
	W	924	Blue oak
	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 and Subtropical Hardwoods Groups
E		982	Mangrove swamps
E	W	983	Palms
		984	Dry forest
		985	Moist forest
		986	Wet and rain forest
		987	Lower montane wet and rainforest
		988	Cloud forest
E		989	Other tropical and subtropical hardwoods
			Exotic Hardwoods Group
E		991	Paulownia
E		992	Melaleuca
E	W	993	Eucalyptus
E	W	995	Other exotic hardwoods

For nonstocked stands, see 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

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, Digger pine, red and white fir. Sites -- thrives in fairly harsh environments throughout most of its range, and is cold hardy, drought tolerant, adapted to short growing seasons, and tolerant of infertile sites. The majority of trees are found in California, although its range extends into SW Oregon and western Nevada.

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

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 SOFWOODS GROUP

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

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

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

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

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

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

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

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

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

CALIFORNIA MIXED CONIFER GROUP

371 California mixed conifer: Associates - a complex association of ponderosa pine, sugar pine, Douglas-fir, white fir, red fir, and incense-cedar. Generally, five or six conifer species are intermixed either as single trees or in small groups. Sites -- Mixed conifer sites are often on east-facing slopes of the California Coast Range and on the west-facing and higher elevation east-facing slopes of the Oregon Cascades and Sierra Nevadas.

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 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, 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, 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 floodplains, 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. Site -- 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.

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.

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 AND SUBTROPICAL HARDWOODS GROUPS

982 Mangrove swamps: 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*i 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 rainforest (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 and subtopical 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 sections 2.5.3 for procedures to determine FOREST TYPE.

Appendix 3. FIA Tree Species Codes

This list includes all tree species tallied in the Continental U.S., Alaska, and the Caribbean. Species designated East/West/Caribbean are commonly found in those regions, although species designated for one region may occasionally be found in another. Woodland species designate species where DRC is measured instead of DBH. Species that have an "X" in the *Core* column are tallied in all regions. All other species on the list are "core optional".

Core	East	West	Carib-bean	Wood-land	FIA Code	PLANTS Code	Common Name	Genus	Species
	E	W			10	ABIES	Fir spp.	Abies	spp.
X	E	W			12	ABBA	balsam fir	Abies	balsamea
X		W			15	ABCO	white fir	Abies	concolor
X	E				16	ABFR	Fraser fir	Abies	fraseri
X		W			18	ABLAA	corkbark fir	Abies	lasiocarpa var. arizonica
X		W			19	ABLA	subalpine fir	Abies	lasiocarpa
X	E				43	CHTH2	Atlantic white-cedar	Chamaecyparis	thyoides
		W	C		50	CUPRE	Cypress (CARIBBEAN ONLY)	Cupressus	spp.
X		W			51	CUAR	Arizona cypress	Cupressus	arizonica
	E	W			57	JUNIP	redcedar, juniper spp.	Juniperus	spp.
X		W		w	58	JUPI	Pinchot juniper	Juniperus	pinchotii
X		W		w	59	JUCO11	redberry juniper	Juniperus	coahuilensis
	E			w	60	JUFL	drooping juniper	Juniperus	flaccida
X	E			w	61	JUAS	Ashe juniper	Juniperus	ashei
X		W		w	63	JUDE2	alligator juniper	Juniperus	deppeana
X		W		w	65	JUOS	Utah juniper	Juniperus	osteosperma
X	E	W		w	66	JUSC2	Rocky Mountain juniper	Juniperus	scopulorum
	E				67	JUVIS	southern redcedar	Juniperus	virginiana var. silicicola
X	E				68	JUVI	eastern redcedar	Juniperus	virginiana
X		W		w	69	JUMO	oneseed juniper	Juniperus	monosperma
	E	W			90	PICEA	spruce spp.	Picea	spp.
X	E				91	PIAB	Norway spruce	Picea	abies
X		W			93	PIEN	Engelmann spruce	Picea	engelmannii
X	E	W			94	PIGL	white spruce	Picea	glauca
X	E	W			95	PIMA	black spruce	Picea	mariana
X	E	W			96	PIPU	blue spruce	Picea	pungens
X	E				97	PIRU	red spruce	Picea	rubens
	E	W	C		100	PINUS	pine spp.	Pinus	spp.
X		W		w	106	PIED	Common pinyon, two-needle pinyon	Pinus	edulis
X	E				107	PICL	sand pine	Pinus	clausa
X	E				110	PIEC2	shortleaf pine	Pinus	echinata
X	E				111	PIEL	slash pine	Pinus	elliottii
X		W			113	PIFL2	limber pine	Pinus	flexilis
X		W			114	PIST3	southwestern white pine	Pinus	strobiformis
X	E				115	PIGL2	spruce pine	Pinus	glabra
X	E				121	PIPA2	longleaf pine	Pinus	palustris
X	E	W			122	PIPO	ponderosa pine	Pinus	ponderosa
X	E				123	PIPU5	Table Mountain pine	Pinus	pungens
X	E				125	PIRE	red pine	Pinus	resinosa
X	E				126	PIRI	pitch pine	Pinus	rigida
X	E				128	PISE	pond pine	Pinus	serotina
X	E				129	PIST	eastern white pine	Pinus	strobus
X	E	W			130	PISY	Scotch pine	Pinus	sylvestris
X	E				131	PITA	loblolly pine	Pinus	taeda
X	E				132	PIVI2	Virginia pine	Pinus	virginiana
X		W			135	PIAR5	Arizona pine	Pinus	arizonica
X	E				136	PINI	Austrian pine	Pinus	nigra
X		W		w	140	PICE	Mexican pinyon pine	Pinus	cembroides
	E			w	141	PIRE5	papershell pinyon pine	Pinus	remota
X	E				144	PIELE2	Caribbean pine	Pinus	elliottii var. elliottii
X		W			202	PSME	Douglas-fir	Pseudotsuga	menziesii
	E				220	TAXOD	cypress spp.	Taxodium	spp.
X	E				221	TADI2	baldcypress	Taxodium	distichum
X	E				222	TAAS	pondcypress	Taxodium	ascendens
	E				223	TAMU	Montezuma baldcypress	Taxodium	mucronatum
X	E				232	TAFL	Florida yew	Taxus	floridana

Core	East	West	Carib-bean	Wood-land	FIA Code	PLANTS Code	Common Name	Genus	Species
	E	W	C		240	THUJA	Thuja spp.	Thuja	spp.
X	E				241	THOC2	northern white-cedar	Thuja	occidentalis
X	E				252	TOTA	Florida torreya (nutmeg)	Torreya	taxifolia
	E	W			260	TSUGA	hemlock spp.	Tsuga	spp.
X	E				261	TSCA	eastern hemlock	Tsuga	canadensis
	E				262	TSCA2	Carolina hemlock	Tsuga	caroliniana
X	E	W	C		299	2TE	unknown dead conifer	Tree	evergreen
	E	W	C	w	300	ACACI	acacia spp. (CARIBBEAN ONLY)	Acacia	spp.
	E	W	C	w	303	ACFA	sweet acacia	Acacia	farnesiana
	E	W			310	ACER	maple spp.	Acer	spp.
X	E				311	ACBA3	Florida maple	Acer	barbatum
X	E	W			313	ACNE2	boxelder	Acer	negundo
X	E				314	ACNI5	black maple	Acer	nigrum
X					315	ACPE	striped maple	Acer	pensylvanicum
X	E				316	ACRU	red maple	Acer	rubrum
X	E				317	ACSA2	silver maple	Acer	saccharinum
X	E				318	ACSA3	sugar maple	Acer	saccharum
	E				319	ACSP2	mountain maple	Acer	spicatum
	E				320	ACPL	Norway maple	Acer	platanoides
		W		w	321	ACGL	Rocky Mountain maple	Acer	glabrum
		W		w	322	ACGR3	bigtooth maple	Acer	grandidentatum
X	E				323	ACLE	chalk maple	Acer	leucoderme
	E	W			330	AESCU	buckeye, horsechestnut spp.	Aesculus	spp.
X	E				331	AEGL	Ohio buckeye	Aesculus	glabra
X	E				332	AEFL	yellow buckeye	Aesculus	flava
	E				334	AEGLA	Texas buckeye	Aesculus	glabra var. arguta
X	E	W			341	AIAL	ailanthus	Ailanthus	altissima
X	E	W			345	ALJU	mimosa/silktree	Albizia	julibrissin
		W			350	ALNUS	alder spp.	Alnus	spp.
X		W			352	ALRH2	white alder	Alnus	rhombifolia
X		W			353	ALOB2	Arizona alder	Alnus	oblongifolia
X	E				355	ALGL2	European alder	Alnus	glutinosa
	E	W			356	AMELA	serviceberry spp.	Amelanchier	spp.
	E	W		w	363	ARXA80	Texas madrone	Arbutus	xalapensis
X	E				367	ASTR	Pawpaw	Asimina	triloba
	E	W			370	BETUL	birch spp.	Betula	spp.
X	E				371	BEAL2	yellow birch	Betula	alleghaniensis
X	E				372	BELE	sweet birch	Betula	lenta
X	E				373	BENI	river birch	Betula	nigra
X	E	W			374	BEOC2	water birch	Betula	occidentalis
X	E	W			375	BEPA	paper birch	Betula	papyrifera
X	E				377	BEUB	Virginia roundleaf birch	Betula	uber
X	E				379	BEPO	gray birch	Betula	populifolia
	E				381	SILAL3	Chittamwood, gum bumelia	Sideroxylon	lanuginosum ssp. lanuginosum
X	E				391	CACA18	American hornbeam, musclewood	Carpinus	caroliniana
	E				400	CARYA	hickory spp.	Carya	spp.
X	E				401	CAAQ2	water hickory	Carya	aquatica
X	E				402	CACO15	bitternut hickory	Carya	cordiformis
X	E				403	CAGL8	pignut hickory	Carya	glabra
X	E				404	CAIL2	pecan	Carya	illinoinensis
X	E				405	CALA21	shellbark hickory	Carya	laciniosa
X	E				406	CAMY	nutmeg hickory	Carya	myristiciformis
X	E				407	CAOV2	shagbark hickory	Carya	ovata
X	E				408	CATE9	black hickory	Carya	texana
X	E				409	CAAL27	mockernut hickory	Carya	alba
X	E				410	CAPA24	sand hickory	Carya	pallida
X	E				411	CAFL6	scrub hickory	Carya	floridana
X	E				412	CAOV3	red hickory	Carya	ovalis
X	E				413	CACA38	southern shagbark hickory	Carya	carolinae-septentrionalis
	E	W			420	CASTA	chestnut spp.	Castanea	spp.
	E				421	CADE12	American chestnut	Castanea	dentata

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X	E				422	CAPU9	Allegheny chinkapin	Castanea	pumila
	E				423	CAPUO	Ozark chinkapin	Castanea	pumila var. ozarkensis
X	E	W			424	CAMO83	Chinese chestnut	Castanea	mollissima
	E		C		450	CATAL	catalpa spp.	Catalpa	spp.
X	E				451	CABI8	southern catalpa	Catalpa	bignonioides
X	E				452	CASP8	northern catalpa	Catalpa	speciosa
	E	W	C		460	CELTI	hackberry spp.	Celtis	spp.
X	E	W			461	CELA	sugarberry	Celtis	laevigata
X	E	W			462	CEOC	hackberry	Celtis	occidentalis
	E	W			463	CELAR	netleaf hackberry	Celtis	laevigata var. reticulata
X	E				471	CECA4	eastern redbud	Cercis	canadensis
X	E				481	CLKE	yellowwood	Cladrastis	kentukea
X	E				491	COFL2	flowering dogwood	Cornus	florida
	E				500	CRATA	hawthorn spp.	Crataegus	spp.
	E				501	CRCR2	cockspur hawthorn	Crataegus	crus-galli
	E				502	CRMO2	downy hawthorn	Crataegus	mollis
	E	W	C		510	EUCAL	eucalyptus spp.	Eucalyptus	spp.
X	E		C		513	EUGR12	grand eucalyptus	Eucalyptus	grandis
X	E		C		514	EURO2	swamp mahogany	Eucalyptus	robusta
	E		C		520	DIOSP	persimmon spp.	Diospyros	spp.
X	E				521	DIVI5	common persimmon	Diospyros	virginiana
X	E				522	DITE3	Texas persimmon	Diospyros	texana
	E			w	523	EHAN	Anacua, knockaway	Ehretia	anacua
X	E				531	FAGR	American beech	Fagus	grandifolia
	E	W	C		540	FRAXI	ash spp.	Fraxinus	spp.
X	E				541	FRAM2	white ash	Fraxinus	americana
X	E				543	FRNI	black ash	Fraxinus	nigra
X	E				544	FRPE	green ash	Fraxinus	pennsylvanica
X	E				545	FRPR	pumpkin ash	Fraxinus	profunda
X	E				546	FRQU	blue ash	Fraxinus	quadrangulata
X		W			547	FRVE2	velvet ash	Fraxinus	velutina
X	E				548	FRCA3	Carolina ash	Fraxinus	caroliniana
X	E				549	FRTE	Texas ash	Fraxinus	texensis
	E				550	GLEDI	locust spp.	Gleditsia	spp.
X	E				551	GLAQ	waterlocust	Gleditsia	aquatica
X	E				552	GLTR	honeylocust	Gleditsia	triacanthos
X	E				555	GOLA	loblolly bay	Gordonia	lasianthus
X	E	W			561	GIBI2	Ginkgo, maidenhair tree	Ginkgo	biloba
X	E				571	GYDI	Kentucky coffeetree	Gymnocladus	dioicus
	E				580	HALES	silverbell spp.	Halesia	spp.
X	E				581	HACA3	Carolina silverbell	Halesia	carolina
X	E				582	HADI3	two-wing silverbell	Halesia	diptera
X	E				583	HAPA2	little silverbell	Halesia	parviflora
X	E				591	ILOP	American holly	Ilex	opaca
	E	W	C		600	JUGLA	walnut spp.	Juglans	spp.
X	E				601	JUCI	butternut	Juglans	cinerea
X	E	W			602	JUNI	black walnut	Juglans	nigra
	E	W			605	JUMI	Texas walnut	Juglans	microcarpa
X		W			606	JUMA	Arizona walnut	Juglans	major
X	E				611	LIST2	sweetgum	Liquidambar	styraciflua
X	E				621	LITU	yellow-poplar	Liriodendron	tulipifera
X	E				641	MAPO	Osage-orange	Maclura	pomifera
	E		C		650	MAGNO	magnolia spp.	Magnolia	spp.
X	E				651	MAAC	cucumbertree	Magnolia	acuminata
X	E				652	MAGR4	southern magnolia	Magnolia	grandiflora
X	E				653	MAVI2	sweetbay	Magnolia	virginiana
X	E				654	MAMA2	bigleaf magnolia	Magnolia	macrophylla
X	E				655	MAFR	mountain magnolia, Fraser magnolia	Magnolia	fraseri
X	E				657	MAPY	pyramid magnolia	Magnolia	pyramidata
X	E				658	MATR	umbrella magnolia	Magnolia	tripetala
	E	W			660	MALUS	apple spp.	Malus	spp.

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X	E				662	MAAN3	southern crabapple	Malus	angustifolia
X	E				663	MACO5	sweet crabapple	Malus	coronaria
X	E				664	MAIO	prairie crabapple	Malus	ioensis
	E		C		680	MORUS	mulberry spp.	Morus	spp.
X	E		C		681	MOAL	white mulberry	Morus	alba
X	E				682	MORU2	red mulberry	Morus	rubra
	E	W			683	MOMI	Texas mulberry	Morus	microphylla
X	E		C		684	MONI	black mulberry	Morus	nigra
	E				690	NYSSA	tupelo spp.	Nyssa	spp.
X	E				691	NYAQ2	water tupelo	Nyssa	aquatica
X	E				692	NYOG	Ogeechee tupelo	Nyssa	ogeche
X	E				693	NYSY	blackgum	Nyssa	sylvatica
X	E				694	NYBI	swamp tupelo	Nyssa	biflora
X	E				701	OSVI	eastern hophornbeam	Ostrya	virginiana
X	E				711	OXAR	sourwood	Oxydendrum	arboreum
X	E				712	PATO2	paulownia, empress-tree	Paulownia	tomentosa
	E	W	C		720	PERSE	bay spp.	Persea	spp.
X	E				721	PEBO	redbay	Persea	borbonia
X	E				722	PLAQ	water-elm, planertree	Planera	aquatica
X	E				731	PLOC	American sycamore	Platanus	occidentalis
	E	W			740	POPUL	cottonwood and poplar spp.	Populus	spp.
X	E	W			741	POBA2	balsam poplar	Populus	balsamifera
X	E				742	PODE3	eastern cottonwood	Populus	deltoides
X	E				743	POGR4	bigtooth aspen	Populus	grandidentata
X	E				744	POHE4	swamp cottonwood	Populus	heterophylla
X	E	W			745	PODEM	plains cottonwood	Populus	deltoides ssp. monilifera
X	E	W			746	POTR5	quaking aspen	Populus	tremuloides
X		W			748	POFR2	Fremont cottonwood	Populus	fremontii
X		W			749	POAN3	narrowleaf cottonwood	Populus	angustifolia
X	E				752	POAL7	silver poplar	Populus	alba
X	E				753	PONI	Lombardy poplar	Populus	nigra
	E	W	C	w	755	PROSO	mesquite spp.	Prosopis	spp.
X	E	W		w	756	PRGL2	honey mesquite	Prosopis	glandulosa
X	E	W		w	757	PRVE	velvet mesquite	Prosopis	velutina
X	E	W		w	758	PRPU	screwbean mesquite	Prosopis	pubescens
	E	W	C		760	PRUNU	cherry and plum spp.	Prunus	spp.
	E	W			761	PRPE2	pin cherry	Prunus	pensylvanica
X	E				762	PRSE2	black cherry	Prunus	serotina
	E	W			763	PRVI	common chokecherry	Prunus	virginiana
	E				764	PRPE3	peach	Prunus	persica
X	E				765	PRNI	Canada plum	Prunus	nigra
X	E				766	PRAM	American plum	Prunus	americana
X	E				771	PRAV	sweet cherry (domesticated)	Prunus	avium
	E	W			800	QUERC	oak spp.	Quercus	spp.
X	E				802	QUAL	white oak	Quercus	alba
X		W		w	803	QUAR	Arizona white oak	Quercus	arizonica
X	E				804	QUBI	swamp white oak	Quercus	bicolor
X	E				806	QUCO2	scarlet oak	Quercus	coccinea
X	E				808	QUSIS	Durand oak	Quercus	sinuata var. sinuata
X	E				809	QUEL	northern pin oak	Quercus	ellipsoidalis
X		W		w	810	QUEM	Emory oak	Quercus	emoryi
X	E				812	QUFA	southern red oak	Quercus	falcata
X	E				813	QUPA5	cherrybark oak	Quercus	pagoda
X		W		w	814	QUGA	Gambel oak	Quercus	gambelii
X	E				816	QUIL	scrub oak	Quercus	ilicifolia
X	E				817	QUIM	shingle oak	Quercus	imbricaria
X	E				819	QULA2	turkey oak	Quercus	laevis
X	E				820	QULA3	laurel oak	Quercus	laurifolia
X	E				822	QULY	overcup oak	Quercus	lyrata
X	E				823	QUMA2	bur oak	Quercus	macrocarpa
X	E				824	QUMA3	blackjack oak	Quercus	marilandica

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X	E				825	QUMI	swamp chestnut oak	Quercus	michauxii
X	E				826	QUMU	chinkapin oak	Quercus	muehlenbergii
X	E				827	QUNI	water oak	Quercus	nigra
X	E				828	QUTE	Nuttall oak, Texas red oak	Quercus	texana
X		W		w	829	QUOB	Mexican blue oak	Quercus	oblongifolia
X	E				830	QUPA2	pin oak	Quercus	palustris
X	E				831	QUPH	willow oak	Quercus	phellos
X	E				832	QUPR2	chestnut oak	Quercus	prinus
X	E				833	QURU	northern red oak	Quercus	rubra
X	E				834	QUSH	Shumard’s oak	Quercus	shumardii
X	E				835	QUST	post oak	Quercus	stellata
	E				836	QUSI2	Delta post oak	Quercus	similis
X	E				837	QUVE	black oak	Quercus	velutina
X	E				838	QUVI	live oak	Quercus	virginiana
X		W			839	QUWI2	interior live oak	Quercus	wislizeni
X	E				840	QUMA6	dwarf post oak	Quercus	margarettae
X	E				841	QUMI2	dwarf live oak	Quercus	minima
X	E				842	QUIN	bluejack oak	Quercus	incana
X		W		w	843	QUHY	silverleaf oak	Quercus	hypoleucoides
X	E				844	QUOG	Oglethorpe oak	Quercus	oglethorpensis
	E				845	QUPR	dwarf chinkapin oak	Quercus	prinoides
X		W		w	846	QUGR3	gray oak	Quercus	grisea
X		W		w	847	QURU4	netleaf oak	Quercus	rugosa
	E				851	QUGR	Chisos oak	Quercus	graciliformis
	E		C		852	AMEL	Torchwood, sea torchwood	Amyris	elemifera
	E		C		853	ANGL4	pond apple	Annona	glabra
	E		C		854	BUSI	gumbo limbo	Bursera	simaruba
	E		C		855	CASUA	sheoak spp.	Casuarina	spp.
X	E		C		856	CAGL11	gray sheoak	Casuarina	glauca
X	E		C		857	CALE28	Australian pine	Casuarina	lepidophloia
	E		C		858	CICA	camphor tree	Cinnamomum	camphora
	E		C		859	CIFR	fiddlewood	Citharexylum	fruticosum
	E		C		860	CITRU2	citrus spp.	Citrus	spp.
	E		C		863	CODI8	pigeon plum, tietongue	Coccoloba	diversifolia
	E		C		864	COEL2	soldierwood	Colubrina	elliptica
	E		C		865	COSE2	geiger tree, largeleaf geigertree	Cordia	sebestena
	E				866	CUAN4	carrotwood	Cupaniopsis	anacardioides
	E			w	867	COHO	Bluewood, Brazilian bluewood	Condalia	hookeri
	E				868	EBEB	blackbead ebony, Texas ebony	Ebenopsis	ebano
	E				869	LEPU3	great leucaena, great leadtree	Leucaena	pulverulenta
	E				870	SOAF	Texas sophora, Eve’s necklacepod	Sophora	affinis
	E		C		873	EURH	red stopper	Eugenia	rhombea
	E		C		874	EXPA	Inkwood, butterbough	Exothea	paniculata
	E				876	FIAU	strangler fig	Ficus	aurea
	E		C		877	FICI	shortleaf fig, wild banyantree	Ficus	citrifolia
	E		C		882	GUDI	Blolly, beeftree	Guapira	discolor
	E		C		883	HIMA2	manchineel	Hippomane	mancinella
	E		C		884	LYLA3	false tamarind	Lysiloma	latisiliquum
	E		C		885	MAIN3	mango	Mangifera	indica
	E		C		886	METO3	Poisonwood, Florida poisontree	Metopium	toxiferum
	E				887	PIPI3	fishpoison tree	Piscidia	piscipula
	E		C		888	SCAC2	schefflera, octopus tree	Schefflera	actinophylla
	E		C		890	SIFO	false mastic	Sideroxylon	foetidissimum
	E		C		891	SISA6	white bully, willow bustic	Sideroxylon	salicifolium
	E				895	SIGL3	paradise tree	Simarouba	glauca
	E				896	SYCU	Java plum	Syzygium	cumini
	E		C		897	TAIN2	tamarind	Tamarindus	indica
X	E	W			901	ROPS	black locust	Robinia	pseudoacacia
		W		w	902	RONE	New Mexico locust	Robinia	neomexicana
	E				906	ACWR4	paurotis palm	Acoelorraphe	wrightii
	E				907	COAR	silver palm	Coccothrinax	argentata

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	E		C		908	CONU	coconut palm	Cocos	nucifera
	E		C		909	ROYST	royal palm spp.	Roystonea	spp.
	E				911	SAME8	Mexican palmetto, Rio Grande palmetto	Sabal	mexicana
X	E				912	SAPA	cabbage palmetto	Sabal	palmetto
	E		C		913	THMO4	key thatch palm	Thrinax	morrisii
	E				914	THRA2	Florida thatch palm	Thrinax	radiata
	E				915	ARECA	other palms	Family Arecaceae	not listed above
	E	W			919	SASAD	western soapberry	Sapindus	saponaria var. drummondii
	E	W	C		920	SALIX	willow spp.	Salix	spp.
	E	W			921	SAAM2	peachleaf willow	Salix	amygdaloides
	E	W			922	SANI	black willow	Salix	nigra
	E	W			923	SABE2	Bebb willow	Salix	bebbiana
		W			924	SABO	red willow	Salix	bonplandiana
X	E				925	SACA5	coastal plain willow	Salix	caroliniana
	E	W			927	SAAL2	white willow	Salix	alba
X	E				929	SASE10	weeping willow	Salix	sepulcralis
X	E				931	SAAL5	sassafras	Sassafras	albidum
	E				934	SORBU	mountain ash spp.	Sorbus	spp.
	E				935	SOAM3	American mountain ash	Sorbus	americana
X	E				936	SOAU	European mountain ash	Sorbus	aucuparia
X	E				937	SODE3	northern mountain ash	Sorbus	decora
	E		C		940	SWMA2	mahogany	Swietenia	mahagoni
	E				950	TILIA	basswood spp.	Tilia	spp.
X	E				951	TIAM	American basswood	Tilia	americana
	E				952	TIAMH	white basswood	Tilia	americana var. heterophylla
	E				953	TIAMC	Carolina basswood	Tilia	americana var. caroliniana
	E				970	ULMUS	elm spp.	Ulmus	spp.
X	E				971	ULAL	winged elm	Ulmus	alata
X	E				972	ULAM	American elm	Ulmus	americana
X	E				973	ULCR	cedar elm	Ulmus	crassifolia
X	E				974	ULPU	Siberian elm	Ulmus	pumila
X	E				975	ULRU	slippery elm	Ulmus	rubra
X	E				976	ULSE	September elm	Ulmus	serotina
X	E				977	ULTH	rock elm	Ulmus	thomasii
	E		C		986	AVGE	black mangrove	Avicennia	germinans
	E		C		987	COER2	buttonwood mangrove, button mangrove	Conocarpus	erectus
	E		C		988	LARA2	white mangrove	Laguncularia	racemosa
X	E		C		989	RHMA2	American mangrove, red mangrove	Rhizophora	mangle
	E	W	C		991	TAMAR2	saltcedar (Caribbean only)	Tamarix	spp.
X	E		C		992	MEQU	Melaleuca, punktree	Melaleuca	quinquenervia
X	E		C		993	MEAZ	chinaberry	Melia	azedarach
X	E				994	TRSE6	Chinese tallowtree	Triadica	sebifera
X	E				995	VEFO	tungoil tree	Vernicia	fordii
X	E				996	COOB2	smoketree	Cotinus	obovatus
	E	W			997	ELAN	Russian-olive	Elaeagnus	angustifolia
X	E	W	C		998	2TB	unknown dead hardwood	Tree	broadleaf
X	E	W	C		999	2TREE	other, or unknown live tree	Tree	unknown
	E				5491	FRBE	Berlandier ash, Mexican ash	Fraxinus	berlandieriana
			C		6001	ACAN4	blackbrush wattle	Acacia	anegadensis
			C		6008	ACMA	porknut	Acacia	macracantha
			C		6009	ACMA12	Acacia mangium	Acacia	mangium
			C		6012	ACMU	spineless wattle	Acacia	muricata
			C		6013	ACNI2	gum arabic tree	Acacia	nilotica
			C		6015	ACPO3	Acacia polyacantha	Acacia	polyacantha
			C		6018	ACTO	poponax	Acacia	tortuosa
			C		6021	ACAR	hollowheart	Acnistus	arborescens
			C		6023	ACME2	grugru palm	Acrocomia	media
			C		6025	ADDI3	baobab	Adansonia	digitata
			C		6026	ADRI	wild lime	Adelia	ricinella
			C		6028	ADPA	red beadtree	Adenanthera	pavonina
			C		6032	AEMA	Caribbean spiritweed	Aegiphila	martinicensis

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			C		6036	AGAU4	kauri	Agathis	australis
			C		6037	AGRO6	Queensland kauri	Agathis	robusta
			C		6053	AIMI	Aiphanes minima	Aiphanes	minima
			C		6055	ALAD	cream albizia	Albizia	adinocephala
			C		6056	ALCA8	naked albizia	Albizia	carbonaria
			C		6059	ALLE	woman's tongue	Albizia	lebbeck
			C		6060	ALPR	tall albizia	Albizia	procera
			C		6064	ALLA	achiotillo	Alchornea	latifolia
			C		6066	ALFL3	palo de gallina	Alchorneopsis	floribunda
			C		6075	ALMO2	Indian walnut	Aleurites	moluccana
			C		6080	ALCR9	palo blanco	Allophylus	crassinervis
			C		6082	ALRA	palo de caja	Allophylus	racemosus
			C		6092	ALBR4	helecho gigante de la sierra	Alsophila	bryophila
			C		6093	ALPO7	Alsophila portoricensis	Alsophila	portoricensis
			C		6101	AMLA4	black calabash	Amphitecna	latifolia
			C		6103	AMBA2	balsam torchwood	Amyris	balsamifera
			C		6106	ANACA	anacardium	Anacardium	spp.
			C		6107	ANOC	cashew	Anacardium	occidentale
			C		6111	ANPE13	Anadenanthera peregrina	Anadenanthera	peregrina
			C		6114	ANIN	cabbagebark tree	Andira	inermis
			C		6120	ANBR7	canelillo	Aniba	bracteata
			C		6124	ANCH9	Annona cherimola	Annona	cherimola
			C		6125	ANDI11	ilama	Annona	diversifolia
			C		6127	ANMO	mountain soursop	Annona	montana
			C		6128	ANMU2	soursop	Annona	muricata
			C		6129	ANRE	custard apple	Annona	reticulata
			C		6131	ANSQ	sugar apple	Annona	squamosa
			C		6137	ANBU3	Antidesma bunius	Antidesma	bunius
			C		6146	ANAC4	placa chiquitu	Antirhea	acutata
			C		6147	ANCO3	pegwood	Antirhea	coriacea
			C		6149	ANLU3	palo iloron	Antirhea	lucida
			C		6150	ANOB2	quina roja	Antirhea	obtusifolia
			C		6151	ANPO3	Puerto Rico quina	Antirhea	portoricensis
			C		6152	ANSI	Sintenis' quina	Antirhea	sintenisii
			C		6154	ARAN15	parana pine	Araucaria	angustifolia
			C		6157	ARHE12	Norfolk Island pine	Araucaria	heterophylla
			C		6162	ARGL11	ausubon	Ardisia	glauciflora
			C		6163	ARLU3	mountain marlberry	Ardisia	luquillensis
			C		6164	AROB2	Guadeloupe marlberry	Ardisia	obovata
			C		6165	ARSO	China-shrub	Ardisia	solanacea
			C		6171	ARAL7	breadfruit	Artocarpus	altilis
			C		6173	ARHE2	Artocarpus heterophyllus	Artocarpus	heterophyllus
			C		6198	AVCA	carambola	Averrhoa	carambola
			C		6206	AZIN2	neem	Azadirachta	indica
			C		6216	BAVU2	common bamboo	Bambusa	vulgaris
			C		6217	BAPO	Puerto Rico palo de ramon	Banara	portoricensis
			C		6219	BAVA2	Vanderbilt's palo de ramon	Banara	vanderbiltii
			C		6220	BAAS3	sea putat	Barringtonia	asiatica
			C		6224	BAEG6	Bastardiopsis eggersii	Bastardiopsis	eggersii
			C		6226	BAMO2	Napoleon's plume	Bauhinia	monandra
			C		6227	BAMU3	petite flamboyant bauhinia	Bauhinia	multinervia
			C		6228	BAPA3	railroadfence	Bauhinia	pauletia
			C		6229	BAPU	butterfly tree	Bauhinia	purpurea
			C		6231	BATO	St. Thomas tree	Bauhinia	tomentosa
			C		6232	BAVA	mountain ebony	Bauhinia	variegata
			C		6233	BEPE	slugwood	Beilschmiedia	pendula
			C		6235	BEDI2	Caribbean myrtlecroton	Bernardia	dichotoma
			C		6238	BIOR	lipsticktree	Bixa	orellana
			C		6240	BLSA2	akee	Blighia	sapida
			C		6247	BOFR2	parrotweed	Bocconia	frutescens
			C		6251	BODA	white alling	Bontia	daphnoides

Core	East	West	Carib-bean	Wood-land	FIA Code	PLANTS Code	Common Name	Genus	Species
			C		6253	BORA2	Bourreria radula	Bourreria	radula
			C		6255	BOSU2	bodywood	Bourreria	succulenta
			C		6257	BOVI2	roble de guayo	Bourreria	virgata
			C		6270	BRCO6	West Indian sumac	Brunellia	comocladiifolia
			C		6272	BRAM4	American brunfelsia	Brunfelsia	americana
			C		6273	BRDE4	Serpentine Hill raintree	Brunfelsia	densifolia
			C		6274	BRLA5	vega blanca	Brunfelsia	lactea
			C		6275	BRPO3	Puerto Rico raintree	Brunfelsia	portoricensis
			C		6283	BUTE4	fourleaf buchenavia	Buchenavia	tetraphylla
			C		6284	BUBU	gregorywood	Bucida	buceras
			C		6294	BUGL2	cafe falso	Bunchosia	glandulifera
			C		6295	BUGL	cafe forastero	Bunchosia	glandulosa
			C		6297	BUPO5	Bunchosia polystachia	Bunchosia	polystachia
			C		6303	BULA10	Buxus laevigata	Buxus	laevigata
			C		6304	BUPO	Puerto Rico box	Buxus	portoricensis
			C		6306	BUVA	Vahl's box	Buxus	vahlii
			C		6308	BYCR	maricao cimun	Byrsonima	crassifolia
			C		6311	BYLU	Long Key locustberry	Byrsonima	lucida
			C		6313	BYSP	doncella	Byrsonima	spicata
			C		6315	BYWA	almendrillo	Byrsonima	wadsworthii
			C		6316	CAESA	nicker	Caesalpinia	spp.
			C		6317	CACO28	divi divi	Caesalpinia	coriaria
			C		6319	CAPU13	pride-of-Barbados	Caesalpinia	pulcherrima
			C		6320	CASA28	sappanwood	Caesalpinia	sappan
			C		6325	CASU33	Surinamese stickpea	Calliandra	surinamensis
			C		6326	CAAM14	caparosa	Callicarpa	ampla
			C		6328	CACI15	crimson bottlebrush	Callistemon	citrinus
			C		6331	CACO2	Callitris columellaris	Callitris	columellaris
			C		6337	CAEC2	Caloncoba echinata	Caloncoba	echinata
			C		6338	CAAN22	Antilles calophyllum	Calophyllum	antillanum
			C		6341	CAIN4	Alexandrian laurel	Calophyllum	inophyllum
			C		6346	CAPR	roostertree	Calotropis	procera
			C		6350	CACA73	degame	Calycophyllum	candidissimum
			C		6351	CAKI	Kiaerskov's lidflower	Calyptranthes	kiaerskovii
			C		6352	CAKR	limoncillo	Calyptranthes	krugii
			C		6353	CALU12	Luquillo forest lidflower	Calyptranthes	luquillensis
			C		6354	CAPA8	pale lidflower	Calyptranthes	pallens
			C		6355	CAPO9	Puerto Rico lidflower	Calyptranthes	portoricensis
			C		6356	CASI8	limoncillo de monte	Calyptranthes	sintenisii
			C		6358	CATH3	Thomas' lidflower	Calyptranthes	thomasiana
			C		6359	CAZU	myrtle of the river	Calyptranthes	zuzygium
			C		6360	CARI3	Puerto Rico manac	Calyptronoma	rivalis
			C		6370	CAOD	ilang-ilang	Cananga	odorata
			C		6380	CAWI	wild cinnamon	Canella	winteriana
			C		6383	CAAM13	burro blanco	Capparis	amplissima
			C		6384	CABA2	caper	Capparis	baducca
			C		6386	CACY	Jamaican caper	Capparis	cynophallophora
			C		6387	CAFL2	falseteeth	Capparis	flexuosa
			C		6389	CAHA9	broadleaf caper	Capparis	hastata
			C		6390	CAIN5	linguam	Capparis	indica
			C		6393	CAGU6	crabwood	Carapa	guianensis
			C		6395	CAPA23	papaya	Carica	papaya
			C		6402	CAAC3	rabo de ranton	Casearia	aculeata
			C		6403	CAAR8	gia verde	Casearia	arborea
			C		6406	CADE11	wild honeytree	Casearia	decandra
			C		6407	CAGU2	Guyanese wild coffee	Casearia	guianensis
			C		6410	CASY2	crackopen	Casearia	sylvestris
			C		6415	CAFI3	golden shower	Cassia	fistula
			C		6417	CAGR11	pink shower	Cassia	grandis
			C		6418	CAJA3	apple blossom	Cassia	javanica
			C		6425	CAXY	marbletree	Cassine	xylocarpa

Core	East	West	Carib-bean	Wood-land	FIA Code	PLANTS Code	Common Name	Genus	Species
			C		6427	CAGU3	goatwood	Cassipourea	guianensis
			C		6429	CAER3	goatbush	Castela	erecta
			C		6430	CAEL5	Panama rubbertree	Castilla	elastica
			C		6433	CACU8	river sheoak	Casuarina	cunninghamiana
			C		6434	CAEQ	beach sheoak	Casuarina	equisetifolia
			C		6439	CALO8	Haitian catalpa	Catalpa	longissima
			C		6443	CESC9	pumpwood	Cecropia	schreberiana
			C		6445	CEOD	Spanish cedar	Cedrela	odorata
			C		6447	CEAC4	pochote	Ceiba	acuminata
			C		6448	CEAE2	pochote	Ceiba	aesculifolia
			C		6449	CEPE2	kapoktree	Ceiba	pentandra
			C		6454	CETR3	almex	Celtis	trinervia
			C		6457	CESI3	St. John's bread	Ceratonia	siliqua
			C		6468	CEHE3	lady of the night cactus	Cereus	hexagonus
			C		6469	CEHI3	Cereus hildmannianus	Cereus	hildmannianus
			C		6474	CEDI6	day jessamine	Cestrum	diurnum
			C		6475	CELA2	galen del monte	Cestrum	laurifolium
			C		6477	CENO	night jessamine	Cestrum	nocturnum
			C		6481	CHAR8	jointed sandmat	Chamaesyce	articulata
			C		6519	CHAX2	hueso	Chionanthus	axilliflorus
			C		6520	CHCO12	bridgotree	Chionanthus	compactus
			C		6521	CHDO4	white rosewood	Chionanthus	domingensis
			C		6522	CHHO4	hueso prieto	Chionanthus	holdridgei
			C		6523	CHLI6	cabra blanca	Chionanthus	ligustrinus
			C		6526	CHSE5	puntaj jayuya	Chione	seminervis
			C		6528	CHVE4	fatpork	Chione	venosa
			C		6529	CHEX5	african teak	Chlorophora	excelsa
			C		6532	CHSP13	silk-floss tree	Chorisia	speciosa
			C		6535	CHIC	icaco coco plum	Chrysobalanus	icaco
			C		6539	CHAR6	bastard redwood	Chrysophyllum	argenteum
			C		6541	CHCA10	star apple	Chrysophyllum	cainito
			C		6542	CHOL	satinleaf	Chrysophyllum	oliviforme
			C		6543	CHPA31	camito de perro	Chrysophyllum	pauciflorum
			C		6554	CIAR8	cassia	Cinnamomum	aromaticum
			C		6559	CIEL2	laurel avispillo	Cinnamomum	elongatum
			C		6560	CIMO3	avispillo	Cinnamomum	montanum
			C		6564	CIVE2	cinnamon	Cinnamomum	verum
			C		6565	CICA8	juniper berry	Citharexylum	caudatum
			C		6567	CISP3	spiny fiddlewood	Citharexylum	spinosum
			C		6569	CITR7	threespike fiddlewood	Citharexylum	tristachyum
			C		6573	CIAU7	key lime	Citrus	×aurantiifolia
			C		6574	CIAU8	sour orange	Citrus	×aurantium
			C		6575	CILI5	lemon	Citrus	×limon
			C		6576	CIPA3	grapefruit	Citrus	×paradisi
			C		6577	CISI3	sweet orange	Citrus	×sinensis
			C		6581	CIMA5	Citrus maxima	Citrus	maxima
			C		6582	CIME3	Citrus medica	Citrus	medica
			C		6584	CIRE3	Citrus reticulata	Citrus	reticulata
			C		6631	CLAC2	haggarbush	Clerodendrum	aculeatum
			C		6637	CLAL4	teta prieta	Cleyera	albopunctata
			C		6639	CLER	jackass breadnut	Clibadium	erosum
			C		6641	CLCY5	Clidemia cymosa	Clidemia	cymosa
			C		6642	CLHI3	soapbush	Clidemia	hirta
			C		6644	CLFA5	Philippine pigeonwings	Clitoria	fairchildiana
			C		6646	CLCL2	cupeillo	Clusia	clusioides
			C		6648	CLGU	Grundlach's attorney	Clusia	gundlachii
			C		6650	CLMI2	cupey de monte	Clusia	minor
			C		6651	CLRO	Scotch attorney	Clusia	rosea
			C		6653	CNHO	deepwoods fern	Cnemidaria	horrida
			C		6655	CNAC	treadsoftly	Cnidoscolus	aconitifolius
			C		6658	COCO8	uvilla	Coccoloba	costata

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			C		6660	COKR	whitewood	Coccoloba	krugii
			C		6661	COMI	puckhout	Coccoloba	microstachya
			C		6662	COPA24	pale seagrape	Coccoloba	pallida
			C		6663	COPU	grandleaf seagrape	Coccoloba	pubescens
			C		6664	COPY	uvera	Coccoloba	pyrifolia
			C		6665	CORU4	ortegon	Coccoloba	rugosa
			C		6666	COSI2	uvero de monte	Coccoloba	sintenisii
			C		6668	COSW	Swartz's pigeonplum	Coccoloba	swartzii
			C		6669	COTE9	Bahama pigeonplum	Coccoloba	tenuifolia
			C		6670	COUV	seagrape	Coccoloba	uvifera
			C		6671	COVE	false chiggergrape	Coccoloba	venosa
			C		6673	COBA3	Coccothrinax barbadensis	Coccothrinax	barbadensis
			C		6679	COVI	silk cottontree	Cochlospermum	vitifolium
			C		6683	COVA3	garden croton	Codiaeum	variegatum
			C		6684	COAR2	Arabian coffee	Coffea	arabica
			C		6686	COLI8	Coffea liberica	Coffea	liberica
			C		6688	COAR9	Cojoba arborea	Cojoba	arborea
			C		6689	COAC4	abata cola	Cola	acuminata
			C		6693	COAR3	greenheart	Colubrina	arborescens
			C		6700	COVE6	Urban's nakedwood	Colubrina	verrucosa
			C		6705	CODO	poison ash	Comocladia	dodonaea
			C		6706	COGL4	carrasco	Comocladia	glabra
			C		6710	CORU17	Luquillo Mountain snailwood	Conostegia	rufescens
			C		6711	COMO8	Consolea moniliformis	Consolea	moniliformis
			C		6712	CORU8	Consolea rubescens	Consolea	rubescens
			C		6714	COOF2	copaiba	Copaifera	officinalis
			C		6728	COAL	Spanish elm	Cordia	alliodora
			C		6730	COBO3	muneco	Cordia	borinquensis
			C		6731	COCO5	red manjack	Cordia	collococca
			C		6735	COLA12	smooth manjack	Cordia	laevigata
			C		6737	COOB3	clammy cherry	Cordia	obliqua
			C		6738	CORI	San Bartolome	Cordia	rickseckeri
			C		6739	CORU5	Puerto Rico manjack	Cordia	rupicola
			C		6743	COSU3	mucilage manjack	Cordia	sulcata
			C		6746	COOB4	nigua	Cornutia	obovata
			C		6747	COPY2	azulejo	Cornutia	pyramidata
			C		6750	COCI4	Corymbia citriodora	Corymbia	citriodora
			C		6756	COGU3	cannonball tree	Couroupita	guianensis
			C		6761	CRCU	common calabash tree	Crescentia	cujete
			C		6762	CRLI5	higuerito	Crescentia	linearifolia
			C		6763	CRPO6	higuero de sierra	Crescentia	portoricensis
			C		6765	CRPO7	Critonia portoricensis	Critonia	portoricensis
			C		6767	CRRH	maidenberry	Crossopetalum	rhacoma
			C		6773	CRAS3	wild marrow	Croton	astroites
			C		6774	CRFL23	Croton flavens	Croton	flavens
			C		6775	CRPO4	sabinon	Croton	poecilanthus
			C		6786	CRJA3	Japanese cedar	Cryptomeria	japonica
			C		6788	CULA	Chinese fir	Cunninghamia	lanceolata
			C		6790	CUAM	wild ackee	Cupania	americana
			C		6792	CUTR	guara blanca	Cupania	triquetra
			C		6795	CULU2	cedar-of-Goa	Cupressus	lusitanica
			C		6796	CUSE2	Italian cypress	Cupressus	sempervirens
			C		6834	CYAN	parrotfeather treefern	Cyathea	andina
			C		6835	CYAR	West Indian treefern	Cyathea	arborea
			C		6839	CYFU	Jamaican treefern	Cyathea	furfuracea
			C		6843	CYPA7	small treefern	Cyathea	parvula
			C		6848	CYTE10	helecho gigante	Cyathea	tenera
			C		6850	CYSI	Cybianthus sintenisii	Cybianthus	sintenisii
			C		6852	CYCI3	queen sago	Cycas	circinalis
			C		6857	CYPO2	oreganillo falso	Cynometra	portoricensis
			C		6862	CYRA	swamp titi	Cyrilla	racemiflora

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			C		6867	DAEX	candletree	Dacryodes	excelsa
			C		6869	DASI	Indian rosewood	Dalbergia	sissoo
			C		6871	DAAM2	burn nose	Daphnopsis	americana
			C		6872	DAHE2	Heller's cieneguillo	Daphnopsis	helleriana
			C		6873	DAPH	emajagua de sierra	Daphnopsis	philippiana
			C		6883	DERE	royal poinciana	Delonix	regia
			C		6888	DEAR	angelica tree	Dendropanax	arboreus
			C		6889	DELA3	palo de vaca	Dendropanax	laurifolius
			C		6896	DIIN6	chulta	Dillenia	indica
			C		6899	DILO7	Dimocarpus longan	Dimocarpus	longan
			C		6909	DIRE6	black apple	Diospyros	revoluta
			C		6912	DISI3	Chinese persimmon	Diospyros	sintenisii
			C		6923	DIMY	jaboncillo	Ditta	myricoides
			C		6927	DOVI	Florida hopbush	Dodonaea	viscosa
			C		6930	DOHE2	Ceylon gooseberry	Dovyalis	hebecarpa
			C		6932	DRFR2	fragrant dracaena	Dracaena	fragrans
			C		6937	DRAL5	cafeillo	Drypetes	alba
			C		6938	DRGL2	varital	Drypetes	glauca
			C		6939	DRIL	rosewood	Drypetes	ilicifolia
			C		6940	DRLA3	guiana plum	Drypetes	lateriflora
			C		6961	DUER	golden dewdrops	Duranta	erecta
			C		6966	DYLU	Dypsis lutescens	Dypsis	lutescens
			C		6996	ENCY	monkeysoap	Enterolobium	cyclocarpum
			C		6998	ERJA3	loquat	Eriobotrya	japonica
			C		7000	ERFR4	blacktorch	Erithalis	fruticosa
			C		7004	ERBE3	machete	Erythrina	berteriana
			C		7005	ERCO22	coral erythrina	Erythrina	corallodendron
			C		7006	ERCR6	crybabytree	Erythrina	crista-galli
			C		7007	EREG	cock's spur	Erythrina	eggersii
			C		7008	ERFU2	bucayo	Erythrina	fusca
			C		7011	ERPO5	mountain immortelle	Erythrina	poeppigiana
			C		7015	ERVA7	tiger's claw	Erythrina	variegata
			C		7016	ERVAO	tiger's claw	Erythrina	variegate var. orientalis
			C		7019	ERAR17	swamp-redwood	Erythroxylum	areolatum
			C		7021	ERRO3	ratwood	Erythroxylum	rotundifolium
			C		7022	ERRU4	rufous false cocaine	Erythroxylum	rufum
			C		7024	ERUR4	Urban's false cocaine	Erythroxylum	urbanii
			C		7034	EUDE2	Indonesian gum	Eucalyptus	deglupta
			C		7043	EUMA23	spotted gum	Eucalyptus	maculata
			C		7046	EUPA	gray ironbark	Eucalyptus	paniculata
			C		7049	EURE2	redmahogany	Eucalyptus	resinifera
			C		7053	EUSA	Sydney bluegum	Eucalyptus	saligna
			C		7060	EUAX	white stopper	Eugenia	axillaris
			C		7061	EUBI	blackrodwood	Eugenia	biflora
			C		7062	EUBO3	Sierra de Cayey stopper	Eugenia	boqueronensis
			C		7063	EUBO4	guayabota de sierra	Eugenia	borinquensis
			C		7066	EUCO4	redberry stopper	Eugenia	confusa
			C		7067	EUCO5	lathberry	Eugenia	cordata
			C		7068	EUCOS	Eugenia cordata	Eugenia	cordata var. sintenisii
			C		7069	EUCO13	sperry guava	Eugenia	corozalensis
			C		7071	EUDO	serrette guave	Eugenia	domingensis
			C		7072	EUEG	guasabara	Eugenia	eggersii
			C		7075	EUGL6	smooth rodwood	Eugenia	glabrata
			C		7076	EUHA4	Luquillo Mountain stopper	Eugenia	haematocarpa
			C		7081	EULI	privet stopper	Eugenia	ligustrina
			C		7084	EUMO	birdcherry	Eugenia	monticola
			C		7089	EUPR4	rockmyrtle	Eugenia	procera
			C		7090	EUPS	Christmas cherry	Eugenia	pseudopsidium
			C		7093	EUSE9	serrasuela	Eugenia	serrasuela
			C		7094	EUSE10	sessileleaf stopper	Eugenia	sessiliflora
			C		7098	EUST3	Stahl's stopper	Eugenia	stahlii

Core	East	West	Carib-bean	Wood-land	FIA Code	PLANTS Code	Common Name	Genus	Species
			C		7100	EUST6	Stewardson's stopper	Eugenia	stewardsonii
			C		7103	EUUN	Underwood's stopper	Eugenia	underwoodii
			C		7104	EUUN2	Surinam cherry	Eugenia	uniflora
			C		7105	EUXE	aridland stopper	Eugenia	xerophytica
			C		7109	EUCO24	Mexican shrubby spurge	Euphorbia	cotinifolia
			C		7111	EULA8	mottled spurge	Euphorbia	lactea
			C		7112	EUNE4	Indian spurgetree	Euphorbia	neriifolia
			C		7113	EUPE8	manchineel berry	Euphorbia	petiolaris
			C		7116	EUTI	Indiantree spurge	Euphorbia	tirucalli
			C		7135	EXCA	Caribbean princewood	Exostema	caribaeum
			C		7136	EXEL	plateado	Exostema	ellipticum
			C		7137	EXSA2	Exostema sanctae-luciae	Exostema	sanctae-luciae
			C		7146	FAOC	false coffee	Faramea	occidentalis
			C		7148	FIAM	Jamaican cherry fig	Ficus	americana
			C		7149	FIBE2	Indian banyan	Ficus	benghalensis
			C		7150	FIBE	weeping fig	Ficus	benjamina
			C		7151	FICA	edible fig	Ficus	carica
			C		7154	FIDR3	brown-woolly fig	Ficus	drupacea
			C		7155	FIEL	Indian rubberplant	Ficus	elastica
			C		7158	FILU	Ficus lutea	Ficus	lutea
			C		7159	FILY	fiddleleaf fig	Ficus	lyrata
			C		7160	FIMI2	Chinese banyan	Ficus	microcarpa
			C		7162	FINO3	tibig	Ficus	nota
			C		7164	FIOB	amate	Ficus	obtusifolia
			C		7166	FIRE3	peepul tree	Ficus	religiosa
			C		7173	FIST	jaguey	Ficus	stahlii
			C		7174	FISY2	sycamore fig	Ficus	sycomorus
			C		7177	FITR	jaguey blanco	Ficus	trigonata
			C		7184	FLIN	governor's plum	Flacourtia	indica
			C		7185	FLIN3	batoko plum	Flacourtia	inermis
			C		7190	FLAC	Flueggea acidoton	Flueggea	acidoton
			C		7194	FOEG	inkbush	Forestiera	eggersiana
			C		7195	FORH	caca ravet	Forestiera	rhamnifolia
			C		7196	FOSE	Florida swampprivet	Forestiera	segregata
			C		7198	FOMA2	oval kumquat	Fortunella	margarita
			C		7202	FRSPL	West Indian buckthorn	Frangula	sphaerosperma
			C		7206	FRUH	shamel ash	Fraxinus	uhdei
			C		7210	FUEL	silkrubber	Funtumia	elastica
X		W	C		7211	PEAM3	avocado	Persea	americana
			C		7212	GADU3	Gourka	Garcinia	dulcis
			C		7213	GAHE5	lemon saptree	Garcinia	hessii
			C		7214	GAMA10	mangosteen	Garcinia	mangostana
			C		7218	GAPO2	palo de cruz	Garcinia	portoricensis
			C		7223	GAXA	Garcinia xanthochymus	Garcinia	xanthochymus
			C		7231	GAAT	llume	Gaussia	attenuata
			C		7235	GEAM	jagua	Genipa	americana
			C		7237	GEPE4	arbol de Navidad	Gesneria	pedunculosa
			C		7239	GIRO	bastard gregre	Ginoria	rohrii
			C		7245	GLSE2	quickstick	Gliricidia	sepium
			C		7256	GOEL	mata buey	Goetzea	elegans
			C		7258	GOLI	grand merisier	Gomidesia	lindeniana
			C		7262	GOBA	Creole cotton	Gossypium	barbadense
			C		7264	GOHIH2	Gossypium hirsutum	Gossypium	hirsutum
			C		7268	GROT	Graffenrieda ottoschulzii	Graffenrieda	ottoschulzii
			C		7273	GRRO	silkoak	Grevillea	robusta
			C		7279	GUOF	lignum-vitae	Guaiacum	officinale
			C		7280	GUSA	holywood	Guaiacum	sanctum
			C		7285	GUFR	black mampoo	Guapira	fragrans
			C		7286	GUOB	corcho prieto	Guapira	obtusata
			C		7288	GUGL3	alligatorwood	Guarea	glabra
			C		7290	GUGU	American muskwood	Guarea	guidonia

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			C		7294	GUBL	haya minga	Guatteria	blainii
			C		7295	GUCA2	haya blanca	Guatteria	caribaea
			C		7298	GUUL	bastardcedar	Guazuma	ulmifolia
			C		7299	GUEL	hammock velvetseed	Guettarda	elliptica
			C		7300	GUKR	frogwood	Guettarda	krugii
			C		7302	GUOD	cucubano de vieques	Guettarda	odorata
			C		7303	GUOV	cucubano	Guettarda	ovalifolia
			C		7305	GUPU	roseta	Guettarda	pungens
			C		7306	GUSC	wild guave	Guettarda	scabra
			C		7309	GUVA	cucubano de monte	Guettarda	valenzuelana
			C		7315	GYLA	West Indian false box	Gyminda	latifolia
			C		7317	GYLU	oysterwood	Gymnanthes	lucida
			C		7321	HACA2	bloodwoodtree	Haematoxylum	campechianum
			C		7327	HASAO	palo de hueso	Haenianthus	salicifolius
			C		7330	HAPA3	scarletbush	Hamelia	patens
			C		7336	HECU10	false locust	Hebestigma	cubense
			C		7341	HEAR	cigarbush	Hedyosmum	arborescens
			C		7347	HEJA	screwtree	Helicteres	jamaicensis
			C		7353	HEFA5	camasey peludo	Henriettea	fascicularis
			C		7354	HEMA11	MacFadyen's camasey	Henriettea	macfadyenii
			C		7355	HEME5	thinleaf camasey	Henriettea	membranifolia
			C		7357	HESQ	jusillo	Henriettea	squamulosum
			C		7366	HESO	mago	Hernandia	sonora
			C		7403	HIEL	mahoe	Hibiscus	elatus
			C		7409	HIPE3	seaside mahoe	Hibiscus	pernambucensis
			C		7410	HIRO3	shoeblackplant	Hibiscus	rosa-sinensis
			C		7412	HITI	sea hibiscus	Hibiscus	tiliaceus
			C		7418	HIRU2	teta de burra cinarron	Hirtella	rugosa
			C		7420	HITR3	pigeonberry	Hirtella	triandra
			C		7422	HORA	white cogwood	Homalium	racemosum
			C		7434	HUCR	sandbox tree	Hura	crepitans
			C		7438	HYCL	cedro macho	Hyeronima	clusioides
			C		7442	HYCO	stinkingtoe	Hymenaea	courbaril
			C		7445	HYTR	inkwood	Hypelate	trifoliata
			C		7446	HYLA8	limestone snakevine	Hyperbaena	laurifolia
			C		7455	ILCA	dahoon	Ilex	cassine
			C		7456	ILCO3	te	Ilex	cookii
			C		7457	ILGU	maconcona	Ilex	guianensis
			C		7458	ILMA	Caribbean holly	Ilex	macfadyenii
			C		7459	ILNI	Puerto Rico holly	Ilex	nitida
			C		7462	ILSI	gongolin	Ilex	sideroxyloides
			C		7463	ILSI2	Sintenis' holly	Ilex	sintenisii
			C		7465	ILUR	Urban's holly	Ilex	urbaniana
			C		7466	ILURR	Ilex urbaniana	Ilex	urbaniana var. riedlaei
			C		7467	INGA	inga	Inga	spp.
			C		7470	INLA	sacky sac bean	Inga	laurina
			C		7471	INNOQ	Inga nobilis	Inga	nobilis
			C		7474	INVE	river koko	Inga	vera
			C		7479	IXFE	palo de hierro	Ixora	ferrea
			C		7481	IXTH	white jungleflame	Ixora	thwaitesii
			C		7482	JAMI	black poui	Jacaranda	mimosifolia
			C		7485	JAAR2	braceletwood	Jacquinia	armillaris
			C		7487	JABE	bois bande	Jacquinia	berteroi
			C		7490	JAUM	chirriador	Jacquinia	umbellata
			C		7491	JACU2	Barbados nut	Jatropha	curcas
			C		7492	JAHE	wild oilnut	Jatropha	hernandiifolia
			C		7493	JAMU	coralbush	Jatropha	multifida
			C		7495	JUJA	West Indian walnut	Juglans	jamaicensis
			C		7499	KHAN	Khaya anthotheca	Khaya	anthotheca
			C		7501	KHSE2	Senegal mahogany	Khaya	senegalensis
			C		7503	KIAF	Kigelia africana	Kigelia	africana

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			C		7506	KLHO	guest tree	Kleinhovia	hospita
			C		7508	KOPO	Koanophyllon polyodon	Koanophyllon	polyodon
			C		7514	KRFE	leadwood	Krugiodendron	ferreum
			C		7530	LAPR2	cuero de rana	Laetia	procera
			C		7532	LAIN	crapemyrtle	Lagerstroemia	indica
			C		7533	LASP	pride of India	Lagerstroemia	speciosa
			C		7541	LAPO	nino de cota	Laplacea	portoricensis
			C		7550	LAIN5	henna	Lawsonia	inermis
			C		7552	LEKR	Krug's roughleaf	Leandra	krugiana
			C		7556	LEQU	pitahaya	Leptocereus	quadricostatus
			C		7565	LELE10	white leadtree	Leucaena	leucocephala
			C		7569	LIBR5	Maria laurel	Licaria	brittoniana
			C		7570	LIPA9	Puerto Rico cinnamon	Licaria	parvifolia
			C		7573	LITR	pepperleaf sweetwood	Licaria	triandra
			C		7574	LIAM	Amur privet	Ligustrum	amurense
			C		7590	LODO5	geno geno	Lonchocarpus	domingensis
			C		7591	LOGL2	geno	Lonchocarpus	glaucifolius
			C		7592	LOHE7	broadleaf lancepod	Lonchocarpus	heptaphyllus
			C		7600	LUSP11	luehea	Luehea	speciosa
			C		7604	LUNAN	lunania	Lunania	spp.
			C		7606	LUEK	Lunania ekmanii	Lunania	ekmanii
			C		7608	LYRU2	St. Thomas staggerbush	Lyonia	rubiginosa
			C		7628	MALU2	palo de hoz	Machaerium	lunatum
			C		7630	MAPO6	Puerto Rico alfilerillo	Machaonia	portoricensis
			C		7632	MATI3	Maclura tinctoria	Maclura	tinctoria
			C		7633	MAEM2	umbrella-tree	Maesopsis	eminii
			C		7635	MAPO2	Puerto Rico magnolia	Magnolia	portoricensis
			C		7636	MASP	laurel magnolia	Magnolia	splendens
			C		7643	MACO11	Singapore holly	Malpighia	coccigera
			C		7644	MAEM	Barbados cherry	Malpighia	emarginata
			C		7645	MAFU2	palo bronco	Malpighia	fucata
			C		7646	MAGL6	wild crapemyrtle	Malpighia	glabra
			C		7647	MAIN5	cowhage cherry	Malpighia	infestissima
			C		7648	MALI2	bastard cherry	Malpighia	linearis
			C		7652	MAAM2	mammee apple	Mammea	americana
			C		7662	MABI5	bulletwood	Manilkara	bidentata
			C		7663	MABIS	Manilkara bidentata	Manilkara	bidentata ssp. surinamensis
			C		7667	MAJA2	wild dilly	Manilkara	jaimiqui
			C		7669	MAPL2	zapote de costa	Manilkara	pleeana
			C		7673	MAVA3	nisperillo	Manilkara	valenzuela
			C		7674	MAZA	sapodilla	Manilkara	zapota
			C		7677	MARA3	palo de cana	Mappia	racemosa
			C		7682	MANO	bastard hogberry	Margaritaria	nobilis
			C		7684	MASI3	beruquillo	Marlierea	sintenisii
			C		7688	MAAP5	Matayba apetala	Matayba	apetala
			C		7689	MADO2	negra lora	Matayba	domingensis
			C		7695	MACY2	Caribbean mayten	Maytenus	cymosa
			C		7697	MAEL3	Puerto Rico mayten	Maytenus	elongata
			C		7698	MALA8	white cinnamon	Maytenus	laevigata
			C		7699	MAPO5	ponce mayten	Maytenus	ponceana
			C		7702	MELA7	Mecranium latifolium	Mecranium	latifolium
			C		7717	MEBI	Spanish lime	Melicoccus	bijugatus
			C		7763	MEHE	aguacatillo	Meliosma	herbertii
			C		7764	MEOB2	cacaillo	Meliosma	obtusifolia
			C		7768	METO4	teabush	Melochia	tomentosa
			C		7803	MILA10	hairy johnnyberry	Miconia	lanata
			C		7804	MIAF	saquiyac	Miconia	affinis
			C		7806	MIFO	Puerto Rico johnnyberry	Miconia	foveolata
			C		7807	MIIM	camasey de costilla	Miconia	impetiolaris
			C		7808	MILA8	smooth johnnyberry	Miconia	laevigata
			C		7810	MIMI3	camasey cuatrocanales	Miconia	mirabilis

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			C		7812	MIPA7	camasey racimoso	Miconia	pachyphylla
			C		7813	MIPR3	granadillo bobo	Miconia	prasina
			C		7814	MIPU9	auquey	Miconia	punctata
			C		7815	MIPY2	ridge johnnyberry	Miconia	pycnoneura
			C		7816	MIRA2	camasey felpa	Miconia	racemosa
			C		7817	MIRU4	peralejo	Miconia	rubiginosa
			C		7818	MISE2	jau jau	Miconia	serrulata
			C		7819	MISI2	mountain johnnyberry	Miconia	sintenisii
			C		7821	MISU3	forest johnnyberry	Miconia	subcorymbosa
			C		7822	MITE4	rajador	Miconia	tetrandra
			C		7823	MITH	camasey tomaso	Miconia	thomasiana
			C		7828	MIGA	caimitillo verde	Micropholis	garciniifolia
			C		7829	MIGU2	Micropholis guyanensis	Micropholis	guyanensis
			C		7833	MIAR4	elegant mimosa	Mimosa	arenosa
			C		7839	MONOD	monodora	Monodora	spp.
			C		7845	MOCE2	Morella cerifera	Morella	cerifera
			C		7847	MOHO3	Morella holdridgeana	Morella	holdridgeana
			C		7849	MOCI3	Indian mulberry	Morinda	citrifolia
			C		7855	MOOL	horseradishtree	Moringa	oleifera
			C		7857	MOAM	ratapple	Morisonia	americana
			C		7862	MODO2	murta	Mouriri	domingensis
			C		7863	MOHE	mameyuelo	Mouriri	helleri
			C		7867	MUCA4	strawberrytree	Muntingia	calabura
			C		7869	MUEX2	Murraya exotica	Murraya	exotica
			C		7886	MYCI	red rodwood	Myrcia	citrifolia
			C		7887	MYDE	cieneguillo	Myrcia	deflexa
			C		7888	MYFA3	curame	Myrcia	fallax
			C		7889	MYLE	guayabacon	Myrcia	leptoclada
			C		7890	MYPA	ausu	Myrcia	paganii
			C		7891	MYSP	punchberry	Myrcia	splendens
			C		7893	MYFR	twinberry	Myrcianthes	fragrans
			C		7895	MYFL	guavaberry	Myrciaria	floribunda
			C		7905	MYFR2	cercipo	Myrospermum	frutescens
			C		7907	MYBA3	balsam of Tolu	Myroxylon	balsamum
			C		7911	MYCO2	leathery colicwood	Myrsine	coriacea
			C		7912	MYCU2	Myrsine cubana	Myrsine	cubana
			C		7932	NECO	Nectandra coriacea	Nectandra	coriacea
			C		7933	NEHI2	shinglewood	Nectandra	hihua
			C		7934	NEKR	Nectandra krugii	Nectandra	krugii
			C		7935	NEME3	Nectandra membranacea	Nectandra	membranacea
			C		7936	NEPA4	Nectandra patens	Nectandra	patens
			C		7939	NETU	Nectandra turbacensis	Nectandra	turbacensis
			C		7940	NEBU	saltwood	Neea	buxifolia
			C		7944	NECA7	kadam	Neolamarckia	cadamba
			C		7946	NERE2	aquilon	Neolaugeria	resinosa
			C		7956	NEOL	oleander	Nerium	oleander
			C		7976	OCMO4	African bird's-eye bush	Ochna	mossambicensis
			C		7980	OCPY	Ochroma pyramidale	Ochroma	pyramidale
			C		7990	OCFL	laurel espada	Ocotea	floribunda
			C		7991	OCFO	black sweetwood	Ocotea	foeniculacea
			C		7994	OCLE	loblolly sweetwood	Ocotea	leucoxylon
			C		7996	OCMO	nemoca	Ocotea	moschata
			C		7997	OCNE	laurel sassafras	Ocotea	nemodaphne
			C		7999	OCPO	laurel de paloma	Ocotea	portoricensis
			C		8001	OCSP	nemoca cimarrona	Ocotea	spathulata
			C		8003	OCWR	Wright's laurel canelon	Ocotea	wrightii
			C		8020	ORKR	peronia	Ormosia	krugii
			C		8027	OTRH	pincho palo de rosa	Ottoschulzia	rhodoxylon
			C		8029	OUIL	chicharron amarillo	Ouratea	ilicifolia
			C		8030	OULI	abey amarillo	Ouratea	littoralis
			C		8032	OUST	guanabanilla	Ouratea	striata

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			C		8033	OXLA4	blacklancewood	Oxandra	lanceolata
			C		8034	OXLA5	haya	Oxandra	laurifolia
			C		8037	PAIN7	wild chestnut	Pachira	insignis
			C		8045	PAAL9	tafetan	Palicourea	alpina
			C		8047	PACR3	red cappel	Palicourea	crocea
			C		8049	PACR18	Palicourea croceoides	Palicourea	croceoides
			C		8051	PAGU	showy cappel	Palicourea	guianensis
			C		8088	PAUT	common screwpine	Pandanus	utilis
			C		8099	PACR2	scratchthroat	Parathesis	crenulata
			C		8106	PARKI3	parkia	Parkia	spp.
			C		8110	PATI5	Parkia timoriana	Parkia	timoriana
			C		8111	PAAC3	Jerusalem thorn	Parkinsonia	aculeata
			C		8113	PAAC13	cuachilote	Parmentiera	aculeata
			C		8114	PACE8	candle tree	Parmentiera	cereifera
			C		8121	PEPT3	Peltophorum pterocarpum	Peltophorum	pterocarpum
			C		8125	PEBU4	butter tree	Pentadesma	butyracea
			C		8127	PEBU2	jiqi	Pera	bumeliifolia
			C		8134	PEKR	canela	Persea	krugii
			C		8138	PEUR2	aquacatillo	Persea	urbaniana
			C		8141	PEDO	bastard stopper	Petitia	domingensis
			C		8143	PHGR11	aquilon prieto	Phialanthus	grandifolius
			C		8144	PHMY	candlewood	Phialanthus	myrtilloides
			C		8157	PHAC3	Tahitian gooseberry tree	Phyllanthus	acidus
			C		8160	PHJU2	gamo de costa	Phyllanthus	juglandifolius
			C		8162	PHOR10	Phyllanthus orbicularis	Phyllanthus	orbicularis
			C		8164	PIPE	Florida bitterbush	Picramnia	pentandra
			C		8167	PIEX	bitterwood	Picrasma	excelsa
			C		8169	PIAC	fustic	Pictetia	aculeata
			C		8171	PIRA3	aceitillo	Pilocarpus	racemosus
			C		8173	PIRO6	Royen's tree cactus	Pilosocereus	royenii
			C		8175	PIDI2	allspice	Pimenta	dioica
			C		8177	PIRA	bayrumtree	Pimenta	racemosa
			C		8178	PIRAG	bayrumtree	Pimenta	racemosa var. grisea
			C		8183	PICA18	Caribbean pine	Pinus	caribaea
			C		8184	PIMA11	Chinese red pine	Pinus	massoniana
			C		8185	PIME2	Merkus pine	Pinus	merkusii
			C		8186	PIOO2	ocote chino	Pinus	oocarpa
			C		8187	PIPA13	Mexican weeping pine	Pinus	patula
			C		8190	PIAD	higuillo de hoja menuda	Piper	aduncum
			C		8191	PIAM2	higuillo de limon	Piper	amalago
			C		8192	PIBL	moth pepper	Piper	blattarum
			C		8193	PIGL3	Guyanese pepper	Piper	glabrescens
			C		8194	PIHI2	Jamaican pepper	Piper	hispidum
			C		8195	PIJA	Caracas pepper	Piper	jacquemontianum
			C		8196	PIMA4	marigold pepper	Piper	marginatum
			C		8199	PISW	spanish elder	Piper	swartzianum
			C		8208	PICA5	stinkwood	Piscidia	carthagenensis
			C		8211	PIAL3	corcho bobo	Pisonia	albida
			C		8216	PISU	water mampoo	Pisonia	subcordata
			C		8220	PIDU	monkeypod	Pithecellobium	dulce
			C		8223	PIUN	catclaw blackbead	Pithecellobium	unguis-cati
			C		8249	PLOR80	Oriental arborvitae	Platycladus	orientalis
			C		8255	PLMA6	chupa gallo	Pleodendron	macranthum
			C		8266	PLAL	nosegaytree	Plumeria	alba
			C		8268	PLOB2	Singapore graveyard flower	Plumeria	obtusa
			C		8269	PLOBO	Plumeria obtusa	Plumeria	obtusa var. obtusa
			C		8271	PLRU2	templetree	Plumeria	rubra
			C		8273	POCO3	yucca plum pine	Podocarpus	coriaceus
			C		8275	POFL20	Poitea florida	Poitea	florida
			C		8276	POPU19	Poitea punicea	Poitea	punicea
			C		8279	POCO5	violet tree	Polygala	cowellii

Core	East	West	Carib-bean	Wood-land	FIA Code	PLANTS Code	Common Name	Genus	Species
			C		8280	POPE13	crevajosa	Polygala	penaea
			C		8284	POGU	geranium aralia	Polyscias	guilfoylei
			C		8300	PODI5	cocuyo	Pouteria	dictyoneura
			C		8301	POHO4	redmammee	Pouteria	hotteana
			C		8302	POMU6	bullytree	Pouteria	multiflora
			C		8305	POSA13	mammee sapote	Pouteria	sapota
			C		8311	PRACM	Prestoea acuminata	Prestoea	acuminata
			C		8340	PRCR2	guasimilla	Prockia	crucis
			C		8342	PRCI4	jand	Prosopis	cineraria
			C		8344	PRPA4	kiawe	Prosopis	pallida
			C		8346	PRMY	West Indian cherry	Prunus	myrtifolia
			C		8347	PROC	western cherry laurel	Prunus	occidentalis
			C		8349	PRSEC	Prunus serotina	Prunus	serotina ssp. capuli
			C		8352	PSSP2	false breadnut	Pseudolmedia	spuria
			C		8353	PSSA	Florida cherry palm	Pseudophoenix	sargentii
			C		8354	PSAM	mountain guava	Psidium	amplexicaule
			C		8356	PSGU	guava	Psidium	guajava
			C		8358	PSLOO	Psidium longipes	Psidium	longipes
			C		8359	PSSI2	Sintenis' guava	Psidium	sintenisii
			C		8361	PSBE	cachimbo-cumun	Psychotria	berteriana
			C		8362	PSBR2	palo de cachimbo	Psychotria	brachiata
			C		8363	PSBR3	Browne's wild coffee	Psychotria	brownei
			C		8364	PSDO2	Psychotria domingensis	Psychotria	domingensis
			C		8367	PSGR2	cachimbo grande	Psychotria	grandis
			C		8389	PSMA4	cachimbo de gato	Psychotria	maleolens
			C		8391	PSMA5	cachimbo de maricao	Psychotria	maricaensis
			C		8394	PSMI	thicket wild coffee	Psychotria	microdon
			C		8395	PSNU2	floating balsamo	Psychotria	nutans
			C		8397	PSPU	hairy wild coffee	Psychotria	pubescens
			C		8407	PTIN2	pterocarpus	Pterocarpus	indicus
			C		8408	PTMA7	Burma padauk	Pterocarpus	macrocarpus
			C		8409	PTMA3	Malabar kino	Pterocarpus	marsupium
			C		8410	PTOF	dragonsblood tree	Pterocarpus	officinalis
			C		8419	PUGR2	pomegranate	Punica	granatum
			C		8422	QUTU	swizzlestick tree	Quararibea	turbinata
			C		8425	RAAC	white indigoberry	Randia	aculeata
			C		8433	RANI2	palo amargo	Rauvolfia	nitida
			C		8436	RAMA7	traveler's tree	Ravenala	madagascariensis
			C		8439	RAUR	tortugo prieto	Ravenia	urbanii
			C		8444	REGU	guama	Reynosia	guama
			C		8445	REKR	Krug's darlingplum	Reynosia	krugii
			C		8447	REUN	sloe	Reynosia	uncinata
			C		8472	RICO3	castorbean	Ricinus	communis
			C		8476	ROAC2	greenheart ebony	Rochefortia	acanthophora
			C		8478	ROSP8	Rochefortia spinosa	Rochefortia	spinosa
			C		8481	ROMU3	wild sugar apple	Rollinia	mucosa
			C		8483	ROIN4	cordobancillo	Rondeletia	inermis
			C		8484	ROPI3	cordobancillo peludo	Rondeletia	pilosa
			C		8485	ROPO	Juan Tomas	Rondeletia	portoricensis
			C		8489	ROBO	Puerto Rico royal palm	Roystonea	borinquena
			C		8490	ROEL	Roystonea elata	Roystonea	elata
			C		8494	SACA	Puerto Rico palmetto	Sabal	causiarum
			C		8499	SAUM3	white hogwood	Sagraea	umbrosa
			C		8501	SAHU	Salix humboldtiana	Salix	humboldtiana
			C		8505	SASA10	raintree	Samanea	saman
			C		8509	SANIC4	common elderberry	Sambucus	nigra
	E				8511	QUGR2	Graves oak, Chisos red oak	Quercus	gravesii
	E				8512	QUPO2	Mexican white oak, netleaf white oak	Quercus	polymorpha
	E				8513	QUBU2	Spanish oak, Buckley oak, Texas red oak	Quercus	buckleyi
	E				8514	QULA	lacey oak	Quercus	laceyi
			C		8529	SASA4	wingleaf soapberry	Sapindus	saponaria

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			C		8533	SAGL5	gumtree	Sapium	glandulosum
			C		8535	SALA25	hinchahuevos	Sapium	laurifolium
			C		8536	SALA8	milktree	Sapium	laurocerasus
			C		8546	SASE6	amansa guapo	Savia	sessiliflora
			C		8554	SCFR	Florida boxwood	Schaefferia	frutescens
			C		8556	SADO7	guayabilla	Samyda	dodecandra
			C		8557	SCGL6	yuquilla	Schefflera	gleasonii
			C		8558	SCMO10	matchwood	Schefflera	morototonii
			C		8563	SCTE	Brazilian peppertree	Schinus	terebinthifolius
			C		8565	SCPA23	Brazilian firetree	Schizolobium	parahybum
			C		8567	SCOL3	lac tree	Schleichera	oleosa
			C		8571	SCAR2	arana	Schoepfia	arenaria
			C		8572	SCOB	white beefwood	Schoepfia	obovata
			C		8573	SCSC3	gulf graytwig	Schoepfia	schreberi
			C		8588	SEAL4	emperor's candlesticks	Senna	alata
			C		8589	SEAT3	flor de San Jose	Senna	atomaria
			C		8591	SEMU5	false sicklepod	Senna	multijuga
			C		8594	SEPO5	retama prieta	Senna	polyphylla
			C		8596	SESI3	Siamese cassia	Senna	siamea
			C		8597	SESP9	casia amarilla	Senna	spectabilis
			C		8599	SESU10	Senna sulfurea	Senna	sulfurea
			C		8600	SESU4	glossy shower	Senna	surattensis
			C		8605	SEGR5	vegetable hummingbird	Sesbania	grandiflora
			C		8611	SICU7	espejuelo	Sideroxylon	cubense
			C		8613	SIOB	breakbill	Sideroxylon	obovatum
			C		8614	SIPO3	Puerto Rico bully	Sideroxylon	portoricense
			C		8617	SIMAR	simarouba	Simarouba	spp.
			C		8619	SITU	aceitillo falso	Simarouba	tulae
			C		8620	SIDE6	hoja menuda	Siphoneugena	densiflora
			C		8622	SLOAN	bullwood	Sloanea	spp.
			C		8623	SLAM	motillo	Sloanea	amygdalina
			C		8624	SLBE	bullwood	Sloanea	berteriana
			C		8626	SOBAB	Solanum bahamense	Solanum	bahamense
			C		8627	SODO3	mullein nightshade	Solanum	donianum
			C		8629	SOER2	potatotree	Solanum	erianthum
			C		8632	SONU4	forest nightshade	Solanum	nudum
			C		8633	SOPO	cakalaka berry	Solanum	polygamum
			C		8634	SORU	tabacon aspero	Solanum	rugosum
			C		8636	SOTO4	turkey berry	Solanum	torvum
			C		8644	SPCA2	African tuliptree	Spathodea	campanulata
			C		8649	SPDU3	Spondias dulcis	Spondias	dulcis
			C		8650	SPMO	yellow mombin	Spondias	mombin
	E				8651	COBO2	Anacahuita, Texas olive	Cordia	boissieri
			C		8652	SPPU	purple mombin	Spondias	purpurea
			C		8654	STMO	cobana negra	Stahlia	monosperma
			C		8664	STAP	Panama tree	Sterculia	apetala
			C		8666	STFO2	hazel sterculia	Sterculia	foetida
			C		8674	STPO3	palo de jazmin	Styrax	portoricensis
			C		8676	SUMA2	bay cedar	Suriana	maritima
			C		8678	SWIET	mahogany	Swietenia	spp.
			C		8679	SWMA	Honduras mahogany	Swietenia	macrophylla
			C		8683	SYLA2	nispero cimarron	Symplocos	lanata
			C		8684	SYMA	Martinique sweetleaf	Symplocos	martinicensis
			C		8685	SYMI3	aceitunilla	Symplocos	micrantha
			C		8701	SYJA	Syzygium jambos	Syzygium	jambos
			C		8702	SYMA2	Malaysian apple	Syzygium	malaccense
			C		8709	TACH3	roble amarillo	Tabebuia	chrysantha
			C		8710	TADO2	primavera	Tabebuia	donnell-smithii
			C		8712	TAHA	roble cimarron	Tabebuia	haemantha
			C		8713	TAHE	white cedar	Tabebuia	heterophylla
			C		8715	TARI	roble de sierra	Tabebuia	rigida

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			C		8716	TARO	pink trumpet-tree	Tabebuia	rosea
			C		8717	TASC2	roble colorado	Tabebuia	schumanniana
			C		8720	TACI	milkwood	Tabernaemontana	citrifolia
			C		8727	TAAP	Athel tamarisk	Tamarix	aphylla
			C		8743	TEST	yellow trumpetbush	Tecoma	stans
			C		8744	TEGR	teak	Tectona	grandis
			C		8748	TERMI	tropical almond	Terminalia	spp.
			C		8750	TECA	tropical almond	Terminalia	catappa
			C		8754	TEIV2	Ivory Coast almond	Terminalia	ivorensis
			C		8756	TEMY	East Indian almond	Terminalia	myriocarpa
			C		8757	TEOB	Peruvian almond	Terminalia	oblonga
			C		8761	TESU2	superb terminalia	Terminalia	superba
			C		8762	TEHE3	saintedwood	Ternstroemia	heptasepala
			C		8763	TELU2	palo colorado	Ternstroemia	luquillensis
			C		8764	TEPE	copey vera	Ternstroemia	peduncularis
			C		8766	TEST3	mamey de cura	Ternstroemia	stahlii
			C		8767	TESU	el yunque colorado	Ternstroemia	subsessilis
			C		8768	TEBA	masa	Tetragastris	balsamifera
			C		8778	TEAN2	stinkingfish	Tetrazygia	angustifolia
			C		8780	TEBI2	Puerto Rico clover ash	Tetrazygia	biflora
			C		8781	TEEL	krekre	Tetrazygia	elaeagnoides
			C		8783	TEUR	cenizo	Tetrazygia	urbanii
			C		8784	THCA	cacao	Theobroma	cacao
			C		8786	THGR2	maga	Thespesia	grandiflora
			C		8787	THPO3	Portia tree	Thespesia	populnea
			C		8789	THPE3	luckynut	Thevetia	peruviana
			C		8793	THST2	ceboruquillo	Thouinia	striata
			C		8794	THSTP	Puerto Rico ceboruquillo	Thouinia	striata var. portoricensis
			C		8803	TIGR3	Brazilian glorytree	Tibouchina	granulosa
			C		8811	TOONA	redcedar	Toona	spp.
			C		8812	TOCI	Australian redcedar	Toona	ciliata
			C		8816	TOCU	boje	Torralbasia	cuneifolia
			C		8825	TOFI	cold withe	Tournefortia	filiflora
			C		8828	TRLA2	Lamarck's trema	Trema	lamarckianum
			C		8829	TRMI2	Jamaican nettletree	Trema	micranthum
			C		8833	TRHI3	broomstick	Trichilia	hirta
			C		8834	TRPA2	gaita	Trichilia	pallida
			C		8836	TRTR8	bariaco	Trichilia	triacantha
			C		8842	TRTR7	limeberry	Triphasia	trifolia
			C		8843	TRIPL5	Triplaris spp.	Triplaris	spp.
			C		8844	TRCU6	ant tree	Triplaris	cumingiana
			C		8848	TRRA4	white ramoon	Trophis	racemosa
			C		8850	TUOC	muttonwood	Turpinia	occidentalis
			C		8853	URBA	scratchbush	Urera	baccifera
			C		8854	URCA2	flameberry	Urera	caracasana
			C		8855	URCH2	ortiga	Urera	chlorocarpa
			C		8861	VAMA5	voa vanga	Vangueria	madagascariensis
			C		8871	VIAG	lilac chastetree	Vitex	agnus-castus
			C		8873	VIDI2	higuerillo	Vitex	divaricata
			C		8881	WALA	Wallenia lamarckiana	Wallenia	lamarckiana
			C		8887	WEPI	bastard briziletto	Weinmannia	pinnata
			C		8901	XIAM	tallow wood	Ximenia	americana
			C		8906	XYBU	mucha-gente	Xylosma	buxifolia
			C		8910	XYPA2	spiny logwood	Xylosma	pachyphylla
			C		8912	XYSC2	white logwood	Xylosma	schaefferioides
			C		8913	XYSC3	Schwaneck's logwood	Xylosma	schwaneckeana
			C		8916	YUAL	aloe yucca	Yucca	aloifolia
			C		8918	YUGL2	moundlily yucca	Yucca	gloriosa
			C		8919	YUGU	bluestem yucca	Yucca	guatemalensis
			C		8923	ZABI	Maricao pricklyash	Zanthoxylum	bifoliolatum
			C		8924	ZACA3	prickly yellow	Zanthoxylum	caribaeum

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			C		8928	ZAFL	West Indian satinwood	Zanthoxylum	flavum
			C		8931	ZAMA	white pricklyash	Zanthoxylum	martinicense
			C		8932	ZAMO	yellow prickle	Zanthoxylum	monophyllum
			C		8934	ZAPU2	dotted pricklyash	Zanthoxylum	punctatum
			C		8935	ZASP	niaragato	Zanthoxylum	spinifex
			C		8937	ZATH	St. Thomas pricklyash	Zanthoxylum	thomasianum
			C		8938	ZAPO2	Zapoteca portoricensis	Zapoteca	portoricensis
			C		8939	ZIMA	Indian jujube	Ziziphus	mauritiana
			C		8940	ZIRE	cacao rojo	Ziziphus	reticulata
			C		8941	ZIRI	soana	Ziziphus	rignonii
			C		8943	ZITA	Taylor's jujube	Ziziphus	taylorii
X		W			11	ABAM	Pacific silver fir	Abies	amabilis
X		W			14	ABBR	Santa Lucia fir, bristlecone fir	Abies	bracteata
X		W			17	ABGR	grand fir	Abies	grandis
X		W			20	ABMA	California red fir	Abies	magnifica
X		W			21	ABSH	Shasta red fir	Abies	shastensis
X		W			22	ABPR	noble fir	Abies	procera
	E	W			40	CHAMA4	cedar spp.	Chamaecyparis	spp.
X		W			41	CHLA	Port-Orford-cedar	Chamaecyparis	lawsoniana
X		W			42	CHNO	Alaska yellow-cedar	Chamaecyparis	nootkatensis
X		W			52	CUBA	Baker cypress, Modoc cypress	Cupressus	bakeri
X		W			53	CUFO2	tecate cypress	Cupressus	forbesii
X		W			54	CUMA2	Monterey cypress	Cupressus	macrocarpa
		W			55	CUSA3	Sargent's cypress	Cupressus	sargentii
X		W			56	CUMA	MacNab's cypress	Cupressus	macnabiana
X		W		w	62	JUCA7	California juniper	Juniperus	californica
X		W			64	JUOC	western juniper	Juniperus	occidentalis
	E	W			70	LARIX	larch spp.	Larix	spp.
X	E	W			71	LALA	tamarack (native)	Larix	laricina
X		W			72	LALY	subalpine larch	Larix	lyallii
X		W			73	LAOC	western larch	Larix	occidentalis
X		W			81	CADE27	incense-cedar	Calocedrus	decurrens
X		W			92	PIBR	Brewer spruce	Picea	breweriana
X		W			98	PISI	Sitka spruce	Picea	sitchensis
X		W			101	PIAL	whitebark pine	Pinus	albicaulis
X		W			102	PIAR	Rocky Mountain bristlecone pine	Pinus	aristata
X		W			103	PIAT	knobcone pine	Pinus	attenuata
X		W			104	PIBA	foxtail pine	Pinus	balfouriana
X	E				105	PIBA2	jack pine	Pinus	banksiana
X		W			108	PICO	lodgepole pine	Pinus	contorta
X		W			109	PICO3	Coulter pine	Pinus	coulteri
X		W			112	PIEN2	Apache pine	Pinus	engelmannii
X		W			116	PIJE	Jeffrey pine	Pinus	jeffreyi
X		W			117	PILA	sugar pine	Pinus	lambertiana
X		W			118	PILE	Chihuahuan pine	Pinus	leiophylla
X		W			119	PIMO3	western white pine	Pinus	monticola
X		W			120	PIMU	bishop pine	Pinus	muricata
X		W			124	PIRA2	Monterey pine	Pinus	radiata
X		W			127	PISA2	gray pine, California foothill pine	Pinus	sabiniana
X		W		w	133	PIMO	singleleaf pinyon	Pinus	monophylla
X		W		w	134	PIDI3	border pinyon	Pinus	discolor
X		W			137	PIWA	Washoe pine	Pinus	washoensis
X		W		w	138	PIQU	four-leaf pine, Parry pinyon pine	Pinus	quadrifolia
X		W			139	PITO	Torrey pine	Pinus	torreyana
X		W			142	PILO	Great Basin bristlecone pine	Pinus	longaeva
X		W		w	143	PIMOF	Arizona pinyon pine	Pinus	monophylla var. fallax
		W			200	PSEUD7	Douglas-fir spp.	Pseudotsuga	spp.
X		W			201	PSMA	bigcone Douglas-fir	Pseudotsuga	macrocarpa
X		W			211	SESE3	redwood	Sequoia	sempervirens
X		W			212	SEGI2	giant sequoia	Sequoiadendron	giganteum
	E	W			230	TAXUS	yew spp.	Taxus	spp.

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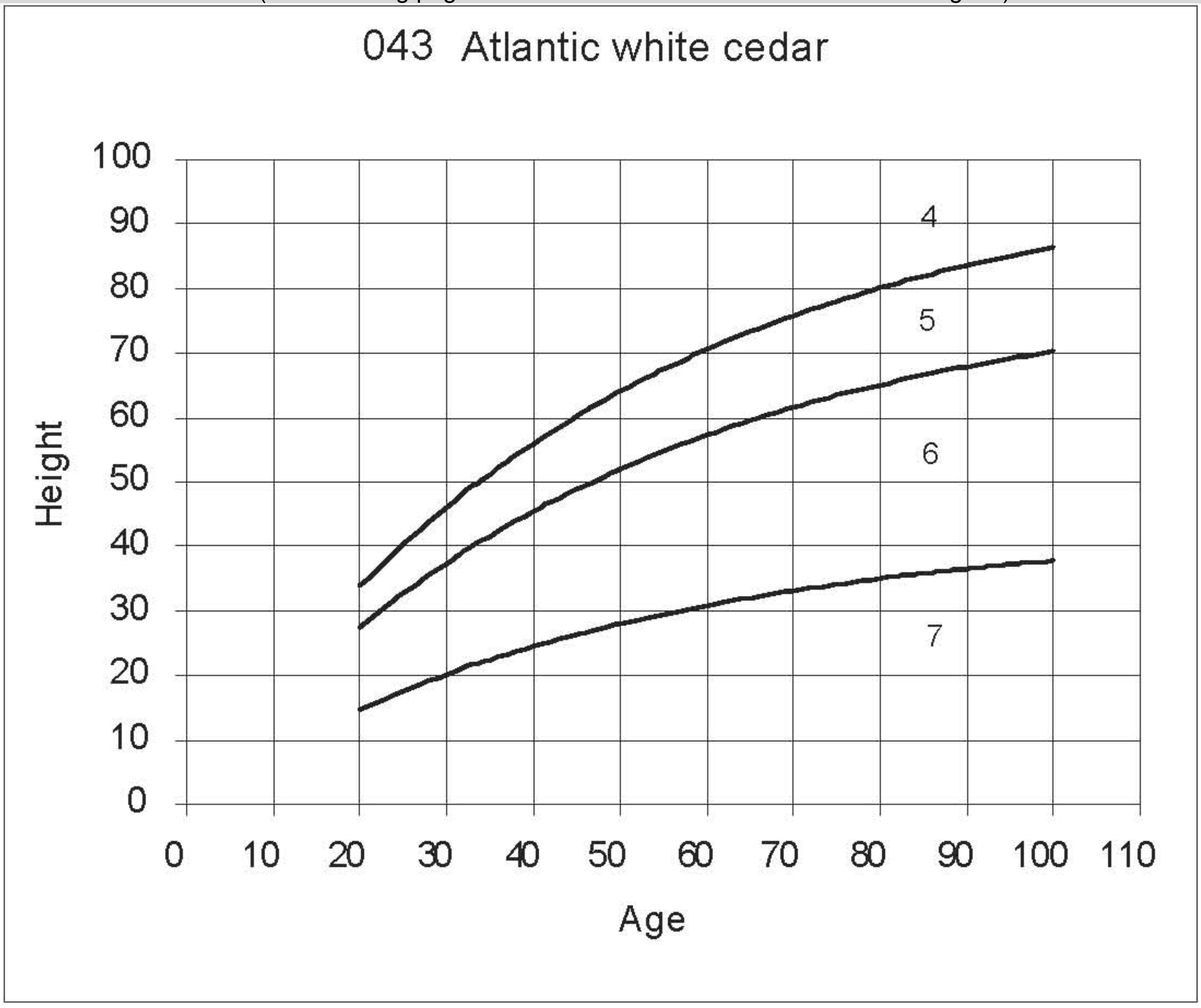
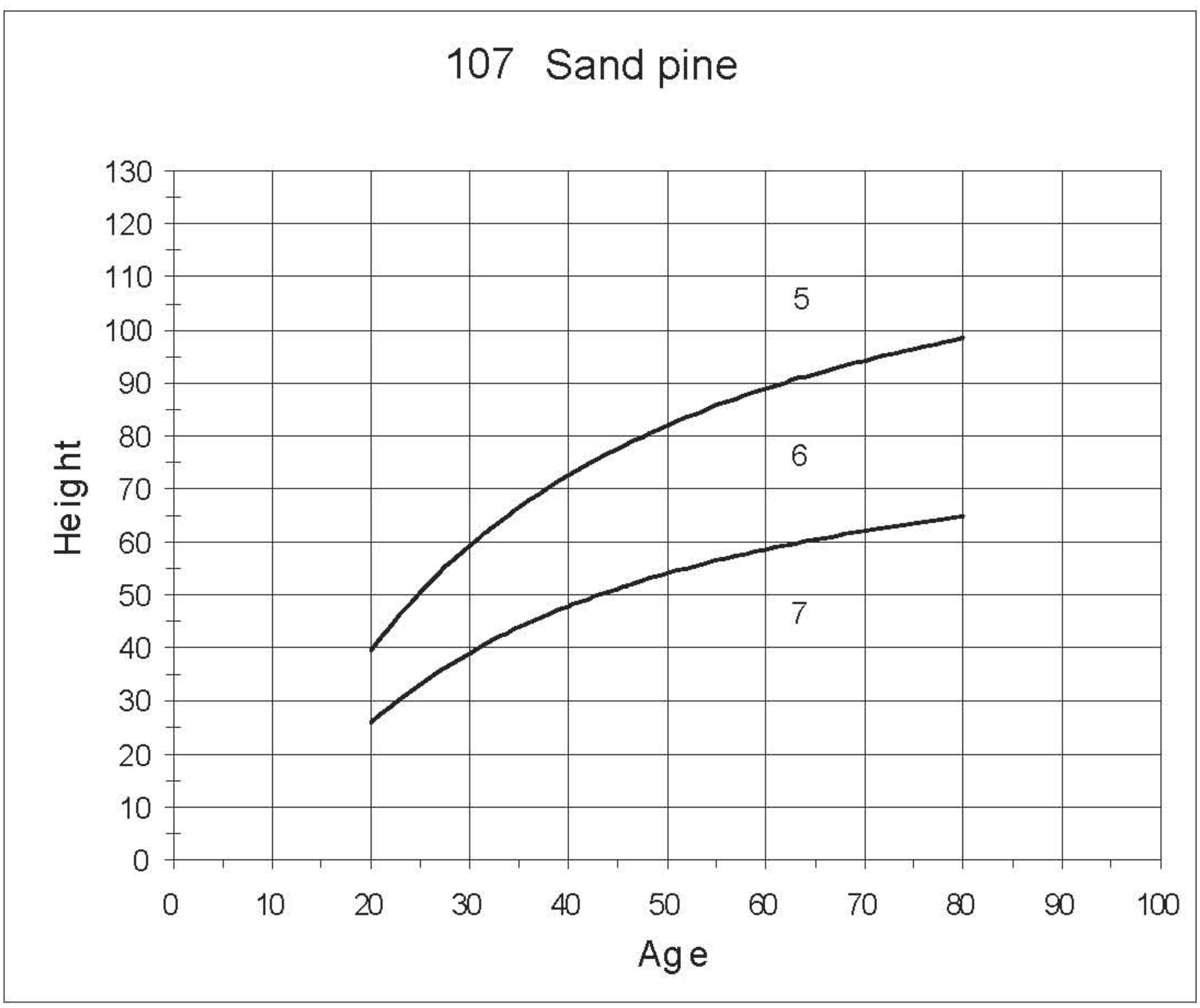
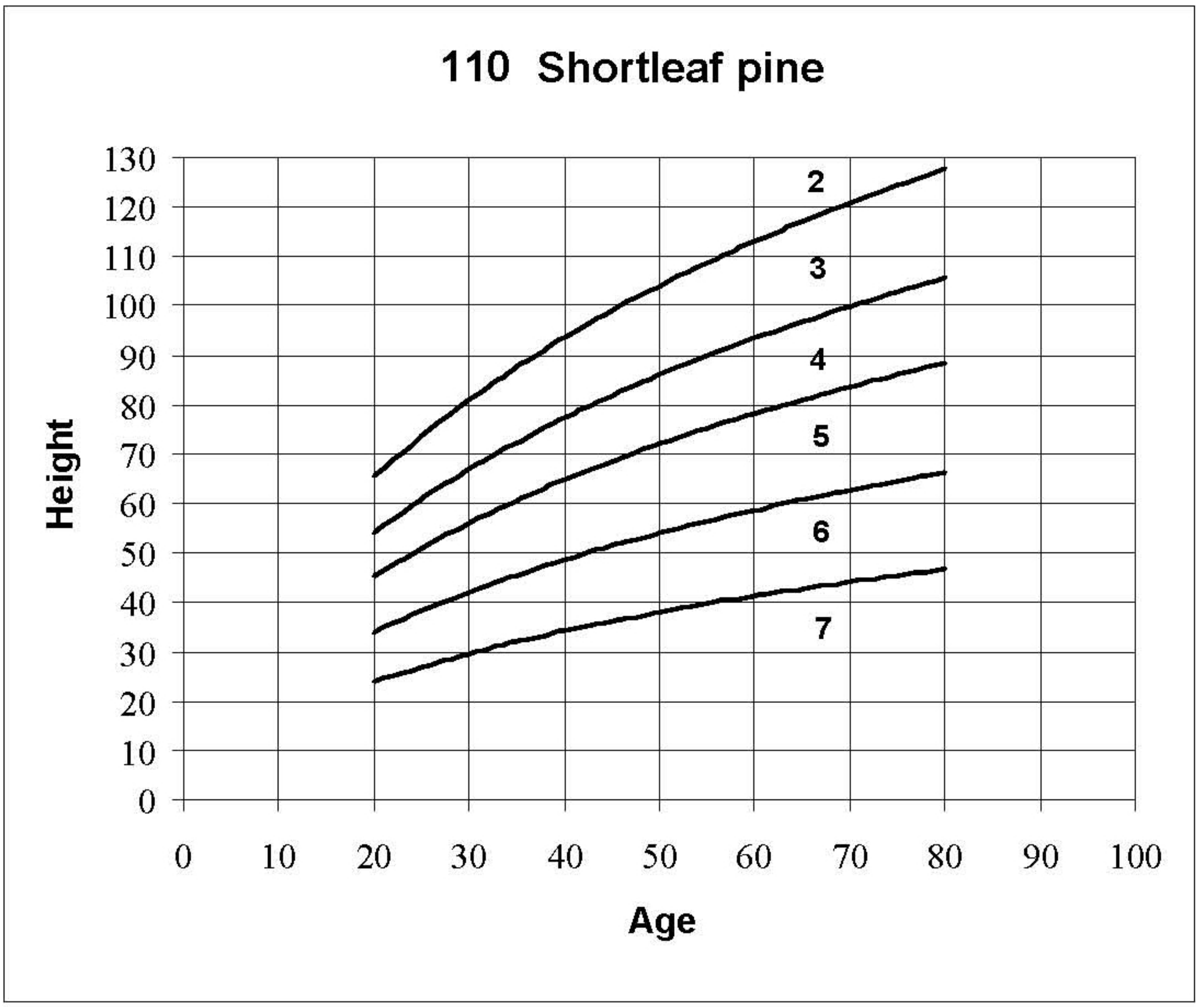
		W			231	TABR2	Pacific yew	Taxus	brevifolia
X		W			242	THPL	western redcedar	Thuja	plicata
	E	W			250	TORRE	torreya (nutmeg) spp.	Torreya	spp.
X		W			251	TOCA	California torreya (nutmeg)	Torreya	californica
X		W			263	TSHE	western hemlock	Tsuga	heterophylla
X		W			264	TSME	mountain hemlock	Tsuga	mertensiana
	E	W		w	304	ACGR	catclaw acacia	Acacia	greggii
X		W			312	ACMA3	bigleaf maple	Acer	macrophyllum
		W			333	AECA	California buckeye	Aesculus	californica
	E				336	AEPA	red buckeye	Aesculus	pavia
X	E				337	AESY	painted buckeye	Aesculus	sylvatica
X		W			351	ALRU2	red alder	Alnus	rubra
	E	W			357	AMAR3	common serviceberry	Amelanchier	arborea
	E	W			358	AMSA	roundleaf serviceberry	Amelanchier	sanguinea
		W			360	ARBUT	Madrone spp.	Arbutus	spp.
X		W			361	ARME	Pacific madrone	Arbutus	menziesii
X		W			362	ARAR2	Arizona madrone	Arbutus	arizonica
X		W			378	BEUT	northwestern paper birch	Betula	X utahensis
		W			431	CHCHC4	giant chinkapin, golden chinkapin	Chrysolepis	chrysophylla var. chrysophylla
		W		w	475	CELE3	curlleaf mountain-mahogany	Cercocarpus	ledifolius
	E	W			490	CORNU	dogwood spp.	Cornus	spp.
X		W			492	CONU4	Pacific dogwood	Cornus	nuttallii
	E				503	CRBR3	Brainerd hawthorn	Crataegus	brainerdii
	E				504	CRCA	pear hawthorn	Crataegus	calpodendron
	E				505	CRCH	fireberry hawthorn	Crataegus	chrysocarpa
	E				506	CRDI	broadleaf hawthorn	Crataegus	dilatata
	E				507	CRFL	fanleaf hawthorn	Crataegus	flabellata
	E				508	CRMO3	oneseed hawthorn	Crataegus	monogyna
	E				509	CRPE	scarlet hawthorn	Crataegus	pedicellata
X		W			511	EUGL	Tasmanian bluegum	Eucalyptus	globulus
X	E				512	EUCA2	river redgum	Eucalyptus	camaldulensis
X		W			542	FRLA	Oregon ash	Fraxinus	latifolia
		W			603	JUHI	Northern California black walnut	Juglans	hindsii
X		W			604	JUCA	Southern California black walnut	Juglans	californica
X		W			631	LIDE3	tanoak	Lithocarpus	densiflorus
X		W			661	MAFU	Oregon crabapple	Malus	fusca
	E	W			729	PLATA	sycamore spp.	Platanus	spp.
X		W			730	PLRA	California sycamore	Platanus	racemosa
X		W			732	PLWR2	Arizona sycamore	Platanus	wrightii
X		W			747	POBAT	black cottonwood	Populus	balsamifera ssp. trichocarpa
		W			768	PREM	bitter cherry	Prunus	emarginata
	E				769	PRAL5	Allegheny plum	Prunus	alleghaniensis
	E	W			770	PRAN3	Chickasaw plum	Prunus	angustifolia
	E				772	PRCE	sour cherry (domesticated)	Prunus	cerasus
	E				773	PRDO	European plum (domesticated)	Prunus	domestica
	E				774	PRMA	Mahaleb plum (domesticated)	Prunus	mahaleb
X		W			801	QUAG	California live oak	Quercus	agrifolia
		W			805	QUCH2	canyon live oak	Quercus	chrysolepis
X		W			807	QUDO	blue oak	Quercus	douglasii
X		W			811	QUEN	Engelmann oak	Quercus	engelmannii
X		W			815	QUGA4	Oregon white oak	Quercus	garryana
X		W			818	QUKE	California black oak	Quercus	kelloggii
X		W			821	QULO	California white oak	Quercus	lobata
X	E				926	SAPY	balsam willow	Salix	pyrifolia
		W			928	SASC	Scouler's willow	Salix	scouleriana
X		W			981	UMCA	California laurel	Umbellularia	californica
		W		w	990	OLTE	desert ironwood	Olneya	tesota
	E				5091	CRPH	Washington hawthorn	Crataegus	phaenopyrum
	E				5092	CRSU5	fleshy hawthorn	Crataegus	succulenta
	E				5093	CRUN	dwarf hawthorn	Crataegus	uniflora

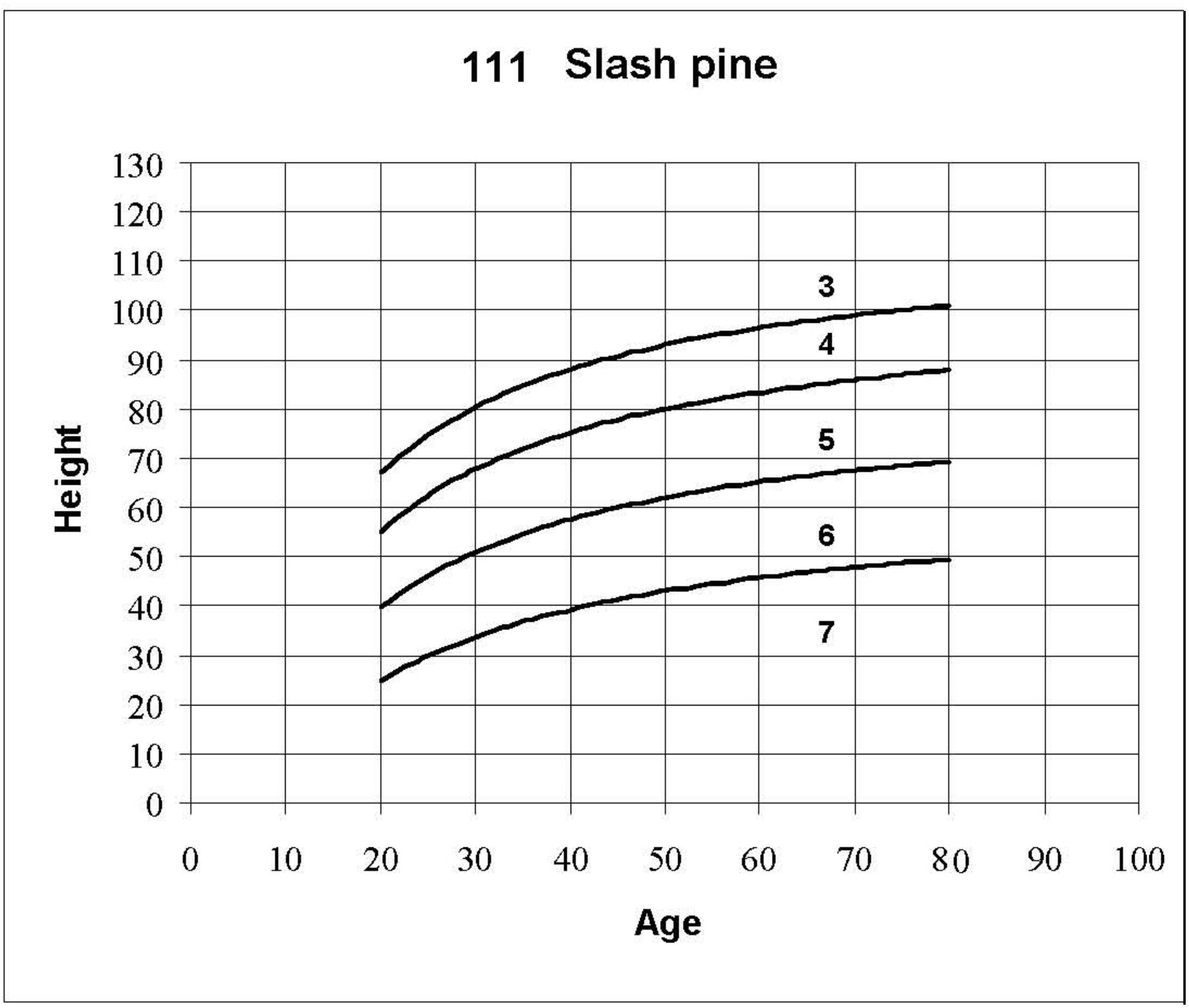
Appendix 4. Southern Site Class Curves

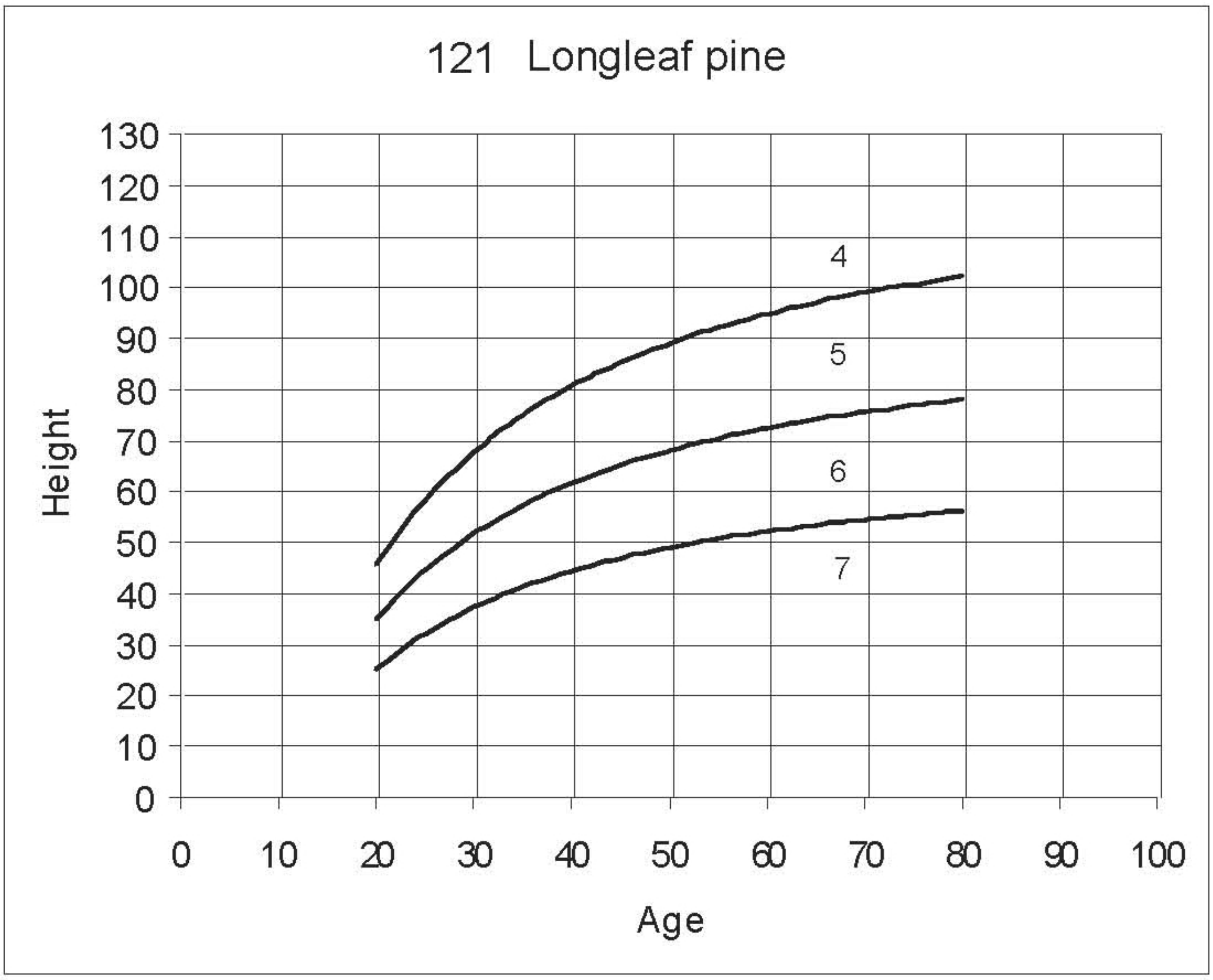
SOUTHERN SITE CLASS CURVES
(The following pages list available site curves for the southern region.)

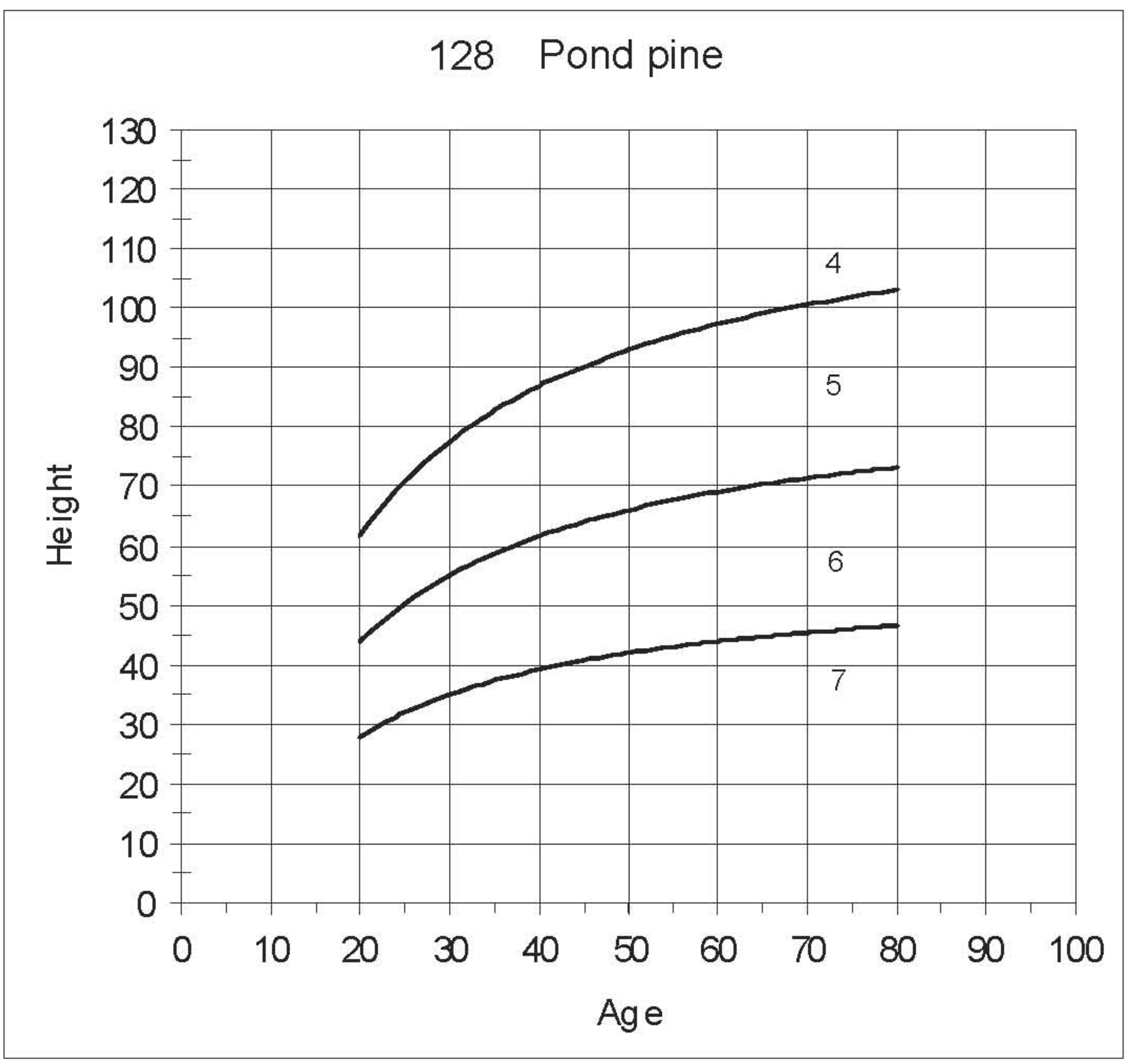


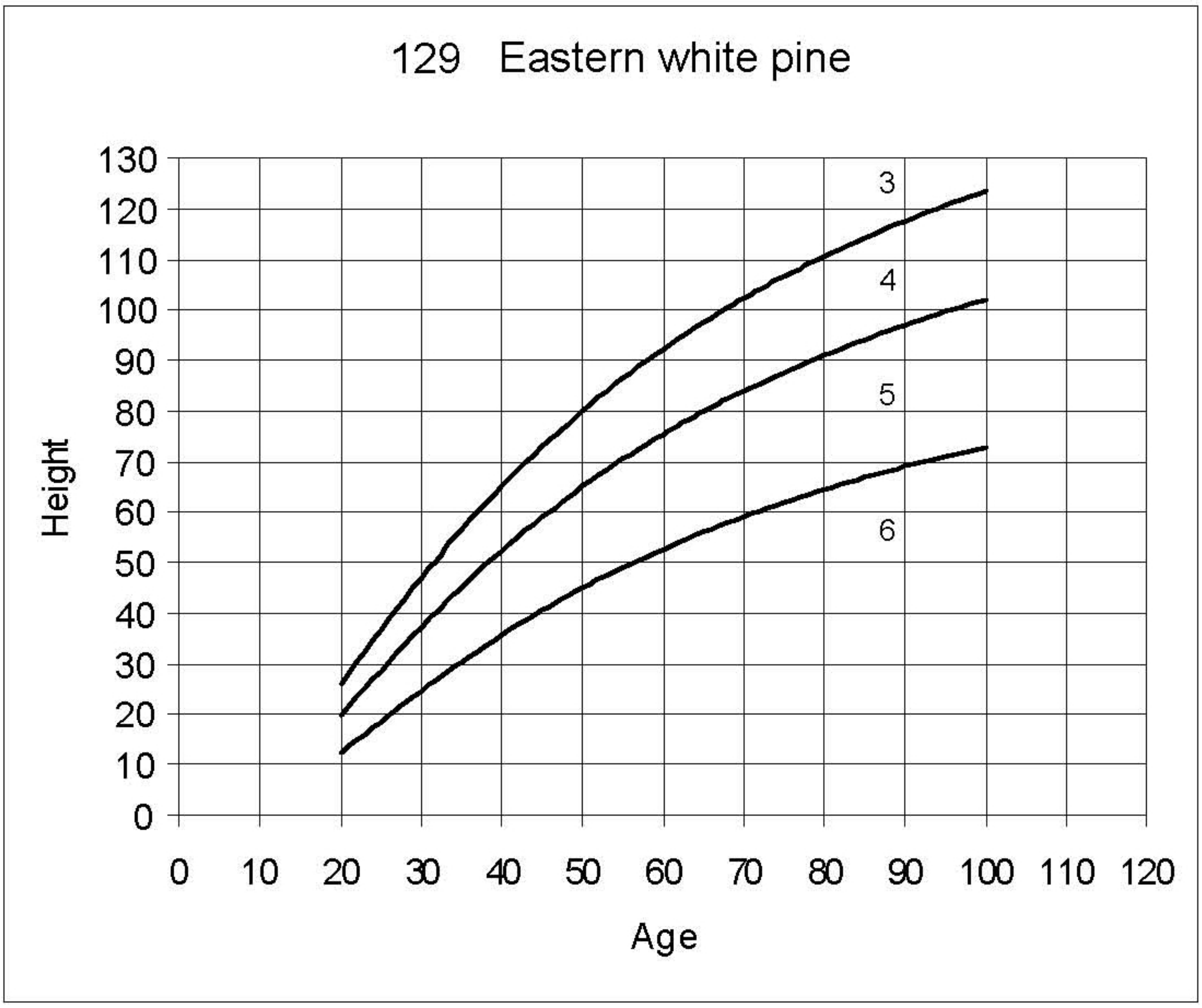



110 Shortleaf pine
Height
Age
130
120
110
100
90
80
70
60
50
40
30
20
10
0
0 10 20 30 40 50 60 70 80 90 100
2
3
4
5
6
7

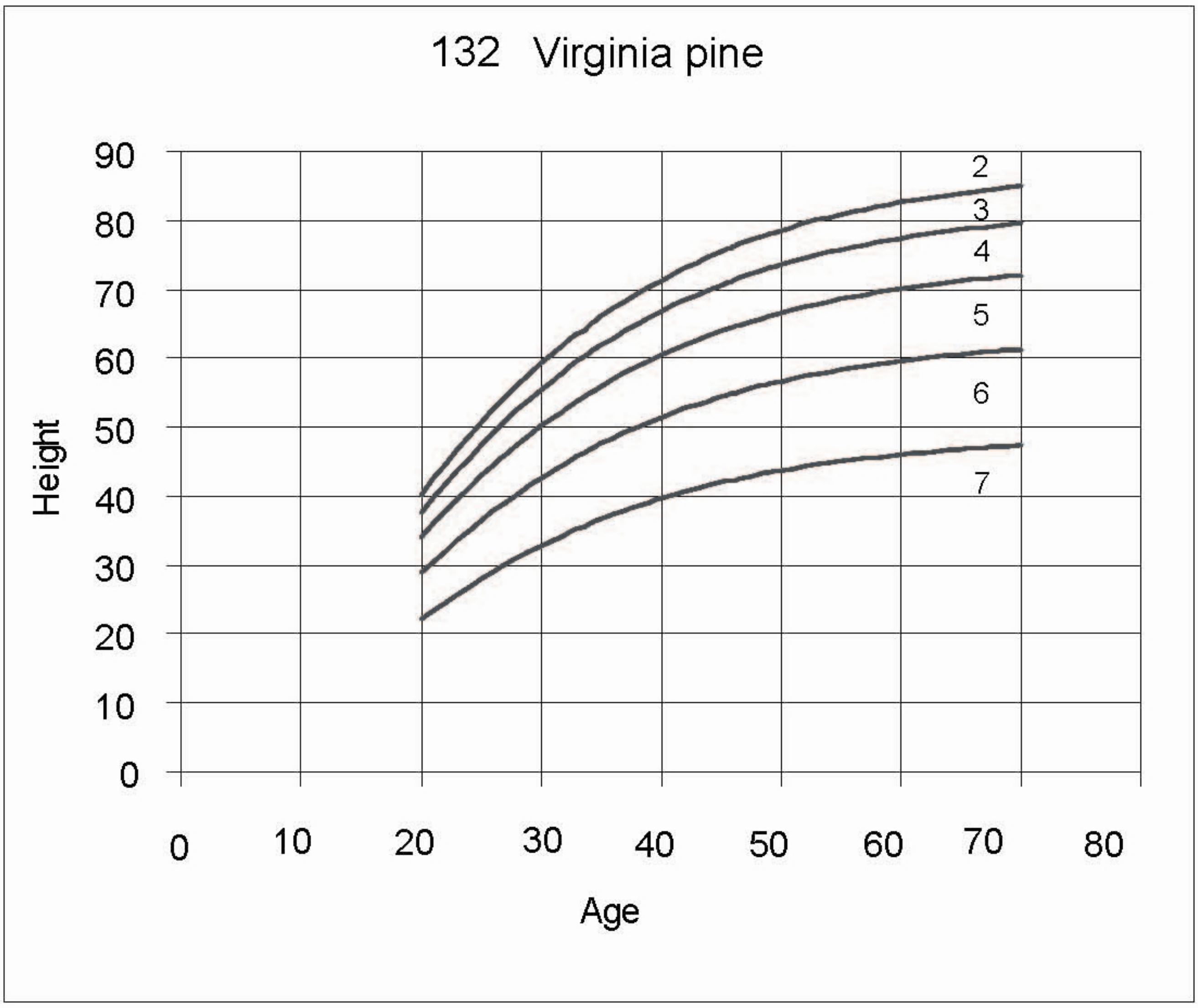

111 Slash pine
Height
Age
130
120
110
100
90
80
70
60
50
40
30
20
10
0
0 10 20 30 40 50 60 70 80 90 100
3
4
5
6
7

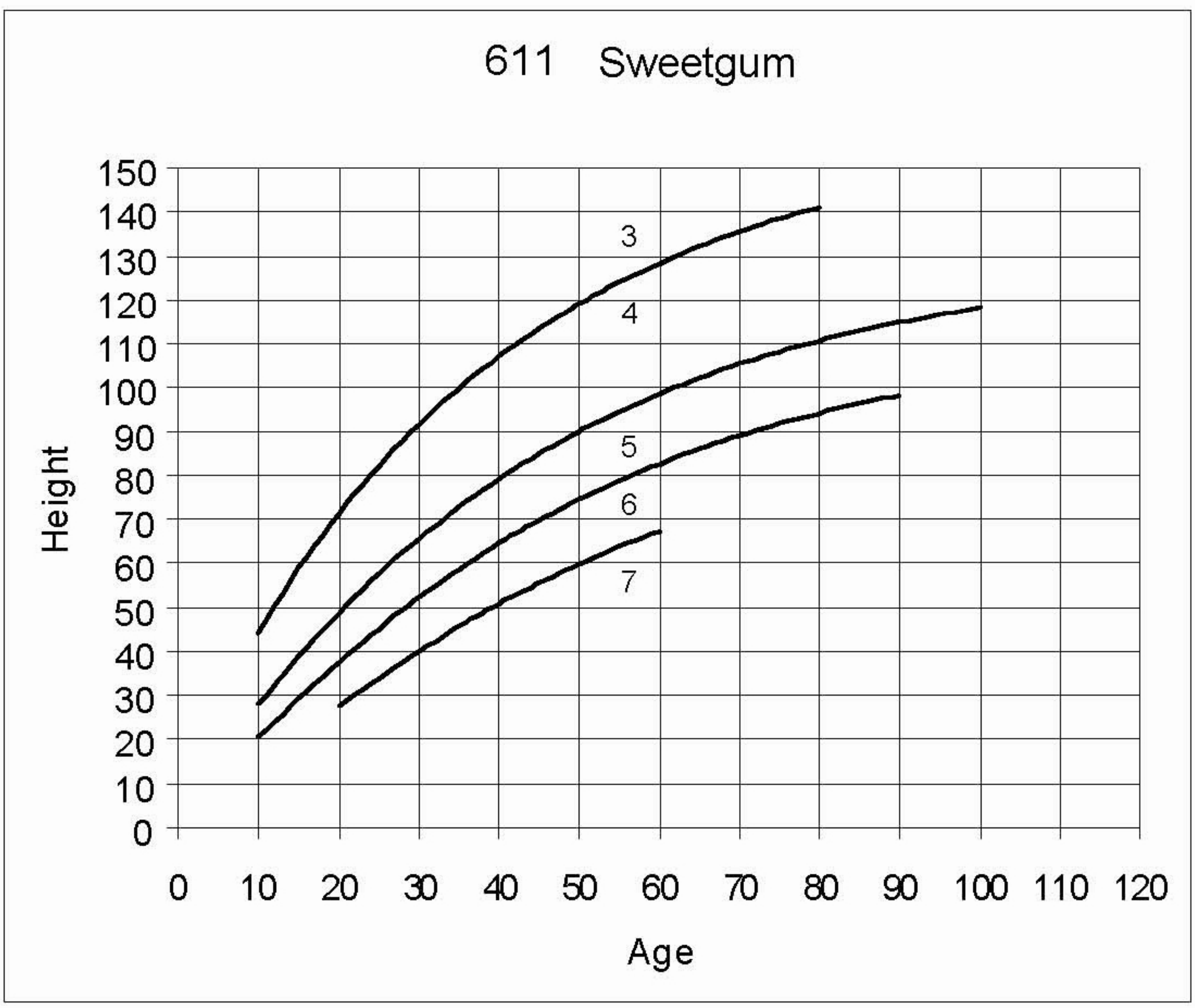

121 Longleaf pine
Height
Age
130
120
110
100
90
80
70
60
50
40
30
20
10
0
0
10
20
30
40
50
60
70
80
90
100
4
5
6
7

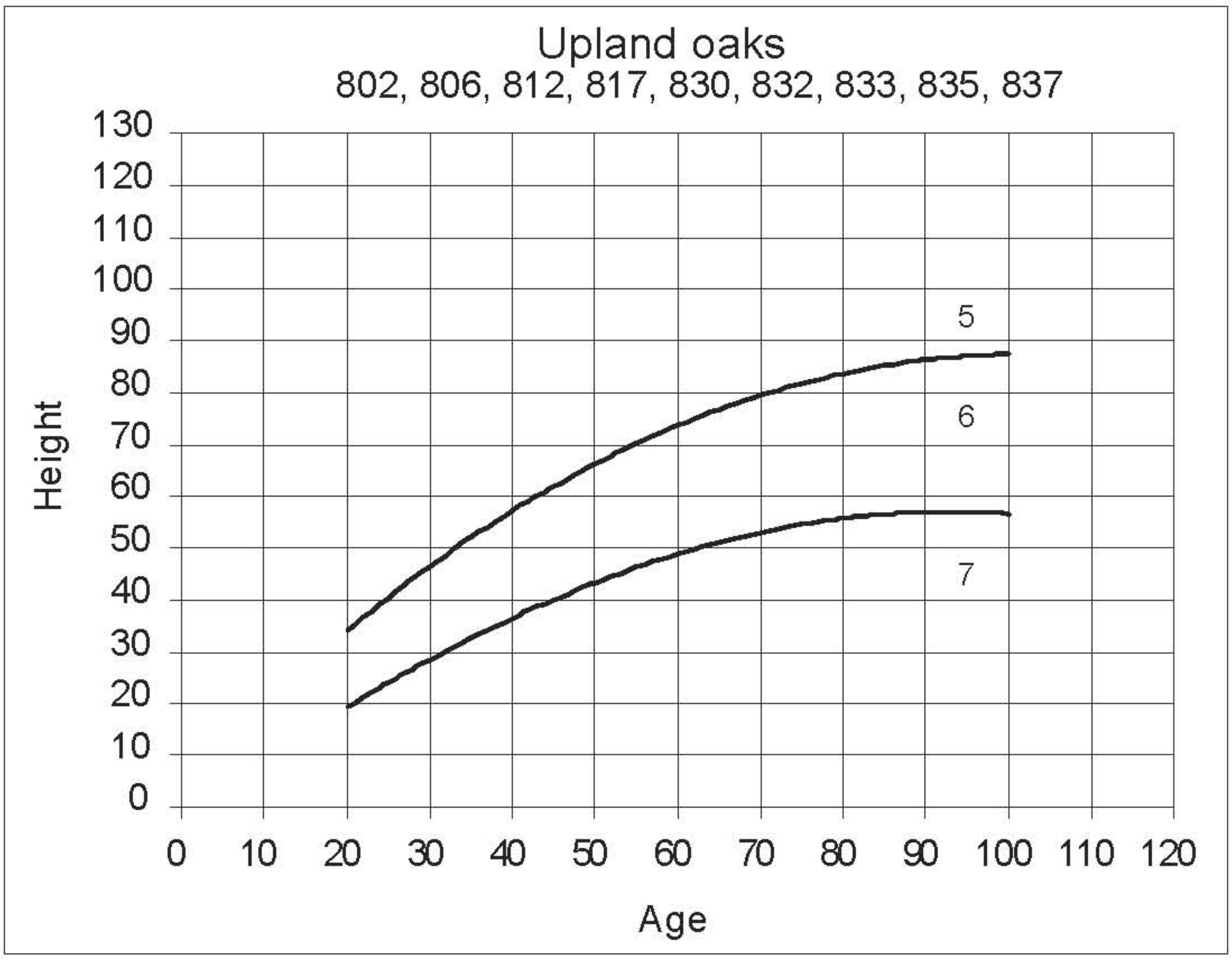

128 Pond pine
Height
Age
130
120
110
100
90
80
70
60
50
40
30
20
10
0
0
10
20
30
40
50
60
70
80
90
100
4
5
6
7

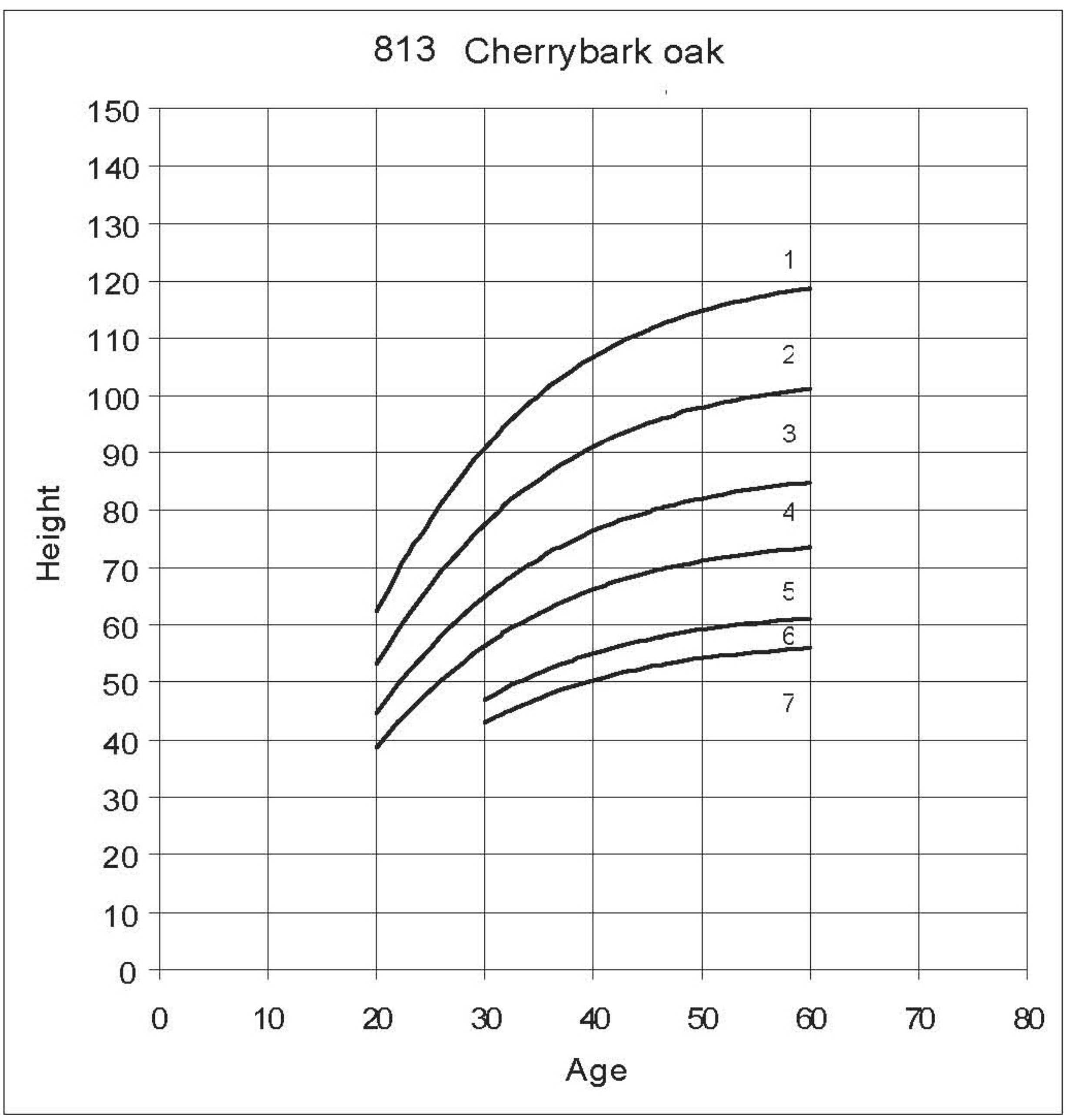

129 Eastern white pine
Height
Age
3
4
5
6
0
10
20
30
40
50
60
70
80
90
100
110
120
130

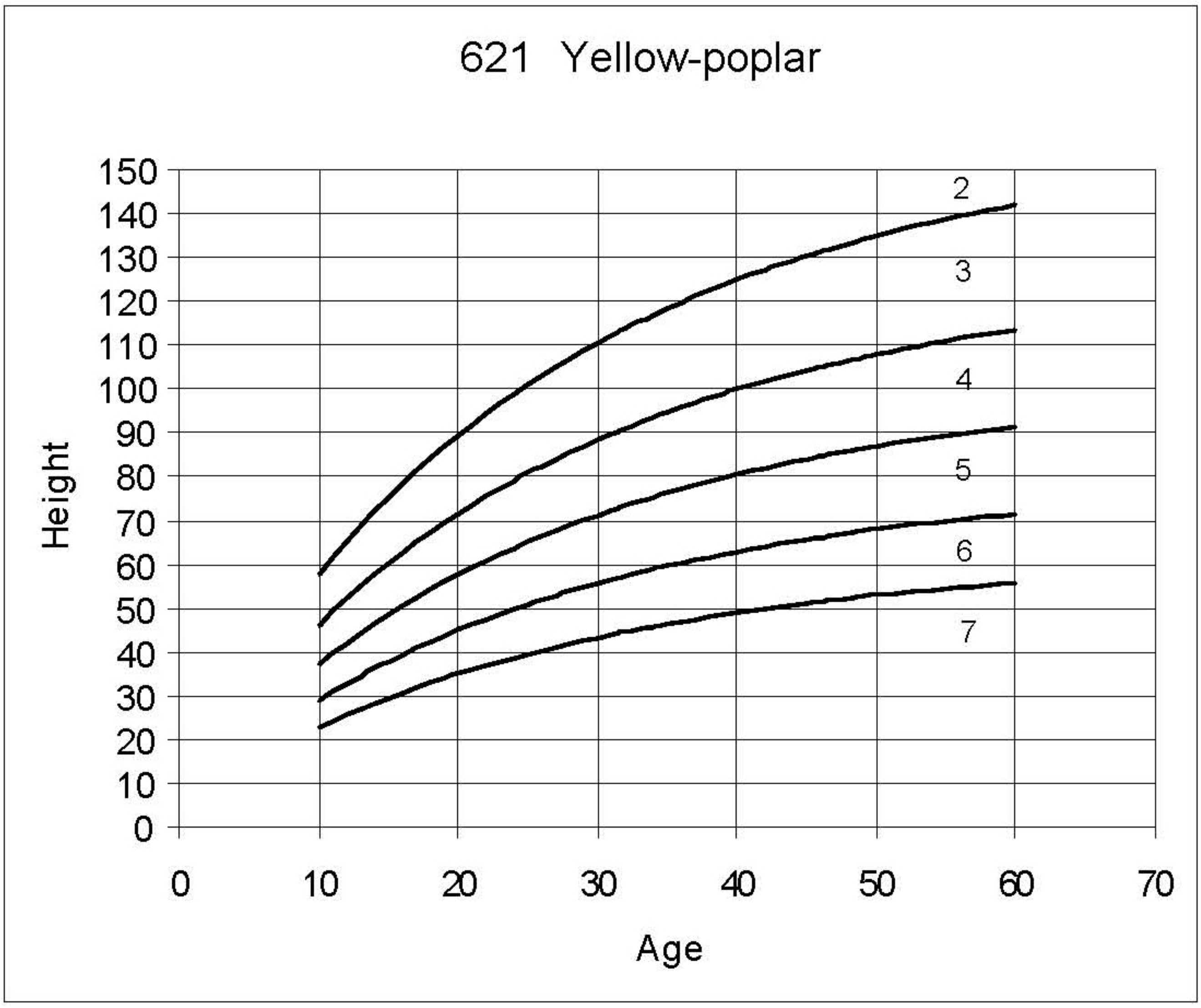

131 Loblolly pine
Height
Age
2
3
4
5
6
7
0
10
20
30
40
50
60
70
80
90
100
110
120
130


132 Virginia pine
Height
Age
2
3
4
5
6
7
0
10
20
30
40
50
60
70
80
90

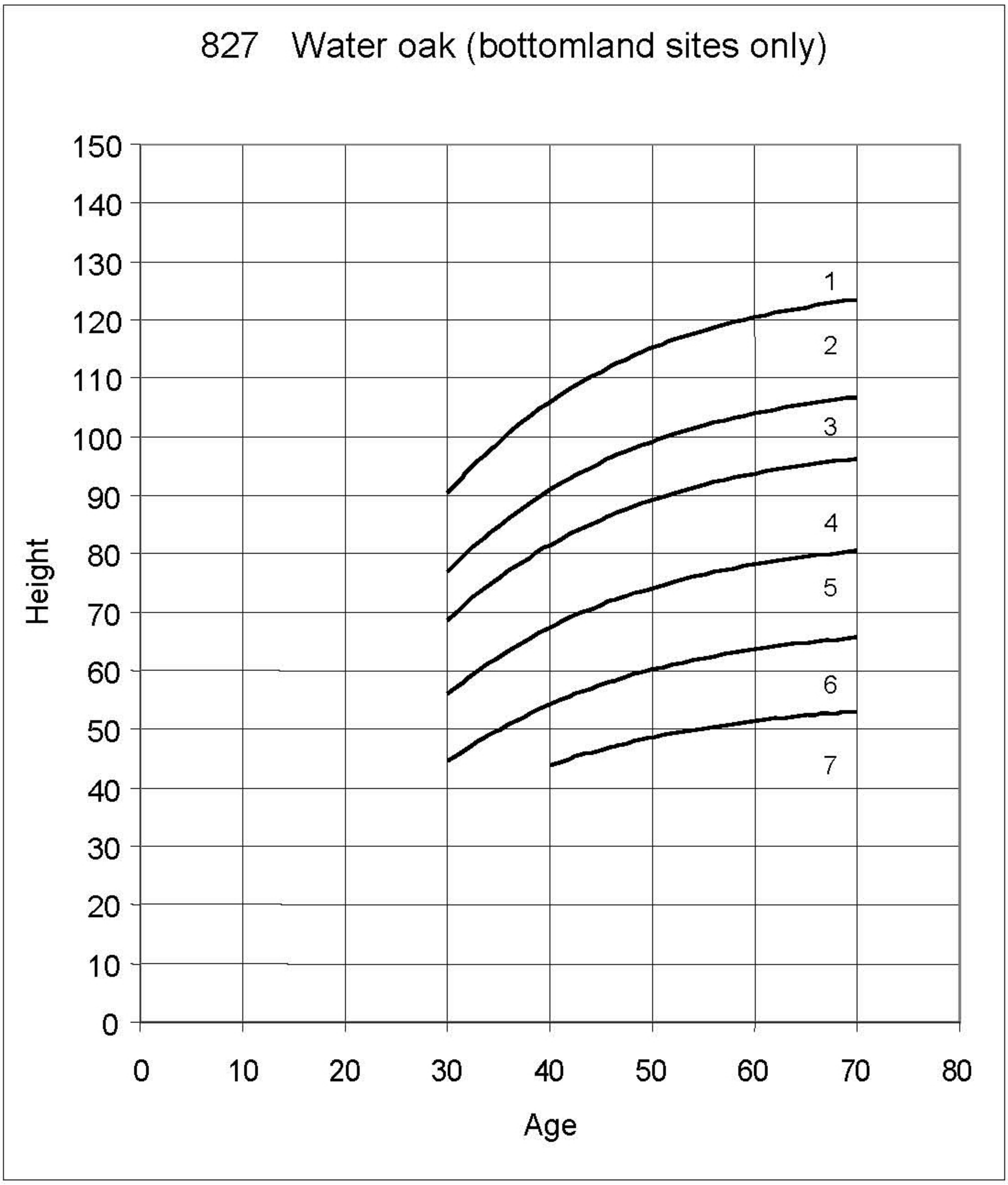

611 Sweetgum
Height
Age
3
4
5
6
7
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150


Upland oaks
802, 806, 812, 817, 830, 832, 833, 835, 837
Height
Age
5
6
7


813 Cherrybark oak
Height
Age
1
2
3
4
5
6
7


621 Yellow-poplar
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
Height
0
10
20
30
40
50
60
70
Age
2
3
4
5
6
7


742 Cottonwood
110
100
90
80
70
60
50
40
30
20
10
0
Height
0
10
20
30
40
50
60
Age
1
2
3
4
5
6


827 Water oak (bottomland sites only)
Height
Age
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
1
2
3
4
5
6
7

Appendix 5. Determination of Stocking Values for Land Use Classification

(This appendix is left in the field guide to assist in determining FOREST TYPE and STAND SIZE CLASS.)

Stocking values are required to determine if a CONDITION CLASS STATUS = 1 (accessible forest land) exists on a plot. This will determine which data items must be recorded for the condition. When the CONDITION CLASS STATUS is in question (usually a nonforest area that is in the process of reverting to forest land or a marginal site that can only support a low number of trees), the crew must determine if there is sufficient stocking to classify the condition as forest. A minimum stocking value of 10 percent is required for accessible forest land (unless the condition was previously forested, such as a recent clearcut).

The following tables show the stocking values to assign to trees or the number of trees per acre to determine if a plot meets the minimum stocking to be considered forest land. In the determination of stocking for this purpose, the field crew should consider the condition over its entire area, not just the trees and seedlings that would be tallied on the subplots and microplots, especially when the plot straddles conditions. Also, for stocking purposes, consider a clump of trees (e.g., stump sprouts) less than 5 inches DBH to be a single tree.

The number of trees per acre needed to obtain minimum stocking depends on the DBH of the largest tree on the plot in the condition being evaluated, and the species and DBH of each of the tally trees. If the condition occurs on all four subplots and the trees are distributed fairly evenly over the entire condition area, the following steps can be used to determine if the condition has the minimum number of trees per acre for forest land.

Observe all of the trees on the plot and classify the condition, based on the tree with the largest DBH, into one of the following groups; the largest tree observed has a DBH of 5 inches or greater, 4.0-4.9 inches, 3.0-3.9 inches, 2.0-2.9 inches, 1.0-1.9 inches or less than 1.0 inch DBH. If you are using the *Stocking Values* table to determine if the condition meets minimum stocking, use table 5a, 5b, 5c, 5d, 5e, or 5f. If you are using the *Number of Trees* table to determine if the condition meets minimum stocking, use table 5g.

When using a *Stocking Values* table, begin a tally of each subplot and microplot and sum the stocking values for each tree tallied based upon its species and size class. When the stocking values for the tallied trees equals or exceeds 10, the condition meets the minimum stocking requirement for forest land.

For example, a condition that was formerly nonforest is no longer being maintained as nonforest and has begun to revert. A check of all four subplots and microplots confirms that the largest tree there is in the 3.0 – 3.9 inches DBH class. The tally of microplot 1 is one red maple (species code = 316) seedling. The sum of the stocking value (table 5a) to this point is 2.4 and the tally continues on microplot 2.

Subplot Number	Plot Type	Species	Size Class	Number Tallied	Stocking Value
1	2	316	< 1.0	1	2.4
Total					2.4

The tally at microplot 2 is two red maple seedlings. The stocking value for the two seedlings is 4.8. The cumulative stocking value to this point is 7.2. Since the minimum value of 10 percent stocking has not been reached, the tally continues to subplot 3.

Subplot Number	Plot Type	Species	Size Class	Number Tallied	Stocking Value
1	2	316	< 1.0	1	2.4
2	2	316	< 1.0	2	4.8
Total					7.2

At microplot 3 one sugar maple (species code = 318) sapling in the 1.0 – 1.9-inch DBH class is tallied. The cumulative stocking value is now 13.1 and the condition meets the minimum stocking to be considered forest land.

Subplot Number	Plot Type	Species	Size Class	Number Tallied	Stocking Value
1	2	316	< 1.0	1	2.4
2	2	316	< 1.0	2	4.8
3	2	318	1.0 – 1.9	1	5.9
Total					13.1

When trees of more than one diameter class are present, their contribution towards meeting the minimum must be combined. For example:

> In a lodgepole pine stand (species code = 108), the largest tree in the condition is 5.0+ inches DBH. If at least 20 trees that are 5.0-6.9 inches DBH are found on the four subplots, the minimum stocking of 10 percent (table 5b: 5th row, 1st column) is met. In the same condition only 5 tally trees in the 13.0-14.9-inch DBH class are needed to meet minimum stocking of 10 percent. If the tally were three 5.0-6.9-inch trees and two 13.0-14.9-inch DBH class trees (total stocking of 3 x 0.5 + 2 x 2.2 = 5.9), the combined stocking would not meet the minimum 10 percent (5.9 < 10) and the condition would be classified nonforest.

When using the *Number of Trees* table (table 5g), estimate the number of trees per acre by the diameter classes. When a condition exists on all 4 of the 24-ft radius subplots, each tally tree (DBH $\geq$ 5.0 inches) represents 6 trees per acre and each sapling (DBH ≥ 1.0 inch to < 5.0 inches) or seedling observed on the 4 microplots represents 75 trees per acre.

In sparse stands of smaller trees, a more accurate observation of trees per acre can be determined by observing trees < 5.0 inches DBH on the 24-ft radius subplot. In many forest types no more than 180 trees per acre of the largest diameter class are needed to meet the minimum stocking requirements, a total of 30 trees on all 4 subplots, 7 or 8 smaller trees on each subplot, will provide minimum stocking.

Other things observed on the plot will influence the determination of condition class status. In the last lodgepole pine example, evidence of a recent disturbance that reduced the stocking (cutting, fire, etc.) should be considered. Also, a very uneven distribution of the trees across the condition can greatly change the observed number of trees per acre on plots installed across the condition.

If the condition does not cover all four subplots entirely, trees per acre must be expanded using an expansion factor. The expansion factor is equal to 400/sum of the percent of subplot area (%ARE) for the condition. The trees per acre value of every diameter class is multiplied by this expansion factor.

If the trees are not uniformly distributed throughout the condition or the condition occurs on only a small portion of the plot (half the plot or less), use your best judgment in assigning status. You may place several additional temporary subplots in the condition in order to get a larger sample to base stocking on. When additional temporary subplots or judgment is used to assign land use, a note should be made on the plot sheet. Use the following procedure to establish these temporary subplots in a condition:

A. Consider locations 120.0 feet horizontal distance from the highest numbered subplot in the condition. First consider the location 0º azimuth from the subplot center. If this location is unsuitable, consider in order locations at azimuth 120º, and 240º. When a suitable location has been found, establish the temporary subplot. Temporary subplots should be entirely within the condition (locations should not be within 24.0 feet of a mapped boundary).

B. If Step A fails to yield a suitable subplot location, repeat Step A at each of the next highest-numbered regular subplots in the condition.

C. If Steps A and B have been exhausted and a suitable temporary subplot still has not been found, repeat Step A at each temporary subplot in turn, beginning with the first temporary subplot that was established.

If more than one temporary subplot is to be established, repeat Steps A and B to establish the second lowest-numbered temporary subplot next, and continue in order until you have enough temporary subplots established in the condition to get a good, representative estimate of stocking. The general rule for establishing temporary subplots is:

- Install the lowest temporary subplot off the highest established subplot, until all the established subplots have been exhausted.
- Then establish the lowest temporary subplot yet to be established off the lowest one already established (lowest off highest, then lowest off lowest).

If there is a transition zone between two conditions use your best judgment to be sure that trees tallied in the transition zone do not have too much weight in the assignment of a land use.

Table 5a. Stocking values for all tallied trees on the four subplots and microplots

	DBH of the largest tally tree in the condition																				
	5.0+						4.0-4.9					3.0-3.9				2.0-2.9			1.0-1.9		Seedling
	DBH of tally tree						DBH of tally tree					DBH of tally tree				DBH of tally tree			DBH of tally tree		
Species	5.0-6.9	4.0-4.9	3.0-3.9	2.0-2.9	1.0-1.9	Seed-ling	4.0-4.9	3.0-3.9	2.0-2.9	1.0-1.9	Seed-ling	3.0-3.9	2.0-2.9	1.0-1.9	Seed-ling	2.0-2.9	1.0-1.9	Seed-ling	1.0-1.9	Seedling	Seedling
10, 12, 16, 18, 19, 70, 71, 90, 91, 93, 94, 96, 97, 992	0.7	6.9	5.2	4.0	2.6	1.2	7.9	6.2	4.6	3.0	1.4	7.6	5.7	3.7	1.8	7.4	4.9	2.3	7.2	3.5	7.0
72, 73, 844	0.6	5.6	4.3	3.3	2.1	1.0	6.4	5.1	3.8	2.5	1.1	6.3	4.6	3.0	1.4	6.1	4.0	1.9	5.9	2.9	5.7
57, 61, 95	0.7	6.2	4.7	3.6	2.3	1.1	7.1	5.6	4.2	2.7	1.3	6.9	5.1	3.3	1.6	6.7	4.4	2.1	6.5	3.2	6.3
67, 68, 105, 107, 115, 123, 126, 130, 132, 230, 232, 250	1.0	9.1	6.9	5.3	3.4	1.6	10.4	8.3	6.1	4.0	1.9	10.1	7.5	4.9	2.3	9.9	6.5	3.1	9.6	4.7	9.3
108	0.5	5.0	3.7	2.9	1.9	0.8	5.7	4.5	3.3	2.2	1.0	5.5	4.1	2.7	1.3	5.4	3.5	1.7	5.2	2.5	5.1
110	0.8	7.3	5.5	4.3	2.7	1.2	8.3	6.6	4.9	3.2	1.5	8.1	6.0	3.9	1.9	7.9	5.2	2.5	7.6	3.7	7.4
111	0.8	7.8	5.9	4.6	3.0	1.3	8.9	7.1	5.3	3.4	1.6	8.7	6.5	4.2	2.0	8.5	5.6	2.7	8.2	4.0	8.0
103, 104, 119	0.4	4.2	3.1	2.4	1.6	0.7	4.7	3.8	2.8	1.8	0.8	4.6	3.4	2.2	1.1	4.5	2.9	1.4	4.4	2.1	4.2
121	1.1	10.1	7.6	5.9	3.8	1.7	11.5	9.1	6.8	4.4	2.1	11.2	8.3	5.4	2.6	10.9	7.2	3.4	10.6	5.1	10.3
50, 51, 52, 53, 54, 55, 56, 58, 59, 62, 63, 64, 65, 66, 69, 100, 101, 102, 106, 109, 112, 113, 114, 116, 117, 118, 120, 122, 124, 127, 133, 134, 135, 137, 138, 139, 140, 142, 143, 144, 321, 322, 323, 475, 755, 756, 757, 758, 800, 803, 810, 811, 814, 823, 826, 829, 843, 846, 847, 850, 902, 990	0.5	5.0	3.8	2.9	1.9	0.9	5.7	4.6	3.4	2.2	1.0	5.6	4.1	2.7	1.3	5.4	3.6	1.7	5.3	2.6	5.1
125, 136	0.7	6.8	5.1	4.0	2.6	1.2	7.7	6.1	4.6	3.0	1.4	7.5	5.6	3.7	1.7	7.3	4.8	2.3	7.1	3.5	6.9
128	1.1	10.2	7.7	5.9	3.8	1.7	11.6	9.2	6.8	4.5	2.1	11.3	8.4	5.5	2.6	11.0	7.2	3.5	10.7	5.2	10.4
129	0.8	7.5	5.7	4.4	2.8	1.3	8.6	6.8	5.1	3.3	1.5	8.4	6.2	4.1	1.9	8.1	5.3	2.6	7.9	3.8	7.7
131	0.9	8.3	6.3	4.8	3.1	1.4	9.4	7.5	5.6	3.6	1.7	9.2	6.8	4.5	2.1	8.9	5.9	2.8	8.7	4.2	8.4
15, 200, 201, 202, 510, 511, 512, 513, 514	0.7	6.8	5.1	4.0	2.6	1.2	7.7	6.2	4.6	3.0	1.4	7.5	5.6	3.7	1.7	7.3	4.8	2.3	7.1	3.5	6.9
43, 241	0.7	6.1	4.6	3.6	2.3	1.0	6.9	5.5	4.1	2.7	1.2	6.8	5.0	3.3	1.6	6.6	4.3	2.1	6.4	3.1	6.2
240, 260, 261, 262	0.8	7.7	5.8	4.5	2.9	1.3	8.7	7.0	5.2	3.4	1.6	8.5	6.3	4.1	2.0	8.3	5.4	2.6	8.0	3.9	7.8
11, 14, 17, 20, 21, 22, 40, 41, 42, 81, 92, 98, 231, 242, 251, 252, 263, 264	0.5	4.8	3.6	2.8	1.8	0.8	5.4	4.3	3.2	2.1	1.0	5.3	3.9	2.6	1.2	5.1	3.4	1.6	5.0	2.4	4.8
211, 212	0.4	3.8	2.9	2.2	1.4	0.6	4.3	3.4	2.5	1.7	0.8	4.2	3.1	2.0	1.0	4.1	2.7	1.3	4.0	1.9	3.8
300, 303, 304, 310, 311, 312, 316, 317, 319, 320, 341, 356, 357, 358, 367, 381, 391, 420, 421, 424, 471, 481, 490, 491, 550, 551, 555, 561, 571, 580, 581, 582, 583, 591, 631, 653, 680, 681, 682, 683, 684, 701, 711, 760, 761, 763, 764, 765, 766, 768, 769, 770, 771, 772, 773, 774, 821, 852, 853, 854, 855, 856, 857, 858, 859, 860, 863, 864, 865, 866, 873, 874, 876, 877, 882, 883, 884, 885, 886, 887, 888, 890, 891, 895, 896, 897, 906, 907, 908, 909, 912, 913, 914, 915, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 934, 935, 936, 937, 940, 982, 986, 987, 988, 989, 991, 994, 995, 996, 997, 999	1.0	9.6	7.2	5.6	3.6	1.6	10.9	8.7	6.4	4.2	2.0	10.6	7.9	5.2	2.4	10.3	6.8	3.3	10.0	4.9	9.8
350, 351, 352, 353, 355, 492	1.3	11.7	8.8	6.8	4.4	2.0	13.3	10.6	7.9	5.1	2.4	13.0	9.6	6.3	3.0	12.6	8.3	4.0	12.3	5.9	11.9

Table 5a. Stocking values for all tallied trees on the four subplots and microplots

	DBH of the largest tally tree in the condition																				
	5.0+						4.0-4.9					3.0-3.9				2.0-2.9			1.0-1.9		Seedling
	DBH of tally tree						DBH of tally tree					DBH of tally tree				DBH of tally tree			DBH of tally tree		
Species	5.0-6.9	4.0-4.9	3.0-3.9	2.0-2.9	1.0-1.9	Seed-ling	4.0-4.9	3.0-3.9	2.0-2.9	1.0-1.9	Seed-ling	3.0-3.9	2.0-2.9	1.0-1.9	Seed-ling	2.0-2.9	1.0-1.9	Seed-ling	1.0-1.9	Seedling	Seedling
314, 315, 318, 330, 331, 332, 333, 334, 336, 337, 370, 371, 372, 377, 450, 451, 452, 531, 552, 712	1.2	10.9	8.2	6.3	4.1	1.8	12.4	9.8	7.3	4.8	2.2	12.1	9.0	5.9	2.8	11.7	7.7	3.7	11.4	5.5	11.1
373, 374, 375, 378, 379	1.1	10.5	7.9	6.1	4.0	1.8	12.0	9.5	7.1	4.6	2.1	11.6	8.7	5.7	2.7	11.3	7.4	3.6	11.0	5.3	10.7
360, 361, 362, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 422, 423, 431, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 520, 521, 522, 549, 641, 660, 661, 662, 663, 664, 801, 802, 804, 805, 806, 807, 808, 809, 812, 813, 815, 816, 817, 818, 819, 820, 822, 824, 825, 827, 828, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 845, 901, 931, 981, 5091, 5092, 5093	1.2	11.6	8.8	6.8	4.4	2.0	13.2	10.5	7.8	5.1	2.4	12.9	9.6	6.3	3.0	12.5	8.2	3.9	12.2	5.9	11.8
600, 601, 602, 603, 604, 605, 606	1.4	12.7	9.6	7.4	4.8	2.2	14.5	11.5	8.5	5.6	2.6	14.1	10.5	6.9	3.2	13.7	9.0	4.3	13.3	6.5	12.9
220, 221, 222, 611, 690, 691, 692, 693, 694	0.7	6.8	5.2	4.0	2.6	1.2	7.8	6.2	4.6	3.0	1.4	7.6	5.6	3.7	1.7	7.4	4.9	2.3	7.2	3.5	7.0
741, 743, 746	1.2	10.9	8.3	6.4	4.1	1.9	12.5	9.9	7.3	4.8	2.2	12.1	9.0	5.9	2.8	11.8	7.8	3.7	11.5	5.6	11.1
540, 541, 542, 543, 545, 546, 547, 548, 621, 650, 651, 652, 654, 655, 657, 658, 720, 721, 722, 762, 993, 7211	1.0	9.3	7.0	5.4	3.5	1.6	10.6	8.4	6.3	4.1	1.9	10.3	7.7	5.0	2.4	10.0	6.6	3.2	9.8	4.7	9.5
950, 951, 952, 953	1.0	9.2	7.0	5.4	3.5	1.6	10.5	8.4	6.2	4.0	1.9	10.2	7.6	5.0	2.3	10.0	6.5	3.1	9.7	4.7	9.4
313, 345, 460, 461, 462, 463, 544, 729, 730, 731, 732, 740, 742, 744, 745, 747, 748, 749, 752, 753, 970, 971, 972, 973, 974, 975, 976, 977	1.2	10.8	8.1	6.3	4.1	1.8	12.3	9.8	7.2	4.7	2.2	12.0	8.9	5.8	2.7	11.6	7.6	3.7	11.3	5.5	11.0

Table 5b. Stocking values for all trees tallied on the subplot only

Species	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+
10, 12, 16, 18, 19, 70, 71, 90, 91, 93, 94, 96, 97, 992	0.7	1.1	1.6	2.1	2.6	3.2	3.8	4.4	5.1	5.8	6.5	7.2	8.0
72, 73, 844	0.6	1.0	1.5	2.0	2.6	3.3	4.0	4.9	5.7	6.7	7.6	8.7	9.8
57, 61, 95	0.7	0.9	1.1	1.4	1.6	1.9	2.1	2.4	2.6	2.9	3.1	3.4	3.6
67, 68, 105, 107, 115, 123, 126, 130, 132, 230, 232, 250	1.0	1.5	2.2	3.0	3.8	4.7	5.6	6.6	7.7	8.9	10.1	11.4	12.7
108	0.5	0.9	1.3	1.7	2.2	2.8	3.4	4.1	4.8	5.6	6.4	7.3	8.2
110	0.8	1.3	2.0	2.7	3.6	4.6	5.7	6.9	8.2	9.6	11.1	12.7	14.4
111	0.8	1.5	2.2	3.2	4.2	5.5	6.9	8.4	10.1	11.9	13.9	16.0	18.2
103, 104, 119	0.4	0.7	1.1	1.5	1.9	2.4	3.0	3.6	4.2	4.9	5.6	6.4	7.2
121	1.1	1.6	2.3	2.9	3.7	4.4	5.3	6.1	7.0	8.0	8.9	10.0	11.0
50, 51, 52, 53, 54, 55, 56, 58, 59, 62, 63, 64, 65, 66, 69, 100, 101, 102, 106, 109, 112, 113, 114, 116, 117, 118, 120, 122, 124, 127, 133, 134, 135, 137, 138, 139, 140, 142, 143, 144, 321, 322, 323, 475, 755, 756, 757, 758, 800, 803, 810, 811, 814, 823, 826, 829, 843, 846, 847, 850, 902, 990	0.5	1.0	1.5	2.2	2.9	3.8	4.9	6.0	7.3	8.6	10.1	11.8	13.5
125, 136	0.7	1.2	1.7	2.3	3.0	3.7	4.6	5.4	6.4	7.4	8.4	9.5	10.7
128	1.1	1.8	2.6	3.5	4.5	5.6	6.8	8.2	9.6	11.1	12.7	14.3	16.1
129	0.8	1.2	1.7	2.3	2.9	3.6	4.2	5.0	5.7	6.6	7.4	8.3	9.2
131	0.9	1.5	2.1	2.9	3.8	4.8	5.9	7.1	8.3	9.7	11.1	12.6	14.2
15, 200, 201, 202, 510, 511, 512, 513, 514	0.7	1.1	1.6	2.1	2.7	3.3	4.0	4.7	5.4	6.2	7.0	7.8	8.7
43, 241	0.7	1.1	1.6	2.3	3.0	3.8	4.7	5.7	6.8	7.9	9.2	10.5	11.8
240, 260, 261, 262	0.8	1.5	2.4	3.6	4.9	6.5	8.4	10.4	12.8	15.3	18.2	21.2	24.6
11, 14, 17, 20, 21, 22, 40, 41, 42, 81, 92, 98, 231, 242, 251, 252, 263, 264	0.5	0.8	1.2	1.6	2.1	2.6	3.2	3.8	4.5	5.2	5.9	6.7	7.5
211, 212	0.4	0.7	1.0	1.3	1.7	2.1	2.6	3.1	3.6	4.2	4.8	5.4	6.1
300, 303, 304, 310, 311, 312, 316, 317, 319, 320, 341, 356, 357, 358, 367, 381, 391, 420, 421, 424, 471, 481, 490, 491, 550, 551, 555, 561, 571, 580, 581, 582, 583, 591, 631, 653, 680, 681, 682, 683, 684, 701, 711, 760, 761, 763, 764, 765, 766, 768, 769, 770, 771, 772, 773, 774, 821, 852, 853, 854, 855, 856, 857, 858, 859, 860, 863, 864, 865, 866, 873, 874, 876, 877, 882, 883, 884, 885, 886, 887, 888, 890, 891, 895, 896, 897, 906, 907, 908, 909, 912, 913, 914, 915, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 934, 935, 936, 937, 940, 982, 986, 987, 988, 989, 991, 994, 995, 996, 997, 999	1.0	1.6	2.2	3.0	3.8	4.6	5.5	6.5	7.5	8.6	9.7	10.9	12.1
350, 351, 352, 353, 355, 492	1.3	1.9	2.6	3.3	4.1	5.0	5.9	6.8	7.8	8.9	9.9	11.0	12.1
314, 315, 318, 330, 331, 332, 333, 334, 336, 337, 370, 371, 372, 377, 450, 451, 452, 531, 552, 712	1.2	2.0	3.0	4.2	5.6	7.2	9.0	11.0	13.1	15.4	17.8	20.5	23.3
373, 374, 375, 378, 379	1.1	1.9	3.0	4.2	5.6	7.2	9.0	11.0	13.1	15.5	18.0	20.7	23.6

Table 5b. Stocking values for all trees tallied on the subplot only

Species	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+
360, 361, 362, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 422, 423, 431, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 520, 521, 522, 549, 641, 660, 661, 662, 663, 664, 801, 802, 804, 805, 806, 807, 808, 809, 812, 813, 815, 816, 817, 818, 819, 820, 822, 824, 825, 827, 828, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 845, 901, 931, 981, 5091, 5092, 5093	1.2	2.0	2.9	3.9	5.0	6.2	7.5	8.9	10.4	11.9	13.6	15.3	17.2
600, 601, 602, 603, 604, 605, 606	1.4	2.1	2.9	3.9	4.9	5.9	7.1	8.3	9.6	10.9	12.3	13.7	15.2
220, 221, 222, 611, 690, 691, 692, 693, 694	0.7	1.3	1.9	2.7	3.6	4.6	5.7	7.0	8.3	9.8	11.4	13.1	14.9
741, 743, 746	1.2	1.8	2.5	3.2	4.0	4.9	5.8	6.8	7.8	8.9	10.0	11.1	12.3
540, 541, 542, 543, 545, 546, 547, 548, 621, 650, 651, 652, 654, 655, 657, 658, 720, 721, 722, 762, 993, 7211	1.0	1.4	1.8	2.2	2.6	3.0	3.5	3.9	4.3	4.8	5.2	5.7	6.2
950, 951, 952, 953	1.0	1.8	2.8	4.0	5.5	7.2	9.1	11.3	13.7	16.3	19.1	22.2	25.5
313, 345, 460, 461, 462, 463, 544, 729, 730, 731, 732, 740, 742, 744, 745, 747, 748, 749, 752, 753, 970, 971, 972, 973, 974, 975, 976, 977	1.2	2.0	3.0	4.2	5.6	7.2	8.9	10.9	13.0	15.2	17.7	20.3	23.1

Table 5c. Stocking values for all trees < 7 inches, observed on the four subplots only

	DBH of the largest tally tree in the condition																			
	5.0+						4.0-4.9					3.0-3.9				2.0-2.9			1.0-1.9		Seedling
	DBH of tally tree						DBH of tally tree					DBH of tally tree				DBH of tally tree			DBH of tally tree		
Species	5.0-6.9	4.0-4.9	3.0-3.9	2.0-2.9	1.0-1.9	Seed-ling	4.0-4.9	3.0-3.9	2.0-2.9	1.0-1.9	Seed-ling	3.0-3.9	2.0-2.9	1.0-1.9	Seed-ling	2.0-2.9	1.0-1.9	Seed-ling	1.0-1.9	Seedling	Seedling
10, 12, 16, 18, 19, 70, 71, 90, 91, 93, 94, 96, 97, 992	0.74	0.55	0.42	0.32	0.21	0.09	0.63	0.50	0.37	0.24	0.11	0.61	0.45	0.30	0.14	0.59	0.39	0.19	0.58	0.28	0.56
72, 73, 844	0.60	0.45	0.34	0.26	0.17	0.08	0.51	0.41	0.30	0.20	0.09	0.50	0.37	0.24	0.11	0.49	0.32	0.15	0.47	0.23	0.46
57, 61, 95	0.67	0.50	0.38	0.29	0.19	0.08	0.57	0.45	0.33	0.22	0.10	0.55	0.41	0.27	0.13	0.54	0.35	0.17	0.52	0.25	0.51
67, 68, 105, 107, 115, 123, 126, 130, 132, 230, 232, 250	0.98	0.73	0.55	0.43	0.28	0.12	0.83	0.66	0.49	0.32	0.15	0.81	0.60	0.39	0.19	0.79	0.52	0.25	0.77	0.37	0.74
108	0.53	0.40	0.30	0.23	0.15	0.07	0.45	0.36	0.27	0.17	0.08	0.44	0.33	0.21	0.10	0.43	0.28	0.13	0.42	0.20	0.40
110	0.78	0.58	0.44	0.34	0.22	0.10	0.66	0.53	0.39	0.26	0.12	0.65	0.48	0.31	0.15	0.63	0.41	0.20	0.61	0.30	0.59
111	0.84	0.63	0.47	0.37	0.24	0.11	0.72	0.57	0.42	0.27	0.13	0.70	0.52	0.34	0.16	0.68	0.45	0.21	0.66	0.32	0.64
103, 104, 119	0.45	0.33	0.25	0.19	0.13	0.06	0.38	0.30	0.22	0.15	0.07	0.37	0.27	0.18	0.08	0.36	0.24	0.11	0.35	0.17	0.34
121	1.08	0.81	0.61	0.47	0.30	0.14	0.92	0.73	0.54	0.35	0.16	0.90	0.67	0.44	0.21	0.87	0.57	0.27	0.85	0.41	0.82
50, 51, 52, 53, 54, 55, 56, 58, 59, 62, 63, 64, 65, 66, 69, 100, 101, 102, 106, 109, 112, 113, 114, 116, 117, 118, 120, 122, 124, 127, 133, 134, 135, 137, 138, 139, 140, 142, 143, 144, 321, 322, 323, 475, 755, 756, 757, 758, 800, 803, 810, 811, 814, 823, 826, 829, 843, 846, 847, 850, 902, 990	0.54	0.40	0.30	0.24	0.15	0.07	0.46	0.36	0.27	0.18	0.08	0.45	0.33	0.22	0.10	0.43	0.29	0.14	0.42	0.20	0.41
125, 136	0.73	0.54	0.41	0.32	0.20	0.09	0.62	0.49	0.36	0.24	0.11	0.60	0.45	0.29	0.14	0.59	0.39	0.18	0.57	0.28	0.55
128	1.09	0.81	0.62	0.48	0.31	0.14	0.93	0.74	0.55	0.36	0.17	0.90	0.67	0.44	0.21	0.88	0.58	0.28	0.85	0.41	0.83
129	0.81	0.60	0.46	0.35	0.23	0.10	0.69	0.55	0.40	0.26	0.12	0.67	0.50	0.33	0.15	0.65	0.43	0.20	0.63	0.31	0.61
131	0.89	0.66	0.50	0.39	0.25	0.11	0.76	0.60	0.45	0.29	0.14	0.74	0.55	0.36	0.17	0.72	0.47	0.23	0.70	0.34	0.68
15, 200, 201, 202, 510, 511, 512, 513, 514	0.73	0.54	0.41	0.32	0.20	0.09	0.62	0.49	0.36	0.24	0.11	0.60	0.45	0.29	0.14	0.59	0.39	0.18	0.57	0.28	0.55
43, 241	0.65	0.49	0.37	0.28	0.18	0.08	0.56	0.44	0.33	0.21	0.10	0.54	0.40	0.26	0.12	0.53	0.35	0.17	0.51	0.25	0.50
240, 260, 261, 262	0.82	0.61	0.46	0.36	0.23	0.10	0.70	0.56	0.41	0.27	0.13	0.68	0.51	0.33	0.16	0.66	0.44	0.21	0.64	0.31	0.63
11, 14, 17, 20, 21, 22, 40, 41, 42, 81, 92, 98, 231, 242, 251, 252, 263, 264	0.51	0.38	0.29	0.22	0.14	0.06	0.43	0.34	0.26	0.17	0.08	0.42	0.31	0.21	0.10	0.41	0.27	0.13	0.40	0.19	0.39
211, 212	0.41	0.30	0.23	0.18	0.11	0.05	0.34	0.27	0.20	0.13	0.06	0.34	0.25	0.16	0.08	0.33	0.21	0.10	0.32	0.15	0.31
300, 303, 304, 310, 311, 312, 316, 317, 319, 320, 341, 356, 357, 358, 367, 381, 391, 420, 421, 424, 471, 481, 490, 491, 550, 551, 555, 561, 571, 580, 581, 582, 583, 591, 631, 653, 680, 681, 682, 683, 684, 701, 711, 760, 761, 763, 764, 765, 766, 768, 769, 770, 771, 772, 773, 774, 821, 852, 853, 854, 855, 856, 857, 858, 859, 860, 863, 864, 865, 866, 873, 874, 876, 877, 882, 883, 884, 885, 886, 887, 888, 890, 891, 895, 896, 897, 906, 907, 908, 909, 912, 913, 914, 915, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 934, 935, 936, 937, 940, 982, 986, 987, 988, 989, 991, 994, 995, 996, 997, 999	1.03	0.77	0.58	0.45	0.29	0.13	0.87	0.69	0.52	0.34	0.16	0.85	0.63	0.41	0.20	0.83	0.54	0.26	0.80	0.39	0.78
350, 351, 352, 353, 355, 492	1.25	0.93	0.71	0.55	0.35	0.16	1.07	0.85	0.63	0.41	0.19	1.04	0.77	0.50	0.24	1.01	0.66	0.32	0.98	0.48	0.95

Table 5c. Stocking values for all trees < 7 inches, observed on the four subplots only

	DBH of the largest tally tree in the condition																				
	5.0+						4.0-4.9					3.0-3.9				2.0-2.9			1.0-1.9		Seedling
	DBH of tally tree						DBH of tally tree					DBH of tally tree				DBH of tally tree			DBH of tally tree		
Species	5.0-6.9	4.0-4.9	3.0-3.9	2.0-2.9	1.0-1.9	Seed-ling	4.0-4.9	3.0-3.9	2.0-2.9	1.0-1.9	Seed-ling	3.0-3.9	2.0-2.9	1.0-1.9	Seed-ling	2.0-2.9	1.0-1.9	Seed-ling	1.0-1.9	Seedling	Seedling
314, 315, 318, 330, 331, 332, 333, 334, 336, 337, 370, 371, 372, 377, 450, 451, 452, 531, 552, 712	1.17	0.87	0.66	0.51	0.33	0.15	0.99	0.79	0.58	0.38	0.18	0.96	0.72	0.47	0.22	0.94	0.62	0.30	0.91	0.44	0.89
373, 374, 375, 378, 379	1.13	0.84	0.63	0.49	0.32	0.14	0.96	0.76	0.56	0.37	0.17	0.93	0.69	0.45	0.21	0.91	0.60	0.28	0.88	0.43	0.85
360, 361, 362, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 422, 423, 431, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 520, 521, 522, 549, 641, 660, 661, 662, 663, 664, 801, 802, 804, 805, 806, 807, 808, 809, 812, 813, 815, 816, 817, 818, 819, 820, 822, 824, 825, 827, 828, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 845, 901, 931, 981, 5091, 5092, 5093	1.25	0.93	0.70	0.54	0.35	0.16	1.06	0.84	0.62	0.41	0.19	1.03	0.77	0.50	0.24	1.00	0.66	0.32	0.97	0.47	0.95
600, 601, 602, 603, 604, 605, 606	1.36	1.01	0.77	0.59	0.38	0.17	1.16	0.92	0.68	0.44	0.21	1.13	0.84	0.55	0.26	1.10	0.72	0.34	1.07	0.52	1.03
220, 221, 222, 611, 690, 691, 692, 693, 694	0.73	0.55	0.41	0.32	0.21	0.09	0.62	0.50	0.37	0.24	0.11	0.61	0.45	0.30	0.14	0.59	0.39	0.19	0.57	0.28	0.56
741, 743, 746	1.17	0.87	0.66	0.51	0.33	0.15	1.00	0.79	0.59	0.38	0.18	0.97	0.72	0.47	0.22	0.94	0.62	0.30	0.92	0.45	0.89
540, 541, 542, 543, 545, 546, 547, 548, 621, 650, 651, 652, 654, 655, 657, 658, 720, 721, 722, 762, 993, 7211	1.00	0.74	0.56	0.43	0.28	0.13	0.85	0.67	0.50	0.33	0.15	0.83	0.61	0.40	0.19	0.80	0.53	0.25	0.78	0.38	0.76
950, 951, 952, 953	0.99	0.74	0.56	0.43	0.28	0.13	0.84	0.67	0.50	0.32	0.15	0.82	0.61	0.40	0.19	0.80	0.52	0.25	0.77	0.38	0.75
313, 345, 460, 461, 462, 463, 544, 729, 730, 731, 732, 740, 742, 744, 745, 747, 748, 749, 752, 753, 970, 971, 972, 973, 974, 975, 976, 977	1.16	0.86	0.65	0.50	0.32	0.15	0.98	0.78	0.58	0.38	0.18	0.96	0.71	0.47	0.22	0.93	0.61	0.29	0.90	0.44	0.88

Table 5d. Stocking values for all trees 5.0 inches and greater observed on the four subplots only

Species	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+
10, 12, 16, 18, 19, 70, 71, 90, 91, 93, 94, 96, 97, 992	0.7	1.1	1.6	2.1	2.6	3.2	3.8	4.4	5.1	5.8	6.5	7.2	8.0
72, 73, 844	0.6	1.0	1.5	2.0	2.6	3.3	4.0	4.9	5.7	6.7	7.6	8.7	9.8
57, 61, 95	0.7	0.9	1.1	1.4	1.6	1.9	2.1	2.4	2.6	2.9	3.1	3.4	3.6
67, 68, 105, 107, 115, 123, 126, 130, 132, 230, 232, 250	1.0	1.5	2.2	3.0	3.8	4.7	5.6	6.6	7.7	8.9	10.1	11.4	12.7
108	0.5	0.9	1.3	1.7	2.2	2.8	3.4	4.1	4.8	5.6	6.4	7.3	8.2
110	0.8	1.3	2.0	2.7	3.6	4.6	5.7	6.9	8.2	9.6	11.1	12.7	14.4
111	0.8	1.5	2.2	3.2	4.2	5.5	6.9	8.4	10.1	11.9	13.9	16.0	18.2
103, 104, 119	0.4	0.7	1.1	1.5	1.9	2.4	3.0	3.6	4.2	4.9	5.6	6.4	7.2
121	1.1	1.6	2.3	2.9	3.7	4.4	5.3	6.1	7.0	8.0	8.9	10.0	11.0
50, 51, 52, 53, 54, 55, 56, 58, 59, 62, 63, 64, 65, 66, 69, 100, 101, 102, 106, 109, 112, 113, 114, 116, 117, 118, 120, 122, 124, 127, 133, 134, 135, 137, 138, 139, 140, 142, 143, 144, 321, 322, 323, 475, 755, 756, 757, 758, 800, 803, 810, 811, 814, 823, 826, 829, 843, 846, 847, 850, 902, 990	0.5	1.0	1.5	2.2	2.9	3.8	4.9	6.0	7.3	8.6	10.1	11.8	13.5
125, 136	0.7	1.2	1.7	2.3	3.0	3.7	4.6	5.4	6.4	7.4	8.4	9.5	10.7
128	1.1	1.8	2.6	3.5	4.5	5.6	6.8	8.2	9.6	11.1	12.7	14.3	16.1
129	0.8	1.2	1.7	2.3	2.9	3.6	4.2	5.0	5.7	6.6	7.4	8.3	9.2
131	0.9	1.5	2.1	2.9	3.8	4.8	5.9	7.1	8.3	9.7	11.1	12.6	14.2
15, 200, 201, 202, 510, 511, 512, 513, 514	0.7	1.1	1.6	2.1	2.7	3.3	4.0	4.7	5.4	6.2	7.0	7.8	8.7
43, 241	0.7	1.1	1.6	2.3	3.0	3.8	4.7	5.7	6.8	7.9	9.2	10.5	11.8
240, 260, 261, 262	0.8	1.5	2.4	3.6	4.9	6.5	8.4	10.4	12.8	15.3	18.2	21.2	24.6
11, 14, 17, 20, 21, 22, 40, 41, 42, 81, 92, 98, 231, 242, 251, 252, 263, 264	0.5	0.8	1.2	1.6	2.1	2.6	3.2	3.8	4.5	5.2	5.9	6.7	7.5
211, 212	0.4	0.7	1.0	1.3	1.7	2.1	2.6	3.1	3.6	4.2	4.8	5.4	6.1
300, 303, 304, 310, 311, 312, 316, 317, 319, 320, 341, 356, 357, 358, 367, 381, 391, 420, 421, 424, 471, 481, 490, 491, 550, 551, 555, 561, 571, 580, 581, 582, 583, 591, 631, 653, 680, 681, 682, 683, 684, 701, 711, 760, 761, 763, 764, 765, 766, 768, 769, 770, 771, 772, 773, 774, 821, 852, 853, 854, 855, 856, 857, 858, 859, 860, 863, 864, 865, 866, 873, 874, 876, 877, 882, 883, 884, 885, 886, 887, 888, 890, 891, 895, 896, 897, 906, 907, 908, 909, 912, 913, 914, 915, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 934, 935, 936, 937, 940, 982, 986, 987, 988, 989, 991, 994, 995, 996, 997, 999	1.0	1.6	2.2	3.0	3.8	4.6	5.5	6.5	7.5	8.6	9.7	10.9	12.1
350, 351, 352, 353, 355, 492	1.3	1.9	2.6	3.3	4.1	5.0	5.9	6.8	7.8	8.9	9.9	11.0	12.1
314, 315, 318, 330, 331, 332, 333, 334, 336, 337, 370, 371, 372, 377, 450, 451, 452, 531, 552, 712	1.2	2.0	3.0	4.2	5.6	7.2	9.0	11.0	13.1	15.4	17.8	20.5	23.3
373, 374, 375, 378, 379	1.1	1.9	3.0	4.2	5.6	7.2	9.0	11.0	13.1	15.5	18.0	20.7	23.6

Table 5d. Stocking values for all trees 5.0 inches and greater observed on the four subplots only

Species	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+
360, 361, 362, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 422, 423, 431, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 520, 521, 522, 549, 641, 660, 661, 662, 663, 664, 801, 802, 804, 805, 806, 807, 808, 809, 812, 813, 815, 816, 817, 818, 819, 820, 822, 824, 825, 827, 828, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 845, 901, 931, 981, 5091, 5092, 5093	1.2	2.0	2.9	3.9	5.0	6.2	7.5	8.9	10.4	11.9	13.6	15.3	17.2
600, 601, 602, 603, 604, 605, 606	1.4	2.1	2.9	3.9	4.9	5.9	7.1	8.3	9.6	10.9	12.3	13.7	15.2
220, 221, 222, 611, 690, 691, 692, 693, 694	0.7	1.3	1.9	2.7	3.6	4.6	5.7	7.0	8.3	9.8	11.4	13.1	14.9
741, 743, 746	1.2	1.8	2.5	3.2	4.0	4.9	5.8	6.8	7.8	8.9	10.0	11.1	12.3
540, 541, 542, 543, 545, 546, 547, 548, 621, 650, 651, 652, 654, 655, 657, 658, 720, 721, 722, 762, 993, 7211	1.0	1.4	1.8	2.2	2.6	3.0	3.5	3.9	4.3	4.8	5.2	5.7	6.2
950, 951, 952, 953	1.0	1.8	2.8	4.0	5.5	7.2	9.1	11.3	13.7	16.3	19.1	22.2	25.5
313, 345, 460, 461, 462, 463, 544, 729, 730, 731, 732, 740, 742, 744, 745, 747, 748, 749, 752, 753, 970, 971, 972, 973, 974, 975, 976, 977	1.2	2.0	3.0	4.2	5.6	7.2	8.9	10.9	13.0	15.2	17.7	20.3	23.1

Table 5e. Stocking values for all trees < 7 inches observed on one acre

	DBH of the largest tally tree in the condition																			
	5.0+						4.0-4.9					3.0-3.9				2.0-2.9			1.0-1.9		Seedling
	DBH of tally tree						DBH of tally tree					DBH of tally tree				DBH of tally tree			DBH of tally tree		
Species	5.0-6.9	4.0-4.9	3.0-3.9	2.0-2.9	1.0-1.9	Seed-ling	4.0-4.9	3.0-3.9	2.0-2.9	1.0-1.9	Seed-ling	3.0-3.9	2.0-2.9	1.0-1.9	Seed-ling	2.0-2.9	1.0-1.9	Seed-ling	1.0-1.9	Seedling	Seedling
10, 12, 16, 18, 19, 70, 71, 90, 91, 93, 94, 96, 97, 992	0.12	0.092	0.069	0.054	0.035	0.016	0.105	0.083	0.062	0.040	0.019	0.102	0.076	0.050	0.023	0.099	0.065	0.031	0.096	0.047	0.094
72, 73, 844	0.10	0.075	0.057	0.044	0.028	0.013	0.086	0.068	0.050	0.033	0.015	0.083	0.062	0.041	0.019	0.081	0.053	0.025	0.079	0.038	0.076
57, 61, 95	0.11	0.083	0.063	0.048	0.031	0.014	0.094	0.075	0.056	0.036	0.017	0.092	0.068	0.045	0.021	0.089	0.059	0.028	0.087	0.042	0.084
67, 68, 105, 107, 115, 123, 126, 130, 132, 230, 232, 250	0.16	0.122	0.092	0.071	0.046	0.021	0.139	0.110	0.082	0.053	0.025	0.135	0.100	0.066	0.031	0.131	0.086	0.041	0.128	0.062	0.124
108	0.09	0.066	0.050	0.039	0.025	0.011	0.075	0.060	0.044	0.029	0.013	0.073	0.055	0.036	0.017	0.071	0.047	0.022	0.069	0.034	0.067
110	0.13	0.097	0.073	0.057	0.037	0.016	0.111	0.088	0.065	0.043	0.020	0.108	0.080	0.052	0.025	0.105	0.069	0.033	0.102	0.049	0.099
111	0.14	0.104	0.079	0.061	0.039	0.018	0.119	0.095	0.070	0.046	0.021	0.116	0.086	0.056	0.027	0.113	0.074	0.036	0.110	0.053	0.107
103, 104, 119	0.07	0.055	0.042	0.032	0.021	0.009	0.063	0.050	0.037	0.024	0.011	0.062	0.046	0.030	0.014	0.060	0.039	0.019	0.058	0.028	0.056
121	0.18	0.134	0.102	0.079	0.051	0.023	0.153	0.122	0.090	0.059	0.027	0.149	0.111	0.073	0.034	0.145	0.095	0.046	0.141	0.068	0.137
50, 51, 52, 53, 54, 55, 56, 58, 59, 62, 63, 64, 65, 66, 69, 100, 101, 102, 106, 109, 112, 113, 114, 116, 117, 118, 120, 122, 124, 127, 133, 134, 135, 137, 138, 139, 140, 142, 143, 144, 321, 322, 323, 475, 755, 756, 757, 758, 800, 803, 810, 811, 814, 823, 826, 829, 843, 846, 847, 850, 902, 990	0.09	0.067	0.051	0.039	0.025	0.011	0.077	0.061	0.045	0.029	0.014	0.074	0.055	0.036	0.017	0.072	0.048	0.023	0.070	0.034	0.068
125, 136	0.12	0.090	0.068	0.053	0.034	0.015	0.103	0.082	0.061	0.040	0.018	0.100	0.075	0.049	0.023	0.098	0.064	0.031	0.095	0.046	0.092
128	0.18	0.136	0.103	0.079	0.051	0.023	0.155	0.123	0.091	0.059	0.028	0.151	0.112	0.073	0.035	0.147	0.096	0.046	0.142	0.069	0.138
129	0.13	0.100	0.076	0.059	0.038	0.017	0.114	0.091	0.067	0.044	0.020	0.111	0.083	0.054	0.026	0.108	0.071	0.034	0.105	0.051	0.102
131	0.15	0.110	0.083	0.065	0.042	0.019	0.126	0.100	0.074	0.048	0.023	0.123	0.091	0.060	0.028	0.119	0.078	0.038	0.116	0.056	0.113
15, 200, 201, 202, 510, 511, 512, 513, 514	0.12	0.090	0.068	0.053	0.034	0.015	0.103	0.082	0.061	0.040	0.018	0.100	0.075	0.049	0.023	0.098	0.064	0.031	0.095	0.046	0.092
43, 241	0.11	0.081	0.061	0.047	0.031	0.014	0.093	0.074	0.055	0.036	0.017	0.090	0.067	0.044	0.021	0.088	0.058	0.028	0.085	0.041	0.083
240, 260, 261, 262	0.14	0.102	0.077	0.060	0.039	0.017	0.117	0.093	0.069	0.045	0.021	0.114	0.084	0.055	0.026	0.110	0.073	0.035	0.107	0.052	0.104
11, 14, 17, 20, 21, 22, 40, 41, 42, 81, 92, 98, 231, 242, 251, 252, 263, 264	0.09	0.063	0.048	0.037	0.024	0.011	0.072	0.057	0.043	0.028	0.013	0.070	0.052	0.034	0.016	0.068	0.045	0.022	0.067	0.032	0.065
211, 212	0.07	0.050	0.038	0.029	0.019	0.009	0.057	0.046	0.034	0.022	0.010	0.056	0.042	0.027	0.013	0.054	0.036	0.017	0.053	0.026	0.051
300, 303, 304, 310, 311, 312, 316, 317, 319, 320, 341, 356, 357, 358, 367, 381, 391, 420, 421, 424, 471, 481, 490, 491, 550, 551, 555, 561, 571, 580, 581, 582, 583, 591, 631, 653, 680, 681, 682, 683, 684, 701, 711, 760, 761, 763, 764, 765, 766, 768, 769, 770, 771, 772, 773, 774, 821, 852, 853, 854, 855, 856, 857, 858, 859, 860, 863, 864, 865, 866, 873, 874, 876, 877, 882, 883, 884, 885, 886, 887, 888, 890, 891, 895, 896, 897, 906, 907, 908, 909, 912, 913, 914, 915, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 934, 935, 936, 937, 940, 982, 986, 987, 988, 989, 991, 994, 995, 996, 997, 999	0.17	0.128	0.097	0.075	0.048	0.022	0.146	0.116	0.086	0.056	0.026	0.142	0.105	0.069	0.033	0.138	0.091	0.043	0.134	0.065	0.130
350, 351, 352, 353, 355, 492	0.21	0.156	0.118	0.091	0.059	0.026	0.178	0.141	0.105	0.068	0.032	0.173	0.128	0.084	0.040	0.168	0.111	0.053	0.163	0.079	0.159
314, 315, 318, 330, 331, 332, 333, 334, 336, 337, 370, 371, 372, 377, 450, 451, 452, 531, 552, 712	0.19	0.145	0.110	0.085	0.055	0.025	0.165	0.131	0.097	0.063	0.030	0.161	0.120	0.078	0.037	0.156	0.103	0.049	0.152	0.074	0.148

Table 5e. Stocking values for all trees < 7 inches observed on one acre

	DBH of the largest tally tree in the condition																				
	5.0+						4.0-4.9					3.0-3.9				2.0-2.9			1.0-1.9		Seedling
	DBH of tally tree						DBH of tally tree					DBH of tally tree				DBH of tally tree			DBH of tally tree		
Species	**5.0-6.9**	**4.0-4.9**	**3.0-3.9**	**2.0-2.9**	**1.0-1.9**	**Seed-ling**	**4.0-4.9**	**3.0-3.9**	**2.0-2.9**	**1.0-1.9**	**Seed-ling**	**3.0-3.9**	**2.0-2.9**	**1.0-1.9**	**Seed-ling**	**2.0-2.9**	**1.0-1.9**	**Seed-ling**	**1.0-1.9**	**Seedling**	**Seedling**
373, 374, 375, 378, 379	0.19	0.140	0.106	0.082	0.053	0.024	0.160	0.127	0.094	0.061	0.028	0.155	0.115	0.076	0.036	0.151	0.099	0.047	0.147	0.071	0.142
360, 361, 362, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 422, 423, 431, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 520, 521, 522, 549, 641, 660, 661, 662, 663, 664, 801, 802, 804, 805, 806, 807, 808, 809, 812, 813, 815, 816, 817, 818, 819, 820, 822, 824, 825, 827, 828, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 845, 901, 931, 981, 5091, 5092, 5093	0.21	0.155	0.117	0.090	0.058	0.026	0.176	0.140	0.104	0.068	0.032	0.172	0.128	0.084	0.039	0.167	0.110	0.053	0.162	0.079	0.158
600, 601, 602, 603, 604, 605, 606	0.23	0.169	0.128	0.099	0.064	0.029	0.193	0.153	0.114	0.074	0.034	0.188	0.140	0.091	0.043	0.183	0.120	0.057	0.178	0.086	0.172
220, 221, 222, 611, 690, 691, 692, 693, 694	0.12	0.091	0.069	0.053	0.034	0.015	0.104	0.083	0.061	0.040	0.019	0.101	0.075	0.049	0.023	0.098	0.065	0.031	0.096	0.046	0.093
741, 743, 746	0.20	0.146	0.110	0.085	0.055	0.025	0.166	0.132	0.098	0.064	0.030	0.162	0.120	0.079	0.037	0.157	0.103	0.049	0.153	0.074	0.148
540, 541, 542, 543, 545, 546, 547, 548, 621, 650, 651, 652, 654, 655, 657, 658, 720, 721, 722, 762, 993, 7211	0.17	0.124	0.094	0.072	0.047	0.021	0.141	0.112	0.083	0.054	0.025	0.138	0.102	0.067	0.032	0.134	0.088	0.042	0.130	0.063	0.126
950, 951, 952, 953	0.16	0.123	0.093	0.072	0.046	0.021	0.140	0.111	0.083	0.054	0.025	0.136	0.101	0.066	0.031	0.133	0.087	0.042	0.129	0.063	0.125
313, 345, 460, 461, 462, 463, 544, 729, 730, 731, 732, 740, 742, 744, 745, 747, 748, 749, 752, 753, 970, 971, 972, 973, 974, 975, 976, 977	0.19	0.143	0.109	0.084	0.054	0.024	0.164	0.130	0.097	0.063	0.029	0.159	0.118	0.078	0.037	0.155	0.102	0.049	0.151	0.073	0.146

Table 5f. Stocking values for all trees 5.0 inches and greater observed on one acre

Species	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+
10, 12, 16, 18, 19, 70, 71, 90, 91, 93, 94, 96, 97, 992	0.12	0.19	0.26	0.34	0.43	0.53	0.63	0.73	0.84	0.96	1.08	1.20	1.33
72, 73, 844	0.10	0.17	0.24	0.33	0.44	0.55	0.67	0.81	0.95	1.11	1.27	1.45	1.63
57, 61, 95	0.11	0.15	0.19	0.23	0.27	0.31	0.35	0.39	0.43	0.48	0.52	0.56	0.60
67, 68, 105, 107, 115, 123, 126, 130, 132, 230, 232, 250	0.16	0.26	0.37	0.49	0.63	0.78	0.94	1.11	1.29	1.48	1.68	1.89	2.11
108	0.09	0.14	0.21	0.29	0.37	0.47	0.57	0.69	0.81	0.94	1.07	1.22	1.37
110	0.13	0.22	0.33	0.46	0.60	0.77	0.95	1.15	1.37	1.60	1.85	2.12	2.40
111	0.14	0.24	0.37	0.53	0.71	0.91	1.14	1.40	1.68	1.98	2.31	2.66	3.04
103, 104, 119	0.07	0.12	0.18	0.25	0.32	0.41	0.50	0.60	0.70	0.82	0.94	1.07	1.20
121	0.18	0.27	0.38	0.49	0.61	0.74	0.88	1.02	1.17	1.33	1.49	1.66	1.83
50, 51, 52, 53, 54, 55, 56, 58, 59, 62, 63, 64, 65, 66, 69, 100, 101, 102, 106, 109, 112, 113, 114, 116, 117, 118, 120, 122, 124, 127, 133, 134, 135, 137, 138, 139, 140, 142, 143, 144, 321, 322, 323, 475, 755, 756, 757, 758, 800, 803, 810, 811, 814, 823, 826, 829, 843, 846, 847, 850, 902, 990	0.09	0.16	0.25	0.36	0.49	0.64	0.81	1.00	1.21	1.44	1.69	1.96	2.25
125, 136	0.12	0.20	0.28	0.39	0.50	0.62	0.76	0.91	1.06	1.23	1.40	1.59	1.78
128	0.18	0.29	0.43	0.58	0.75	0.94	1.14	1.36	1.60	1.84	2.11	2.39	2.68
129	0.13	0.21	0.29	0.38	0.48	0.59	0.71	0.83	0.96	1.09	1.23	1.38	1.53
131	0.15	0.24	0.36	0.49	0.64	0.80	0.98	1.18	1.39	1.61	1.85	2.10	2.36
15, 200, 201, 202, 510, 511, 512, 513, 514	0.12	0.19	0.27	0.35	0.45	0.55	0.66	0.78	0.90	1.03	1.16	1.30	1.45
43, 241	0.11	0.18	0.27	0.38	0.50	0.64	0.79	0.95	1.13	1.32	1.53	1.74	1.97
240, 260, 261, 262	0.14	0.25	0.40	0.59	0.82	1.09	1.39	1.74	2.13	2.56	3.03	3.54	4.10
11, 14, 17, 20, 21, 22, 40, 41, 42, 81, 92, 98, 231, 242, 251, 252, 263, 264	0.09	0.14	0.20	0.27	0.35	0.44	0.53	0.64	0.75	0.86	0.98	1.11	1.25
211, 212	0.07	0.11	0.16	0.22	0.28	0.35	0.43	0.51	0.60	0.69	0.79	0.90	1.01
300, 303, 304, 310, 311, 312, 316, 317, 319, 320, 341, 356, 357, 358, 367, 381, 391, 420, 421, 424, 471, 481, 490, 491, 550, 551, 555, 561, 571, 580, 581, 582, 583, 591, 631, 653, 680, 681, 682, 683, 684, 701, 711, 760, 761, 763, 764, 765, 766, 768, 769, 770, 771, 772, 773, 774, 821, 852, 853, 854, 855, 856, 857, 858, 859, 860, 863, 864, 865, 866, 873, 874, 876, 877, 882, 883, 884, 885, 886, 887, 888, 890, 891, 895, 896, 897, 906, 907, 908, 909, 912, 913, 914, 915, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 934, 935, 936, 937, 940, 982, 986, 987, 988, 989, 991, 994, 995, 996, 997, 999	0.17	0.27	0.37	0.49	0.63	0.77	0.92	1.08	1.25	1.43	1.62	1.81	2.01
350, 351, 352, 353, 355, 492	0.21	0.31	0.43	0.56	0.69	0.83	0.98	1.14	1.31	1.48	1.65	1.83	2.02
314, 315, 318, 330, 331, 332, 333, 334, 336, 337, 370, 371, 372, 377, 450, 451, 452, 531, 552, 712	0.19	0.33	0.50	0.71	0.94	1.21	1.50	1.83	2.18	2.56	2.97	3.41	3.88
373, 374, 375, 378, 379	0.19	0.32	0.49	0.70	0.93	1.20	1.50	1.83	2.19	2.58	3.00	3.45	3.93

Table 5f. Stocking values for all trees 5.0 inches and greater observed on one acre

Species	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+
360, 361, 362, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 422, 423, 431, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 520, 521, 522, 549, 641, 660, 661, 662, 663, 664, 801, 802, 804, 805, 806, 807, 808, 809, 812, 813, 815, 816, 817, 818, 819, 820, 822, 824, 825, 827, 828, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 845, 901, 931, 981, 5091, 5092, 5093	0.21	0.33	0.48	0.64	0.83	1.03	1.24	1.48	1.73	1.99	2.27	2.56	2.86
600, 601, 602, 603, 604, 605, 606	0.23	0.35	0.49	0.64	0.81	0.99	1.18	1.38	1.60	1.82	2.05	2.29	2.54
220, 221, 222, 611, 690, 691, 692, 693, 694	0.12	0.21	0.32	0.45	0.60	0.77	0.95	1.16	1.39	1.63	1.90	2.18	2.48
741, 743, 746	0.20	0.30	0.41	0.54	0.67	0.82	0.97	1.13	1.30	1.48	1.66	1.85	2.05
540, 541, 542, 543, 545, 546, 547, 548, 621, 650, 651, 652, 654, 655, 657, 658, 720, 721, 722, 762, 993, 7211	0.17	0.23	0.30	0.36	0.43	0.50	0.58	0.65	0.72	0.80	0.87	0.95	1.03
950, 951, 952, 953	0.16	0.29	0.46	0.67	0.91	1.20	1.52	1.88	2.28	2.71	3.19	3.70	4.26
313, 345, 460, 461, 462, 463, 544, 729, 730, 731, 732, 740, 742, 744, 745, 747, 748, 749, 752, 753, 970, 971, 972, 973, 974, 975, 976, 977	0.19	0.33	0.50	0.70	0.93	1.19	1.49	1.81	2.16	2.54	2.95	3.38	3.85

Table 5g. Minimum number of trees per acre for forest land based on largest tally tree

Species	DBH of largest tally tree																
	Seed-ling	1.0-1.9	2.0-2.9	3.0-3.9	4.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+
10, 12, 16, 18, 19, 70, 71, 90, 91, 93, 94, 96, 97, 992	106.9	103.8	100.9	98.1	95.5	81.2	53.0	38.1	29.1	23.2	19.0	16.0	13.7	11.9	10.4	9.3	8.3	7.5
72, 73, 844	130.8	127.0	123.4	120.0	116.8	99.3	60.3	41.0	29.9	22.9	18.2	14.8	12.4	10.5	9.0	7.9	6.9	6.1
57, 61, 95	118.7	115.3	112.0	108.9	106.0	90.1	66.6	52.7	43.5	37.0	32.2	28.4	25.5	23.0	21.0	19.3	17.9	16.6
67, 68, 105, 107, 115, 123, 126, 130, 132, 230, 232, 250	80.6	78.3	76.1	74.0	72.0	61.2	38.7	27.2	20.3	15.9	12.9	10.7	9.0	7.8	6.8	5.9	5.3	4.7
108	148.4	144.1	140.0	136.2	132.6	112.7	69.1	47.3	34.7	26.7	21.3	17.4	14.6	12.4	10.7	9.3	8.2	7.3
110	101.0	98.1	95.3	92.7	90.2	76.7	45.6	30.4	21.9	16.5	13.0	10.5	8.7	7.3	6.2	5.4	4.7	4.2
111	93.9	91.2	88.6	86.1	83.8	71.3	41.1	26.9	19.0	14.1	10.9	8.7	7.1	6.0	5.0	4.3	3.8	3.3
103, 104, 119	177.2	172.0	167.2	162.6	158.2	134.5	81.8	55.6	40.5	31.1	24.7	20.1	16.8	14.2	12.2	10.6	9.4	8.3
121	73.0	70.9	68.9	67.0	65.2	55.4	36.6	26.6	20.4	16.4	13.5	11.4	9.8	8.5	7.5	6.7	6.0	5.5
50, 51, 52, 53, 54, 55, 56, 58, 59, 62, 63, 64, 65, 66, 69, 100, 101, 102, 106, 109, 112, 113, 114, 116, 117, 118, 120, 122, 124, 127, 133, 134, 135, 137, 138, 139, 140, 142, 143, 144, 321, 322, 323, 475, 755, 756, 757, 758, 800, 803, 810, 811, 814, 823, 826, 829, 843, 846, 847, 850, 902, 990	146.4	142.1	138.1	134.3	130.7	111.1	62.5	40.0	27.8	20.4	15.6	12.3	10.0	8.3	6.9	5.9	5.1	4.4
125, 136	108.5	105.4	102.4	99.6	96.9	82.4	51.0	35.1	25.9	20.0	16.0	13.2	11.0	9.4	8.1	7.1	6.3	5.6
128	72.3	70.2	68.2	66.4	64.6	54.9	34.0	23.4	17.3	13.3	10.7	8.8	7.4	6.3	5.4	4.7	4.2	3.7
129	97.8	95.0	92.3	89.8	87.4	74.3	48.1	34.3	26.1	20.7	16.9	14.1	12.1	10.4	9.2	8.1	7.3	6.5
131	88.9	86.3	83.9	81.5	79.4	67.5	41.1	28.0	20.5	15.7	12.5	10.2	8.5	7.2	6.2	5.4	4.8	4.2
15, 200, 201, 202, 510, 511, 512, 513, 514	108.5	105.3	102.4	99.6	96.9	82.4	52.9	37.5	28.3	22.3	18.2	15.2	12.9	11.1	9.7	8.6	7.7	6.9
43, 241	120.9	117.4	114.1	111.0	108.0	91.8	54.7	36.6	26.4	20.0	15.7	12.7	10.5	8.9	7.6	6.6	5.7	5.1
240, 260, 261, 262	96.0	93.2	90.6	88.1	85.7	72.9	39.7	24.8	16.9	12.2	9.2	7.2	5.7	4.7	3.9	3.3	2.8	2.4
11, 14, 17, 20, 21, 22, 40, 41, 42, 81, 92, 98, 231, 242, 251, 252, 263, 264	154.8	150.3	146.1	142.0	138.2	117.5	72.7	50.1	36.9	28.5	22.8	18.8	15.7	13.4	11.6	10.2	9.0	8.0
211, 212	195.0	189.3	184.0	178.9	174.1	148.0	91.3	62.7	46.2	35.7	28.5	23.4	19.6	16.7	14.4	12.6	11.1	9.9
300, 303, 304, 310, 311, 312, 316, 317, 319, 320, 341, 356, 357, 358, 367, 381, 391, 420, 421, 424, 471, 481, 490, 491, 550, 551, 555, 561, 571, 580, 581, 582, 583, 591, 631, 653, 680, 681, 682, 683, 684, 701, 711, 760, 761, 763, 764, 765, 766, 768, 769, 770, 771, 772, 773, 774, 821, 852, 853, 854, 855, 856, 857, 858, 859, 860, 863, 864, 865, 866, 873, 874, 876, 877, 882, 883, 884, 885, 886, 887, 888, 890, 891, 895, 896, 897, 906, 907, 908, 909, 912, 913, 914, 915, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 934, 935, 936, 937, 940, 982, 986, 987, 988, 989, 991, 994, 995, 996, 997, 999	76.9	74.6	72.5	70.5	68.7	58.4	37.6	26.7	20.2	16.0	13.0	10.9	9.2	8.0	7.0	6.2	5.5	5.0

Table 5g. Minimum number of trees per acre for forest land based on largest tally tree

Species	DBH of largest tally tree																	
	Seed-ling	**1.0-1.9**	**2.0-2.9**	**3.0-3.9**	**4.0-4.9**	**5.0-6.9**	**7.0-8.9**	**9.0-10.9**	**11.0-12.9**	**13.0-14.9**	**15.0-16.9**	**17.0-18.9**	**19.0-20.9**	**21.0-22.9**	**23.0-24.9**	**25.0-26.9**	**27.0-28.9**	**29.0+**
350, 351, 352, 353, 355, 492	63.0	61.2	59.5	57.8	56.3	47.8	31.9	23.3	18.0	14.5	12.0	10.2	8.8	7.7	6.8	6.1	5.5	4.9
314, 315, 318, 330, 331, 332, 333, 334, 336, 337, 370, 371, 372, 377, 450, 451, 452, 531, 552, 712	67.8	65.8	63.9	62.2	60.5	51.4	30.1	19.9	14.2	10.6	8.3	6.7	5.5	4.6	3.9	3.4	2.9	2.6
373, 374, 375, 378, 379	70.2	68.1	66.2	64.4	62.7	53.3	30.9	20.3	14.4	10.7	8.3	6.7	5.5	4.6	3.9	3.3	2.9	2.5
360, 361, 362, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 422, 423, 431, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 520, 521, 522, 549, 641, 660, 661, 662, 663, 664, 801, 802, 804, 805, 806, 807, 808, 809, 812, 813, 815, 816, 817, 818, 819, 820, 822, 824, 825, 827, 828, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 845, 901, 931, 981, 5091, 5092, 5093	63.5	61.6	59.9	58.2	56.7	48.2	30.1	20.9	15.6	12.1	9.7	8.0	6.8	5.8	5.0	4.4	3.9	3.5
600, 601, 602, 603, 604, 605, 606	58.0	56.3	54.7	53.2	51.8	44.0	28.6	20.5	15.6	12.3	10.1	8.5	7.2	6.3	5.5	4.9	4.4	3.9
220, 221, 222, 611, 690, 691, 692, 693, 694	107.7	104.5	101.6	98.8	96.2	81.7	47.7	31.4	22.4	16.8	13.1	10.5	8.6	7.2	6.1	5.3	4.6	4.0
741, 743, 746	67.4	65.4	63.6	61.8	60.2	51.2	33.6	24.3	18.6	14.8	12.2	10.3	8.8	7.7	6.8	6.0	5.4	4.9
540, 541, 542, 543, 545, 546, 547, 548, 621, 650, 651, 652, 654, 655, 657, 658, 720, 721, 722, 762, 993, 7211	79.2	76.9	74.7	72.6	70.7	60.1	43.4	33.7	27.5	23.1	19.8	17.4	15.4	13.8	12.5	11.5	10.5	9.8
950, 951, 952, 953	79.9	77.6	75.4	73.3	71.3	60.6	33.9	21.6	14.9	10.9	8.4	6.6	5.3	4.4	3.7	3.1	2.7	2.3
313, 345, 460, 461, 462, 463, 544, 729, 730, 731, 732, 740, 742, 744, 745, 747, 748, 749, 752, 753, 970, 971, 972, 973, 974, 975, 976, 977	68.4	66.4	64.5	62.7	61.0	51.9	30.4	20.1	14.3	10.7	8.4	6.7	5.5	4.6	3.9	3.4	3.0	2.6

Appendix 6. 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:

(a) 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.
b) 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
c) 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.
d) 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.
e) 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.

Accessible Other Forest Land – Land that meets the definition of accessible forest land, but is incapable of producing 20 cubic feet per acre per year of industrial wood under natural conditions because of adverse site conditions (SITE CLASS = 7). Adverse conditions include sterile soils, dry climate, poor drainage, high elevation, steepness and soil rockiness.

ACTUAL LENGTH – For trees with broken or missing tops. The actual length of the tree is recorded to the nearest 1.0 foot from ground level to the highest remaining portion of the tree still present and attached to the bole. If the top is intact, this item may be omitted. Forked trees should be treated the same as unforked trees.

Agricultural Land – Land managed for crops, pasture, or other agricultural use. Evidence includes geometric field and road patterns, fencing, and the traces produced by livestock or mechanized equipment. The area must be at least 1.0 acre in size and 120.0 feet wide at the point of occurrence.

Annular plot – a circular ring with a beginning radius of 24.0 feet from subplot center and an ending radius of 58.9 feet.

ARTIFICIAL REGENERATION SPECIES – Indicates the predominant species that is planted or seeded in an artificially regenerated condition.

Black Knot – Visible branches, stubs or sockets that do not conform to the definition of sound red knots.

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.

BOARD-FOOT CULL – Solid wood cull due to sweep, crook, and excessive knot collars, as well as unsound cull due to rotten or missing wood. Board-foot cull is expressed as a percentage of the sawlog portion of the tree.

Bole – The main stem of a tree, extending from one foot above the ground to the point on the tree where DOB reaches 4 inches.

Botched plot – A plot that should not be included in the standard inventory data base due to data collection errors or other problems.

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.

Census Water – Rivers and streams that are more than 200 feet wide and bodies of water that are greater than 4.5 acres in size.

Certification plot – a plot installed by a certification candidate. It may be a training plot or a production plot. The candidate working alone installs the plot.

Cold check – An inspection of a production plot done either as part of the training process, periodic review of field crew performance, or as part of the ongoing QA/QC program. Normally the installation crew is not present at the time of inspection. The inspector has the completed data in-hand at the time of inspection. The inspection can include the whole plot or a subset of the plot. Discrepancies between the inspection crew measurements and the production crew measurements are identified, and changes may be made to production data to correct these errors. Cold checks are done on production plots only.

CONDITION CLASS – The combination of discrete landscape and forest attributes that identify and define different strata on the plot. Examples of such attributes include condition class status, forest type, stand origin, stand size, owner group, reserve status and stand density.

Cropland – Land under cultivation within the past 24 months, including orchards and land in soil improving crops, but excluding land cultivated in developing improved pasture.

CROWN CLASS – A classification of trees based on dominance in relation to adjacent trees within the stand as indicated by crown development and the amount of sunlight received from above and sides.

Cull – Portions of a tree that are unusable for industrial wood products because of rot, form, or other defect.

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.

Ephermeral – A stream that flows only in direct response to precipitation or surface run-off.

Federal Information Processing Standard (FIPS) – A unique code identifying U.S. States and counties (or units in Alaska).

Forest Industry Land – Land owned by companies or individuals that operate wood-using plants.

Forest Trees – Plants having a well-developed, woody stem and usually more than 12 feet in height at maturity.

FOREST TYPE – A classification of forest land based upon the trees or tree communities that constitute the majority of stocking on the site.

GPS – Global Positioning System. Information from this system is collected and used to determine the latitude and longitude of each plot.

Hardwoods – Dicotyledonous trees, usually broad-leaved and deciduous.

Hot check – an inspection normally done as part of the training process. The inspector is present on the plot with the trainee and provides immediate feedback regarding data quality. Data errors are corrected. Hot checks can be done on training plots or production plots.

Idle Farmland -- Former cropland or pasture that has not been tended within the last 2 years and that has less than 10 percent stocking with live trees.

Improved Pasture -- Land that is currently maintained and used for grazing. Evidence of maintenance, besides the degree of grazing, includes condition of fencing, presence of stock ponds, periodic brush removal, seeding, irrigation, or mowing.

Inclusion – An area that would generally would be recognized as a separate condition, except that it is not large enough to qualify. For example, a ½ acre pond within a forested stand.

Industrial Wood – All roundwood products, except firewood.

Inspection crew – a crew of qualified QC/QA individuals whose primary responsibility is the training, certification and inspection of production crews.

Intermittent – A stream that flows for protracted periods only when it receives ground water discharge or long-continued contributions from melting snow or other surface and shallow subsurface sources.

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.

Macroplot – A circular, fixed area plot with a radius of 58.9 feet. Macroplots may be used for sampling relatively rare events.

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.

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.

MORTALITY – Remeasure trees and saplings that were alive at the time of the last visit, but are now dead. Does not include trees or saplings that have been utilized.

National Forest Land – Federal lands which have been legally designated as National Forests or purchase units, and other lands under the administration of the Forest Service, including experimental areas and Bankhead-Jones Title III lands.

Native American (Indian) Land – Tribal lands held in fee, or trust, by the Federal government but administered for Indian tribal groups and Indian trust allotments. This land is considered “Private Lands”, Owner Group 40.

Noncensus Water – Bodies of water from 1 to 4.5 acres in size and water courses from 30 feet to 200 feet in width.

Nonforest Land -- Land that does not support, or has never supported, forests, and lands formerly forested where use for timber management is precluded by development for other uses. Includes areas used for crops, improved pasture, residential areas, city parks, improved roads of any width and adjoining rights-of-way, power line clearings of any width, and noncensus water. If intermingled in forest areas, unimproved roads and nonforest strips must be more than 120.0 feet wide, and clearings, etc., more than one acre in size, to qualify as nonforest land.

Nonstockable – Areas of forest land that are not capable of supporting trees because of the presence of rock, water, etc.

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.

Phase 1 (P1) – FIA activities done as part of remote-sensing and/or aerial photography.

Phase 2 (P2) – FIA activities done on the network of ground plots formerly known as FIA plots.

Phase 3 (P3) – FIA activities done on a subset of Phase 2 plots formerly known as Forest Health Monitoring plots. Additional ecological indicator information is collected from Phase 3 plots.

Plot – A cluster of four subplots that samples approximately 1/6 acre. The subplots are established so that subplot 1 is centered within the sample and the centers of subplots 2, 3,and 4 are located 120.0 feet from the center of subplot 1 at azimuths of 360, 120, and 240 degrees, respectively. Each subplot has an associated microplot and macroplot.

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.

Red Knot – Visible branches, stubs or sockets that are from living branches or branches that have recently died. They are inter-grown with the surrounding wood and contain no rot.

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.

Reserved Land – Land that is withdrawn from timber utilization by a public agency or by law, such as national parks, national monuments and designated wilderness areas on federal lands. State parks are not usually classified as reserved.

RESERVE STATUS – An indication of whether the land in a condition has been reserved.

ROTTEN/MISSING CULL – An assessment of the rotten, missing, or otherwise defective portions of a tree bole that are unsuitable for industrial wood products. Cubic-foot cull is expressed as a percentage of the entire bole.

Saplings – Live trees 1.0 to 4.9 inches DBH.

Seedlings – Conifer seedlings must be at least 6.0 inches in length and less than 1.0 inch at DBH/DRC in order to qualify for tallying, except Longleaf pine must be at least 0.5 in 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 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.

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 24.0 feet. Each subplot represents ¼ of the fixed plot sample unit.

TOTAL LENGTH – The total length of the tree, recorded to the nearest 1.0 foot from ground level to the tip of the apical meristem. For trees growing on a slope, measure on the uphill side of the tree. If the tree has a broken or missing top, the total length is estimated to what the length would be if there were no missing or broken top. Forked trees should be treated the same as unforked trees

Training (practice) plot – A plot established for training or certification purposes only. It is NOT a plot in the ongoing inventory process and data from these plots do not become part of the standard inventory data base. To ensure that these plots do not enter into the inventory data base, they are assigned plot numbers outside the normal range of production plots or other invalid plot identification information such as an invalid STATE code (STATECD).

Transition Zone – An area where a distinct boundary between two or more different conditions cannot be determined.

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Appendix 7. Tolerance / MQO / Value / Units / Field Width/ When Collected Table

Core optional variables are in italics. N/A is not applicable. Variables with both a core and core optional listing are marked with an asterisk.

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
General Description						
New Subplot Location	+/- 7 feet	At least 95% of the time	N/A	feet	N/A	N/A
New Microplot Location	+/- 1 foot	At least 95% of the time	N/A	feet	N/A	N/A
Plot Level Data						
STATE	No errors	At least 99% of the time	Appendix 1	N/A	2 digits	All plots
COUNTY	No errors	At least 99% of the time	Appendix 1	N/A	3 digits	All plots
PLOT NUMBER	No errors	At least 99% of the time	00001 to 99999	N/A	5 digits	All plots
PLOT STATUS	No errors	At least 99% of the time	1 to 3	N/A	1 digit	All plots
NONFOREST SAMPLING STATUS	No errors	At least 99% of the time	0 to 1	N/A	1 digit	All plots
NONFOREST PLOT STATUS	No errors	At least 99% of the time	1 to 3	N/A	1 digit	When PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1
PLOT NONSAMPLED REASON	No errors	At least 99% of the time	01 to 03 and 05 to 11	N/A	2 digits	When PLOT STATUS = 3
NONFOREST PLOT NONSAMPLED REASON	No errors	At least 99% of the time	02, 03, 08, 09, 10	N/A	2 digits	When PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS = 3
SUBPLOTS EXAMINED	No errors	At least 90% of the time	1, 4	N/A	1 digit	All plots
SAMPLE KIND	No errors	At least 99% of the time	1 to 3	N/A	1 digit	All plots
PREVIOUS PLOT NUMBER	No errors	At least 99% of the time	00001 to 99999	N/A	5 digits	When SAMPLE KIND = 3
FIELD GUIDE VERSION	No errors	At least 99% of the time	7.0	N/A	2 digits	All plots
YEAR	No errors	At least 99% of the time	≥ 2003	year	4 digits	All plots
MONTH	No errors	At least 99% of the time	Jan – Dec (01 – 12)	month	2 digits	All plots
DAY	No errors	At least 99% of the time	01 to 31	day	2 digits	All plots
DECLINATION	*No errors*	*At least 99% of the time*	*+/- 50*	*degrees*	*5 digits including sign (+xxx.y)*	*CORE OPTIONAL: All plots*
HORIZONTAL DISTANCE TO IMPROVED ROAD	No errors	At least 90% of the time	1 to 9	N/A	1 digit	When PLOT STATUS = 1 or PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS =1
WATER ON PLOT	No errors	At least 90% of the time	0 to 5, 9	N/A	1 digit	When PLOT STATUS = 1 or PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS = 1
QA STATUS	No errors	At least 99% of the time	1 to 7	N/A	1 digit	All plots

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Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
CREW NUMBER	No errors	At least 99% of the time	NRS 240001-249999 SRS 330001-339999 RMRS 220001-229999 PNW 260001-269999	N/A	6 digits	All plots
GPS UNIT	No errors	At least 99% of the time	0, 2, 3, 4	N/A	1 digit	All field visited plots
GPS SERIAL NUMBER	No errors	At least 99% of the time	000001 to 999999	N/A	6 digits	When GPS UNIT > 0
GPS ENTRY METHOD	No errors	At least 99% of the time	0, 1	N/A	1 digit	GPS UNIT > 0
GPS DATUM	No errors	At least 99% of the time	NAD83	N/A	5 characters (cccnn)	GPS UNIT > 0
COORDINATE SYSTEM	No errors	At least 99% of the time	1, 2	N/A	1 digit	GPS UNIT > 0
LATITUDE DEGREES	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	00-90	degrees	3 digits (1st digit is + or -, last 2 digits are numeric)	All plots where GPS UNIT >0
LATITUDE MINUTES	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	00 – 59	minutes	2 digits	All plots where GPS UNIT >0
LATITUDE SECONDS	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	0.00 – 59.99	seconds	4 digits	All plots where GPS UNIT >0
LONGITUDE DEGREES	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	001 – 180	degrees	4 digits (1st digit is + or -, last 3 digits are numeric)	All plots where GPS UNIT >0
LONGITUDE MINUTES	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	00 – 59	minutes	2 digits	All plots where GPS UNIT >0
LONGITUDE SECONDS	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	0.00 – 59.99	seconds	4 digits	All plots where GPS UNIT >0
UTM ZONE	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	Number varies from 2 in Alaska to 19 on the East Coast. The letter varies from Q in Hawaii to W in Alaska	N/A	3 digits: (##C)	When COORDINATE SYSTEM = 2
EASTING (X) UTM	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	0000000-9999999		7 digits	When COORDINATE SYSTEM = 2

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Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
NORTHING (Y) UTM	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	0000000-9999999		7 digits	When COORDINATE SYSTEM = 2
AZIMUTH TO PLOT CENTER	+/- 3 degrees	At least 99% of the time	000 at plot center 001 to 360 not at plot center	degrees	3 digits	When GPS UNIT = 2, 3 or 4
DISTANCE TO PLOT CENTER	+/- 6 ft.	At least 99% of the time	000 at plot center 001 to 200 if a Laser range finder not used 001 to 999 if a Laser range finder is used	feet	3 digits	When GPS UNIT = 2, 3 or 4
GPS ELEVATION	No errors	At least 99% of the time	-00100 to 20000	feet	6 digits (1st digit is + or -, last 5 digits are numeric)	When GPS UNIT = 2 or 4
GPS ERROR	No errors	At least 99% of the time	000 to 999	feet	3 digits	When GPS UNIT = 2
NUMBER OF READINGS	No errors	At least 99% of the time	001 to 999	N/A	3 digits	When GPS UNIT = 2
GPS FILENAME	*No errors*	*At least 99% of the time*	*English words, phrases and numbers*	*N/A*	15 characters	When GPS UNIT = 3
MACROPLOT BREAKPOINT DIAMETER	*No errors*	*At least 99% of the time*	*21, 24, and 30*	*inches*	2 digits (xx)	All plots
PLOT NOTES	N/A	N/A	English, alpha-numeric	N/A	Unlimited alphanumeric character field	All plots
P2 VEGETATION SAMPLING STATUS	No errors	At least 99% of the time	0, 1, 2	N/A	1 digit	All plots
LEVEL OF DETAIL	No errors	At least 99% of the time	1, 2, 3	N/A	1 digit	When P2 VEGETATION SAMPLING STATUS = 1 or 2
INVASIVE PLANT SAMPLING STATUS	No errors	At least 99% of the time	0, 1, 2	N/A	1 digit	All plots
INVASIVE PLANT SPECIMEN COLLECTION RULE	No errors	At least 99% of the time	0, 1	N/A	1 digit	Downloaded on all plots where INVASIVE PLANT SAMPLING STATUS = 1 or 2
DWM SAMPLING STATUS (BASE)	No errors	At least 99% of the time	0, 1, 2, 3	N/A	1 digit	All plots
DWM NUMBER OF SUBPLOTS (BASE)	No errors	At least 99% of the time	1 to 4	N/A	1 digit	All plots where DWM SAMPLING STATUS >0
DWM NUMBER OF TRANSECTS ON SUBPLOT (BASE)	No errors	At least 99% of the time	1, 2, 3	N/A	1 digit	All plots where DWM SAMPLING STATUS >0
DWM TRANSECT LENGTH (BASE)	+/- 1 ft.	At least 95% of the time	24.0 to 58.9	feet	3 digits (xx.y)	All plots where DWM SAMPLING STATUS >0
DWM SUBPLOT LIST	No errors	At least 99% of the time	1000 to 4000	N/A	4 digits	All plots where DWM SAMPLING STATUS >0
DWM NOTES (BASE)	N/A	N/A	English language words, phrases, and numbers	N/A	Unlimited alphanumeric character field	All plots where DWM SAMPLING STATUS >0, as needed
SRS CYCLE	No errors	At least 99% of the time	01 to 99	n/a	2 digits	All plots
SRS SUBCYCLE	No errors	At least 99% of the time	1 to 5	n/a	2 digits	All plots

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Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
SRS PHASE	No errors	At least 99% of the time	2, 3	n/a	1 digit	All plots
SRS PLOT IN CORRECT COUNTY?	No errors	At least 99% of the time	0 or 1	n/a	1 digit	All plots
SRS CORRECT COUNTY	No errors	at least 99% of the time	Appendix 1	n/a	3 digits	All plots where PLOT IN CORRECT COUNTY = 0
SRS PAST YEAR	No errors	At least 99% of the time	≤ 2003	n/a	4 digits	SAMPLE KIND = 2
SRS PAST MONTH	No errors	At least 99% of the time	01 - 12	n/a	2 digits	SAMPLE KIND = 2
SRS PAST DAY	No errors	At least 99% of the time	01- 31	n/a	2 digits	SAMPLE KIND = 2
SRS NUMBER OF ACCESSIBLE FORESTLAND CONDITIONS	No errors	at least 99% of the time	0 to 9	n/a	1 digit	PLOT STATUS = 1 (Paper tally only)
SRS PLOT ACCESSIBILITY	No errors	at least 99% of the time	1-9	n/a	1 digit	All plots
SRS GPS STATUS	No errors	At least 99% of the time	1, 8, 9	n/a	1 digit	All plots
SRS AUTHORIZATION CODE	No errors	At least 99% of the time	00001 - 99999	n/a	5 digits	When PLOT STATUS = 3
Condition Class Information						
CONDITION CLASS NUMBER	No errors	At least 99% of the time	1 to 9	N/A	1 digit	All condition classes
CONDITION CLASS STATUS	No errors	At least 99% of the time	1, 2, 3, 4, 5	N/A	1 digit	All condition classes
CONDITION NONSAMPLED REASON	No errors	At least 99% of the time	01, 02, 03, 05, 06, 07, 08, 09, 10, 11	N/A	2 digits	When CONDITION CLASS STATUS = 5
NONFOREST CONDITION CLASS STATUS	No errors	At least 99% of the time	2, 5	N/A	1 digit	When CONDITION CLASS STATUS = 2 and NONFOREST SAMPLING STATUS = 1
NONFOREST CONDITION NONSAMPLED REASON	No errors	At least 99% of the time	02, 03, 10	N/A	2 digits	When CONDITION CLASS STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST CONDITION CLASS STATUS = 5
RESERVED STATUS*	No errors	At least 99% of the time	0, 1	N/A	1 digit	CORE: CONDITION CLASS STATUS = 1 CORE OPTIONAL: All condition classes
OWNER GROUP*	No errors	At least 99% of the time	10, 20, 30, 40	N/A	2 digits	CORE: CONDITION CLASS STATUS = 1 CORE OPTIONAL: All condition classes Field width: 2 digits
FOREST TYPE	No errors in group or type	At least 99% of the time in group At least 95% of the time in type no MQO when STAND SIZE CLASS = 0	Appendix 2	N/A	3 digits	When CONDITION CLASS STATUS = 1
STAND SIZE CLASS	No errors	At least 99% of the time	0, 1, 2, 3, 4, 5	class	1 digit	When CONDITION CLASS STATUS = 1
REGENERATION STATUS	No errors	At least 99% of the time	0, 1	N/A	1 digit	When CONDITION CLASS STATUS = 1
TREE DENSITY	No errors	At least 99% of the time	1, 2, 3	N/A	1 digit	When CONDITION CLASS STATUS = 1
OWNER CLASS*	No errors	At least 99% of the time	11-13; 21-25; 31-33; 41-45	class	2 digits	CORE: When CONDITION CLASS STATUS = 1 CORE OPTIONAL: All condition classes
OWNER SUB-CLASS	*No errors*	*At least 95% of the time*	*1-4*	*N/A*	*1 digit*	*When OWNER CLASS = 31*
PUBLIC ADMINISTRATIVELY WITHDRAWN STATUS	*No errors*	*At least 99% of the time*	*0, 1*	*N/A*	*1 digit*	*When OWNER CLASS <40 and RESERVED STATUS=0*
ADMINISTRATIVELY WITHDRAWN AREA NAME	*No errors*	*At least 99% of the time*	*English language word, phrases, and numbers*	*N/A*	*Alphanumeric character field*	*All conditions with PUBLIC ADMINISTRATIVELY WITHDRAWN STATUS=1*
ADMINISTRATIVELY WITHDRAWN NOTES	*N/A*	*N/A*	*English language word, phrases, and numbers*	*N/A*	Unlimited alphanumeric character field	*When ADMINISTRATIVELY WITHDRAWN STATUS is 0 or 1*

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Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
RESERVED AREA NAME	No errors	At least 99% of the time	English language word, phrases, and numbers	N/A	Alphanumeric character field	All conditions with RESERVED STATUS=1
ARTIFICIAL REGENERATION SPECIES	No errors	At least 99% of the time	Appendix 3	N/A	4 digits	When CONDITION CLASS STATUS = 1 and REGENERATION STATUS = 1
STAND AGE	+/- 10%	At least 95% of the time	000 to 997, 998, 999	number of years	3 digits	When CONDITION CLASS STATUS = 1
DISTURBANCE 1	No errors	At least 99% of the time	00; 10-12; 20-22; 30-32;40-46; 50-54; 60; 70; 80; 90-95	N/A	2 digits	When CONDITION CLASS STATUS = 1 or NONFOREST SAMPLING STATUS = 1 and NONFOREST CONDITION CLASS STATUS = 2
DISTURBANCE YEAR 1	+/- 1 year for 5-year measurement cycles +/ 2 years for >5-year measurement cycles	At least 99% of the time	Since the previous plot visit, or the past 5 years for plots visited for the first time; 9999 if disturbance occurs continuously over time	year	4 digits	When DISTURBANCE 1 > 00
DISTURBANCE 2	No errors	At least 99% of the time	00; 10-12; 20-22; 30-32;40-46; 50-54; 60; 70; 80; 90-95	N/A	2 digits	When CONDITION CLASS STATUS = 1 or NONFOREST SAMPLING STATUS = 1 and NONFOREST CONDITION CLASS STATUS = 2
DISTURBANCE YEAR 2	+/- 1 year for 5-year measurement cycles +/ 2 years for >5-year measurement cycles	At least 99% of the time	Since the previous plot visit, or the past 5 years for plots visited for the first time; 9999 if disturbance occurs continuously over time	year	4 digits	When DISTURBANCE 2 > 00
DISTURBANCE 3	No errors	At least 99% of the time	00; 10-12; 20-22; 30-32;40-46; 50-54; 60; 70; 80; 90-95	N/A	2 digits	When CONDITION CLASS STATUS = 1 or NONFOREST SAMPLING STATUS = 1 and NONFOREST CONDITION CLASS STATUS = 2
DISTURBANCE YEAR 3	+/- 1 year for 5-year measurement cycles +/ 2 years for >5-year measurement cycles	At least 99% of the time	Since the previous plot visit, or the past 5 years for plots visited for the first time; 9999 if disturbance occurs continuously over time	year	4 digits	When DISTURBANCE 3 > 00
TREATMENT 1	No errors	At least 99% of the time	00, 10, 20, 30, 40, 50	N/A	2 digits	When CONDITION CLASS STATUS = 1
TREATMENT YEAR 1	+/- 1 year for 5-year measurement cycles +/- 2 years for >5-year measurement cycles	At least 99% of the time	Since the previous plot visit, or the past 5 years for plots visited for the first time	year	4 digits	When TREATMENT 1 > 00
TREATMENT 2	No errors	At least 99% of the time	00, 10, 20, 30, 40, 50	N/A	2 digits	When CONDITION CLASS STATUS = 1
TREATMENT YEAR 2	+/- 1 year for 5-year measurement cycles +/- 2 years for >5-year measurement cycles	At least 99% of the time	Since the previous plot visit, or the past 5 years for plots visited for the first time	year	4 digits	When TREATMENT 2 > 00
TREATMENT 3	No errors	At least 99% of the time	00, 10, 20, 30, 40, 50	N/A	2 digits	When CONDITION CLASS STATUS = 1
TREATMENT YEAR 3	+/- 1 year for 5-year measurement cycles +/- 2 years for >5-year measurement cycles	At least 99% of the time	Since the previous plot visit, or the past 5 years for plots visited for the first time	year	4 digits	When TREATMENT 3 > 00
PHYSIOGRAPHIC CLASS	No errors	At least 80% of the time	xeric: 11, 12, 13, 19 mesic: 21, 22, 23, 24, 25, 29 hydric: 31, 32, 33, 34, 35, 39	N/A	2 digits	When CONDITION CLASS STATUS = 1 or NONFOREST SAMPLING STATUS = 1 and NONFOREST CONDITION CLASS STATUS = 2

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Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
LAND COVER CLASS	No errors	At least 95% of the time	01-10	N/A	2 digits	All condition classes
PRESENT NONFOREST LAND USE	No errors	At least 99% of the time	10-17; 20; 30-34; 40, 41, 42, 43, 45	N/A	2 digits	CONDITION CLASS STATUS = 2
CANOPY COVER SAMPLE METHOD	None	At least 90% of the time	1-4	N/A	1 digit	CONDITION CLASS STATUS = 1, 2, or 5
LIVE CANOPY COVER	No errors for 0-12% live canopy cover; 10% for 13-20% live canopy cover; 25% for 21-100% live canopy cover	At least 99% of the time	00-99 (where 99 = 99-100)	percent	2 digits	CONDITION CLASS STATUS = 1, 2, or 5
LIVE PLUS MISSING CANOPY COVER	No errors% for 0-12% live plus missing canopy cover; 10% for 13-20% live plus missing canopy cover; 25% for 21-100% live plus missing canopy cover	At least 80% of the time	00-99 (where 99 = 99-100)	percent	2 digits	CONDITION CLASS STATUS = 1, 2, or 5
CURRENT AFFORESTATION CODE	No errors	At least 99% of the time	0, 1	N/A	1 digit	CONDITION CLASS STATUS = 1 or 2
PREVIOUS AFFORESTATION CODE	No errors	At least 99% of the time	0, 1	N/A	1 digit	When SAMPLE KIND = 2 and CONDITION CLASS STATUS = 1 or 2
TOTAL STEMS	10%	At least 90% of the time	00000-99999	N/A	5 digits	CURRENT AFFORESTATION CODE = 1 or PREVIOUS AFFORESTATION CODE = 1
CHAINING CODE	No errors	At least 99% of the time	0, 1	N/A	1 digit	When CONDITION CLASS STATUS = 1 or 2
CONDITION FUELBED TYPE (OPTIONAL)	*+/- 1 class within a type*	*At least 80% of the time*	*GR1, GR2, GR3, GR4, GR5, GR6, GR7, GR8, GR9, GS1, GS2, GS3, GS4, SB1, SB2, SB3, SB4, SH1, SH2, SH3, SH4, SH5, SH6, SH7, SH8, SH9, TL1, TL2, TL3, TL4, TL5, TL6, TL7, TL8, TL9, TU1, TU2, TU3, TU4, TU5, NB1, NB2, NB3, NB8, NB9*	*N/A*	*3 alpha-numeric characters*	*All conditions where DWM SAMPLING STATUS >0*
SRS PRESENT LAND USE	No errors	At least 99% of the time	01-02; 10-17; 20; 30-34; 40-45; 91; 92; 99	n/a	2 digits	All condition classes
SRS TRACT TOTAL ACRES	No errors	At least 99% of the time	00001- 99999	n/a	5 digits	CONDITION CLASS STATUS = 1 and OWNER GROUP = 40
SRS TRACT PERCENT FOREST	No errors	At least 99% of the time	001- 100	n/a	3 digits	CONDITION CLASS STATUS = 1 and OWNER GROUP = 40
SRS STAND STRUCTURE	No errors	At least 99% of the time	0 - 2	n/a	1 digit	When CONDITION CLASS STATUS = 1
SRS OPERABILITY	No errors	At least 99% of the time	0 - 6	n/a	1 digit	When CONDITION CLASS STATUS = 1
SRS CONDITION SITE CLASS	+/- 1 class	At least 99% of the time	0 - 7	n/a	1 digit	When CONDITION CLASS STATUS = 1
SRS CUTTING TYPE 1, 2, 3	No errors	At least 99% of the time	11-16	n/a	2 digits	When TREATMENT 1, 2 or 3 = 10
SRS SECONDARY LAND USE	No errors	At least 99% of the time	01-02; 10-17; 20; 30-34; 40-45; 91; 92; 99	n/a	2 digits	When CONDITION CLASS STATUS = 1
SRS LIVE CANOPY COVER	No errors for 0-12% live canopy cover; 10% for 13-20% live canopy cover; 25% for 21-100% live canopy cover	At least 99% of the time	00-99 (where 99 = 99-100)	percent	2 digits	CONDITION CLASS STATUS = 1, 2, or 5

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Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
SRS LIVE PLUS MISSING CANOPY COVER	No errors% for 0-12% live plus missing canopy cover; 10% for 13-20% live plus missing canopy cover; 25% for 21-100% live plus missing canopy cover	At least 80% of the time	00-99 (where 99 = 99-100)	percent	2 digits	CONDITION CLASS STATUS = 1, 2, or 5
Subplot Information						
SUBPLOT NUMBER	No errors	At least 99% of the time	1, 2, 3, 4	N/A	1 digit	All subplots
SUBPLOT/ MACROPLOT STATUS	No errors	At least 99% of the time	1, 2, 3, 4	N/A	1 digit	All subplots
SUBPLOT NONSAMPLED REASON	No errors	At least 99% of the time	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11	N/A	2 digits	When SUBPLOT/MACROPLOT STATUS = 3
NONFOREST SUBPLOT/MACROPLOT STATUS	No errors	At least 99% of the time	1, 2, 3	N/A	1 digit	When NONFOREST SAMPLING STATUS = 1 and SUBPLOT/MACROPLOT STATUS = 2
NONFOREST SUBPLOT/MACROPLOT NONSAMPLED REASON	No errors	At least 99% of the time	02, 03, 04, 10	N/A	2 digits	When NONFOREST SAMPLING STATUS = 1 and SUBPLOT/MACROPLOT STATUS = 2 and NONFOREST SUBPLOT/MACROPLOT STATUS = 3
SUBPLOT CENTER CONDITION	No errors	At least 99% of the time	1 to 9	N/A	1 digit	All subplots
MICROPLOT CENTER CONDITION	No errors	At least 99% of the time	1 to 9	N/A	1 digit	All microplots
SUBPLOT SLOPE	+/- 10 %	At least 90% of the time	000 to 155	percent	3 digits	When SUBPLOT/MACROPLOT STATUS = 1 or NONFOREST SUBPLOT/MACROPLOT STATUS = 1
SUBPLOT ASPECT	+/- 10 degrees	At least 90% of the time	000 to 360	degrees	3 digits	When SUBPLOT/MACROPLOT STATUS = 1 or NONFOREST SUBPLOT/MACROPLOT STATUS = 1
SNOW/WATER DEPTH	+/- 0.5 ft.	At the time of measurement	0.0 to 9.9	feet	2 digits (x.y)	When SUBPLOT/MACROPLOT STATUS = 1 or NONFOREST SUBPLOT/MACROPLOT STATUS = 1)
SUBPLOT/ MACROPLOT CONDITION LIST	No errors	At least 99% of the time	1000 to 9876	N/A	4 digits	All plots
P2 VEG SUBPLOT SAMPLE STATUS	*No errors*	*At least 99% of the time*	*1, 2*	*N/A*	*1 digit*	*When P2 VEGETATION SAMPLING STATUS=1 and at least one accessible forest land condition (CONDITION CLASS STATUS = 1) exists within the 24-foot radius subplot, or P2 VEGETATION SAMPLING STATUS=2 and at least one accessible forest condition or measurable nonforest condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) exists within the 24-foot radius subplot.*
VEGETATION NONSAMPLED REASON	*No errors*	*At least 99% of the time*	*04, 05, 10*	*N/A*	*2 digits*	*On all subplots where P2 VEG SUBPLOT SAMPLE STATUS = 2*
VEGETATION SUBPLOT NOTES	*N/A*	*N/A*	*English language words, phrases, and numbers*	*N/A*	*2000 alphanumeric characters*	*VEGETATION NONSAMPLED REASON = 10 or as needed*

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
INVASIVE PLANT SUBPLOT SAMPLE STATUS	*No errors*	*At least 99% of the time*	*1, 2, 3*	*N/A*	*1 digit*	*On all subplots where invasive species are being sampled on accessible forest land (INVASIVE PLANT SAMPLING STATUS=1 and at least one accessible forest land condition (CONDITION CLASS STATUS = 1) exists within the 24-foot radius subplot, or invasive species are being sampled on all accessible land conditions (INVASIVE PLANT SAMPLING STATUS=2) and at least one accessible forest condition or measurable nonforest condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) exists within the 24-foot radius subplot*
INVASIVE PLANT NONSAMPLED REASON	*No errors*	*At least 99% of the time*	*4, 5, 10*	*N/A*	*2 digits*	*On all subplots where INVASIVE PLANT SUBPLOT SAMPLE STATUS = 3*
INVASIVE PLANT DATA NOTES	*N/A*	*N/A*	*English language words, phrases, and numbers*	*N/A*	*Unlimited alphanumeric character field*	*INVASIVE PLANT NONSAMPLED REASON=10 or as needed*
Boundary Data						
SUBPLOT NUMBER	No errors	At least 99% of the time	1, 2, 3 4	N/A	1 digit	All boundaries
PLOT TYPE	No errors	At least 99% of the time	1, 2, 3, 4	N/A	1 digit	All boundaries
BOUNDARY CHANGE	No errors	At least 99% of the time	0, 1, 2, 3	N/A	1 digit	SAMPLE KIND = 2, All boundaries
CONTRASTING CONDITION	No errors	At least 99% of the time	1 to 9	N/A	1 digit	All boundaries
LEFT AZIMUTH	+/- 5 degrees	At least 90% of the time	001 to 360	degrees	3 digits	All boundaries
CORNER AZIMUTH	+/- 5 degrees	At least 90% of the time	000 to 360	degrees	3 digits	All boundaries
CORNER DISTANCE	+/- 1 ft.	At least 90% of the time	microplot: 001 to 007 (6.8 ft.. actual limiting distance) subplot:001 to 024 macroplot: 001 to 059 (58.9 ft.. actual limiting distance) hectare: 001 to 185	feet	3 digits	All boundaries when CORNER AZIMUTH > 000
RIGHT AZIMUTH	+/- 10 degrees	At least 90% of the time	001 to 360	degrees	3 digits	All boundaries
Tree and Sapling Data						
SUBPLOT NUMBER	No errors	At least 99% of the time	1, 2, 3, 4	N/A	1 digit	All tree records
TREE RECORD NUMBER	No errors	At least 99% of the time	000, 001 to 999	N/A	3 digits	All tree records
CONDITION CLASS NUMBER	No errors	At least 99% of the time	1 to 9	N/A	1 digit	All tree records
AZIMUTH	+/- 3 degrees	At least 90% of the time	001 to 360	degrees	3 digits	All live and standing dead tally trees ≥ 1.0 inch DBH/DRC

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Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
HORIZONTAL DISTANCE	Microplot:+/- 0.2 ft.; Microplot woodland species: +/- 0.4 ft.; Subplot: +/- 1.0 ft. from 0.1 to 23.0 ft.; Subplot: +/-0.2 ft. from 23.1 to 24.0 ft.; Subplot multi-stemmed woodland species: +/- 2.0 ft.; Annular plot: +/- 3.0 ft. from 24.0 to 55.9 ft.; Annular plot: +/- 1.0 ft. from 55.9 to 58.9 ft.; Annular plot woodland species: +/- 6.0 ft.	At least 90% of the time	Microplot: 00.1 to 06.8 Subplot: 00.1 to 24.0 Annular plot: 24.1 to 58.9	feet	3 digits (xx.y)	All live and standing dead tally trees ≥ 1.0 inch DBH/DRC
PREVIOUS TREE STATUS	No errors	At least 95% of the time	1, 2	N/A	1 digit	On SAMPLE KIND = 2, all previously tallied trees ≥ 1.0 inch DBH
PRESENT TREE STATUS	No errors	At least 95% of the time	0, 1, 2, 3	N/A	1 digit	All new live and standing dead tally trees ≥ 1.0 inch DBH/DRC On remeasurement plots, all previously tallied trees
RECONCILE	No errors	At least 95% of the time	1 to 4: valid for new trees on the plot 5 to 9: valid for remeasured trees that no longer qualify as tally	N/A	1 digit	On SAMPLE KIND = 2; all new live and standing dead tally trees and saplings ≥ 1.0 inch DBH/DRC (PRESENT TREE STATUS = 1 or 2 and no PREVIOUS TREE STATUS) and all no status trees (PRESENT TREE STATUS = 0)
STANDING DEAD	No errors	At least 99% of the time	0, 1	N/A	1 digit	SAMPLE KIND = 2 only: All dead tally trees (PRESENT TREE STATUS = 2)
MORTALITY	*No errors*	*At least 85% of the time*	*0, 1*	*N/A*	*1 digit*	*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).*
SPECIES	No errors	At least 99% of the time for genus At least 95% of the time for species	Appendix 3	N/A	4 digits	All tree records
DIAMETER	+/- 0.1 inch per 20.0 inch increment of measured diameter on all live trees and dead trees with DECAY CLASS = 1, 2; +/-1.0 inch per 20.0 inch increment of measured diameter on dead trees with DECAY CLASS = 3, 4, 5; +/- 0.5 inch per 20.0 inch increment of measured diameter when a wedge or pentaprism is used for all trees; and estimated diameters trees ≥ 5.0 in diameter; For woodland species: +/- 0.2 inch per stem	At least 95% of the time	001.0 to 999.9	inches	4 digits (xxx.y)	All live and standing dead tally trees ≥ 1.0 inch DBH/DRC
DRC STEM DIAMETER	+/- 0.2 inch per stem	At least 95% of the time	001.0 to 999.9	inch	4 digits (xxx.y)	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

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Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
DRC STEM STATUS	No errors	At least 95% of the time	1, 2	N/A	1 digit	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
PAST NUMBER OF STEMS	No errors	At least 90% of the time	01 to 99	N/A	2 digits	Value is preprinted for SAMPLE KIND = 2 locations
CURRENT NUMBER OF STEMS	No errors	At least 90% of the time	01 to 99	N/A	2 digits	For tallied woodland species with at least one stem 1.0 inch in diameter or larger; includes woodland species tallied on the microplot
DIAMETER CHECK	No errors	At least 99% of the time	0, 1, 2	N/A	1 digit	All live and standing dead tally trees ≥ 1.0 inch DBH/DRC
ROTTEN / MISSING CULL*	+/- 10%	At least 90% of the time	00 to 99	percent	2 digits	CORE: All live tally trees ≥ 5.0 in DBH/DRC CORE OPTIONAL: All live and standing dead tally trees ≥ 5.0 in DBH/DRC
TOTAL LENGTH	+/- 10% of true length	At least 90% of the time	001 to 400	feet	3 digits	All live and standing dead tally trees ≥ 1.0 inch DBH/DRC
ACTUAL LENGTH	+/- 10% of true length	At least 90% of the time	001 to 400	feet	3 digits	All live and standing dead tally trees (with broken or missing tops) ≥1.0 inch DBH/DRC
LENGTH METHOD	No errors	At least 99% of the time	1,2, 3	N/A	1 digit	All live and standing dead tally trees ≥ 1.0 inch DBH/DRC
CROWN CLASS	No errors	At least 85% of the time	1, 2, 3, 4, 5	N/A	1 digit	All live tally trees ≥ 1.0 inch DBH/DRC
UNCOMPACTED LIVE CROWN RATIO*	+/- 10%	At least 90% of the time	00 to 99	percent	2 digits	Phase 2 CORE OPTIONAL: All live tally trees ≥ 5.0 inches DBH/DRC Phase 3 CORE: All live tally trees ≥ 1.0 inch DBH/DRC
COMPACTED CROWN RATIO	+/- 10%	At least 80% of the time	00 to 99	percent	2 digits	All live tally trees ≥ 1.0 inch DBH/DRC
DAMAGE AGENT 1*	No errors	Will be established following blind audit results	See Appendix 11	N/A	5 digits	CORE: All live tally trees ≥ 5.0 inches DBH/DRC CORE OPTIONAL: All live tally trees ≥ 1.0 inch DBH/DRC
DAMAGE AGENT 2*	No errors	Will be established following blind audit results	See Appendix 11	N/A	5 digits	CORE: All live tally trees ≥ 5.0 inches DBH/DRC CORE OPTIONAL: All live tally trees ≥ 1.0 inch DBH/DRC
DAMAGE AGENT 3*	No errors	Will be established following blind audit results	See Appendix 11	N/A	5 digits	CORE: All live tally trees ≥ 5.0 inches DBH/DRC CORE OPTIONAL: All live tally trees ≥ 1.0 inch DBH/DRC
CAUSE OF DEATH*	No errors	At least 80% of the time	10, 20, 30, 40, 50, 60, 70, 80	N/A	2 digits	CORE: SAMPLE KIND = 2 plots: all PREVIOUS TREE STATUS = 1 and PRESENT TREE STATUS = 2 or 3; or PRESENT TREE STATUS = 2 and RECONCILE = 1, 2, or 3 CORE OPTIONAL: SAMPLE KIND = 1 plots; all MORTALITY = 1
MORTALITY YEAR	*+/- 1year for 5-year measure. cycles* *+/- 2years for > 5-year measure. cycles*	*At least 70% of the time*	*1994 or higher*	*year*	*4 digits*	*Plots where SAMPLE KIND = 2: all PREVIOUS TREE STATUS = 1 and PRESENT TREE STATUS = 2 or 3; or PRESENT TREE STATUS = 2 and RECONCILE = 1, 2, or 3.*
DECAY CLASS	+/- 1 class	At least 90% of the time	1, 2, 3, 4, 5	class	1 digit	All standing dead tally trees ≥ 1.0 inch DBH/DRC
LENGTH TO DIAMETER MEASUREMENT POINT	*+/- 0.2 ft.*	*At least 90% of the time*	*00.1 – 15.0*	*feet*	*3 digits*	*CORE OPTIONAL: All live and standing dead tally trees (except woodland species) ≥ 1.0 inch DBH*
ROUGH CULL	*+/- 10%*	*At least 90% of the time*	*00 to 99*	*percent*	*2 digits*	*CORE OPTIONAL: All live tally trees ≥ 5.0 inches DBH/DRC*

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Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
DWARF MISTLETOE CLASS	*+/- 1 class*	*At least 90% of the time*	*0 to 6*	*class*	*1 digit*	*CORE OPTIONAL: All live conifer (except juniper) tally trees ≥ 1.0 inch DBH/DRC*
TREE NOTES	N/A	N/A	English, alpha-numeric	N/A	Alphanumeric character field	All trees
SRS TREE CLASS	No errors	At least 90% of the time	2, 3, 4	n/a	1 digit	All live tally trees ≥ 5.0 in DBH and all TREE STATUS = 2 and RECONCILE = 1-3.
SRS TREE GRADE	No errors	At least 90% of the time	1 to 5	n/a	1 digit	PRESENT TREE STATUS = 1 and TREE CLASS = 2; DBH ≥ 11.0 in for hardwoods or DBH ≥ 9.0 in for softwoods
PERCENT BOARD FOOT CULL	+/- 10%	At least 90% of the time	00 - 67	percent	2 digits	PRESENT TREE STATUS = 1 and TREE CLASS = 2; DBH ≥ 11.0 in for hardwoods or DBH ≥ 9.0 in for softwoods
SRS DIEBACK SEVERITY	+/- 1 class	At least 80% of the time	1 to 9	Class	1 digit	All live hardwood tally trees ≥ 5.0 in DBH
SRS UTILIZATION CLASS	No errors	At least 99% of the time	1, 2	n/a	1 digit	PRESENT TREE STATUS = 3
SRS SPECIES CODE	No errors	At least 99% of the time	00 - 04	n/a	2 digits	SPECIES CODE = 999
SRS ABNORMAL TERMINATION	No errors	at least 99% of the time	0, 1	n/a	1 digit	All standing trees
SRS SAPLING FUSIFORM	No errors	At least 80% of the time	0, 1	n/a	1 digit	All live saplings on the four microplots when SPECIES = 110, 111, 121, 126, 128 or 131
Seedling Data						
SUBPLOT NUMBER	No errors	At least 99% of the time	1, 2, 3, 4	N/A	1 digit	All counts of seedlings
SPECIES	No errors	At least 90% of the time for genus At least 85% of the time for species	Appendix 3	N/A	4 digits	All counts of seedlings
CONDITION CLASS NUMBER	No errors	At least 99% of the time	1-9	N/A	1 digit	All counts of seedlings
SEEDLING COUNT	No errors for 5 or less per species +/- 20% over a count of 5	At least 90% of the time	001-999	number	3 digits	Each accessible forest land condition class on each microplot
SRS SPECIES CODE	No errors	At least 99% of the time	00 - 04	n/a	2 digits	SPECIES CODE = 999
Site Tree Information						
CONDITION CLASS LIST	No errors	At least 99% of the time	1000 to 9876	N/A	4 digits	All site trees
SPECIES	No errors	At least 99% of the time for genus At least 95% of the time for species	See code list in text	N/A	4 digits	All site trees
DIAMETER	+/- 0.1 in per 20.0 in increment of measured diameter	At least 95% of the time	001.0 to 999.9	inches	4 digits (xxx.y)	All site trees
SITE TREE LENGTH	+/- 10% of true length	At least 90% of the time	005 to 999	feet	3 digits	All site trees
TREE AGE AT DIAMETER	+/- 5 years	At least 95% of the time	012 to 120 for softwoods; 013 to 120 for hardwoods, and 008 to 120 for longleaf pine	year	3 digits	All site trees
SITE TREE NOTES	N/A	N/A	English, language words, phrases and numbers	N/A	alphanumeric character field	All site trees as necessary
SUBPLOT NUMBER	*No errors*	*At least 99% of the time*	*1, 2, 3, 4*	*N/A*	*1 digit*	*All site trees*
AZIMUTH	*+/- 10 degrees*	*At least 90% of the time*	*001 to 360*	*degrees*	*3 digits*	*All site trees*
HORIZONTAL DISTANCE	*+/-5 ft.*	*At least 90% of the time*	*000.1 to 200.0*	*feet*	*4 digits (xxx.y)*	*All site trees*

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Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
SRS SITE CLASS	+/- 1 class	At least 99% of the time	0 - 7	n/a	1 digit	All site trees
Phase 2 (P2) Vegetation Profile						
SUBPLOT NUMBER	*No errors*	*At least 99% of the time*	*1,2 ,3, 4*	*N/A*	*1 digit*	*On all subplots where P2 Vegetation is being sampled (P2 VEGETATION SAMPLING STATUS = 1 or 2)*
CONDITION CLASS NUMBER	*No errors*	*At least 99% of the time*	*1 to 9*	*N/A*	*1 digit*	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS =1)*
TALLY TREE SPECIES COVER LAYER 1	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
TALLY TREE SPECIES COVER LAYER 2	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
TALLY TREE SPECIES COVER LAYER 3	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
TALLY TREE SPECIES COVER LAYER 4	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
TALLY TREE SPECIES COVER – AERIAL VIEW	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
NON-TALLY TREE SPECIES COVER LAYER 1	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*

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Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
NON-TALLY TREE SPECIES COVER LAYER 2	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
NON-TALLY TREE SPECIES COVER LAYER 3	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
NON-TALLY TREE SPECIES COVER LAYER 4	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
NON-TALLY TREE SPECIES COVER – AERIAL VIEW	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 1	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 2	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 3	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 4	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
SHRUB, SUBSHRUB, AND WOODY VINE COVER – AERIAL VIEW	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*

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Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
FORB COVER LAYER 1	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
FORB COVER LAYER 2	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
FORB COVER LAYER 3	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
FORB COVER LAYER 4	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
FORB COVER LAYER – AERIAL VIEW	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
GRAMINOID COVER LAYER 1	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
GRAMINOID COVER LAYER 2	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
GRAMINOID COVER LAYER 3	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
GRAMINOID COVER LAYER 4	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*

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Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
GRAMINOID COVER LAYER – AERIAL VIEW	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*000-100*	*percent*	3 digits	*Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)*
SPECIES GROWTH HABIT	*No errors*	*At least 95% of the time*	*SD, SH, FB, GR, LT*	*N/A*	*2 alphanumeric characters*	*LEVEL OF DETAIL = 2 or 3, and for each species recorded*
SPECIES CODE	*No errors*	*At least 80% of the time*	Accepted NRCS species code when the species is known, or an accepted NRCS genus or unknown code when the species is not known	*N/A*	*8 alphanumeric characters*	*LEVEL OF DETAIL = 2 or 3 and species total aerial canopy cover on the full subplot and within a SPECIES GROWTH HABIT is 3% or greater.*
UNIQUE SPECIES NUMBER	*No errors*	*At least 99% of the time*	*1-99, assigned in sequential numbers*	*N/A*	*2 digits*	*All species recorded*
SPECIES CANOPY COVER	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*001-100*	*percent*	3 digits	*For each plant species present on the subplot with total aerial canopy cover greater than or equal to 3% within a SPECIES GROWTH HABIT. A plant species is defined as a unique SPECIES CODE and UNIQUE SPECIES NUMBER pair.*
SPECIES VEGETATION LAYER	*No errors*	*At least 90% of the time*	*1, 2, 3, 4*	*N/A*	*1 digit*	*For each species recorded*
SPECIMEN OFFICIALLY COLLECTED	*No errors*	*At least 99% of the time*	*0, 1*	*N/A*	*1 digit*	*All species recorded*
SPECIMEN LABEL NUMBER	*No errors*	*At least 99% of the time*	*1 to 99999, as pre-printed and assigned by region or auto-generated in the PDR*	*N/A*	*5 digits*	*SPECIMEN OFFICIALLY COLLECTED = 1*
P2 SPECIMEN NOT COLLECTED REASON CODE	*No errors*	*At least 99% of the time*	*01, 02, 03, 04, 05, 06, 07, 10*	*N/A*	*2 digits*	*An unknown code or genus code is entered and SPECIMEN OFFICIALLY COLLECTED = 0*
VEGETATION SPECIES NOTES	*N/A*	*N/A*	*English language words, phrases, and numbers*	*N/A*	*unlimited alphanumeric character field*	*As needed*
Invasive Plants						
SUBPLOT NUMBER	*No errors*	*At least 99% of the time*	*1, 2, 3, 4*	*N/A*	*1 digit*	*On all subplots where INVASIVE PLANT SAMPLING STATUS = 1 or 2*
CONDITION CLASS NUMBER	*No errors*	*At least 99% of the time*	*1-9*	*N/A*	*1 digit*	*Any accessible measured land condition within subplots (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS =2) when invasive plants are being sampled on the subplot (INVASIVE PLANT SUBPLOT SAMPLE STATUS=1 or 2)*

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Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
SPECIES CODE	*No errors*	*At least 99% of the time*	*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.*	*N/A*	*8 alphanumeric characters*	*Any accessible measured land condition within subplots (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS =2) when invasive plants are being sampled on the subplot (INVASIVE PLANT SUBPLOT SAMPLE STATUS=1 or 2)*
UNIQUE SPECIES NUMBER	*No errors*	*At least 99% of the time*	*1-99, assigned in sequential numbers*	*N/A*	*2 digits*	*All species records*
SPECIES CANOPY COVER	*+/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%*	*At least 90% of the time*	*001-100*	*percent*	3 digits	*All species records*
INVASIVE SPECIMEN COLLECTED	*No errors*	*At least 99% of the time*	*0, 1*	*N/A*	*1 digit*	*All species records when INVASIVE PLANT SPECIMEN COLLECTION RULE = 1*
SPECIMEN LABEL NUMBER	*No errors*	*At least 99% of the time*	*1 to 99999, as pre-printed and assigned by FIA unit*	*N/A*	*5 digits*	*Where INVASIVE SPECIMEN COLLECTED=1*
INVASIVE PLANT NOTES	*N/A*	*N/A*	*English language words, phrases, and numbers*	*N/A*	*Unlimited alphanumeric character field*	*Required for each record with an unknown code and SPECIMEN LABEL NUMBER.*
Down Woody Materials						
SUBPLOT NUMBER	*No errors*	*At least 99% of the time*	*1, 2, 3, 4*	*N/A*	*1 digit*	*All transect segments on plots where DWM SAMPLING STATUS >0*
TRANSECT (BASE)	*No errors*	*At least 99% of the time*	*Subplot 1: 090, 270, 180** *Subplot 2: 360, 180, 270** *Subplot 3: 135, 315, 225** *Subplot 4: 045, 225, 315** **extra optional transect*	*degrees*	*3 digits*	*All transect segments where DWM SAMPLING STATUS > 0*
SEGMENT CONDITION CLASS NUMBER (BASE)	*No errors*	*At least 99% of the time*	*1 to 9*	*N/A*	*1 digit*	*All transect segments where DWM SAMPLING STATUS >0*
SEGMENT BEGINNING DISTANCE (BASE)	*+/- 1 ft.*	*At least 95% of the time*	*00.0 to 58.9*	*horizontal feet*	*3 digits (xx.y)*	*All transect segments where DWM SAMPLING STATUS >0*
SEGMENT ENDING DISTANCE (BASE)	*+/- 1 ft.*	*At least 95% of the time*	*00.1 to 58.9*	*horizontal feet*	*3 digits (xx.y)*	*All transect segments where DWM SAMPLING STATUS >0*
DWM TRANSECT SEGMENT SAMPLE STATUS (BASE)	*No errors*	*At least 99% of the time*	*0, 1*	*N/A*	*1 digit*	*All transect segments where DWM SAMPLING STATUS >0*
DWM TRANSECT SEGMENT NONSAMPLED REASON (BASE)	*No errors*	*At least 99% of the time*	*04, 05,10*	*N/A*	*2 digits*	*All transects where DWM TRANSECT SEGMENT SAMPLE STATUS = 0*
SUBPLOT NUMBER (BASE)	*No errors*	*At least 99% of the time*	*1, 2, 3, 4*	*N/A*	*1 digit*	*All tally pieces in CONDITION CLASS STATUS = 1 OR NONFOREST CONDITION CLASS STATUS = 2 where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*

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Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
TRANSECT (BASE)	*No errors*	*At least 99% of the time*	*Subplot 1: 090, 270, 180* Subplot 2: 360, 180, 270* Subplot 3: 135, 315, 225* Subplot 4: 045, 225, 315* *extra optional transect*	*degrees*	*3 digits*	*All tally pieces where DWM TRANSECT SAMPLE STATUS = 1*
CWD CONDITION CLASS (BASE)	*No errors*	*At least 90% of the time*	*1 to 9*	*N/A*	*1 digit*	*All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST C0NDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*
PIECE ON SUBPLOT OR ANNULAR PLOT? (BASE)	*No errors*	*At least 90% of the time*	*1, 2*	*N/A*	*1 digit*	*All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST C0NDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*
*CWD HORIZONTAL DISTANCE (WILDLIFE OPTION)**	*+/- 1.0 ft.*	*At least 90% of the time*	*00.0 to 58.9*	*feet*	*3 digits (xx.y)*	*WILDLIFE: All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2 where DWM TRANSECT SEGMENT SAMPLE STATUS = 1 and DWM SAMPLING STATUS =2 OPTIONAL: All tally pieces in CONDITION CLASS STATUS =1 or NONFOREST CONDITION CLASS STATUS = 2 where DWM TRANSECT SEGMENT SAMPLE STATUS = 1 and DWM SAMPLING STATUS = 1 or 3*
CWD DECAY CLASS (BASE)	*+/- 1 class*	*At least 90% of the time*	*1, 2, 3, 4, 5*	*class*	*1 digit*	*All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2 where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*
SPECIES (BASE)	*No errors*	*At least 80% of the time*	*See appendix 3*	*N/A*	*4 digits*	*All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2 where DWM TRANSECT SEGMENT SAMPLE STATUS = 1 and CWD DECAY CLASS = 1 to 4*
DIAMETER AT POINT OF INTERSECTION (BASE)	*Pieces <20.0 inches diameter: +/- 1 inch for decay class 1-4, +/- 2 inches for decay class 5 Pieces ≥ 20.0 inches diameter (decay classes 1-4): +/- 2 inches for each 20-inch increment >20.0 inches Pieces ≥ 20.0 inches diameter (decay class 5): +/- 3 inches for each 20-inch increment above 20.0 inches*	*At least 90% of the time*	*003 to 200*	*inches*	*3 digits*	*All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*
DIAMETER OF HOLLOW AT POINT OF INTERSECTION (BASE)	*Pieces < 20.0 inches diameter: +/- 1 inch Pieces ≥ 20.0 inches diameter: +/- 2 inches for each 20-inch increment above 20.0 inches*	*At least 80% of the time*	*000, 001 to 200*	*inches*	*3 digits*	*All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1 and CWD DECAY CLASS = 1 to 4*

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Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
DIAMETER AT THE SMALL END (WILDLIFE OPTION)	*Pieces < 20.0 inches diameter: +/- 1 inch* *Pieces > 20.0 inches diameter: +/- 2 inches for each 20-inch increment above 20.0 inches*	*At least 90% of the time*	*003 to 200*	*Inches*	*3 digits*	*WILDLIFE: All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CANDITION CLASS STATUS = 2, where DWM SAMPLING STATUS = 2, DWM TRANSECT SEGMENT SAMPLE STATUS = 1, CWD DECAY CLASS = 1 to 4, and CWD LENGTH ≥3 FEET = 1* *OPTIONAL: All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CANDITION CLASS STATUS = 2, where DWM SAMPLING STATUS = 1 or 3, DWM TRANSECT SEGMENT SAMPLE STATUS = 1, CWD DECAY CLASS = 1 to 4, and CWD LENGTH ≥3 FEET = 1*
DIAMETER AT THE LARGE END (WILDLIFE OPTION)	*Pieces < 20.0 inches diameter: +/- 1 inch* *Pieces > 20.0 inches diameter: +/- 2 inches for each 20-inch increment above 20.0 inches*	*At least 90% of the time*	*003 to 250*	*Inches*	*3 digits*	*WILDLIFE: All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM SAMPLING STATUS = 2, DWM TRANSECT SEGMENT SAMPLE STATUS = 1, CWD DECAY CLASS = 1 to 4, and CWD LENGTH ≥3 FEET = 1* *OPTIONAL: All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM SAMPLING STATUS = 1 or 3, DWM TRANSECT SEGMENT SAMPLE STATUS = 1, CWD DECAY CLASS = 1 to 4, and CWD LENGTH ≥3 FEET = 1*
CWD LENGTH >= 3 FEET (BASE)	*+/- 20%*	*At least 90% of the time*	*1, 2*	*N/A*	*1 digit*	*All tally pieces >0.5 foot long, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*
CWD TOTAL LENGTH (WILDLIFE OPTION)	*+/- 20%*	*At least 90% of the time*	*003 to 250*	*feet*	*3 digits*	*WILDLIFE: All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM SAMPLING STATUS = 2, DWM TRANSECT SEGMENT SAMPLE STATUS = 1, and CWD LENGTH ≥3 FEET = 1* *OPTIONAL: All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM SAMPLING STATUS = 1 or 3, DWM TRANSECT SEGMENT SAMPLE STATUS = 1, and CWD LENGTH ≥3 FEET = 1*
IS THE PIECE HOLLOW? (OPTIONAL)	*No errors*	*At least 90% of the time*	*0, 1*	*N/A*	*1 digit*	*All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1 and CWD DECAY CLASS = 1 to 4 and CWD LENGTH >=3 FEET = 1*
PIECE INCLINATION (OPTIONAL)	*+/- 5 degrees*	*At least 90% of the time*	*00 to 90*	*degrees*	*2 digits*	*All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*

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Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
CWD HISTORY (OPTIONAL)	*No errors*	*At least 90% of the time*	*1, 2, 3, 4, 5*	*N/A*	*1 digit*	*All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1 and CWD DECAY CLASS = 1 to 4*
PERCENT OF LOG CHARRED BY FIRE (OPTIONAL)	*+/- 1 class*	*At least 90% of the time*	*0, 1, 2, 3*	*class*	*1 digit*	*All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1, DIAMETER AT POINT OF INTERSECTION >20, and CWD DECAY CLASS = 1 to 3*
LARGE END DIAMETER CLASS (OPTIONAL)	*No errors*	*At least 90% of the time*	*1, 2, 3, 4, 5, 6*	*N/A*	*1 digit*	*All tally pieces where DWM TRANSECT SEGMENT SAMPLE STATUS = 1 and CWD DECAY CLASS = 1 to 4*
PILE SUBPLOT NUMBER (BASE)	*No errors*	*At least 99% of the time*	*1, 2, 3, 4*	*N/A*	*1 digit*	*All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*
PILE TRANSECT (BASE)	*No errors*	*At least 99% of the time*	*Subplot 1: 090, 270, 180* *Subplot 2: 360, 180, 270* *Subplot 3: 135, 315, 225* *Subplot 4: 045, 225, 315* *extra optional transect*	*N/A*	*3 digits*	*All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*
PILE CONDITION CLASS NUMBER (BASE)	*No errors*	*At least 99% of the time*	*1 to 9*	*N/A*	*1 digit*	*All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*
PILE BEGINNING DISTANCE (BASE)	*+/- 10 %*	*At least 90% of the time*	*00.0 to 58.8*	*feet*	*3 digits (xx.y)*	*All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*
PILE ENDING DISTANCE (BASE)	*+/- 10%*	*At least 90% of the time*	*00.1 to 58.9*	*feet*	*3 digits (xx.y)*	*All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*
COMPACTED HEIGHT OF CWD IN PILE (BASE)	*+/- 10%*	*At least 90% of the time*	*1 to 99*	*feet*	*2 digits*	*All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*
PILE DECAY CLASS (BASE)	*+/- 1 decay class*	*At least 90% of the time*	*1, 2, 3, 4, 5*	*class*	*1 digit*	*All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*
PILE SPECIES (BASE)	*No errors*	*At least 90% of the time*	*See appendix 3*	*N/A*	*4 digits*	*All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1 and PILE DECAY CLASS = 1 to 4*

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Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
FWD SUBPLOT NUMBER (BASE)	*No errors*	*At least 99% of the time*	*1, 2, 3, 4*	*N/A*	*1 digit*	*All FWD transect segments where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*
FWD TRANSECT (BASE)	*No errors*	*At least 99% of the time*	*Subplot 1: 270 Subplot 2: 360 Subplot 3: 135 Subplot 4: 225*	*N/A*	*3 digits*	*All FWD transect segments where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*
FWD CONDITION CLASS NUMBER (BASE)	*No errors*	*At least 99% of the time*	*1 to 9*	*N/A*	*1 digit*	*All FWD transect segments where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*
FWD TRANSECT SEGMENT SAMPLE STATUS (BASE)	*No errors*	*At least 99% of the time*	*0, 1*	*N/A*	*1 digit*	*All FWD transect segments where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*
FWD TRANSECT SEGMENT NONSAMPLED REASON (BASE)	*No errors*	*At least 99% of the time*	*04, 05, 10*	*N/A*	*2 digits*	*All FWD transect segments where FWD TRANSECT SEGMENT SAMPLE STATUS = 0*
SMALL FWD COUNT (BASE)	*0 to 50 = +/- 20% of the total count for the transect 51 to 100 = +/- 25% of the total count for the transect 100 + = +/- 50% of the total count for the transect*	*At least 90% of the time*	*000 to 999*	*pieces*	*3 digits*	*All FWD transect segments in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2 where FWD TRANSECT SEGMENT SAMPLE STATUS = 1*
MEDIUM FWD COUNT (BASE)	*+/- 20% of the total count for the transect*	*At least 90% of the time*	*000 to 999*	*pieces*	*3 digits*	*All FWD transect segments in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2 where FWD TRANSECT SEGMENT SAMPLE STATUS = 1*
LARGE FWD COUNT (BASE)	*+/- 20% of the total count for the transect*	*At least 90% of the time*	*000 to 500*	*pieces*	*3 digits*	*All FWD transect segments in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2 where FWD TRANSECT SEGMENT SAMPLE STATUS = 1*
HIGH COUNT REASON (BASE)	*No errors*	*At least 90% of the time*	*1, 2, 3, 4, 5*	*N/A*	*1 digit*	*All FWD transect segments in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2 where FWD TRANSECT SEGMENT SAMPLE STATUS = 1 and (SMALL FWD COUNT ≥ 100 or MEDIUM FWD COUNT ≥100 or LARGE FWD COUNT ≥100*
DUFF/LITTER SUBPLOT NUMBER (BASE)	*No errors*	*At least 99% of the time*	*1, 2, 3, 4*	*N/A*	*1 digit*	*All duff/litter transects where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*
DUFF/LITTER TRANSECT (BASE)	*No errors*	*At least 99% of the time*	*Subplot 1: 090, 270 Subplot 2: 360, 180 Subplot 3: 135, 315 Subplot 4: 045, 225*	*degrees*	*3 digits*	*All duff/litter transects where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*
DUFF/LITTER CONDITION CLASS NUMBER (BASE)	*No errors*	*At least 99% of the time*	*1 to 9*	*N/A*	*1 digit*	*All duff/litter transects where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*
DUFF/LITTER SAMPLE STATUS (BASE)	*No errors*	*At least 99% of the time*	*0, 1*	*N/A*	*1 digit*	*All duff/litter transects where DWM TRANSECT SEGMENT SAMPLE STATUS = 1*
DUFF/LITTER NONSAMPLED REASON (BASE)	*No errors*	*At least 99% of the time*	*04, 05, 10*	*N/A*	*2 digits*	*All duff/litter transects where DUFF/LITTER SAMPLE STATUS = 0*

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Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
DUFF DEPTH (BASE)	*+/- 0.5 inch*	*At least 90% of the time*	*00.0 to 24.0*	*inches*	*3 digits*	*All duff/litter transects in measureable conditions (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) where DUFF/LITTER SAMPLE STATUS = 1*
LITTER DEPTH (BASE)	*+/- 0.5 inch*	*At least 90% of the time*	*00.0 to 99.9*	*Inches*	*3 digits*	*All duff/litter transects in measureable conditions (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) where DUFF/LITTER SAMPLE STATUS = 1*
DUFF AND LITTER METHOD (BASE)	*No errors*	*At least 90% of the time*	*1, 2, 3, 4*	*N/A*	*1 digit*	*All duff/litter transects in measureable conditions (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) where DUFF/LITTER SAMPLE STATUS*

Appendix 8. Tree Coding Guide

Previous Measurement	Present Measurement	PREVIOUS TREE STATUS	PRESENT TREE STATUS	RECONCILE	Standing Dead	CAUSE OF DEATH
SAMPLE KIND 1 or 3						
	Live 1.0+ DBH/DRC	-	1			
	Standing dead 1.0+ DBH/DRC	-	2		Null – Office inserts code 1	Core optional
SAMPLE KIND 2 (Remeasure)						
Live 5.0+ DBH/DRC	Live 5.0+ DBH/DRC	1	1			
Live 1.0-4.9 DBH/DRC on microplot	Live 5.0+ DBH/DRC Note: this live tally tree should be referenced with a new distance and azimuth from the subplot center.	1	1			
Live 1.0-4.9 DBH/DRC on microplot	Live 1.0-4.9 DBH/DRC on microplot	1	1			
Live 5.0+ DBH/DRC	Live but shrank < 5.0 and on microplot Note: this live sapling should be referenced with a new distance and azimuth from the microplot center.	1	1			
Live 1.0+	Live but land no longer qualifies as forest	1	1			
Live 1.0+ DBH/DRC	Standing dead 5.0+ DBH/DRC	1	2		1	10-80
Live 5.0+ DBH/DRC	Down dead 5.0+ DBH/DRC	1	2		0	10-80
Live 1.0-4.9 DBH/DRC on microplot	Dead 5.0+ DBH/DRC (standing or down) Note: if standing, this dead tally tree should be referenced with a new distance and azimuth from the subplot center.	1	2		0 or 1	10-80
Live 1.0+ DBH/DRC	Cruiser unable to locate tree due to a weather, geologic (such as landslide), or fire event & assume tree is down dead **or** you can see tree and it is dead and off the plot	1	2		0	30 or 50
Live 1.0+ DBH/DRC	Cut and left in the woods	1	2		0	80
Live 1.0 + DBH/DRC	Dead (standing or down) and land no longer qualifies as forest (land clearing or conversion to nonforest land use)	1	2		0 or 1	10-80
Live 1.0+ DBH/DRC	Tree removed (cut and hauled away)	1	3			80
Live 1.0+ DBH/DRC	Gone (cut and removed) and land no longer qualifies as forest	1	3			80
Dead 5.0+ DBH/DRC	Dead standing 5.0 DBH/DRC	2	2		1	
Dead 5.0+ DBH/DRC	Dead down 5.0+ DBH/DRC	2	2		0	
Dead 5.0+ DBH/DRC	Cruiser is unable to locate tree due to a weather, geologic (such as landslide), or fire event &	2	2		0	

Previous Measurement	Present Measurement	PREVIOUS TREE STATUS	PRESENT TREE STATUS	RECONCILE	Standing Dead	CAUSE OF DEATH
	assume it is down dead or you can see tree and it is dead and off the plot					
Dead 5.0+ DBH/DRC	Tree removed (cut and hauled away)	2	3			
Dead 5.0+ DBH/DRC	Tree shrank <5.0 but ≥ 1.0 (e.g., bark loss) and is standing dead, located on subplot (not located on microplot)	2	2		0	
Dead 5.0+ DBH/DRC	Tree shrank <5.0 but ≥ 1.0 (e.g., bark loss) and is standing dead located on microplot. Note: this dead sapling should be referenced with a new distance and azimuth from the microplot center	2	2		1	
Live 5.0+ DBH/DRC	Tree shrank <5.0 and live, NOT on microplot	1	0	5		
Live 5.0+ DBH/DRC	Tree shrank <5.0 but ≥ 1.0 (e.g., bark loss) and is standing dead, located on subplot (not located on microplot)	1	2		0	10-80
Live 5.0+ DBH/DRC	Tree shrank <5.0 but ≥ 1.0 (e.g., bark loss) and is standing dead located on microplot. Note: this dead sapling should be referenced with a new distance and azimuth from the microplot center	1	2		1	10-80
Live 1.0-4.9 DBH/DRC	Tree shrank <1.0 and live	1	0	5		
Live 1.0 – 4.9 DBH/DRC	Tree shrank <1.0 and dead	1	2		0	10-80
Live 1.0-4.9 DBH/DRC	Live 1.0-4.9 DBH/DRC, shouldn't have been tallied—beyond 6.8—cruiser error	1	0	7		
Live 5.0+ DBH/DRC	Live 5.0+ DBH/DRC, shouldn't have been tallied –beyond 24.0—cruiser error	1	0	7		
Live 1.0+ DBH/DRC	No longer a tally species	1	0	8		
Live 1.0+ DBH/DRC	Tree moved off plot/microplot due to a geologic (e.g., slight earth movement) or weather event (e.g., hurricane) and you can still see it (live before, live now)	1	0	6		
Live 1.0+ DBH/DRC	Nonsampled area now	1	0	9		
Dead 5.0+ DBH/DRC	No longer a tally species	2	0	8		
Dead 5.0 DBH/DRC	Tree moved off plot due to a geologic (e.g., small earth movement) or weather event (e.g., hurricane) and you can still see the tree	2	0	6		
Dead 5.0+ DBH/DRC	Nonsampled area now	2	0	9		
Missed live	Live 1.0+ DBH/DRC	-	1	3		
< 5.0 live DBH/DRC	5.0+ DBH/DRC live (not on the microplot)	-	1	1		
< 1.0 live DBH/DRC	1.0-4.9 DBH/DRC live (on the microplot)	-	1	1		
< 1.0 live DBH/DRC	Standing dead 1.0-4.9 DBH/DRC on microplot		2	1	1	10-80
< 1.0 live DBH/DRC	5.0+ DBH/DRC live (on the microplot) (Through growth)	-	1	2		
Nonsampled area before	Live 1.0 + DBH/DRC	-	1	3		
Nonforest before	Forest now, Live 1.0+ DBH/DRC	-	1	1		

Previous Measurement	Present Measurement	PREVIOUS TREE STATUS	PRESENT TREE STATUS	RECONCILE	Standing Dead	CAUSE OF DEATH
Missed dead	Dead 1.0+ DBH/DRC	-	2	4	1	
Missed live	Dead 1.0+ DBH/DRC	-	2	3	1	10-80
< 5.0 live DBH/DRC	5.0+ DBH/DRC dead (standing, not on the microplot)	-	2	1	0 or 1	10-80
< 5.0 live DBH/DRC	5.0+ DBH/DRC dead (standing or down, on the microplot)	1	2		0 or 1	10-80
Nonsampled area before	Standing Dead 1.0+ DBH/DRC	-	2	3 or 4		10-80
Nonforest before	Forest now, Standing Dead 1.0+ DBH/DRC	-	2	1		10-80

Appendix 9. SRS Invasive Plant List

CODE	COMMON NAME	SCIENTIFIC NAME
	Tree/tree-form	
AIAL	Tree-of-heaven	*Ailanthus altissima**
ALJU	Silktree, Mimosa	*Albizia julibrissin**
BRPA4	Paper mulberry	*Boussonetia papyrifera*
CICA	Camphortree	*Cinnamomum camphora*
FISI2	Chinese parasoltree	*Firmiana simplex**
FRAL4	Glossy buckthorn	*Frangula alnus*
MEAZ	Chinaberry	*Melia azedarach**
PATO2	Princesstree, Royal paulownia	*Paulownia tomentosa**
POTR4	Trifoliate orange	*Poncirus trifoliate*
PYCA80	Bradford pear	*Pyrus calleryana*
SCTE	Brazilian pepper	*Schinus terebinthifolious*
TAMAR2	Tamarix group: Saltcedar	*Tamarix spp.*
TRSE6	Tallowtree, Popcorntree	*Triadica sebifera**
VEFO	Tungoil tree	*Vernicia fordii*
	Shrub	
ARCR80	Coral ardisia, Hen's eyes	*Ardisia crenata*
BETH	Japanese barberry	*Berberis thunbergii*
ELPU2	Silverthorn, Thorny olive	*Elaeagnus pungens*
ELAEA	Olive group: Autumn olive, Russian olive	*Elaeagnus umbellate, E. angustifolia*
EUAL8	Winged burning bush	*Euonymus alatus*
LESPE	Lespedeza group: Shrubby lespedeza, Thunberg's lespedeza	*Lespedeza bicolor, L. thunbergii*
LIJA	Privet group 1: Japanese privet, Glossy privet	*Ligustrum japonicum, L. lucidum*
LIGUS2	Privet group 2: Chinese privet, European privet, Border privet, California privet	*Ligustrum sinsense, L. vulgare, L. obtusifolium, L. ovalifolium*
LONIC	Bush honeysuckle group: Tatarian honeysuckle, Amur honeysuckle, Morrow's honeysuckle, Sweet-breath-of-sprint, Bell's honeysuckle	*Lonicera tatarica, L. maackii, L. morrowii, L. fragrantissima, Lonicera x bella*
MABE2	Leatherleaf mahonia	*Mahonia bealei*
NADO	Sacred bamboo, Nandina	*Nandina domestica*
POCU6	Japanese knotweed	*Polygonum cuspidatum*
ROSA5	Rose group: Multiflora rose, Macartney rose, Cherokee rose, other nonnative roses	*Rosa multiflora, R. bracteata, R. laevigata, Rosa spp.*
SPJA	Japanese meadowsweet	*Spiraea japonica*
	Vine	
AKQU	Five-leaf akebia, Chocolate vine	*Akebia quinata*
AMBR7	Amur peppervine	*Ampelopsis brevipedunculata*
CEOR7	Oriental bittersweet	*Celastrus orbiculatus*
DIOSC	Yam group: Air yam, Chinese yam, Water yam	*Dioscorea bulbifera, D. oppositifolia, D. alata*
EUFO5	Winter creeper	*Euonymus fortunei*
HEDER	Ivy group: English ivy, Atlantic ivy, Colchis ivy	*Hedera helix, H. hibernica, H. colchica*
LOJA	Japanese honeysuckle	*Lonicera japonica*
PUMOL	Kudzu	*Pueraria Montana*
VINCA	Vinca group: Common periwinkle, Bigleaf periwinkle	*Vinca minor, V. major*
WISTE	Wisteria group: Chinese wisteria, Japanese wisteria	*Wisteria sinensis, W. floribunda*
	Grass	
BAMBU	Bamboo group: Golden bamboo, Bamboo spp.	*Phyllostachys aurea, Bambusa spp.*
MISI	Chinese silvergrass	*Miscanthus sinensis*
IMCY	Cogongrass	*Imperata cylindrical*
MIVI	Nepalese browntop	*Microstegium vimineum*
SCPH	Tall fescue	*Schedonorus phoenix*
ERCU2	Weeping lovegrass	*Eragrostis curvula*
	Fern	
LYJA	Japanese climbing fern	*Lygodium japonicum*
	Herb	
LIRIO2	Lirope group: Big blue lilyturf, Monkey grass	*Liriope muscari, L. spicata*
LECU	Chinese lespedeza	*Lespedeza cuneata*
SEVA4	Crownvetch	*Securigera varia*
ALPE4	Garlic mustard	*Alliaria petiolata*

The following species are valid ONLY in Florida

CODE	COMMON NAME	SCIENTIFIC NAME
	Tree/tree-form	
CASUA	Australian pine	*Casuarina equisetifolia*
CUAN4	Carrotwood	*Cupaniopsis anacardioides*
MEQU	Melaleuca	*Melaleuca quinquenervia*
SCAC2	Schefflera	*Schefflera actinophylla*
SYCU	Java plum	*Syzygium cumini*
ACAU	Earleaf acacia	*Acacia auriculiformis*
LELE10	Lead tree	*Leucaena leucocephala*
	Subshrub	
LACA2	Lantana	*Lantana camara*
	Shrub	
EUUN2	Surinam cherry	*Eugenia uniflora*
PSIDI	Common guava	*Psidium guajava*
RHTO10	Downy rose myrtle	*Rhodomyrtus tomentosa*
SOTA3	Wetland nightshade	*Solanum tampicense*
	Vine	
ABPR3	Rosary pea	*Abrus precatorius*
MAUN3	Cat's-claw vine	*Macfadyena unguis-cati*
PAFO3	Skunk vine	*Paederia foetida*
	Grass	
PEPU2	Napier grass	*Pennisetum purpureum*
URMA3	Guinea grass	*Panicum maximum*
MERE9	Natal grass	*Rhynchelytrum repens*
	Fern	
LYMI	Old World Climbing fern	*Lygodium microphyllum*
NEPHR	Sword fern	*Nephrolepis cordifolia*
	Herb	
INHI	Hairy indigo	*Indigofera hirsuta*
TRADE	Spiderwort group	*Tradescantia spp.*
URLO	Caesar's week	*Urena lobata*

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. 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,

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:

A. 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.

B. 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.

C. 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 full 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).
11003	southern pine beetle	Dendroctonus frontalis	Any occurrence
11011	black turpentine beetle	Dendroctonus terebrans	Any evidence of a successful attack.
11030	Ips engraver beetles	Ips spp.	Any evidence of a successful attack.
12000	**Defoliators**		Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected.
12028	texas leafcutting ant	Atta texana	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected.
12082	fall webworm	Hyphantria cunea	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected.
12089	gypsy moth	Lymantria dispar	Any occurrence
12093	eastern tent caterpillar	Malacosoma americanum	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected.
12154	bagworm	Thyridopteryx ephemeraeformis	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.
13006	cicadas	Cicadidae	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.
14003	balsam woolly adelgid	Adelges piceae	Any occurrence
14004	hemlock woolly adelgid	Adelges tsugae	Any occurrence
14041	twig girdler	Oncideres cingulata	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.
15026	red oak borer	Enaphalodes rufulus	Damage to ≥10% of the bole circumference.
15052	ambrosia beetles	Platypus spp.	Damage to ≥10% of the bole circumference.
15082	Asian longhorned beetle	Anoplophora glabripennis	Any occurrence
15087	emerald ash borer	Agrilus planipennis	Any occurrence
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
21001	Armillaria root disease	Armillaria spp.	Any occurrence
21019	Littleleaf disease/Phytophthora	Phytophthora cinnamoni	Any occurrence
21010	Heterobasidion root disease	Heterobasidion annosum	Any occurrence
21028	sudden oak death	Phytophthora ramorum	Any occurrence
22000	**Cankers**		Any occurrence
22006	black knot of cherry	Apiosporina morbosa	Any occurrence on the bole or on branches ≤1 foot from bole; damage to ≥50% of branches
22037	Hypoxylon canker of oak	Hypoxylon atropunctatum	Any occurrence

CODE	Common Name	Scientific Name	Threshold
22042	beech bark disease	Nectria coccinea	Any occurrence
22086	Thousand cankers disease	Geosmithia morbida	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.
23011	Douglas-fir dwarf mistletoe	Arceuthobium douglasii	Hawksworth rating of ≥3
23017	Southwestern dwarf mistletoe	Arceuthobium vaginatum subsp. crytopodum	Hawksworth rating of ≥3
24000	**Decline Complexes/ Dieback/Wilts**		Damage ≥ 20 dieback of crown area.
24014	oak decline	Hypoxylon spp.	Damage ≥ 20 dieback of crown area.
24022	Dutch elm disease	Ceratocystis ulmi	Damage ≥ 20 dieback of crown area.
24031	laurel wilt	Raffaelea spp.	Any occurrence
25000	**Foliage diseases**		Damage ≥20% of the foliage with ≥50% of the leaf/needle affected.
25010	sycamore anthracnose	Apiognomonia veneta	Damage ≥20% of the foliage with ≥50% of the leaf/needle affected.
25015	pine needle rust	Coleosporium spp.	Damage ≥20% of the foliage with ≥50% of the leaf/needle affected.
25020	dogwood anthracnose	Discula spp.	Damage ≥20% of the foliage with ≥50% of the leaf/needle affected.
25024	walnut anthracnose	Gnomonia leptostyla	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
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 >

CODE	Common Name	Scientific Name	Threshold
			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 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.
90001	broken top	Not recorded for multi-stemmed trees	When actual length is less than total length
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

OWNGRP[a]	OWNCD[b]	Land designation (and example)	RESERVCD[c]	ADWDRAWCD[d]	Designated by	Comments
10,20	all	Wilderness (Cohutta Wilderness, GA/TN)	1		Congress	Some of these are within National Parks, and are reserved either way.
10,20	all	Wilderness Study Area (Browns Canyon WSA, CO)	0	1	Congress, proposed	These are areas that were established by Congress during the RARE II process or in other bills. They can be/have been "released" by Congress at a future date, but until then are managed by the agency as wilderness.
10,20	all	Recommended Wilderness (Lionhead recommended wilderness, MT)	0	1	Federal unit, recommended	Areas recommended as wilderness through land management planning are managed as wilderness until Congressional action or revised Forest Plan direction.
10	all	Primitive Area (Blue Range Primitive Area, AZ)	0	1	Federal unit, recommended	Managed as Wilderness pending possible designation
10,20	all	Proposed Wilderness	0	0	not designated; recommended by legislators, interest groups, etc.	These can be proposed by anybody anywhere and the size and borders are very fluid up until the time the bill is passed (or not). No apparent impact on current management.
10,20	all	National Monument/National Volcanic Monument (Grand Staircase-Escalante, UT)	1		Executive Order or Congress	Agencies have treated these executive orders as having the force of law, with modifications requiring an act of Congress.
10,20	all	National Recreation Area (Hell's Canyon NRA, OR/ID)	1		Congress	Although the legislation of some NRAs do not preclude wood production, most do and given the emphasis is likely to be minor, so default to reserved.
10,20	all	Wild and Scenic Rivers (wild, scenic or recreational classification) (Au Sable River, MI)	1		Congress	Wood production is not an objective for any wild and scenic river (FSM 2354.42d). Harvest in segments classified as wild is excluded except under emergency conditions; harvest in segments classified as scenic or recreational is only allowed to further river management objectives. If a map of the area or other information is unavailable, use 1/4 mile on either side of the river on federal land (1/2 mile in Alaska).
10,20	all	Wild and Scenic Study Rivers (wild, scenic or recreational classification) (White Salmon River, WA)	0	1	Federal admin. unit or Congress, proposed	Includes "eligible" or "suitable" study rivers. Wood production is not allowed and harvest restrictions are similar to designated rivers (FSH 199.12 82.51). Study rivers have a default area of 1/4 mile from either side of the river on federal lands.
10	all	National Scenic Area (Mt. Pleasant, VA)	1		Congress	Although the legislation of some NSAs do not preclude wood production, most do and given the emphasis is likely to be minor, so default to reserved.
10	all	Experimental Forest (Hubbard Brook, NH)	0	0	Congress/WO	Purpose includes research and management
10	all	Experimental Range (Santa Rita, AZ)	0	0	Congress/WO	Purpose includes research and management
10	all	Research Natural Area (Limestone Jags, AK)	0	1	NFS unit	RNAs may be established through coordination with WO, but land planning done at NF level
10	all	Roadless Area (Carribean NF, PR)	0	1	NFS unit	Roadless Rule was established through coordination with WO, but land planning and future changes are done at NF level
10	all	Special Interest Area (Cape Perpetua, OR)	0	1	NFS unit	

OWNGRP[a]	OWNCD[b]	Land designation (and example)	RESERVCD[c]	ADWDRAWCD[d]	Designated by	Comments
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
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
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.

SRS Reserved Status Rules for State and Local Lands

Alabama:
1) NOT reserved, any OWNCD in (31, 32, 33)

Arkansas:
1) Reserved, Any State (OWNCD 31,33) property description type or name having the “key words” Park, Wilderness, Wild, Reserve, or Preserve
2) Reserved, All Arkansas Natural Heritage Commission (OWNCD=31) lands designated as a Natural Area.
3) NOT reserved OWNCD=32

Florida:
1) Reserved, OWNCD=31 < 1,000 acres and property description = STATE PARK
2) NOT Reserved, OWNCD=31 >= 1,000 acres and property description = STATE PARK
3) Reserved, OWNCD 31, 32, 33 with property description type or name having the “key words” Park, Wilderness, Wild, Reserve, Preserve, **Natural Area,** or **Sanctuary**
4) Exceptions: NOT Reserved, Volusia County – Longleaf Pine Preserve

Georgia:
1) NOT reserved, any OWNCD in (31, 32, 33)

Kentucky:
1) Reserved, Any (OWNCD 31, 32, 33) property description type or name having the “key words” Park, Wilderness, Wild, Reserve, or Preserve
2) Reserved, Lily Cornett Woods

Louisiana:
1) NOT reserved, any OWNCD in (31,32,33)

Mississippi:
1) NOT reserved, any OWNCD in (31, 32, 33) with the following exception:
a) Reserved, Clark Creek Natural Area OWNCD=31

North Carolina:
1) NOT reserved, any OWNCD in (31, 32, 33) with the following exceptions:
a) Reserved, South Mountains State Park areas designated Preserve
b) Reserved, Stone Mountain State Park areas designated Preserve
c) Reserved, Buxton Woods Coastal Reserve

Oklahoma:
1) Reserved, Any (OWNCD 31, 33) property description type or name having the “key words” Park, Wilderness, Wild, Reserve, Preserve
2) NOT reserved, any OWNCD=32

South Carolina:
1) NOT reserved, any OWNCD in (31, 32, 33) with the following exception:
a) Reserved, Greenville Watershed OWNCD=32

Tennessee:
1) Reserved, Any (OWNCD 31) property description type or name having the “key words” Park or Wilderness
2) NOT Reserved, OWNCD in (32, 33)

Texas:
1) NOT reserved, any OWNCD in (31, 32, 33)

Virginia:
1) Reserved, Any (OWNCD 31, 32, 33) property description type or name having the “key words” Park, Wilderness, Wild, Reserve, Preserve, or Natural Area

Appendix 13. Ownership Prefield Procedures

A13.1 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.

The (core) ownership variables described below are required for the first private, forested condition encountered on a plot. Ownership information is optional for:

- Other ownerships (private or public) on the plot; and
- Other ownerships associated with the plot – e.g., other ownerships who may need to be contacted in order to gain access to the plot.

It is often difficult to know if a plot has a forested condition before it is visited, so it is often more efficient to collect the ownership information for all plots that are likely to have one or more forested conditions. For remeasured plots, ownership information should be auto-filled from history files, verified using current sources, and then, where necessary, changed/modified. A look-up table containing the most common ownerships in a State should be utilized to expedite and improve ownership data collection.

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
See Core Field Guide variable 1.1.

A13.3 COUNTY
See Core Field Guide variable 1.2.

A13.4 PLOT NUMBER
See Core Field Guide variable 1.3.

A13.5 INVYEAR
The year the plot is inventoried.

When collected: All owners recorded for a plot
Field width: 4 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: ≥ 2012

A13.6 OWNERSHIP TYPE
Record whether the ownership information corresponds to an ownership that (likely) owns part or all of the plot (OWNER TYPE = 1) or the information was collected for access purposes (OWNER TYPE = 2).

When collected: All ownerships recorded for a plot
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

1	Ownership information corresponds to a potential plot ownership
2	Ownership information collected for plot access purposes

A13.6.1 OWNERSHIP CONDITION LIST

Record each condition number that is present on the defined owner. If OWNER TYPE = 2, then enter 0000 to indicate information is for plot access purposes and none of the plot falls on this respective owner.

When collected: All OWNER CLASSes on CONDITION CLASS STATUS = 1, 2 and 5 (with the exception of rights-of-way owned by Federal, State, or Local governments)
Field width: 4 digits
Tolerance: No errors
MQO: At least 95% of the time
Values: 0000 to 9876

A13.7 PLOT CENTER OWNER (CORE OPTIONAL)

Record whether the ownership information corresponds to the ownership that most likely owns plot center

When collected: All ownerships recorded for a plot
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

0	The ownership is not the likely owner of plot center
1	The ownership is the likely owner of plot center

A13.8 OWNER SHORT NAME

An alphanumeric code that can be used to quickly enter frequently encountered ownerships. These codes are assigned by regional offices.

When collected: All ownerships recorded for a plot
Field width: 50 characters
Tolerance: No errors
MQO: At least 99% of the time
Values: Letters and numbers. Null values are permissible

A13.9 AGENCY

Record the name of the public agency that owns the forest land as indicated by public tax records or other data sources. “Care of” (e.g., c/o), “attention” (e.g., attn:), and similar information should be recorded in ATTENTION.

When collected: CORE: All public plot ownerships (OWNER CLASS = 11, 12, 13, 21, 22, 23, 24, 25, 31, 32, or 33 and OWNER TYPE = 1)
CORE OPTIONAL: All public agencies recorded for a plot (OWNER CLASS = 11, 12, 13, 21, 22, 23, 24, 25, 31, 32, or 33 and OWNER TYPE ≥ 1)
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.10 COMPANY

Record the name of the company or organization that owns the forest land as indicated by public tax records or other data sources. “Care of” (e.g., c/o), “attention” (e.g., attn:), and similar information should be recorded in ATTENTION.

When collected: CORE: All corporate and other private organization plot ownerships (OWNER CLASS = 41, 42, 43, or 44 and OWNER TYPE = 1)
CORE OPTIONAL: All corporate and other organization ownerships and public agencies recorded for a plot (OWNER CLASS = 41, 42, 43, or 44 and OWNER TYPE ≥ 1)
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.11 MANAGEMENT UNIT

If available, record the name of the management unit that owns the forest land as indicated by public tax records or other data sources.

When collected: CORE: All public and private plot ownerships (OWNER TYPE = 1)
CORE OPTIONAL: All public and private ownerships recorded for a plot (OWNER TYPE ≥ 1)
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.12 NAME

Record the name of the ownership. All of the 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.

When collected: CORE: All individual and family plot ownerships (OWNER CLASS = 45 and OWNER TYPE = 1)
CORE OPTIONAL: All individual and family ownerships recorded for a plot (OWNER CLASS = 45 and OWNER TYPE ≥ 1)
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters

A13.13 ATTENTION

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: All private plot ownerships (OWNER CLASS ≥ 41 and OWNER TYPE = 1)
CORE OPTIONAL: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.14 ADDRESS LINE 1

Record the first line of the mailing address for the ownership. 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: All private plot ownerships (OWNER CLASS ≥ 41 and OWNER TYPE = 1)
CORE OPTIONAL: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.15 ADDRESS LINE 2

Where applicable, record the second line of the mailing address for the ownership.

When collected: CORE: All private plot ownerships (OWNER CLASS ≥ 41 and OWNER TYPE = 1)
CORE OPTIONAL: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER 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

A13.16 ADDRESS LINE 3

Where applicable, record the third line of the mailing address for the ownership.

When collected: CORE: All private plot ownerships (OWNER CLASS ≥ 41 and OWNER TYPE = 1)
CORE OPTIONAL: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER 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

A13.17 ADDRESS CITY

Record the city of the mailing address for the ownership.

When collected: CORE: All private plot ownerships (OWNER CLASS ≥ 41 and OWNER TYPE = 1)
CORE OPTIONAL: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
Field width: 100 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters

A13.18 ADDRESS STATE

For ownerships with mailing addresses in the United States (including territories and protectorates), record the state of the mailing address for the ownership.

When collected: CORE: All private plot ownerships with mailing addresses in the United States (OWNER CLASS ≥ 41 and OWNER TYPE = 1 and ADDRESS COUNTRY = “US”)
CORE OPTIONAL: All ownerships recorded for a plot with mailing addresses in the United States (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1 and ADDRESS COUNTRY = “US”)
Field width: 2 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: See section A13.57.2

A13.19 ADDRESS PROVINCE

For ownerships with mailing addresses outside of the United States, record the province, state, or other pertinent geographic division of the mailing address of the ownership.

When collected: CORE: All private plot ownerships with mailing addresses outside of the United States (OWNER CLASS ≥ 41 and OWNER TYPE = 1 and ADDRESS COUNTRY ≠ “US”)
CORE OPTIONAL: All ownerships recorded for a plot with mailing addresses outside of the United States (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1 and ADDRESS COUNTRY ≠ “US”)
Field width: 50 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters

A13.20 ADDRESS POSTAL CODE

Record the postal code of the mailing address for the ownership. Postal codes for US and foreign addresses should be included here.

When collected: CORE: All private plot ownerships with mailing addresses in the United States (OWNER CLASS ≥ 41 and OWNER TYPE = 1 and ADDRESS COUNTRY = “US”)
CORE OPTIONAL: All ownerships recorded for a plot with mailing addresses in the United States (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1 and ADDRESS COUNTRY = “US”)
Field width: 10 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Alphanumeric

A13.21 ADDRESS COUNTRY

Record the two-character code for the country of the mailing address for the ownership. The default value is United States (US).

When collected: CORE: All private plot ownerships (OWNER CLASS ≥ 41 and OWNER TYPE = 1)
CORE OPTIONAL: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
Field width: 2 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: See section A13.57.3

A13.22 OWNERSHIP PHONE NUMBER 1 (CORE OPTIONAL)

When available, record the primary phone number for the ownership, including area code. If available, record the extension in OWNER PHONE NUMBER 1 EXTENSION. It should be formatted as numbers separated by dashes (e.g., “123-456-7890”).

When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
Field width: 12 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Numbers and the special character ‘-’ (dash). Null values are permissible

A13.23 OWNERSHIP PHONE NUMBER 1 EXTENSION (CORE OPTIONAL)

When available, record the extension associated with the primary phone number for the ownership.

When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
Field width: 5 digits
Tolerance: No errors
MQO: At least 95% of the time
Values: Numbers. Null values are permissible

A13.24 OWNERSHIP PHONE NUMBER 1 TYPE (CORE OPTIONAL)
When available, record whether the phone number is a work, home, mobile, or other number.

When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
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

A13.25 OWNERSHIP PHONE NUMBER 2 (CORE OPTIONAL)
When available, record the secondary phone number for the ownership, including area code. If available, record the extension in OWNER PHONE NUMBER 2 EXTENSION. It should be formatted as numbers separated by dashes (e.g., “123-456-7890”).

When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
Field width: 12 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Numbers and the special character ‘-‘ (dash). Null values are permissible

A13.26 OWNERSHIP PHONE NUMBER 2 EXTENSION (CORE OPTIONAL)
When available, record the extension associated with the secondary phone number for the ownership.

When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
Field width: 5 digits
Tolerance: No errors
MQO: At least 95% of the time
Values: Numbers. Null values are permissible

A13.27 OWNERSHIP PHONE NUMBER 2 TYPE (CORE OPTIONAL)
When available, record whether the phone number is a work, home, mobile, or other number.

When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
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

A13.28 OWNERSHIP E-MAIL ADDRESS (CORE OPTIONAL)
When available, record the e-mail address for the ownership.

When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER 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

A13.29 DATA SOURCE (CORE OPTIONAL)
Record the data source used to determine the ownership (e.g., tax office, GIS, owner, etc.).

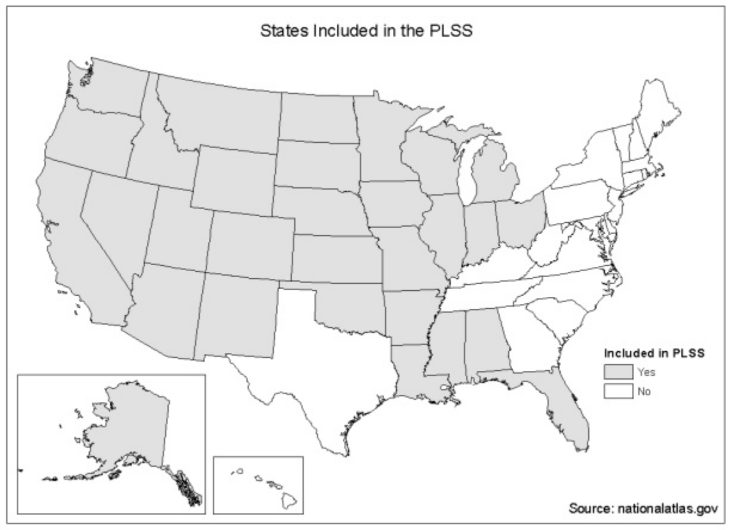
When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

1	Tax office
2	GIS
3	Owner
4	Other

A13.30 DATA SOURCE OTHER (CORE OPTIONAL)
If "other" data source is indicated, specify what it is.

When collected: When DATA SOURCE = 4
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.31 MERIDIAN (CORE OPTIONAL)
Record the Principal Meridian that, in conjunction with TOWNSHIP, RANGE, SECTION, 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 Public Land Survey System (PLSS) Township-Range-Section (TRS) cadastral system:



When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
Field width: 2 digits
Tolerance: No errors
MQO: At least 95% of the time
Values: See section A13.57.4

A13.32 TOWNSHIP (CORE OPTIONAL)
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: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
Field width: 4 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters and numbers

A13.33 RANGE (CORE OPTIONAL)
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: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
Field width: 4 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters and numbers

A13.34 SECTION (CORE OPTIONAL)
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: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
Field width: 2 digits
Tolerance: No errors
MQO: At least 95% of the time
Values: 01 - 36

A13.35 QUARTER SECTION (CORE OPTIONAL)

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: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER 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

A13.36 QUARTER QUARTER SECTION (CORE OPTIONAL)

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: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER 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

A13.37 QUARTER QUARTER QUARTER SECTION (CORE OPTIONAL)

Record the Section that, in conjunction with MERIDIAN, TOWNSHIP, RANGE, SECTION, QUARTER SECTION, and 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: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER 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

A13.38 MAP NUMBER (CORE OPTIONAL)

Record the map number that, in conjunction with DATA SOURCE, 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: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.39 BLOCK NUMBER (CORE OPTIONAL)

Record the block number that, in conjunction with DATA SOURCE, MAP 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: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.40 PARCEL NUMBER (CORE OPTIONAL)

Record the parcel number that, in conjunction with DATA SOURCE, 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: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.41 TRACT SIZE (CORE OPTIONAL)

Record the total size (acres) of the tract/parcel. This information can be obtained from public tax records. Round to the nearest whole number.

When collected: All plot ownerships (OWNER CLASS ≥ 11 and OWNER TYPE = 1)
Field width: 7 digits
Tolerance: No errors
MQO: At least 95% of the time
Values: 0000000 to 9999999

A13.42 TRACT PERCENT FOREST COVER (CORE OPTIONAL)

Record the percent of the tract/parcel that is forested. This can be accomplished using GIS software (where ownership boundaries are electronically available) or by visual, dot-count, or other methods involving overlaying the boundaries and aerial photographs. Where only hardcopy paper maps are available, mentally superimposing the boundaries and aerial photographs can be used to approximate this variable. Round to the nearest whole number.

When collected: All plot ownerships (OWNER CLASS ≥ 11 and OWNER TYPE = 1)
Field width: 3 digits
Tolerance: ±10
MQO: At least 90% of the time
Values: 000 - 100

A13.43 OWNER NOTES

Record any notes that should be conveyed about the ownership and/or ownership data.

When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
Field width: 2000 characters
Tolerance: N/A
MQO: N/A
Values: English language words, phrases and numbers. Null values are permissible

A13.44 OWNERSHIP CONTACT NAME (CORE OPTIONAL)

Record the name of the person spoken to or who otherwise responded.

When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
Field width: 255 characters
Tolerance: N/A
MQO: N/A
Values: English language words, phrases and numbers

A13.45 OWNERSHIP CONTACT ATTEMPT NUMBER (CORE OPTIONAL)

Record the contact attempt number.

When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
Field width: 2 digits
Tolerance: No errors
MQO: At least 95% of the time
Values: Attempt number

A13.46 OWNERSHIP CONTACT DATE (CORE OPTIONAL)

Record the date of the attempted ownership contact. Date should be in the form DD-MON-YYYY.

When collected: When an ownership contact attempt has been made (OWNERSHIP CONTACT ATTEMPT NUMBER is not null)
Field width: 11 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Date

A13.47 OWNERSHIP CONTACT METHOD (CORE OPTIONAL)
Record the code identifying how the ownership was contacted.

When collected: 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)

A13.48 LAND POSTED (CORE OPTIONAL)
Record the code identifying if the land is posted prohibiting trespassing.

When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

0	No
1	Yes

A13.49 ACCESS GRANTED (CORE OPTIONAL)
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 INFORMATION DETAILS.

When collected: 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)

A13.50 ACCESS GRANTED DATE (CORE OPTIONAL)
Record the date access was granted. Date should be in the form DD-MON-YYYY.

When collected: 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

A13.51 ACCESS GRANTED BY(CORE OPTIONAL)
Record the name of the person from whom access was granted.

When collected: All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1)
Field width: 255 characters
Tolerance: N/A
MQO: N/A
Values: English language words, phrases and numbers

A13.52 ACCESS NOTES (CORE OPTIONAL)
Record any other information relevant to contacting and accessing the plot.

When collected: 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

A13.53 OWNERSHIP REQUESTS NOTICE (CORE OPTIONAL)
Record the code identifying if the ownership wants to be notified before we access their land.

When collected: All ownerships contacted
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

0	No
1	Yes

A13.54 OWNERSHIP REQUESTS INFORMATION (CORE OPTIONAL)
Record the code identifying if the ownership representation wants us to send him or her additional information. If they do (OWNERS REQUESTS INFORMATION = 1), then record what they want in REQUESTS INFORMATION DETAILS.

When collected: All ownerships contacted
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

0	No
1	Yes

A13.55 INFORMATION REQUEST DETAILS (CORE OPTIONAL)
Record any other information relevant to contacting and accessing the plot.

When collected: All ownerships requesting additional information (OWNERS REQUESTS INFORMATION = 1)
Field width: 2,000 characters
Tolerance: N/A
MQO: N/A
Values: English language words, phrases and numbers. Null values are permissible

A13.56 INFORMATION REQUEST FULFILLED (CORE OPTIONAL)
Record if the information request has been fulfilled and not further action is required.

When collected: All ownerships contacted
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

0	Information request has NOT been fulfilled
1	Information request has been fulfilled

A13.57 Supplemental Information for Ownership Prefield Procedures

A13.57.1 FIA Ownership Data Recording Examples

Example 1 – U.S. Forest Service
AGENCY: USDA Forest Service
COMPANY:
MANAGEMENT UNIT: Siuslaw National Forest, Hebo Ranger District
NAME:
ATTENTION:
ADDRESS LINE 1: P.O. Box 235
ADDRESS LINE 2: 31525 Hwy 22
ADDRESS LINE 3:
ADDRESS CITY: Hebo
ADDRESS STATE: OR
ADDRESS PROVINCE:
ADDRESS POSTAL CODE: 97122
ADDRESS COUNTRY:

Example 2 – State Forestry Agency
AGENCY: Pennsylvania Department of Conservation and Natural Resources
COMPANY:
MANAGEMENT UNIT: William Penn State Forest
NAME:
ATTENTION:
ADDRESS LINE 1: 845 Park Rd
ADDRESS LINE 2:
ADDRESS LINE 3:

ADDRESS CITY: Elverson
ADDRESS STATE: PA
ADDRESS PROVINCE:
ADDRESS POSTAL CODE: 19520
ADDRESS COUNTRY:

<u>Example 3 – Company with c/o</u>

AGENCY:
COMPANY: Generic Tree Company
MANAGEMENT UNIT:
NAME:
ATTENTION: c/o Jane Doe, Chief Forester
ADDRESS LINE 1: PO Box 456
ADDRESS LINE 2: 123 S Main St
ADDRESS LINE 3:
ADDRESS CITY: Somewhere
ADDRESS STATE: AL
ADDRESS PROVINCE:
ADDRESS POSTAL CODE: 12345-1234
ADDRESS COUNTRY:

<u>Example 4 – Company with foreign address</u>

AGENCY:
COMPANY: Trees R Us
MANAGEMENT UNIT:
NAME:
ATTENTION:
ADDRESS LINE 1: 1 Spruce Blvd Ste 100
ADDRESS LINE 2:
ADDRESS LINE 3:
ADDRESS CITY: Somewhere
ADDRESS STATE:
ADDRESS PROVINCE: AB
ADDRESS POSTAL CODE: A1B 2C3
ADDRESS COUNTRY: CA

<u>Example 5 – Single individual</u>

AGENCY:
COMPANY:
MANAGEMENT UNIT:
NAME: Mr John D Doe
ATTENTION:
ADDRESS LINE 1: 2 Birch Pl
ADDRESS LINE 2:
ADDRESS LINE 3:
ADDRESS CITY: Somewhere
ADDRESS STATE: AL
ADDRESS PROVINCE:
ADDRESS POSTAL CODE: 12345-1234
ADDRESS COUNTRY:

<u>Example 6 – Multiple individuals</u>

AGENCY:
COMPANY:
NAME: Jane and Jack Doe
MANAGEMENT UNIT:
ATTENTION:
ADDRESS LINE 1: 3 Oak Ln
ADDRESS LINE 2:
ADDRESS LINE 3:
ADDRESS CITY: Somewhere
ADDRESS STATE: AL
ADDRESS PROVINCE:
ADDRESS POSTAL CODE: 12345-1234
ADDRESS COUNTRY:

<u>Example 7 – Estate</u>

AGENCY:
COMPANY:
MANAGEMENT UNIT:
NAME: Jennifer A Smith Estate
ATTENTION:
ADDRESS LINE 1: 4 Pine Ave
ADDRESS LINE 2:
ADDRESS LINE 3:
ADDRESS CITY: Somewhere
ADDRESS STATE: AL
ADDRESS PROVINCE:
ADDRESS POSTAL CODE: 12345-1234
ADDRESS COUNTRY:

A13.57.2 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
Alabama	AL
Alaska	AK
Arizona	AZ
Arkansas	AR
California	CA
Colorado	CO
Connecticut	CT
Delaware	DE
District of Columbia	DC
Florida	FL
Georgia	GA
Hawaii	HI
Idaho	ID
Illinois	IL
Indiana	IN
Iowa	IA
Kansas	KS
Kentucky	KY
Louisiana	LA
Maine	ME
Maryland	MD
Massachusetts	MA
Michigan	MI
Minnesota	MN
Mississippi	MS
Missouri	MO
Montana	MT
Nebraska	NE
Nevada	NV
New Hampshire	NH

Name	Code
New Jersey	NJ
New Mexico	NM
New York	NY
North Carolina	NC
North Dakota	ND
Ohio	OH
Oklahoma	OK
Oregon	OR
Pennsylvania	PA
Rhode Island	RI
South Carolina	SC
South Dakota	SD
Tennessee	TN
Texas	TX
Utah	UT
Vermont	VT
Virginia	VA
Washington	WA
West Virginia	WV
Wisconsin	WI
Wyoming	WY
American Samoa	AS
Federated States of Micronesia	FM
Guam	GU
Marshall Islands	MH
Northern Mariana Islands	MP
Palau	PW
Puerto Rico	PR
U.S. Minor Outlying Islands	UM
Virgin Islands of the U.S.	VI

A13.57.3 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
Afghanistan	AF
Åland Islands	AX
Albania	AL
Algeria	DZ
American Samoa	AS
Andorra	AD
Angola	AO
Anguilla	AI
Antarctica	AQ
Antigua and Barbuda	AG
Argentina	AR
Armenia	AM
Aruba	AW
Australia	AU
Austria	AT
Azerbaijan	AZ
Bahamas	BS
Bahrain	BH
Bangladesh	BD
Barbados	BB
Belarus	BY
Belgium	BE
Belize	BZ
Benin	BJ
Bermuda	BM
Bhutan	BT
Bolivia	BO
Bosnia and Herzegovina	BA
Botswana	BW
Bouvet Island	BV
Brazil	BR
British Indian Ocean Territory	IO
Brunei Darussalam	BN
Bulgaria	BG
Burkina Faso	BF
Burundi	BI
Cambodia	KH
Cameroon	CM
Canada	CA
Cape Verde	CV
Cayman Islands	KY
Central African Republic	CF
Chad	TD
Chile	CL
China	CN
Christmas Island	CX
Cocos (Keeling) Islands	CC
Colombia	CO
Comoros	KM
Congo	CG
Congo, The Democratic Republic of The	CD
Cook Islands	CK
Costa Rica	CR
Côte D'Ivoire	CI
Croatia	HR
Cuba	CU
Cyprus	CY
Czech Republic	CZ
Denmark	DK
Djibouti	DJ
Dominica	DM
Dominican Republic	DO
Ecuador	EC
Egypt	EG
El Salvador	SV
Equatorial Guinea	GQ
Eritrea	ER
Estonia	EE
Ethiopia	ET
Falkland Islands (Malvinas)	FK
Faroe Islands	FO
Fiji	FJ
Finland	FI

Country	Code
France	FR
French Guiana	GF
French Polynesia	PF
French Southern Territories	TF
Gabon	GA
Gambia	GM
Georgia	GE
Germany	DE
Ghana	GH
Gibraltar	GI
Greece	GR
Greenland	GL
Grenada	GD
Guadeloupe	GP
Guam	GU
Guatemala	GT
Guernsey	GG
Guinea	GN
Guinea-Bissau	GW
Guyana	GY
Haiti	HT
Heard Island and Mcdonald Islands	HM
Holy See (Vatican City State)	VA
Honduras	HN
Hong Kong	HK
Hungary	HU
Iceland	IS
India	IN
Indonesia	ID
Iran, Islamic Republic of	IR
Iraq	IQ
Ireland	IE
Isle of Man	IM
Israel	IL
Italy	IT
Jamaica	JM
Japan	JP
Jersey	JE
Jordan	JO
Kazakhstan	KZ
Kenya	KE
Kiribati	KI
Korea, Democratic People's Republic of	KP
Korea, Republic of	KR
Kuwait	KW
Kyrgyzstan	KG
Lao People's Democratic Republic	LA
Latvia	LV
Lebanon	LB
Lesotho	LS
Liberia	LR
Libyan Arab Jamahiriya	LY
Liechtenstein	LI
Lithuania	LT
Luxembourg	LU
Macao	MO
Macedonia, The Former Yugoslav Republic of	MK
Madagascar	MG
Malawi	MW
Malaysia	MY
Maldives	MV
Mali	ML
Malta	MT
Marshall Islands	MH
Martinique	MQ
Mauritania	MR
Mauritius	MU
Mayotte	YT
Mexico	MX
Micronesia, Federated States of	FM
Moldova, Republic of	MD

Country	Code
Monaco	MC
Mongolia	MN
Montenegro	ME
Montserrat	MS
Morocco	MA
Mozambique	MZ
Myanmar	MM
Namibia	NA
Nauru	NR
Nepal	NP
Netherlands	NL
Netherlands Antilles	AN
New Caledonia	NC
New Zealand	NZ
Nicaragua	NI
Niger	NE
Nigeria	NG
Niue	NU
Norfolk Island	NF
Northern Mariana Islands	MP
Norway	NO
Oman	OM
Pakistan	PK
Palau	PW
Palestinian Territory, Occupied	PS
Panama	PA
Papua New Guinea	PG
Paraguay	PY
Peru	PE
Philippines	PH
Pitcairn	PN
Poland	PL
Portugal	PT
Puerto Rico	PR
Qatar	QA
Réunion	RE
Romania	RO
Russian Federation	RU
Rwanda	RW
Saint Helena	SH
Saint Kitts and Nevis	KN
Saint Lucia	LC
Saint Pierre and Miquelon	PM
Saint Vincent and The Grenadines	VC
Samoa	WS
San Marino	SM
Sao Tome and Principe	ST
Saudi Arabia	SA
Senegal	SN
Serbia	RS
Seychelles	SC
Sierra Leone	SL
Singapore	SG
Slovakia	SK
Slovenia	SI
Solomon Islands	SB
Somalia	SO
South Africa	ZA
South Georgia and The South Sandwich Islands	GS
Spain	ES
Sri Lanka	LK
Sudan	SD
Suriname	SR
Svalbard and Jan Mayen	SJ
Swaziland	SZ
Sweden	SE
Switzerland	CH
Syrian Arab Republic	SY
Taiwan, Province of China	TW
Tajikistan	TJ
Tanzania, United Republic of	TZ
Thailand	TH
Timor-Leste	TL
Togo	TG
Tokelau	TK
Tonga	TO
Trinidad and Tobago	TT
Tunisia	TN
Turkey	TR

Country	Code
Turkmenistan	TM
Turks and Caicos Islands	TC
Tuvalu	TV
Uganda	UG
Ukraine	UA
United Arab Emirates	AE
United Kingdom	GB
United States	US
United States Minor Outlying Islands	UM
Uruguay	UY
Uzbekistan	UZ
Vanuatu	VU
Vatican City State See Holy See	
Venezuela	VE
Viet Nam	VN
Virgin Islands, British	VG
Virgin Islands, U.S.	VI
Wallis and Futuna	WF
Western Sahara	EH
Yemen	YE
Zaire (See Congo, The Democratic Republic of The)	
Zambia	ZM
Zimbabwe	ZW

A13.57.4 Meridian Codes

Source: U.S. Geological Survey. 2003. Public land survey system of the United States. Reston, VA: U.S. Geological Survey. http://nationalatlas.gov/atlasftp.html (last accessed: March 28, 2007).

Code	Meridian/survey	State(s)
01	First Principal Meridian	Ohio and Indiana
02	Second Principal Meridian	Illinois and Indiana
03	Third Principal Meridian	Illinois
04	Fourth Principal Meridian	Illinois
05	Fifth Principal Meridian	Arkansas, Iowa, Minnesota, Missouri, North Dakota, and South Dakota
06	Sixth Principal Meridian	Colorado, Kansas, Nebraska, South Dakota, and Wyoming
07	Black Hills	South Dakota
08	Boise	Idaho
09	Chickasaw	Mississippi
10	Choctaw	Mississippi
11	Cimarron	Oklahoma
12	Copper River	Alaska
13	Fairbanks	Alaska
14	Gila And Salt River	Arizona
15	Humboldt	California
16	Huntsville	Alabama and Mississippi
17	Indian	Oklahoma
18	Louisiana	Louisiana
19	Michigan	Michigan and Ohio
20	Montana (Principal)	Montana
21	Mount Diablo	California and Nevada
22	Navajo	Arizona
23	New Mexico	Colorado and New Mexico
24	St Helena	Louisiana
25	St Stephens	Alabama and Mississippi
26	Salt Lake	Utah
27	San Bernardino	California
28	Seward	Alaska
29	Tallahassee	Florida and Alabama
30	Uintah	Utah
31	Ute	Colorado
32	Washington	Mississippi
33	Willamette	Oregon and Washington
34	Wind River	Wyoming
35	Ohio River Survey	Ohio
36	Between The Miamis	Ohio
37	Muskingum River	Ohio
38	Ohio River Base	Ohio
39	Scioto River	Ohio
40	Second Scioto River	Ohio
41	Third Scioto River	Ohio
42	Ellicotts Line	Alabama
43	Twelve-Mile Square	Ohio
44	Kateel River	Alaska
45	Umiat	Alaska
46	Fourth Principal Extended Meridian	Minnesota and Wisconsin
47	West of the Great Miami	Ohio
48	U S Military	Ohio
91	Connecticut Western Reserve	Ohio
92	Ohio Company Purchase	Ohio
99	Not Public Land Survey	

Supplement A. Cull and Tree Grading Procedures and Tables

CUBIC FOOT CULL PROCEDURES

Record the percentage of rotten and missing cubic-foot volume, to the nearest 1 percent. When estimating volume loss (tree cull), only consider the cull on the merchantable bole/portion of the tree, from a 1-ft stump to a 4-inch top. Do not include any cull estimate above actual length.

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 in tree (ex. signs, deerstands, fences, 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 4in top, (aluminum is okay).

Cubic-Foot Volume of Short Logs

DIB	Length of log or section (feet)									
midpoint	1	2	3	4	6	8	10	12	14	16
4	0.1	0.2	0.3	0.3	0.5	--	--	--	--	--
5	0.1	0.3	0.4	0.5	0.8	1.1	1.4	1.6	1.9	2.2
6	0.2	0.4	0.6	0.8	1.2	1.6	2.0	2.4	2.7	3.1
7	0.3	0.5	0.8	1.1	1.6	2.1	2.7	3.2	3.7	4.3
8	0.3	0.7	1.0	1.4	2.1	2.8	3.5	4.2	4.9	5.6
9	0.4	0.9	1.3	1.8	2.7	3.5	4.4	5.3	6.2	7.1
10	0.5	1.1	1.6	2.2	3.3	4.4	5.5	6.5	7.6	8.7
12	0.8	1.6	2.4	3.1	4.7	6.3	7.9	9.4	11.0	13.0
14	1.1	2.1	3.2	4.3	6.4	8.6	11.0	13.0	15.0	17.0
16	1.4	2.8	4.2	5.6	8.4	11.0	14.0	17.0	20.0	22.0
18	1.8	3.5	5.3	7.1	11.0	14.0	18.0	21.0	25.0	28.0
20	2.2	4.4	6.5	8.7	13.0	18.0	22.0	26.0	30.0	35.0
22	2.6	5.3	7.9	11.0	16.0	21.0	26.0	32.0	37.0	42.0
24	3.1	6.3	9.4	13.0	19.0	25.0	31.0	38.0	44.0	50.0
26	3.7	7.4	11.0	15.0	22.0	30.0	37.0	44.0	52.0	59.0
28	4.3	8.6	13.0	17.0	26.0	34.0	43.0	51.0	60.0	68.0
30	4.9	9.8	15.0	20.0	30.0	39.0	49.0	59.0	69.0	78.0
32	5.6	11.0	17.0	22.0	34.0	45.0	56.0	67.0	78.0	89.0
34	6.3	13.0	19.0	25.0	38.0	50.0	63.0	76.0	88.0	101.0
36	7.1	14.0	21.0	28.0	42.0	56.0	71.0	85.0	99.0	113.0
38	7.9	16.0	24.0	32.0	47.0	63.0	79.0	94.0	110.0	126.0
40	8.7	18.0	26.0	35.0	52.0	70.0	87.0	105.0	122.0	140.0

BOARD FOOT CULL PROCEDURES

Record the percentage of rotten and missing board-foot volume, to the nearest 1 percent. When estimating board-foot cull, only consider the cull in the sawlog portion of the tree, from a 1-ft stump to a 7-inch top for pines, from a 1-ft stump to 9-inch top on hardwoods. Do not include any cull estimate above actual length. Board foot cull cannot be coded greater than 67 percent. If the actual amount of board foot cull is greater than 67 percent, then TREE CLASS ≠ 2, and board foot cull is not required.

Board-foot cull is the volume within the entire sawlog portion of all live trees that cannot be recovered for use as lumber because of rot, sweep or crook, or other defect. Cull volume includes the entire volume of sections that do not meet minimum log grade requirements. This includes all sections less than 8 feet in length and the cull volume within sawlogs. Board foot cull is assigned for those trees receiving a tree grade, according to the section length (in feet), from a 1-foot stump to a 7-inch top in softwood or 9 inch top in hardwood.

Sweep and Crook

Estimate the length, small-end DIB, and sweep or crook departure of the affected section. If the length is 6 feet or less, treat as crook. To determine board-foot deduction, see the tables for sweep and crook in the appendix. If sweep or crook is so excessive that the section is cull, record the entire volume of the section as cull. This is the area within the heavy black lines of the sweep/crook tables.

Other Board-Foot Cull

Determine the length and the small-end DIB of the section containing decay, missing wood, fork, etc. Estimate the percentage of the section that is unusable for lumber, ties, or timber, ignoring cull defect that could normally be removed in slabbing. Apply this percentage to the total volume contained in the section, as shown in the board foot cull table.

Sawlog Stoppers

Measure the main stem to the point above which no sawlog can be produced to meet log grade standards (size and soundness) and to a minimum top of 7.0 inches DOB for softwoods and 9.0 inches DOB for hardwoods.

The sawlog cannot extend above a point where taper becomes excessive as evidenced by:

(1) A fork with less than 8 foot sawlog above it (12 feet if this is the only log in the tree)

(2) A limb with a base diameter equal to one half or more of the stem diameter below the limb, or a group of smaller limbs 2.0 inches or larger within a 1 foot section with equivalent diameter which collectively influence taper to the same degree.

Sawlog length should not extend above a sawlog section that does not meet minimum grade specifications and which has less than 8 feet of sawlog length above it (12 feet if this is the only log in the tree).

Board-Foot Volume of Short Logs										
DIB small end	Length of log or section (feet)									
	1	2	3	4	6	8	10	12	14	16
6	1	2	2	3	5	8	10	13	16	19
7	1	3	4	5	8	12	15	19	24	28
8	2	4	6	8	12	17	22	27	33	39
9	3	5	8	10	16	22	29	36	43	51
10	3	7	10	13	21	29	37	46	55	65
11	4	9	13	17	26	36	46	57	68	80
12	5	10	16	21	32	44	57	69	83	97
13	6	13	19	25	39	53	68	83	99	115
14	8	15	23	30	46	63	80	98	117	136
16	10	20	31	41	62	84	108	131	158	181
18	13	26	40	53	81	109	139	169	200	232
20	17	33	50	67	102	137	174	212	251	290
22	21	41	62	82	125	169	214	259	306	354
24	25	50	74	99	151	203	257	311	368	424
26	29	59	88	118	179	241	304	368	435	501
28	35	69	104	138	210	281	356	430	507	584
30	40	80	120	160	243	325	411	497	585	674
32	46	92	137	183	278	373	470	568	669	770
34	52	104	156	208	316	423	534	644	758	872
36	59	117	176	235	356	477	601	725	853	981
38	66	132	197	263	398	533	672	811	954	1096
40	73	146	220	293	443	593	747	902	1060	1218

CUBIC FOOT VOLUME OF SHORT LOGS										
D.I.B.	LENGTH OF LOG OR SECTION (FT.)									
Mid-point	**1**	**2**	**3**	**4**	**6**	**8**	**10**	**12**	**14**	**16**
4	0.1	0.2	0.3	0.3	0.5	-	-	-	-	-
5	0.1	0.3	0.4	0.5	0.8	1.1	1.4	1.6	1.9	2.2
6	0.2	0.4	0.6	0.8	1.2	1.6	2.0	2.4	2.7	3.1
7	0.3	0.5	0.8	1.1	1.6	2.1	2.7	3.2	3.7	4.3
8	0.3	0.7	1.0	1.4	2.1	2.8	3.5	4.2	4.9	5.6
9	0.4	0.9	1.3	1.8	2.7	3.5	4.4	5.3	6.2	7.1
10	0.5	1.1	1.6	2.2	3.3	4.4	5.5	6.5	7.6	8.7
12	0.8	1.6	2.1	3.1	4.7	6.3	7.9	9.4	11	13
14	1.1	2.1	3.2	4.3	6.4	8.6	11	13	15	17
16	1.4	2.8	4.2	5.6	8.4	11	14	17	20	22
18	1.8	3.5	5.3	7.1	11	14	18	21	25	28
20	2.2	4.4	6.5	8.7	13	18	22	26	30	35
22	2.6	5.3	7.9	11	16	21	26	32	37	42
24	3.1	6.3	9.4	13	19	25	31	38	44	50
26	3.7	7.4	11	15	22	30	37	44	52	59
28	4.3	8.6	13	17	26	34	43	51	60	68
30	4.9	9.8	15	20	30	39	49	59	69	78
32	5.6	11	17	22	34	45	56	67	78	89
34	6.3	13	19	25	38	50	63	76	88	101
36	7.1	14	21	28	42	56	71	85	99	113
38	7.9	16	24	32	47	63	79	94	110	126
40	8.7	18	26	35	52	70	87	105	122	140

PERCENT BOARD-FOOT CULL OF ***HARDWOOD SAWTIMBER*** BY 4-FT. SECTION & LOCATION IN THE TREE																	
LOG	(FT)	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th
1	(16)	29	26	24	21												
1 ½	(24)	19	18	16	16	16	15										
2	(32)	15	14	13	13	12	12	11	10								
2 ½	(40)	12	12	11	11	10	10	9	9	8	8						
3	(48)	12	10	10	9	9	9	8	7	7	7	6	5				
3 ½	(56)	10	10	9	9	9	8	8	7	7	6	5	5	4	3		
4	(64)	9	9	9	8	8	7	7	7	6	6	5	5	4	4	3	3

PERCENT BOARD-FOOT CULL OF ***SOFTWOOD SAWTIMBER*** BY 4-FT. SECTION & LOCATION IN THE TREE																	
LOG	(FT)	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th
1	(16)	33	27	21	19												
1 ½	(24)	26	20	16	15	12	11										
2	(32)	21	17	14	12	10	9	9	8								
2 ½	(40)	19	15	12	10	9	8	7	7	7	6						
3	(48)	16	13	11	10	8	7	7	6	6	6	5	5				
3 ½	(56)	13	12	10	9	7	7	6	6	6	5	5	5	5	4		
4	(64)	10	9	9	8	7	7	6	6	6	5	5	5	5	4	4	4

PERCENT OF CUBIC-FOOT CULL VOLUME FOR ***ALL TREES*** BY 4-FT. SECTION & LOCATION IN THE TREE																		
HEIGHT (FT)	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th	18th
8	57	43																
12	42	32	26															
16	30	26	23	21														
20	26	23	21	19	11													
24	24	21	18	17	10	10												
28	21	19	17	16	10	9	8											
32	20	18	16	14	10	8	7	7										
36	19	16	14	13	9	8	8	7	6									
40	17	15	13	12	9	8	7	7	6	6								
44	16	14	12	11	9	7	7	7	6	6	5							
48	15	13	12	10	8	7	7	6	6	6	5	5						
52	14	12	11	9	8	7	6	6	6	6	5	5	5					
56	13	11	10	9	8	6	6	6	6	6	5	5	5	4				
60	12	11	10	9	7	6	6	6	6	5	5	5	5	4	4			
64	11	10	9	9	7	6	6	6	5	5	5	5	5	4	4	4		
68	10	10	9	8	6	6	6	5	5	5	5	5	4	4	4	4	4	
72	10	9	9	8	6	6	6	5	5	5	4	4	4	4	4	4	4	4

TREE SIZE		VOLUME DISTRIBUTION									
		BOLT NUMBER									
BOLT 8’	LOG 16’	1	2	3	4	5	6	7	8	9	10
		-------PERCENT OF THE TREE VOLUME-------									
2	1	56	44								
3	1 ½	41	33	26							
4	2	33	28	22	17						
5	2 ½	27	23	19	17	14					
6	3	24	21	18	15	12	10				
7	3 ½	22	19	17	14	12	9	7			
8	4	20	18	15	13	11	9	8	6		
-	5	18	15	13	12	10	9	8	6	5	3

Crook Deduction in Board Feet															
Crook departure (inches)	Crook length (feet)	Scaling diameter of section with crook (inches)													
		6	7	8	9	10	12	14	16	18	20	22	24	26	28
1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	2	0	0	0	1	1	1	1	1	1	2	2	2	2	2
	3	1	1	1	1	1	1	2	2	2	2	3	3	3	4
	4	1	1	1	1	1	2	2	3	3	3	4	4	4	5
	5	1	1	1	1	2	2	3	3	4	4	5	5	6	6
	6	1	1	2	2	2	3	3	4	5	5	6	6	7	8
2	1	0	0	0	1	1	1	1	1	1	2	2	2	2	3
	2	1	1	1	1	1	2	2	2	3	3	4	4	4	5
	3	1	1	2	2	2	3	3	4	4	4	6	6	7	7
	4	1	1	2	2	3	3	4	5	6	7	8	8	9	10
	5	1	2	2	3	3	4	5	6	8	8	10	10	11	13
	6	2	2	3	4	4	5	7	8	9	10	13	13	14	15
3	1	0	0	1	1	1	1	2	2	2	3	3	3	3	4
	2	1	1	2	2	2	2	3	4	4	5	5	6	7	7
	3	1	2	2	3	3	4	5	6	7	8	8	9	10	11
	4	2	2	3	3	4	5	6	8	9	10	10	12	13	15
	5	2	3	4	4	5	6	8	10	11	13	13	16	17	19
	6	2	3	4	5	6	8	10	12	14	15	15	19	20	23
4	1	1	1	1	1	1	2	2	2	3	3	3	4	4	5
	2	1	2	2	2	3	3	4	5	6	7	7	8	9	10
	3	1	2	3	3	4	5	7	8	9	10	10	12	13	15
	4	2	3	4	3	5	7	9	10	12	13	13	17	18	20
	5	2	3	5	6	7	9	11	13	15	17	17	21	22	25
	6	3	5	6	7	8	11	13	15	18	20	20	25	27	30
5	1	-	-	1	2	2	2	3	3	4	4	4	5	6	6
	2	-	-	2	3	4	4	5	6	7	8	8	10	11	12
	3	-	-	4	4	5	7	8	10	11	12	12	16	17	19
	4	-	-	5	6	6	9	11	13	15	17	17	21	22	25
	5	-	-	6	7	8	11	13	16	19	21	21	26	28	31
	6	-	-	8	9	10	13	16	19	23	26	26	32	34	36
6	1	-	-	-	2	2	2	3	4	4	5	5	6	7	8
	2	-	-	-	3	4	5	6	7	9	10	10	13	13	15
	3	-	-	-	4	6	8	10	12	13	15	15	19	20	22
	4	-	-	-	7	8	10	13	15	18	20	20	25	27	30
	5	-	-	-	9	10	13	16	19	23	25	25	32	34	38
	6	-	-	-	11	13	16	20	23	27	31	31	38	41	45
8	1	-	-	-	-	-	3	5	5	6	7	7	8	9	10
	2	-	-	-	-	-	7	9	10	12	13	13	17	18	20
	3	-	-	-	-	-	10	13	16	18	20	20	25	27	30
	4	-	-	-	-	-	14	17	20	24	27	27	33	36	40
	5	-	-	-	-	-	17	22	26	30	34	34	42	45	50
	6	-	-	-	-	-	21	26	31	36	41	41	51	54	60
10	1	-	-	-	-	-	-	-	6	7	8	8	10	11	12
	2	-	-	-	-	-	-	-	12	14	16	16	21	23	25
	3	-	-	-	-	-	-	-	19	22	25	25	31	34	37
	4	-	-	-	-	-	-	-	26	29	34	34	41	45	49
	5	-	-	-	-	-	-	-	32	37	42	42	52	57	62
	6	-	-	-	-	-	-	-	39	45	51	51	63	69	75

In dashed (-) spaces, crook exceeds the maximum that is allowed and culls the entire section. Boxed spaces are sound for softwoods, but cull for hardwoods.

Sweep Deduction in Board Feet

Sweep departure (inches)	Sweep length (feet)	Scaling diameter of section with sweep (inches)													
		6	7	8	9	10	12	14	16	18	20	22	24	26	28
2	6	1	1	2	2	3	3	4	5	6	6	7	8	9	9
	8	1	1	2	2	3	4	5	5	6	7	8	8	9	10
	10	1	1	2	2	3	4	4	5	6	7	7	8	9	10
	12	1	1	2	2	2	3	4	4	5	6	6	6	7	8
	14	1	1	1	1	1	2	2	2	3	3	3	4	4	5
	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	6	2	3	3	5	5	6	7	9	10	11	13	14	15	17
	8	2	3	4	6	6	7	9	10	12	14	15	17	19	20
	10	2	4	5	6	6	8	10	12	13	15	17	19	20	22
	12	3	4	5	7	7	9	11	12	14	16	18	19	21	23
	14	3	4	5	7	7	9	10	12	14	16	17	19	21	23
	16	3	4	5	6	6	8	10	11	13	14	16	18	19	21
4	6	3	4	5	6	7	8	11	13	15	17	18	20	22	24
	8	4	5	6	7	9	11	14	16	18	21	23	25	28	30
	10	5	6	8	9	10	13	16	19	21	24	27	29	32	35
	12	5	7	8	10	12	14	18	20	23	26	29	32	35	38
	14	6	8	9	11	12	16	19	22	25	28	31	35	38	41
	16	6	8	10	11	13	16	19	23	26	29	32	35	39	42
5	6	-	5	6	8	9	11	14	16	19	22	24	27	29	32
	8	5	7	8	10	12	15	18	21	24	27	31	34	37	40
	10	6	8	10	12	14	18	21	25	29	33	36	40	44	48
	12	8	10	12	12	16	20	25	29	33	37	41	45	50	54
	14	9	11	13	16	18	22	27	32	36	41	45	50	54	59
	16	10	12	15	17	20	24	29	34	39	44	48	53	58	63
6	6	-	-	8	9	11	14	17	20	24	27	30	33	36	39
	8	-	-	11	12	14	18	22	26	30	34	38	42	46	50
	10	-	10	13	15	18	23	27	32	36	41	46	51	56	60
	12	-	12	15	18	21	26	32	37	42	48	53	58	64	69
	14	11	15	18	20	23	29	36	41	47	53	59	65	71	77
	16	13	16	20	23	26	32	39	45	52	58	64	71	77	83
7	6	-	-	-	11	13	16	21	24	28	32	36	39	43	47
	8	-	-	-	15	17	22	27	31	36	41	46	51	56	60
	10	-	-	-	19	21	27	33	39	44	50	56	62	67	73
	12	-	-	-	22	25	32	39	45	52	58	65	71	78	84
	14	-	-	-	25	29	36	44	51	58	66	73	81	88	95
	16	-	-	24	28	33	40	49	57	64	72	80	88	96	104
8	6	-	-	-	-	-	19	24	28	33	37	41	46	50	54
	8	-	-	-	-	-	25	31	37	42	48	54	59	65	70
	10	-	-	-	-	25	32	39	46	52	59	66	72	79	86
	12	-	-	-	-	30	37	46	53	61	69	76	84	92	100
	14	-	-	-	-	34	43	52	61	69	78	87	96	105	113
	16	-	-	-	34	39	48	58	68	77	87	97	106	116	125
9	6	-	-	-	-	-	-	27	32	37	42	47	52	57	62
	8	-	-	-	-	-	29	36	42	48	55	61	68	74	80
	10	-	-	-	-	-	37	44	52	60	67	75	83	91	99
	12	-	-	-	-	-	43	52	61	70	80	88	97	106	115
	14	-	-	-	-	-	50	61	71	81	91	101	111	121	131
	16	-	-	-	-	-	57	68	79	90	102	113	124	135	146

In dashed (-) spaces, excessive sweep culls the entire section. Boxed spaces are sound for softwoods, but cull for hardwoods.

TREE GRADE PROCEDURES

HARDWOOD TREE GRADES

HARDWOOD TREE GRADES			
GRADING FACTORS	**GRADE 1**	**GRADE 2**	**GRADE 3**
Length of grading zone (ft)	Butt 16	Butt 16	Butt 16
Length of grading section[a] (ft)	Best 12	Best 12	Best 12
Minimum DBH (in)	16[b]	13	11
Minimum DIB at the top of the grading section (in)	13[b] 16 20	11[c] 12	8
Clear cuttings on 3rd best face[d]			
minimum length (ft)	7 5 3	3 3	2
number on face (max)	2	2 3	unlimited
yield in face length (min)*	5/6	4/6	3/6
Cull deduction, including crook and sweep but excluding shake, maximum w/in grading section (%)	9	9[e]	50

[a] Whenever a 14- or 16-ft section of the butt log is better than the best 12-ft section, the grade of the longer section will become the grade of the tree. This longer section, when used, is the basis for determining the grading factors, such as diameter and cull deduction.

[b] In basswood and ash, DIB at the top of the grading section may be 12-in and DBH may be15-in.

[c] Grade 2 trees can be 10-in DIB at the top of the grading section if otherwise meeting surface requirements for small grade 1's.

[d] A clear cutting is a portion of a face free of defects, extending the width of the face. A face is one-fourth of the surface of the grading section as divided lengthwise.

[e] 15% crook and sweep, or 40% total cull deduction are permitted in grade 2 if size and surface of grading section qualify as grade 1. If rot shortens the required clear cuttings to the extent of dropping the butt log to grade 2, do not drop the tree's grade to 3 unless the cull deduction for rot is greater than 40%.

*Minimum Yield in Face Length			
Face Length	Grade 1 Min. Yield	Grade 2 Min. Yield	Grade 3 Min. Yield
12-ft	10-ft	8-ft	6-ft
14-ft	11.7-ft	9.3-ft	7-ft
16-ft	13.3-ft	10.7-ft	8-ft

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

On naturally swelled-butted trees (e.g., 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.

HARDWOOD TIE AND TIMBER GRADE 4	
GRADING FACTORS	**SPECIFICATIONS**
Length of grading zone (ft)	Butt 16
Scaling diameter (in)	8-in DIB and larger
Length, w/o trim (ft)	12-ft and longer
Clear cuttings	No requirements (not graded on cutting basis)
Maximum sweep allowance	One-fourth DIB of small end for half logs, and one-half DIB for logs 16-ft long
Sound surface defects -	
Single knots	Any number, if none has an average collar[a] diameter that is more than one-third of the log diameter at the point of occurrence.
Whorled knots	Any number, provided the sum of the collar diameters does not exceed one-third the log diameter at the point of occurrence.
Knots	Any number not exceeding knot specifications, if they do not extend more than 3-in into the contained tie or timber.
Unsound surface defects[b]	Any number and size, if they do not extend into contained tie or timber. If they extend into contained tie or timber, they shall not exceed size, number, and depth of limits for sound defects.

[a] Knot collar is the average of the vertical and horizontal diameters of the limb,or knot swelling, as measured flush with the surface of the log.

[b] Interior defects are not visible in standing trees. They are considered in grading cut logs. No interior defects are permitted except one shake not more than one-third the width of the contained tie or timber, and one split not more than 5-in long.

Knots and limbs should be measured at the point where they would normally be trimmed from the main stem. This procedure is in contrast to footnote “a” in the grading table.

The presence of a crack or seam within the grading section is not allowed in grade 4. This type of surface defect is an indication of interior rot. Grade 4 does not allow unsound surface defects that may extend into the log as described in footnote “b” in the grading table.

HARDWOOD TREE GRADE 5

Record TREE GRADE 5 for hardwood species that do not meet the length of grading zone requirement for TREE GRADE 1-4, but do have either an upper 12-foot log or 2 non-contiguous 8-foot logs, and the total board foot cull deduction is less than 67%.

These logs must still meet the size, soundness and surface yield requirements for a grade 1-4 log. The only difference is that the length of the grading zone extends beyond the butt 16-foot log.

Since these logs are in the upper portion of the tree, determining the surface yield is impractical. When determining if TREE GRADE = 5, simply make sure the log appears to meet the size and soundness requirements of a TREE GRADE 4 (no internal rot). If it is clear the upper log does have internal rot, then it must be examined further to determine if it can at least meet the size, soundness and surface yield requirements of a TREE GRADE 3 (the log must be at least 8 inches DIB, with no more than 50% board foot cull in the section, at least 3/6 of the section length clear of defects, and at least 2 feet between defects.)

LOG SURFACE ABNORMALITIES THAT ARE HARDWOOD TREE GRADING DEFECTS

Log abnormalities that are defects in factory logs include the following:

- Adventitious bud clusters
- Bulge, butt or stem
- High bumps
- Burl
- Butt scar
- Canker
- Conk
- Flutes, if not superficial
- Holes extending into the bole
- Embedded metal (fence)
- Limb
- Knots
- Knot overgrowths
- Low bumps
- Overgrowths following insect damage or bird peck*
- Seams, if not superficial
- Wounds extending into the bole

Abnormalities not ordinarily limiting cuttings are butt swell, flanges and surface rise.

Hardwood Tree Grading Defects Defined --

Bark distortions – Many log surface abnormalities appear to be only breaks in the normal bark pattern. Overgrown knots, mechanical wounds, holes of all types, ingrown bark, and bird peck are typical defects under bark distortions which can be definitely established from bark appearance. They are all grading defects. A slight bark distortion consisting of a simple horizontal break across the normal bark pattern is not a grading defect.

Bulge – A general enlargement of a section of the log and a sign of internal rot.

Bump – Bumps usually indicate overgrown knots or other defects. Surface swells (less than 1" rise in 12" of length) can be disregarded as a grading defect.

Burls – A sound, hard, woody protuberance on the log with no protruding limbs, etc.

Butt scar – Damage at the base of the tree. Scars of recent origin are usually associated with a limited amount of rotten or stained wood. Severe rot is usually associated with older scars. If the scar extends into the log beyond the slab section, the area involved is a grading defect.

Bird peck – There must be four bird pecks within a square foot to affect the tree grade and be considered a defect. First, determine the tree grade without the bird pecks. If the tree grade is determined to be 1 or 2, then down grade the tree by one grade. If the tree graded out to be a 3 or 4 without the bird pecks, then ignore them as defects and record the initial tree grade.

Canker – A definite, relatively localized lesion, primarily of bark and wood.

Conk – It is the fruiting body of a wood rotting fungus located on the bole of the tree and is an indication of serious internal rot.

Epicormic branches and dormant bud clusters – Epicormic branches are found on the main stem. Dormant bud clusters may develop on the main stem any time during the life of a tree.

Holes – All holes extending into or past the cambium on hardwood trees are grading defects.

Knots – Cut or broken-off limbs or sprout branches, green or dead, protruding, flush or depressed but with exposed sound or rotten wood.

Metal – Logs suspected of or know to contain metal should either be jump-butted (i.e., a qualifiying grading section is above the metal within the first 16-ft of the butt log) or rejected (i.e., butt log is cull). All metal (except aluminum research tags and nails) is considered an unsound grading defect.

Rot – Wood which has decayed to the point where it is useless.

Seams – Seams are cracks or splits running with the grain for part of or full length of the log. They are generally caused by wind, lightning or frost and extend from the bark to the center of the log. They may be open or completely healed. They are very damaging and especially so when they run spirally around the log.

- No clear cuttings can be taken on a log face that includes a full-length straight seam or a spiral seam. However, one straight seam can be placed on the edge of one face and ignored. This fixes the location of all other defects.
- All seams have cull associated with it and the estimation of cull will need to be determined before the final grade is assigned.

Wounds – Wounds or injuries that expose sapwood and/or heartwood are defects. The following are a few guidelines for wounds:

- Old wounds are commonly associated with stain, decay, and/or insects and the affected area becomes a defect.
- New "fresh" wounds (less than 1 year old) are disregarded as long as deterioration is not visible.
- If new or old wounds look superficial, disregard them.

Source: Official Grading Rules for Northern Hardwood and Softwood Logs and Tie Cuts (Effective Sept. 1, 1998).

SOUTHERN PINE TREE GRADES

SOUTHERN PINE TREE GRADES All pines except eastern white pine. Includes eastern redcedar and cypress.			
FACE LENGTH	**GRADE 1**	**GRADE 2**	**GRADE 3**
Butt 16-ft*	3 or 4 clear faces	1 or 2 clear faces	No clear faces

After the tentative grade is established, the tree will be ***reduced one grade*** for each of the following:

Sweep - Degrade any tentative Grade 1 or 2 tree one grade if sweep in the lower 12-ft of the grading section amounts to 3 or more inches and equals or exceeds one-fourth the DBH.

Heart rot - Degrade any tentative Grade 1 or 2 tree one grade if conks, punk knots, or other evidence of advanced heart rot is found anywhere on the tree stem.

Note - No tree can be degraded below Grade 3, provided the total scaling deductions for sweep and/or rot do not exceed two-thirds the gross scale of the tree. Trees with total scaling deductions in excess of two- thirds are classified as cull (Tree Class 3 or 4).

A face is one-fourth the circumference of the 16-ft grading section and ex tends the full length of the grading section. Clear faces are those free from knots measuring more than 1/2-in in diameter, overgrown knots of any size, and holes more than 1/4-in in diameter that extends into or past the cambium. Faces may be rotated, if necessary, to obtain the maximum number of clear faces on the grading section.

*Note: Only grade the length of the log up to a 7-inch top DOB. The 7-inch top DOB must be between 12 and 16 feet off of the 1-ft stump to be TREE CLASS 2.

On naturally swelled-butted trees (e.g., baldcypress and pondcypress), TREE GRADE is determined 3.5 feet below the recorded LENGTH TO DIAMETER MEASUREMENT POINT. This point is the base of the butt log.

On naturally swelled-butted trees (e.g., baldcypress and pondcypress), 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.

SOUTHERN PINE TREE GRADE 5

Record TREE GRADE 5 for southern pine species group that do not have a 12-foot log in the butt 16-foot grading section due primarily to poor form, but do have either an upper 12-foot log or 2 non-contiguous 8-foot logs, and the total board foot cull deduction is less than 67%.

EASTERN WHITE PINE TREE GRADES

EASTERN WHITE PINE TREE GRADES				
GRADING FACTORS	**GRADE 1**	**GRADE 2**	**GRADE 3**	**GRADE 4**
Minimum DBH (in)	9	9	9	9
Maximum weevil injury in butt 16-ft section (number)	None	None	2 Injuries	No limit
Minimum face requirements on butt 16-ft section	Two full length or four 50% length good faces[1]. (In addition, knots on balance of faces shall not exceed size limitations for Grade 2 sections.)	NO GOOD FACES REQUIRED. Maximum diam-eter of knots on 3 best faces: **SOUND RED KNOTS** not to exceed 1/6 of scaling diameter or 3-in maximum[2]. **DEAD OR BLACK KNOTS**, in-cluding over-grown knots, not to exceed 1/12 scaling diameter and 1-1/2-in maximum.	NO GOOD FACES REQUIRED. Maximum diam-eter of knots on 3 best faces: **SOUND RED KNOTS** not to exceed 1/3 of scaling diameter of 5-in maximum[2]. **DEAD OR BLACK KNOTS**, in-cluding over-grown knots, not to exceed 1/6 scaling dia-meter and 2-1/2-in maximum.	Includes all trees not qualifying for Grade 3 or better and judged to have at least 1/3 of their gross volume in sound wood suitable for manufacture into standard lumber.
Maximum sweep or crook in butt 16-ft section (%)	20	30	40	No limit
Maximum total scaling deduction in 16-ft section (%)	50	50	50	No limit

After the tentative grade of the section is established from face examination, the section will be ***reduced one grade*** whenever the following defects are evident[3]:

CONKS, PUNK KNOTS AND PINE BORER DAMAGE ON THE SURFACE OF THE SECTION

Degrade one grade if present on one face.
Degrade two grades if present on two faces.
Degrade three grades if present on three to four faces.

If the final grade of the grading section is 1, 2 or 3, examine the tree for weevil injuries in the merchantable stem ***above*** 16-ft. If the total apparent weevil damage exceeds 3, de-grade the tree grade one below the section grade[3]. Otherwise the tree grade is the same as the final section grade.

[1] Trees under 16-in DBH require four full length good faces.
[2] Scaling diameter is estimated at the top of the 16-ft grading section.
[3] No tree will be designated below Grade 4 unless net tree scale is less than one-third of gross tree scale.

EASTERN WHITE PINE TREE GRADE 5

Record TREE GRADE 5 for eastern white pine trees that do not have a 12-foot log in the butt 16-foot grading section due primarily to poor form, but do have either an upper 12-foot log or 2 non-contiguous 8-foot logs, and the total board foot cull deduction is less than 67%.

White Pine Collar Diameter Limits for Red & Black Knots			
Scaling Diameter (DIB in)	**Black Knots 1/12**	**Black & Red Knots 1/6**	**Red Knots 1/3**
7	7/12"	1-1/6"	2-1/3"
8	2/3"	1-1/3"	2-2/3"
9	3/4"	1-1/2"	3"
10	5/6"	1-2/3"	3-1/3"
11	11/12"	1-5/6"	3-2/3"
12	1"	2"	4"
13	1-1/12"	2-1/6"	4-1/3"
14	1-1/6"	2-1/3"	4-2/3"
15	1-1/4"	**2-1/2" Black Max**	**5" Max**
16	1-1/3"	2-2/3"	**5" Max**
17	1-5/12"	2-5/6"	**5" Max**
18	**1-1/2" Max**	**3" Red Max**	**5" Max**

Red knots – Visible branches, stubs or sockets that are from living branches or branches that have recently died. They are inter-grown with the surrounding wood and contain no rot.

Dead or black knots – Visible branches, stubs or sockets that do not conform to the definition of red knots.

Overgrown knots – Identified by a distinctive circular/elliptical pattern in the bark and are treated the same as dead knots.

Average diameter of red and black knots on white pine – Measured at the point where the limb would normally be trimmed from the main stem. For red knots measure only the heartwood portion of the knot. For black knots measure the whole limb.

SPRUCE, FIR, CEDAR (excluding eastern redcedar) TAMARACK AND HEMLOCK

SPRUCE, FIR, CEDAR, TAMARACK AND HEMLOCK Minimum Merchantability Specifications for Grade 1				
DIB (small end of log)	**Length (2-ft multiples w/o trim)**	**Total Deduction**	**Sweep Permitted**	**Other Requirements***
6" - 12"	12' - 16'	50%	25%	Not more than one sound knot or branch greater than 2" in diameter.
13" +	12' - 16'	50%	25%	Not more than one sound knot or branch greater than 3" in diameter.

If the tree does not meet the specifications for a grade 1, but does have a 12-foot log in the butt 16-foot section, then record TREE GRADE = 4.

If the tree does not meet the specifications for a grade 1, but does have a 12-foot log in the butt 16-foot section, then record TREE GRADE = 4.

SPRUCE, FIR, CEDAR (not eastern red) TAMARACK AND HEMLOCK TREE GRADE 5

Record TREE GRADE 5 for trees that do not have a 12-foot log in the butt 16-foot grading section due primarily to poor form, but do have either an upper 12-foot log or 2 non-contiguous 8-foot logs, and the total board foot cull deduction is less than 67%.

Supplement B. Miscellaneous Charts Tables

Instructions: Attach logger's tape to tree as if measuring for horizonatal distance (center of tree not face). Using the prism, align the bole segment with the main bole (i.e., borderline). When the boles are borderline, check the distance on the logger's tape. Find the distance in the table and record the corresponding diameter (e.g., 37.1 ft = 26.1 in diameter). These diameters are to be considered as “measured accurately” and not estimated. See illustration on page 298.

37.5 FACTOR PRISM ONLY!

TABLE OF VARIABLE PLOT LIMITING DISTANCE RADII / SLOPE = 0

USE TABLE WITH PRISM TO DETERMINE DIAMETER

<<< 37.5 BAF PRISM >>>

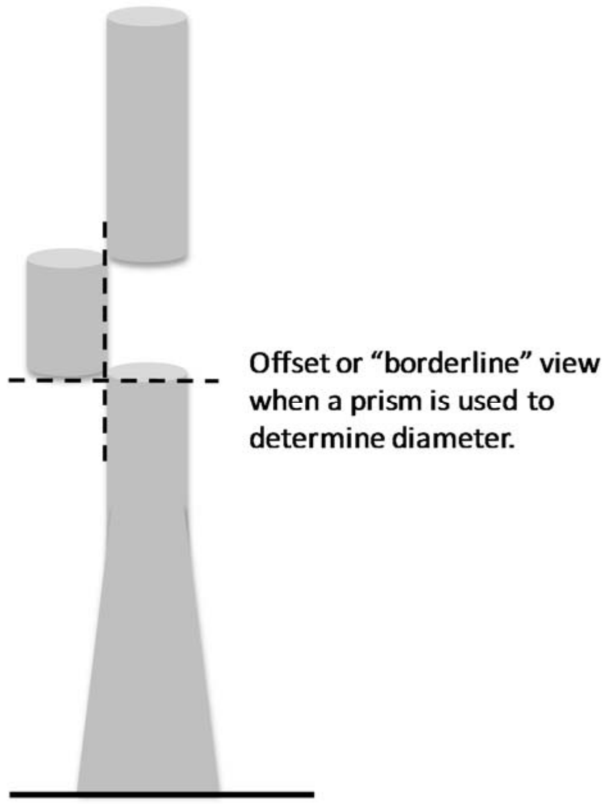
	Tenths of Inch									
DBH	0	1	2	3	4	5	6	7	8	9
---Distance in Feet---										
5	7.1	7.2	7.4	7.5	7.7	7.8	8.0	8.1	8.2	8.4
6	8.5	8.7	8.8	9.0	9.1	9.2	9.4	9.5	9.7	9.8
7	9.9	10.1	10.2	10.4	10.5	10.7	10.8	10.9	11.1	11.2
8	11.4	11.5	11.6	11.8	11.9	12.1	12.2	12.4	12.5	12.6
9	12.8	12.9	13.1	13.2	13.4	13.5	13.6	13.8	13.9	14.1
10	14.2	14.3	14.5	14.6	14.8	14.9	15.1	15.2	15.3	15.5
11	15.6	15.8	15.9	16.1	16.2	16.3	16.5	16.6	16.8	16.9
12	17.0	17.2	17.3	17.5	17.6	17.8	17.9	18.0	18.2	18.3
13	18.5	18.6	18.8	18.9	19.0	19.2	19.3	19.5	19.6	19.7
14	19.9	20.0	20.2	20.3	20.5	20.6	20.7	20.9	21.0	21.2
15	21.3	21.4	21.6	21.7	21.9	22.0	22.2	22.3	22.4	22.6
16	22.7	22.9	23.0	23.2	23.3	23.4	23.6	23.7	23.9	24.0
17	24.1	24.3	24.4	24.6	24.7	24.9	25.0	25.1	25.3	25.4
18	25.6	25.7	25.9	26.0	26.1	26.3	26.4	26.6	26.7	26.8
19	27.0	27.1	27.3	27.4	27.6	27.7	27.8	28.0	28.1	28.3
20	28.4	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.5	29.7
21	29.8	30.0	30.1	30.3	30.4	30.5	30.7	30.8	31.0	31.1
22	31.2	31.4	31.5	31.7	31.8	32.0	32.1	32.2	32.4	32.5
23	32.7	32.8	33.0	33.1	33.2	33.4	33.5	33.7	33.8	33.9
24	34.1	34.2	34.4	34.5	34.7	34.8	34.9	35.1	35.2	35.4
25	35.5	35.6	35.8	35.9	36.1	36.2	36.4	36.5	36.6	36.8
26	36.9	37.1	37.2	37.4	37.5	37.6	37.8	37.9	38.1	38.2
27	38.3	38.5	38.6	38.8	38.9	39.1	39.2	39.3	39.5	39.6
28	39.8	39.9	40.1	40.2	40.3	40.5	40.6	40.8	40.9	41.0
29	41.2	41.3	41.5	41.6	41.8	41.9	42.0	42.2	42.3	42.5
30	42.6	42.7	42.9	43.0	43.2	43.3	43.5	43.6	43.7	43.9
31	44.0	44.2	44.3	45.9	44.6	44.7	44.9	45.0	45.2	45.3
32	45.4	45.6	45.7	47.3	46.0	46.2	46.3	46.4	46.6	46.7
33	46.9	47.0	47.2	48.7	47.4	47.6	47.7	47.9	48.0	48.1
34	48.3	48.4	48.6	50.2	48.9	49.0	49.1	49.3	49.4	49.6
35	49.7	49.9	50.0	51.6	50.3	50.4	50.6	50.7	50.8	51.0
36	51.1	51.3	51.4	53.0	51.7	51.8	52.0	52.1	52.3	52.4
37	52.5	52.7	52.8	54.4	53.1	53.3	53.4	53.5	53.7	53.8
38	54.0	54.1	54.3	55.8	54.5	54.7	54.8	55.0	55.1	55.2
39	55.4	55.5	55.8	57.3	56.0	56.1	56.2	56.4	56.5	56.7
40	56.8	57.0	57.2	58.7	57.4	57.5	57.7	57.8	57.9	58.1

!!!!!MULTIPLE FACTOR PRISM TABLE!!!!!

	BAF				BAF				BAF		
	10	37.5	40		10	37.5	40		10	37.5	40
	Limiting Distance Factor				*Limiting Distance Factor*				*Limiting Distance Factor*		
	2.750	*1.420*	*1.375*		*2.750*	*1.420*	*1.375*		*2.750*	*1.420*	*1.375*
Diameter	**Distance in Feet**			**Diameter**	**Distance in Feet**			**Diameter**	**Distance in Feet**		
5.0	13.8	7.1	6.9	9.1	25.0	12.9	12.5	14.1	38.8	20.0	19.4
5.1	14.0	7.2	7.0	9.2	25.3	13.1	12.7	14.2	39.0	20.2	19.5
5.2	14.3	7.4	7.2	9.3	25.6	13.2	12.8	14.3	39.3	20.3	19.7
5.3	14.6	7.5	7.3	9.4	25.9	13.3	12.9	14.4	39.6	20.4	19.8
5.4	14.9	7.7	7.4	9.5	26.1	13.5	13.1	14.5	39.9	20.6	19.9
5.5	15.1	7.8	7.6	9.6	26.4	13.6	13.2	14.6	40.1	20.7	20.1
5.6	15.4	8.0	7.7	9.7	26.7	13.8	13.3	14.7	40.4	20.9	20.2
5.7	15.7	8.1	7.8	9.8	27.0	13.9	13.5	14.8	40.7	21.0	20.4
5.8	16.0	8.2	8.0	9.9	27.2	14.1	13.6	14.9	41.0	21.2	20.5
5.9	16.2	8.4	8.1	10.0	27.5	14.2	13.8	15.0	41.2	21.3	20.6
6.0	16.5	8.5	8.2	10.1	27.8	14.3	13.9	15.1	41.5	21.4	20.8
6.1	16.8	8.7	8.4	10.2	28.0	14.5	14.0	15.2	41.8	21.6	20.9
6.2	17.1	8.8	8.5	10.3	28.3	14.6	14.2	15.3	42.1	21.7	21.0
6.3	17.3	8.9	8.7	10.4	28.6	14.8	14.3	15.4	42.3	21.9	21.2
6.4	17.6	9.1	8.8	10.5	28.9	14.9	14.4	15.5	42.6	22.0	21.3
6.5	17.9	9.2	8.9	10.6	29.1	15.1	14.6	15.6	42.9	22.2	21.4
6.6	18.2	9.4	9.1	10.7	29.4	15.2	14.7	15.7	43.2	22.3	21.6
6.7	18.4	9.5	9.2	10.8	29.7	15.3	14.9	15.8	43.4	22.4	21.7
6.8	18.7	9.7	9.3	10.9	30.0	15.5	15.0	15.9	43.7	22.6	21.9
6.9	19.0	9.8	9.5	11.0	30.2	15.6	15.1	16.0	44.0	22.7	22.0
7.0	19.3	9.9	9.6	11.1	30.5	15.8	15.3	16.1	44.3	22.9	22.1
7.1	19.5	10.1	9.8	11.2	30.8	15.9	15.4	16.2	44.5	23.0	22.3
7.2	19.8	10.2	9.9	11.3	31.1	16.0	15.5	16.3	44.8	23.1	22.4
7.3	20.1	10.4	10.0	11.4	31.3	16.2	15.7	16.4	45.1	23.3	22.6
7.4	20.4	10.5	10.2	11.5	31.6	16.3	15.8	16.5	45.4	23.4	22.7
7.5	20.6	10.7	10.3	11.6	31.9	16.5	16.0	16.6	45.6	23.6	22.8
7.6	20.9	10.8	10.5	11.7	32.2	16.6	16.1	16.7	45.9	23.7	23.0
7.7	21.2	10.9	10.6	11.8	32.4	16.8	16.2	16.8	46.2	23.9	23.1
7.8	21.5	11.1	10.7	11.9	32.7	16.9	16.4	16.9	46.5	24.0	23.2
7.9	21.7	11.2	10.9	12.0	33.0	17.0	16.5	17.0	46.7	24.1	23.4
8.0	22.0	11.4	11.0	12.1	33.3	17.2	16.6	17.1	47.0	24.3	23.5
8.1	22.3	11.5	11.1	12.2	33.5	17.3	16.8	17.2	47.3	24.4	23.7
8.2	22.6	11.6	11.3	12.3	33.8	17.5	16.9	17.3	47.6	24.6	23.8
8.3	22.8	11.8	11.4	12.4	34.1	17.6	17.1	17.4	47.8	24.7	23.9
8.4	23.1	11.9	11.6	12.5	34.4	17.8	17.2	17.5	48.1	24.9	24.1
8.5	23.4	12.1	11.7	12.6	34.6	17.9	17.3	17.6	48.4	25.0	24.2
8.6	23.7	12.2	11.8	12.7	34.9	18.0	17.5	17.7	48.7	25.1	24.3
8.7	23.9	12.4	12.0	12.8	35.2	18.2	17.6	17.8	49.0	25.3	24.5
8.8	24.2	12.5	12.1	12.9	35.5	18.3	17.7	17.9	49.2	25.4	24.6
8.9	24.5	12.6	12.2	13.0	35.7	18.5	17.9	18.0	49.5	25.6	24.8
9.0	24.8	12.8	12.4	13.1	36.0	18.6	18.0	18.1	49.8	25.7	24.9
9.1	25.0	12.9	12.5	13.2	36.3	18.7	18.2	18.2	50.1	25.8	25.0
9.2	25.3	13.1	12.7	13.3	36.6	18.9	18.3	18.3	50.3	26.0	25.2
9.3	25.6	13.2	12.8	13.4	36.8	19.0	18.4	18.4	50.6	26.1	25.3
9.4	25.9	13.3	12.9	13.5	37.1	19.2	18.6	18.5	50.9	26.3	25.4
9.5	26.1	13.5	13.1	13.6	37.4	19.3	18.7	18.6	51.2	26.4	25.6
9.6	26.4	13.6	13.2	13.7	37.7	19.5	18.8	18.7	51.4	26.6	25.7
9.7	26.7	13.8	13.3	13.8	37.9	19.6	19.0	18.8	51.7	26.7	25.9
9.8	27.0	13.9	13.5	13.9	38.2	19.7	19.1	18.9	52.0	26.8	26.0
9.9	27.2	14.1	13.6	14.0	38.5	19.9	19.3	19.0	52.3	27.0	26.1

!!!!!!CONTINUATION OF MULTIPLE FACTOR PRISM TABLE!!!!!!

	BAF					BAF		
	10	37.5	40			10	37.5	40
	Limiting Distance Factor					*Limiting Distance Factor*		
	2.750	*1.420*	*1.375*			*2.750*	*1.420*	*1.375*
Diameter	**Distance in Feet**				**Diameter**	**Distance in Feet**		
19.1	52.5	27.1	26.3		24.1	66.3	34.2	33.1
19.2	52.8	27.3	26.4		24.2	66.6	34.4	33.3
19.3	53.1	27.4	26.5		24.3	66.8	34.5	33.4
19.4	53.4	27.5	26.7		24.4	67.1	34.7	33.6
19.5	53.6	27.7	26.8		24.5	67.4	34.8	33.7
19.6	53.9	27.8	27.0		24.6	67.7	34.9	33.8
19.7	54.2	28.0	27.1		24.7	67.9	35.1	34.0
19.8	54.5	28.1	27.2		24.8	68.2	35.2	34.1
19.9	54.7	28.3	27.4		24.9	68.5	35.4	34.2
20.0	55.0	28.4	27.5		25.0	68.8	35.5	34.4
20.1	55.3	28.5	27.6		25.1	69.0	35.6	34.5
20.2	55.6	28.7	27.8		25.2	69.3	35.8	34.7
20.3	55.8	28.8	27.9		25.3	69.6	35.9	34.8
20.4	56.1	29.0	28.1		25.4	69.9	36.1	34.9
20.5	56.4	29.1	28.2		25.5	70.1	36.2	35.1
20.6	56.7	29.3	28.3		25.6	70.4	36.4	35.2
20.7	56.9	29.4	28.5		25.7	70.7	36.5	35.3
20.8	57.2	29.5	28.6		25.8	71.0	36.6	35.5
20.9	57.5	29.7	28.7		25.9	71.2	36.8	35.6
21.0	57.8	29.8	28.9		26.0	71.5	36.9	35.8
21.1	58.0	30.0	29.0		26.1	71.8	37.1	35.9
21.2	58.3	30.1	29.2		26.2	72.1	37.2	36.0
21.3	58.6	30.2	29.3		26.3	72.3	37.3	36.2
21.4	58.9	30.4	29.4		26.4	72.6	37.5	36.3
21.5	59.1	30.5	29.6		26.5	72.9	37.6	36.4
21.6	59.4	30.7	29.7		26.6	73.2	37.8	36.6
21.7	59.7	30.8	29.8		26.7	73.4	37.9	36.7
21.8	60.0	31.0	30.0		26.8	73.7	38.1	36.9
21.9	60.2	31.1	30.1		26.9	74.0	38.2	37.0
22.0	60.5	31.2	30.3		27.0	74.3	38.3	37.1
22.1	60.8	31.4	30.4		27.1	74.5	38.5	37.3
22.2	61.1	31.5	30.5		27.2	74.8	38.6	37.4
22.3	61.3	31.7	30.7		27.3	75.1	38.8	37.5
22.4	61.6	31.8	30.8		27.4	75.4	38.9	37.7
22.5	61.9	32.0	30.9		27.5	75.6	39.1	37.8
22.6	62.2	32.1	31.1		27.6	75.9	39.2	38.0
22.7	62.4	32.2	31.2		27.7	76.2	39.3	38.1
22.8	62.7	32.4	31.4		27.8	76.5	39.5	38.2
22.9	63.0	32.5	31.5		27.9	76.7	39.6	38.4
23.0	63.3	32.7	31.6		28.0	77.0	39.8	38.5
23.1	63.5	32.8	31.8		28.1	77.3	39.9	38.6
23.2	63.8	32.9	31.9		28.2	77.6	40.0	38.8
23.3	64.1	33.1	32.0		28.3	77.8	40.2	38.9
23.4	64.4	33.2	32.2		28.4	78.1	40.3	39.1
23.5	64.6	33.4	32.3		28.5	78.4	40.5	39.2
23.6	64.9	33.5	32.5		28.6	78.7	40.6	39.3
23.7	65.2	33.7	32.6		28.7	78.9	40.8	39.5
23.8	65.5	33.8	32.7		28.8	79.2	40.9	39.6
23.9	65.7	33.9	32.9		28.9	79.5	41.0	39.7
24.0	66.0	34.1	33.0		29.0	79.8	41.2	39.9



This illustration is a depiction of the bole when viewed through a prism. The horizontal dashed line represents the LENGTH TO DIAMETER MEASUREMENT POINT. When the offset or borderline is achieved represented by the vertical dashed line and a wedge prism is used, the horizontal distance from the tree is found in the table to determine the corresponding diameter from the table. If a pentaprism is used, read the diameter directly from the diameter scale on the pentaprism.

If the horizontal distance or prism factor is not represented on the preceding tables, take the horizontal distance and divide it by the limiting distance factor for the prism being used to determine the diameter.

Prism	Limiting Distance Factor
10	2.750
30	1.588
37.5	1.420
40	1.375

Example using a 37.5 factor prism: 58.1 feet / 1.420 = 40.9-in diameter.

SLOPE CORRECTION FOR SELECTED HORIZONTAL DISTANCES (Corrections given in both horizontal distance and slope distance)										
% Slope	Horizontal Distance					Horizontal Distance				
	50	60	66	70	100	50	60	66	70	100
	Feet to add in horizontal distance					Feet to add in slope distance				
5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
10	0.2	0.3	0.3	0.4	0.5	0.2	0.3	0.3	0.4	0.5
15	0.6	0.7	0.7	0.8	1.1	0.6	0.7	0.7	0.8	1.1
20	1.0	1.2	1.3	1.4	2.0	1.0	1.2	1.3	1.4	2.0
25	1.5	1.8	2.0	2.1	3.0	1.5	1.9	2.0	2.2	3.1
30	2.1	2.5	2.8	2.9	4.2	2.2	2.6	2.9	3.0	4.4
35	2.8	3.4	3.7	3.9	5.6	3.0	3.6	3.9	4.1	5.9
40	3.6	4.3	4.7	5.0	7.2	3.9	4.6	5.1	5.4	7.7
45	4.4	5.3	5.8	6.2	8.8	4.8	5.8	6.4	6.8	9.6
50	5.3	6.3	7.0	7.4	10.6	5.9	7.0	7.8	8.3	11.8
55	6.2	7.4	8.2	8.7	12.4	7.0	8.4	9.3	9.9	14.1
60	7.1	8.6	9.4	9.9	14.2	8.3	10.0	11.0	11.5	16.6
65	8.1	9.7	10.7	11.3	16.2	9.6	11.6	12.7	13.5	19.3
70	9.0	10.8	11.9	12.7	18.1	11.0	13.2	14.6	15.5	22.1
75	10.0	12.0	13.2	14.0	20.0	12.5	15.0	16.5	17.5	25.0
80	11.0	13.1	14.5	15.3	21.9	14.0	16.8	18.5	19.6	28.1
85	11.9	14.3	15.7	16.7	23.8	15.6	18.8	20.6	21.9	31.2
90	12.8	15.4	16.9	17.9	25.6	17.3	20.7	22.8	24.1	34.5
100	14.6	17.6	19.3	20.5	29.3	20.7	24.9	27.3	29.0	41.4
105	15.5	18.6	20.5	21.7	31.0	22.5	27.0	29.7	31.5	45.0
110	16.4	19.6	21.6	23.0	32.8	24.3	29.1	32.1	34.2	48.7
115	17.2	20.6	22.7	24.1	34.4	26.2	31.4	34.6	36.7	52.4
120	18.0	21.6	23.7	25.2	36.0	28.1	33.7	37.1	39.4	56.2

Supplement C. Plot Monumentation (optional)

This section describes the Plot Monumentation variables recorded in the Portable Data Recorder (PDR).

The information documented on the Draw Page may also be recorded in the PDR. Though optional at this time, the data is helpful and will be used to develop an all-electronic draw page for future use.

The reference variables are recorded in the Regional “SRS” data section under “Plotmonument” in the PDR.

SRS C1. MONUMENT TYPE

Record the code describing what is being monumented. Depending on what code is used (codes 1-5), certain variables will be turned on or off. Complete each line of data as it appears in the PDR for each MONUMENT TYPE recorded.

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

1	Starting point (SP)
2	Alternate starting point (AltSP)
3	Witness 1 (or white-tag tree)
4	Witness 2 (or base-tag tree)
5	Witness 3

SRS C2. SUBPLOT REFERENCED

Record the subplot number to which the MONUMENT TYPE is referenced. The goal of monumentation is to re-locate the plot. On some locations, referencing witness trees to another subplot (2-4) may aid in relocation. Examples include when subplot one is not sampled or has no trees.

When collected: All plots when MONUMENT TYPE is recorded
Field width: 1 digit
Tolerance: No errors
Values:

1	Subplot 1
2	Subplot 2
3	Subplot 3
4	Subplot 4

SRS C3. AZIMUTH

Record the azimuth (to nearest degree) obtained by either measuring the azimuth to the referenced item or by calculating the course-to-plot.

When collected: All plots when MONUMENT TYPE is recorded
Field width: 3 digits
Tolerance: ± 3 degrees.
Values: 001 - 360

SRS C4. HORIZONTAL DISTANCE

Record the horizontal distance, to the nearest tenth foot, by either measuring the actual distance to the referenced item or by calculating the course-to-plot. Horizontal distance is required for witness trees but either horizontal or slope distance (or both) may be recorded for SP to PC (course-to-plot).

When collected: Optional when MONUMENT TYPE is 1 or 2; required when MONUMENT TYPE is 3, 4 or 5.
Field width: 5 digits
Tolerance: Monument type 1: distance ≤ 700 feet, ± 10%; distance >700 feet, ± 70 feet maximum tolerance of 70 feet.
Monument type 2: ± 0.5 feet
Values: 0000.1 – 9999.9

SRS C5. SLOPE DISTANCE

Record the slope distance, to the nearest tenth foot, by either measuring the actual distance to the referenced item or by calculating the course-to-plot. Slope distance is optional for SP to PC (course-to-plot).

When collected: MONUMENT TYPE = 1 when HORIZONTAL DISTANCE is not recorded
Field width: 5 digits
Tolerance: Monument type 1: distance ≤ 700 feet, ± 10%; distance >700 feet, ± 70 feet maximum tolerance of 70 feet
Values: 0000.1 – 9999.9

SRS C6. REFERENCE TYPE
Record whether the MONUMENT TYPE is a tree or some other type of reference.

When collected: All plots when MONUMENT TYPE is recorded
Field width: 1 digit
Tolerance: No errors
Values:

1 Tally tree species
2 Other reference (pole, bldg., shrub, rock, etc.)

SRS C7. SPECIES
Record the tally FIA species code (see Appendix 3) of the SP or witness tree.

When collected: When REFERENCE TYPE = 1
Field width: 4 digits
Tolerance: No errors
Values: See Appendix 3

SRS C8. OTHER REFERENCE
When a tally tree is not used for the SP or witness to the plot center, such as a sharp bend in a road, a corner of a building, the intersection of two fence lines, a rock cairn, etc. use a short word (25 characters maximum) to describe the landmark (e.g. ROCK, FORK, or CORNER, and further provide more details in the NOTES.

When collected: REFERENCE TYPE = 2
Field width: 25 characters
Tolerance: No errors
Values: Alphanumeric

SRS C9. DIAMETER
When a tree is used as the SP or for the witness trees, record the diameter. If a multistemmed woodland tree is used, measure only one stem, preferably the largest or main stem. Record the diameter to the last whole 0.1 inch. If possible, use a tree or stem at least 5.0 inches DBH or 3.0 inches DRC. If the SP or witness tree is not a tally species but another reference type (rock, etc.), diameter is optional and may be estimated.

When collected: All plots when MONUMENT TYPE is recorded and REFERENCE TYPE = 1; optional when REFERENCE TYPE = 2.
Field width: 4 digits
Tolerance: Starting point: ± 1.0 inch
Witness tree: Measured diameter - ± 0.1 inch per 20.0 inch increment
Estimated diameter - ± 0.5 inch per 20.0 inch increment

SRS C10. GPS TYPE (UNIT): See Section 1.19.3

SRS C12. LATITUDE DEGREES: See Section 1.19.8.1

SRS C13. LATITUDE MINUTES: See Section 1.19.8.2

SRS C14. LATITUDE SECONDS: See Section 1.19.8.3

SRS C15. LONGITUDE DEGREES: See Section 1.19.9.1

SRS C16. LONGITUDE DEGREES: See Section 1.19.9.2

SRS C17. LONGITUDE SECONDS: See Section 1.19.9.3

SRS C18. GPS ERROR: See Section 1.19.17

SRS C19. NUMBER OF READINGS: See Section 1.19.18