# FOREST INVENTORY AND ANALYSIS
# NATIONAL CORE FIELD GUIDE

## VOLUME I: FIELD DATA COLLECTION PROCEDURES FOR PHASE 2 PLOTS

Version 6.1

**Changes from the Phase 2 Field Guide version 6.0 to version 6.1**

Changes documented in change proposals are indicated in **bold** type. All of the changes relating to damage codes were approved using the change proposal system of incorporating changes to the damage code list annually. 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 the *Values* from "6.0" to "6.1".
- 5.7.1 RECONCILE. In codes 3 and 4, added the following text: "Includes previously nonsampled subplots."
- **5.20.1 DAMAGE AGENT 1. Added the following text to the procedure: "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." Under *Values*, added the following text to code 13000 in column 2: "Note: this is only collected by IW and SRS."**
- **Appendix 11. Damage Codes. 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; | | SRS | |

| Code | Old Threshold | New Threshold | Old REGION | New REGION |
|---|---|---|---|---|
| | damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | | | |
| 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 | | PNW |

| Code | Old Threshold | New Threshold | Old REGION | New REGION |
|---|---|---|---|---|
| | | 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 | | (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 | | PNW |

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

**Changes from the Phase 2 Field Guide version 5.1 to version 6.0**

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

- Introduction. Field Guide Layout. Made the following changes:

| Old text | New text |
|---|---|
| 0 General Description | 0 General Description |
| 1 Plot | 1 Plot Level Data |
| 2 Condition | 2 Condition Class |
| 3 Subplot | 3 Subplot Information |
| 4 Boundary | 4 Boundary References |
| 5 Tree Measurements | 5 Tree Measurements and Sapling Data |
| 6 Seedling | 6 Seedling Data |
| 7 Site Tree | 7 Site Tree Information |
| 8 Phase 2 Vegetation Profile (core optional) | 8 Phase 2 (P2) Vegetation Profile (core optional) |
| 9 Invasive Plants | 9 Invasive Plants |
| | 10 Down Woody Materials |

- 0.0 General Description. Paragraph 5, Defined NIMS (the National Information Management System). Also Figure 1. Figure 1 was replaced by a plot diagram including the annular ring.

- 0.2 Plot Integrity. Copied the following paragraph (as it appears in chapter 9) to the end of the section: "**Note: Avoid becoming part of the problem!** There is a risk that field crews walking into plot locations could pick up seeds along roadsides or other patches of invasive plants and spread them through the forest and on to the plot. Be aware of the vegetation you are traveling through and consider stopping and removing seeds from boots and clothing before entering uninvaded lands, particularly remote areas that are rarely visited."

- 1.3 PLOT NUMBER. Changed *When collected* from "SAMPLE KIND=1 or SAMPLE KIND=2" to "All plots".

- 1.6 NONFOREST PLOT STATUS. Changed *When collected* from "When PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 0 or 1" to "When PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1". Also changed the first sentence from "Record the code that describes the sampling status of the other-than-forest plot, i.e., PLOT STATUS = 2." to "Record the code that describes the plot status of the nonforest plot, i.e., PLOT STATUS = 2."

- 1.8 NONFOREST PLOT NONSAMPLED REASON. Changed description from "For entire plots that cannot be sampled, record one of the following reasons." to "For entire nonforest plots that cannot be sampled, record one of the following reasons."

- 1.9 SUBPLOTS EXAMINED. Changed *When collected* from "When PLOT STATUS = 2 or 3" to "All plots".

- 1.12 FIELD GUIDE VERSION. Changed *Values* from "4.0" to "6.0".

- 1.15 HORIZONTAL DISTANCE TO IMPROVED ROAD. Changed *When collected* from "All plots with either one accessible forest land condition class (PLOT STATUS = 1) or one accessible nonforest land condition class when nonforest is being sampled (PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS =1)" to "All plots with either one

accessible forest land condition class (PLOT STATUS = 1) or one accessible nonforest land condition class when nonforest is field-measured (PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS =1)".

- 1.16 WATER ON PLOT. Changed *When collected* from "All plots with either at least one accessible forest land condition class (PLOT STATUS = 1) or one accessible nonforest land condition class when nonforest is being sampled (PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS = 1)" to "All plots with either at least one accessible forest land condition class (PLOT STATUS = 1) or one accessible nonforest land condition class when nonforest is field-measured (PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS = 1)". Also deleted "CONDITION CLASS" from code 0.

- 1.19.2 Collected Readings. Deleted all references to 180 readings from this section.

- 1.19.8.2 LATITUDE MINUTES. Corrected *Values* from "1 – 59" to "0 – 59".

- 1.19.9.2 LONGITUDE MINUTES. Corrected *Values* from "1 – 59" to "0 – 59".

- 1.19.18 NUMBER OF READINGS. Deleted the sentence "Collect at least 180 readings if possible."

- 2.1.1 Step 1: Delineate the plot area by CONDITION CLASS STATUS. Added this sentence to the description " Additionally, nonforest land is sampled in some areas of special interest."

- 2.1.2 Step 2: Further subdivide Accessible Forest Land by 6 delineation variables. Moved last paragraph from 2.1.1 to the end of this section. Updated the section number in the Note and the section number in the last paragraph.

- 2.1.3 Step 3. When inventorying Nonforest Land, delineate accessible Nonforest Land by 3 delineation variables. Added this step to accommodate nonforest land.

- **2.2 Condition Class Status Definitions. Added the text for the new forest land definition. Replaced part of the text under #1 Accessible Forest Land and retained the name 'accessible forest land' rather than changing the name to 'forest land'. Replaced the old text with the new text under #2 Nonforest Land.**

- **2.3.1 Forest Land. Deleted 2.5.12 PRIVATE OWNER INDUSTRIAL STATUS because this variable is no longer in the field guide.**

- 2.3.2 Nonforest Land. Added this subsection to accommodate nonforest land.

- 2.4 Delineating Condition Classes Differing in Condition Class Status. Deleted old figure 6 from version 5.1. Also, in step 5, changed the sentence from "Nonsampled conditions within accessible forest land are delineated, regardless of size, as a separate condition" to "Nonsampled conditions are delineated as a separate condition class regardless of size."

- **2.4.3 CONDITION NONSAMPLED REASON. Added code 05, 06, 07, 08, and 09.**

- 2.4.5 NONFOREST CONDITION NONSAMPLED REASON. In the *When collected*, corrected the variable "NONFOREST CONDITION STATUS" to "NONFOREST CONDITION CLASS STATUS."

- 2.5 Delineating Condition Classes Within Accessible Forest Land. Changed the final sentence in the first paragraph from "Stands" are defined by plurality of stocking for all live trees that are not overtopped." to "Stands" are defined by plurality of stocking for all live trees, saplings, and seedlings that are not overtopped." This is needed to accommodate the new definition of forest land. Also, in step 3, the third sentence in the example was changed from "Between subplot 1 and 2 is a transition

zone; the number of trees present goes from none to what clearly represents at least 10-percent tree stocking." to "Between subplot 1 and 2 is a transition zone; the number of trees present goes from none to what clearly represents forest land." Also, in step 4, the first line of the Note was changed from "When the width of forest adjacent to a stream is between 120.0 feet and 150.0 feet and the width of the riparian forest is at least 30.0 feet wide, the rules for identifying the non-riparian forest (at least 30.0 feet but less than 120.0 feet) need to be modified." to "When the width of forest adjacent to a body of water or water course is between 120.0 feet and 150.0 feet and the width of the riparian forest is at least 30.0 feet wide, the rules for identifying the non-riparian forest (at least 30.0 feet but less than 120.0 feet) need to be modified." Also, under #3 in the first sentence, changed "fixed radii plots" to "fixed-radius subplots, and in the second sentence, changed "two fixed-radius plots" to "two fixed-radius subplots".

- **2.5.1 RESERVED STATUS. Added clarification to the text.** Made an additional change to the new text – added "preserve" to the list of "park, wilderness, wild river, reserve". Also, clarified the *When collected CORE OPTIONAL* from "All accessible forest land condition classes (CONDITION CLASS = 1) and nonforest land condition classes (CONDITION CLASS STATUS >1)" to "All condition classes".

- 2.52.OWNER GROUP. Clarified the *When collected CORE OPTIONAL* from "All accessible forest land condition classes (CONDITION CLASS = 1) and nonforest land condition classes (CONDITION CLASS STATUS >1)" to "All condition classes".

- 2.5.3 FOREST TYPE. Added this note to the text: . NOTE: Canopy cover is used to determine whether an area is forest or nonforest. Stocking is used with other variables such as this one."

- 2.5.4 STAND SIZE CLASS. Added "seedlings and saplings" to the first sentence and this note to the text: NOTE: Canopy cover is used to determine whether an area is forest or nonforest. Stocking is used with other variables such as this one." Also, in each code, changed "…5 percent crown cover…" to "…10 percent canopy cover…" and added "seedlings and saplings" to accommodate the new definition of forest land. Also, deleted code 6 to correct the field guide to match the MIDAS program.

- 2.5.5 REGENERATION STATUS. Changed the last sentence before the Note from "In these cases, there is no need to differentiate conditions based on stand origin " to "In these cases, there is no need to differentiate conditions based on regeneration status".

- 2.5.6 TREE DENSITY. Changed the second sentence from "Base the classification on the number of stems/unit area, basal area, tree cover, or stocking of all live trees in the condition that are not overtopped, compared to any previously defined condition class TREE DENSITY." to "Base the classification on the number of stems/unit area, basal area, tree cover, or stocking of all live trees, seedlings, and saplings in the condition that are not overtopped, compared to any previously defined condition class TREE DENSITY."

- **2.5.7 OWNER. Added this new variable and renumbered the rest of the section. Changed the final version of the text to "Record the name and address of the ownership of 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. If there is more than one ownership on a condition, choose the ownership in the given condition that is closest to the center of the lowest numbered subplot."** Also, in the first sentence changed "owner of the condition" to "ownership of the condition". Also, in the *When collected* CORE, changed "First" to All". Also, clarified the *When collected* CORE OPTIONAL from "All accessible forest land condition classes (CONDITION CLASS STATUS = 1) and nonforest land condition classes (CONDITION CLASS STATUS > 1)" to "All condition classes".

- **2.5.8 (old) PRIVATE OWNER INDUSTRIAL STATUS. Deleted from the field guide (determined by expert panel) in final revision of the Ownership proposal.**

- **2.5.8 OWNER CLASS. (was 2.5.7) Modified the descriptive text. Changed the *When collected* CORE OPTIONAL statement from "CORE OPTIONAL: All accessible forest land condition classes (CONDITION CLASS STATUS = 1) and nonforest land condition classes CONDITION CLASS STATUS > 1)" to "CORE OPTIONAL: All condition classes (CONDITION CLASS STATUS ≥1)". Also, dropped code 44 and modified the text in codes 42, 43, and 45. Added back in: the OWNER GROUP names back in as subheadings; Boy Scouts of America as an example in OWNER CLASS-FIELD code 42; and church camps in OWNER CLASS code 43, with the agreement of the proposal champion. Added back in code 44 with the agreement of the proposal champion.** Also, clarified the *When collected* CORE OPTIONAL from "All accessible forest land condition classes (CONDITION CLASS STATUS = 1) and nonforest land condition classes (CONDITION CLASS STATUS > 1)" to "All condition classes".

- **2.5.9 OWNER SUB-CLASS (CORE OPTIONAL). Added this new variable and renumbered the rest of the section.**

- **2.5.10 PUBLIC ADMINISTRATIVELY WITHDRAWN STATUS (CORE OPTIONAL). Added this new variable and renumbered the rest of the section.** Clarified *When collected* from "Any defined and documented combination of STATECD, COUNTYCD (if necessary), CONDITION CLASS and OWNCD (<40) for each individual assessment, where RESERVED STATUS=0." to "When OWNCD <40 and RESERVED STATUS=0".

- **2.5.11 ADMINISTRATIVELY WITHDRAWN AREA NAME. Added this new variable and renumbered the rest of the section.**

- **2.5.12 ADMINISTRATIVELY WITHDRAWN NOTES (CORE OPTIONAL). Added this new variable and renumbered the rest of the section.**

- **2.5.13 RESERVED AREA NAME. Added this new variable and renumbered the rest of the section.**

- 2.5.15 STAND AGE. Changed the first sentence from "Record the average total age, to the nearest year, of the trees (plurality of all live trees not overtopped) in the predominant STAND SIZE CLASS of the condition, determined using local procedures." to "Record the average total age, to the nearest year, of the trees (plurality of all live trees, seedlings, and saplings not overtopped) in the predominant STAND SIZE CLASS of the condition, determined using local procedures." Also added this note to the first paragraph "NOTE: Canopy cover is used to determine whether an area is forest or nonforest. Stocking is used with other variables such as this one."

- 2.5.16 DISTURBANCE 1. Changed the *When collected* from "All accessible forest land condition classes (CONDITION CLASS STATUS = 1) or accessible nonforest condition classes when nonforest is being sampled (NONFOREST SAMPLING STATUS = 1 and CONDITION CLASS STATUS = 2 and NONFOREST CONDITION CLASS STATUS = 2)" to "All accessible forest land condition classes (CONDITION CLASS STATUS = 1) or accessible nonforest condition classes when nonforest is being sampled (NONFOREST CONDITION CLASS STATUS = 2)". Also, in code 80, changed the final sentence from "Must include a plot-level note to describe further." to "Must include a condition-level note to describe further."

- 2.5.22 TREATMENT1. Changed the *When collected* from "All accessible forest land condition classes (CONDITION CLASS STATUS = 1), or accessible nonforest condition classes when nonforest is being sampled (NONFOREST SAMPLING STATUS = 1 and CONDITION CLASS STATUS = 2 and NONFOREST CONDITION CLASS STATUS = 2)" to "All accessible forest land condition classes (CONDITION CLASS STATUS = 1".

- 2.5.28 PHYSIOGRAPHIC CLASS. Changed the *When collected* from "All accessible forest land condition classes (CONDITION CLASS STATUS = 1), or accessible nonforest condition classes when nonforest is being sampled (NONFOREST SAMPLING STATUS = 1 and CONDITION CLASS STATUS = 2 and NONFOREST CONDITION CLASS STATUS = 2)" to "All accessible forest land condition classes (CONDITION CLASS STATUS = 1), or accessible nonforest condition classes when nonforest is being sampled (NONFOREST CONDITION CLASS STATUS = 2)".

- **2.5.29 LAND COVER CLASS. Added this new variable and renumbered the rest of the section.** In code 06, dropped the following sentence: "The Common Land Unit (CLU) and/or the Cropland Data Layer code (from prefield) can be used to guide assignment of this class if it is ambiguous." Also changed final sentence in code 08 from "Can include the natural material portions of quarries, mines, and gravel pits." to "Can include the natural material portions of quarries, mines, gravel pits, and cut or burned land <10% vegetation." Also in code 09, deleted "Sparsely Vegetated" form the name of the code. Also added a paragraph to the description.

- 2.5.30 PRESENT NONFOREST LAND USE. Modified the text. Changed the *When collected* from "CORE: SAMPLE KIND = 2, current CONDITION CLASS STATUS = 2, CORE OPTIONAL: SAMPLE KIND = 1, 2, or 3; current CONDITION CLASS STATUS = 2" to "CONDITION CLASS STATUS = 2".

- 2.5.31 CANOPY COVER SAMPLE METHOD. Changed first sentence from "Record the CANOPY COVER SAMPLE METHOD used to determine LIVE CANOPY COVER, LIVE PLUS MISSING CANOPY COVER, and TOTAL STEMS for the condition." to "Record the CANOPY COVER SAMPLE METHOD used to determine LIVE CANOPY COVER and LIVE PLUS MISSING CANOPY COVER for the condition." Also, under Subplot method number 3, deleted the second paragraph and the table, and changed "plots" to "subplots" in the last sentence of the first paragraph. Also, under Acre method, deleted the old number 3 and moved the old number 4 to number 3; corrected the equation "Canopy Area = pi*long axis d/2*short axis d/2)" to "pi*((long axis diameter/2)*(90 degrees axis diameter/2))"; in the paragraph Transition zones and forest/nonforest encroachment, deleted "stocking" from the first sentence; replaced figure 15 with a new figure. Also, under Sub-acre method, deleted the old number 4 and moved old number 5 and 6 up; deleted the far right column in the table; in the second column, changed "67.6" to "68.0" and "49.0" to "48.1". Also, changed the *When collected* from "CONDITION CLASS STATUS = 1 or 2" to "CONDITION CLASS STATUS = 1, 2, or 5".

- 2.5.32 LIVE CANOPY COVER. Changed text just prior to the *When collected* from "LIVE CANOPY COVER can be based on an ocular estimate when the condition in question is certain to contain greater than 10% LIVE PLUS MISSING CANOPY COVER or TOTAL STEMS greater than 200." to "LIVE CANOPY COVER can be based on an ocular estimate when the condition in question is certain to contain greater than 10% LIVE PLUS MISSING CANOPY COVER or CURRENT AFFORESTATION CODE =1 and TOTAL STEMS greater than or equal to 150." Also, added this sentence to the last paragraph of text: "For LIVE CANOPY COVER <1 percent (trace), record 01." Also, changed the *When collected* from "All CONDITION CLASS STATUS = 1 or 2" to "CONDITION CLASS STATUS = 1, 2, or 5".

- 2.5.33 LIVE PLUS MISSING CANOPY COVER. Deleted "chaining" from the first sentence. Added the following to the text "Dead trees and dead portions of live trees are not considered as missing unless it is part of the condition disturbance." Also, changed the *When collected* from "CONDITION CLASS STATUS = 1 or 2" to "CONDITION CLASS STATUS = 1, 2, or 5".

- **2.5.34 CURRENT AFFORESTATION CODE. Added this new variable.**

- **2.5.35 PREVIOUS AFFORESTATION CODE. Added this new variable.**

- **2.5.36 TOTAL STEMS. Change *When collected* from "CONDITION CLASS STATUS = 1 or 2" to "CURRENT AFFORESTATION CODE = 1 or PREVIOUS AFFORESTATION CODE = 1".** Also, in the second sentence, changed "plot size" to "subplot size".

- **2.5.37 CHAINING CODE. Added this new variable.**

- **3.3 SUBPLOT NONSAMPLED REASON. Added codes 06, 07, 08, and 09.**

- 3.8 SUBPLOT SLOPE. Changed the *When collected* from "All subplots with at least one accessible forest land condition present on subplot (SUBPLOT/MACROPLOT STATUS = 1) or subplots with an accessible nonforest condition class present when nonforest is being sampled (NONFOREST SAMPLING STATUS = 1 and SUBPLOT/MACROPLOT STATUS = 2 and NONFOREST SUBPLOT/MACROPLOT STATUS = 1)" to "All subplots with at least one accessible forest land condition present on subplot (SUBPLOT/MACROPLOT STATUS = 1) or subplots with an accessible nonforest condition class present when nonforest is being sampled (NONFOREST SUBPLOT/MACROPLOT STATUS = 1)".

- 3.9 SUBPLOT ASPECT. Changed the *When collected* from "All subplots with at least one accessible forest land condition present on subplot (SUBPLOT/MACROPLOT STATUS = 1) or subplots with an accessible nonforest condition class present when nonforest is being sampled (NONFOREST SAMPLING STATUS = 1 and SUBPLOT/MACROPLOT STATUS = 2 and NONFOREST SUBPLOT/MACROPLOT STATUS = 1)" to "All subplots with at least one accessible forest land condition present on subplot (SUBPLOT/MACROPLOT STATUS = 1) or subplots with an accessible nonforest condition class present when nonforest is being sampled (NONFOREST SUBPLOT/MACROPLOT STATUS = 1)".

- 4.1 Reference Procedure. In #5, in the first sentence, changed "MQO's" to "tolerances".

- 5.0 Tree and Sapling Data. Fifth paragraph. Corrected the first sentence from "Once tallied, dead trees over 5.0 inches in diameter are tracked until they no longer qualify as standing dead." to "Once tallied, dead trees 5.0 inches and greater in diameter are tracked until they no longer qualify as standing dead."

- 5.5 HORIZONTAL DISTANCE. Added the following text to the description "Note: On remeasurement plots (SAMPLE KIND = 2), the current crew is responsible for verifying downloaded data and updating when it is out of tolerance. When the old pin or dowel is not found, current cruisers should consider all "edge" trees or saplings that were in or out on the previous occasion when reestablishing the subplot center. For saplings on the microplot that become trees at the time of plot remeasurement, crews must collect new HORIZONTAL DISTANCE information from the subplot center." Also, Modified the tolerances to the following:
  Microplot: +/- 0.2 ft
  Microplot woodland species: +/- 0.4 ft
  Subplot: +/- 1.0 ft from 0.1 to 23.0 ft
  Subplot: +/- 0.2 ft from 23.1 to 24.0 ft
  Subplot multi-stemmed woodland species: +/- 2.0 ft
  Annular plot: +/- 3.0 ft from 24.0 to 55.9 ft
  Annular plot: +/- 1.0 ft from 55.9 to 58.9 ft
  Annular plot woodland species: +/- 6.0 ft

- 5.7.1 RECONCILE. In code 6, corrected "i.e." to "e.g."

- 5.8 SPECIES. Modified the text to reflect the addition of Caribbean species in version 5.1.

- 5.9.2 DIAMETER AT BREAST HEIGHT (DBH). Under #2, figure 26 was updated to clarify measure of trees that fork at or above 1.0 foot.

- 5.12 DIAMETER CHECK. Modified the text from "Record this code to identify any irregularities in diameter measurement positions (e.g., abnormal swellings, diseases, damage, new measurement

positions, etc.) that may affect use of this tree in diameter growth/change analyses." to "Record this code to identify the accuracy of the diameter measurement (due to factors such as abnormal swellings, diseases, damage, new measurement positions, etc.) that may affect use of this tree in diameter growth/change analyses." Also added the following Note: "If either code 1 or code 2 is used, a tree-level note is required."

- 5.15 ACTUAL LENGTH. Added the following Note: ": Some regions will measure ACTUAL LENGTH differently due to growth form. Some examples are swamp tupelo, cypress, trees growing off of old high stumps with stilted roots in the West. Check regional field guides for regional guidance."
- **5.20 Tree Damage. Changed from CORE OPTIONAL to CORE. Also completely revised the text.**
- 5.20 Tree Damage. Corrections were made to the table of code after the original posting of chapter 5 (file dated 4/26/2012)
- **5.20.1 DAMAGE LOCATION 1 (CORE OPTIONAL). Deleted this variable.**
- **Figure 45. Location codes for damage. Deleted this figure.**
- **Figure 46. The damage runs from stump to crownstem. Deleted this figure.**
- **5.20.1 DAMAGE AGENT 1. Added this new variable.**
- **5.20.2 DAMAGE TYPE 1 (CORE OPTIONAL). Deleted this variable.**
- **5.20.2 DAMAGE AGENT 2. Added this new variable.**
- **5.20.3 DAMAGE SEVERITY 1 (CORE OPTIONAL). Deleted this variable.**
- **Figure 47. A canker which exceeds threshold. Deleted this figure.**
- **Figure 48. Multiple damage in "stump" and lower bole. Deleted this figure.**
- **Figure 49. Examples of damage coding. Deleted this figure.**
- **Figure 50. Examples of damage coding. Deleted this figure.**
- **Figure 51. Examples of damage coding. Deleted this figure.**
- **Figure 52. Examples of damage coding. Deleted this figure.**
- **Figure 53. Examples of damage coding. Deleted this figure.**
- **Figure 54. Examples of damage coding. Deleted this figure.**
- **Figure 55. Examples of damage coding. Deleted this figure.**
- **5.20.3 DAMAGE AGENT 3. Added this new variable.**
- **5.20.4 DAMAGE LOCATION 2 (CORE OPTIONAL). Deleted this variable.**
- **5.20.5 DAMAGE TYPE 2 (CORE OPTIONAL). Deleted this variable.**
- **5.20.6 DAMAGE SEVERITY 2 (CORE OPTIONAL). Deleted this variable.**

- 5.26. DWARF MISTLETOE CLASS (CORE OPTIONAL). Added the following note: “In addition to these requirements, longleaf pine (0121) seedlings must be greater than or equal to 0.5 inches DRC.”

- 6.0 SEEDLING DATA. Modified the first sentence from “Stocking and regeneration information are obtained by counting live seedlings within the 6.8-foot radius microplot located 90 degrees and 12.0 feet from each subplot center within each of the four subplots.” to “Regeneration information is obtained by counting live seedlings within the 6.8-foot radius microplot located 90 degrees and 12.0 feet from each subplot center within each of the four subplots.”

- 7.2.2 SPECIES. The site tree selection guidelines and values for the Eastern and Western U.S. were moved to this location from appendix 4. Also, added the following to match what is listed in 5.8 SPECIES: “Field width: 4 digits  Tolerance: No errors  MQO: At least 99% of the time for genus, at least 95% of the time for species”.  Also, the following changes were made in the list of valid *Values*:

| Type of change | Species code | Common name | Region |
|---|---|---|---|
| Eastern U.S. species | | | |
| Deleted region | 0131 | loblolly pine | NC |
| Deleted region | 0132 | Virginia pine | NC |
| Deleted code | 0135 | Arizona pine | SO |
| Deleted code | 0202 | Douglas-fir | SO |
| Added code | 0403 | pignut hickory | NC |
| Added code | 0404 | pecan | NC |
| Added code | 0405 | shellbark hickory | NC |
| Added code | 0408 | black hickory | NC |
| Added code | 0409 | mockernut hickory | NC |
| Added code | 0741 | balsam poplar | NC |
| Deleted code | 0745 | plains cottonwood | SO |
| Deleted region | 0746 | quaking aspen | SO |
| Deleted code | 0748 | Fremont poplar | SO |
| Deleted code | 0749 | narrowleaf cottonwood | SO |
| Added code | 0809 | northern pin oak | NC |
| Deleted region | 0813 | cherrybark oak | NC |
| Added code | 0823 | bur oak | NC |
| Added code | 0826 | chinkapin oak | NC |
| Deleted region | 0832 | chestnut oak | NC |
| Added code | 0975 | slippery elm | NC |
| Added code | 0977 | rock elm | NC |
| Western U.S. species | | | |
| Added code | 0068 | eastern red cedar | RMRS |
| Added code | 0101 | whitebark pine | RMRS, PNW |
| Added region | 0231 | Pacific yew | RMRS |
| Added region | 0351 | red alder | RMRS |
| Added code | 0462 | hackberry | RMRS |
| Added code | 0544 | green ash | RMRS |
| Added code | 0742 | eastern cottonwood | RMRS |
| Added code | 0972 | American elm | RMRS |

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

- 8.1 Vegetation Sampling Design. The text in this section was clarified.

- 8.2 General definitions. Canopy cover – this text was expanded and clarified. Figure 45 was clarified. Growth habits – this text was clarified including adding subshrubs to the description. Layer codes – this text was expanded and clarified: a table and figure were added. NRCS PLANTS database – the database reference was updated (occurred in version 5.1 but repeated here for clarity.) Figure 46 was added and the following figures renumbered. New figure 47 was clarified. Tables 1 and 2 were updated.

- 8.3.1 P2 VEGETATION SAMPLING STATUS. Modified code 2 from "Vegetation data collected on all accessible land conditions (CONDITION CLASS STATUS=1 or 2, NONFOREST SAMPLING STATUS =1 and NONFOREST PLOT STATUS=1)" to "P2 Vegetation data collected on all accessible land conditions (CONDITION CLASS STATUS=1 or NONFOREST CONDITION CLASS STATUS =2)".

- 8.3.2 LEVEL OF DETAIL. Modified the text from "This plot-level variable determines whether data are collected for vegetation structure growth habits only or for individual species (that qualify as most abundant) as well. If LEVEL OF DETAIL = 3, then a tree species could be recorded twice, but it would have two different species growth habits (see 8.6.1)." to "This plot-level variable determines whether data are collected for *Vegetation Structure* only or for *Species Composition* as well. If LEVEL OF DETAIL = 3, then a tree species could be recorded twice, but it would have two different SPECIES GROWTH HABITs (see 8.6.1)." Also modified text in all three codes.

- 8.4.1 SUBPLOT NUMBER. Modified *When collected* from "On all plots where P2 Vegetation is being sampled (P2 VEGETATION SAMPLING STATUS = 1 or 2)" to "On all subplots where P2 Vegetation is being sampled (P2 VEGETATION SAMPLING STATUS = 1 or 2)".

- 8.4.2 P2VEG SUBPLOT SAMPLE STATUS. Clarified the text. Also modified the *When collected* from "On all subplots where P2 vegetation is being sampled on accessible forest land (P2 VEGETATION SAMPLING STATUS=1 and SUBPLOT STATUS = 1) or is being sampled on accessible forest land or nonforest land and at least one accessible nonforest land condition is present on the plot (P2 VEGETATION SAMPLING STATUS=2 and NONFOREST SUBPLOT STATUS=1) to "On all subplots where P2 Vegetation is being sampled on accessible forest land (P2 VEGETATION SAMPLING STATUS=1) and at least one accessible forest land condition (CONDITION CLASS STATUS = 1) exists within the 24-foot radius subplot, or P2 Vegetation is being sampled on all accessible land conditions (P2 VEGETATION SAMPLING STATUS=2) and at least one accessible forest condition or measurable nonforest condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) exists within the 24-foot radius subplot."

- 8.4.3 VEGETATION NONSAMPLED REASON. Modified the *When collected* from "On all subplots where P2 vegetation is being sampled on all accessible land conditions (P2 VEG SUBPLOT SAMPLE STATUS = 2)" to "On all subplots where P2 VEG SUBPLOT SAMPLE STATUS = 2".

- 8.4.4 CONDITION CLASS NUMBER. Clarified the text. Also, modified the *When collected* from "Any accessible condition class when P2 vegetation is being sampled on accessible forest land conditions (P2 VEGETATION SAMPLING STATUS =1)" to "Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)".

- 8.4.5 VEGETATION SUBPLOT NOTES. Added the following text: "When plant specimens are collected, use this field to record a community type description for each subplot sampled for P2 Vegetation. The community description is intended to fully automate the specimen collection process by providing a description of the community in which this plant was found. Some examples of community descriptions are as follows:
    - 25 year aspen boundary of mature trees. very little slope. a lot of light entry
    - *acer saccharum* floodplain forest. hummock-hollow microtopography
    - mature mesic hemlock-hardwood forest adjacent to pond

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

- 8.5 Vegetation Structure. Clarified the introductory text. Canopy cover by layer – clarified the description. Aerial View Coverage – this text was almost completely rewritten for clarity. Vegetation Structure Growth Habits – the definitions of the growth habits Tally Tree Species (TT), Non-tally Tree Species (NT), and Shrubs/Subshrubs/Woody Vines (SH) were clarified.

- 8.5.1 TALLY TREE SPECIES COVER LAYER 1. Modified the *When collected* from "On all conditions within subplots where (P2 VEGETATION SAMPLING STATUS=1 and CONDITION CLASS STATUS = 1) or (P2 VEGETATION SAMPLING STATUS=2 and NONFOREST CONDITION STATUS=2)" to "Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)".

- 8.5.6 NON_TALLY TREE SPECIES COVER LAYER 1. Modified the *When collected* from "On all conditions within subplots where (P2 VEGETATION SAMPLING STATUS=1 and CONDITION CLASS STATUS = 1) or (P2 VEGETATION SAMPLING STATUS=2 and NONFOREST CONDITION STATUS=2)" to "Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)".

- 8.5.10 NON_TALLY TREE SPECIES COVER – AERIAL VIEW. Changed the last sentence in the text from "Follow the same procedures as for NON-TALLY TREE SPECIES COVER LAYER 1" to "Follow the same procedures as for NON-TALLY TREE SPECIES COVER LAYER 1, but include all layers."

- 8.5.11 SHRUB AND WOODY VINE COVER LAYER 1. Change the variable name from "SHRUB AND WOODY VINE COVER LAYER 1" to "SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 1". Changed the text from "Record a total canopy coverage for shrubs in layer 1 (0-2.0 feet) to the nearest percent." to "Record canopy cover for shrubs/subshrubs/woody vines in layer 1 (0-2.0 feet) to the nearest percent." Also modified the *When collected* from "On all conditions within subplots where (P2 VEGETATION SAMPLING STATUS=1 and CONDITION CLASS STATUS = 1) or (P2 VEGETATION SAMPLING STATUS=2 and NONFOREST CONDITION STATUS=2)" to "Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)".

- 8.5.12 SHRUB AND WOODY VINE COVER LAYER 2. Change the variable name from "SHRUB AND WOODY VINE COVER LAYER 2" to "SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 2".
  Changed the text from "Record a total canopy coverage for shrubs in layer 2 (2.1-6.0 feet) to the nearest percent." to "Record canopy cover for shrubs/subshrubs/woody vines in layer 2 (2.1-6.0 feet) to the nearest percent."

- 8.5.13 SHRUB AND WOODY VINE COVER LAYER 3. Change the variable name from "SHRUB AND WOODY VINE COVER LAYER 3" to "SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 3". Changed the text from "Record a total canopy coverage for shrubs in layer 3 (6.1-16.0 feet) to the nearest percent." to "Record canopy cover for shrubs/subshrubs/woody vines in layer 3 (6.1-16.0 feet) to the nearest percent."

- 8.5.14 SHRUB AND WOODY VINE COVER LAYER 4. Change the variable name from "SHRUB AND WOODY VINE COVER LAYER 4" to "SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 4". Changed the text from "Record a total canopy coverage for shrubs in layer 4 (16.1 feet and above) to the nearest percent." to "Record canopy cover for shrubs/subshrubs/woody vines in layer 4 (16.1 feet and above) to the nearest percent."

- 8.5.15 SHRUB AND WOODY VINE COVER – AERIAL VIEW. Change the variable name from "SHRUB AND WOODY VINE COVER – AERIAL VIEW" to "SHRUB, SUBSHRUB, AND WOODY VINE COVER = AERIAL VIEW". Changed the text from "Record the total canopy cover for the shrub/ woody vine growth habit over all layers. Follow the same procedures as for SHRUB AND WOODY VINE COVER LAYER 1, but include all layers." to "Record the total aerial canopy cover for the shrub/subshrub/woody vine growth habit over all layers. Follow the same procedures as for SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 1, but include all layers".

- 8.5.16 FORB COVER LAYER 1. Modified the *When collected* from "On all conditions within subplots where (P2 VEGETATION SAMPLING STATUS=1 and CONDITION CLASS STATUS = 1) or (P2 VEGETATION SAMPLING STATUS=2 and NONFOREST CONDITION STATUS=2)" to "Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)".

- 8.5.20 FORB COVER – AERIAL VIEW. Changed the text from "Record the total canopy cover for the forb growth habit over all layers. Follow the same procedures as for FORB COVER LAYER 1." to "Record the total aerial canopy cover for the forb growth habit over all layers. Follow the same procedures as for FORB COVER LAYER 1, but include all layers."

- 8.5.21 GRAMINOID COVER LAYER 1. Modified the *When collected* from "On all conditions within subplots where (P2 VEGETATION SAMPLING STATUS=1 and CONDITION CLASS STATUS = 1) or (P2 VEGETATION SAMPLING STATUS=2 and NONFOREST CONDITION STATUS=2)" to "Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)".

- 8.5.25 GRAMINOID COVER – AERIAL VIEW. Changed the text from "Record the total canopy cover for the graminoid growth habit over all layers. Follow the same procedures as for GRAMINOID COVER LAYER 1." To "Record the total aerial canopy cover for the graminoid growth habit over all layers. Follow the same procedures as for GRAMINOID COVER LAYER 1, but include all layers."

- 8.6 Species Composition. The text was extensively rewritten for clarity. Also, the caption for figure 48 was revised. Also, a new figure was added, figure 49. Renumbered the rest of figures following figure 49.

- 8.6.1 SPECIES GROWTH HABIT. The text was extensively rewritten for clarity. All five codes were also revised.

- 8.6.2 SPECIES CODE. Three sentences in the text were revised. The first two were changed from "Record a code for each sampled vascular plant species found rooted in or overhanging the sampled condition of the subplot at any height. Species codes must be the standardized codes in the Natural Resource Conservation Service (NRCS) PLANTS database (currently January 2010 version). " to "Record a code for each most abundant (see section 8.6) vascular plant species. Species codes must be the standardized codes in the Natural Resource Conservation Service (NRCS) PLANTS database (currently January 2010 version)." The other sentence was changed from "For example, if several unknown CAREX species are present, only record the individual species present with cover of at least 3 percent." to For example, if several unknown CAREX species are present, only record the individual most abundant species." Also added the following sentence to the text: "See appendix 10, Unknown Plant Specimen Collection." Also the *When collected* was changed from "LEVEL OF DETAIL = 2 or 3 and species canopy cover on the full subplot is 3% or greater." to "Level of detail = 2 or 3 and species total aerial canopy cover on the full subplot and within a SPECIES GROWTH HABIT is 3% or greater."

- 8.6.4 SPECIES CANOPY COVER. The text was extensively revised. Also, the *When collected* was changed from "For each plant species present on the subplot with canopy cover greater than or equal to 3%. A plant species is defined as a unique SPECIES CODE and UNIQUE SPECIES NUMBER pair." to "For each plant species present on the subplot with total aerial canopy cover greater than or equal to 3% within a SPECIES GROWTH HABIT. A plant species is defined as a unique SPECIES CODE and UNIQUE SPECIES NUMBER pair."

- 8.6.5 SPECIES VEGETATION LAYER. The text was clarified.

- 8.6.6 SPECIMEN OFFICIALLY COLLECTED. The text was clarified.

- 8.6.7 SPECIMEN LABEL NUMBER. The text was changed from "Record the label number for the collected specimen. Pre-numbered labels are provided to each crew by the regional coordinator." to "Record the label number for the collected specimen. Pre-numbered labels are provided to each crew by the regional coordinator or auto-generated with the data collection software." Also, the *Values* were clarified from "1 to 99999, as pre-printed and assigned by region" to "1 to 99999, as pre-printed and assigned by region or auto-generated in the PDR".

- 9.1 Invasive species sample design. Deleted the reference to appendix 9 from paragraph 3.

- 9.2 Species Records. The fourth sentence was changed to use terminology consistent with the rest of the chapter ("foliage" instead of "vegetation and plant parts").

- 9.3 INVASIVE PLANT SAMPLING STATUS (Plot-level variable). In code 2, NONFOREST CONDITION STATUS was corrected to NONFOREST CONDITION CLASS STATUS.

- 9.5 INVASIVE PLANT SUBPLOT STATUS (Subplot-level variable). Changed the variable name to "INVASIVE PLANT SUBPLOT SAMPLE STATUS". Also, the *When collected* was changed from "On all subplots where (INVASIVE PLANT SAMPLING STATUS=1 and SUBPLOT STATUS=1) or (INVASIVE PLANT SAMPLING STATUS=2 and NONFOREST SUBPLOT STATUS=2)" to "On all subplots where invasive species are being sampled on accessible forest land (INVASIVE PLANT SAMPLING STATUS=1 and at least one accessible forest land condition (CONDITION CLASS STATUS = 1) exists within the 24-foot radius subplot, or invasive species are being sampled on all accessible land conditions (INVASIVE PLANT SAMPLING STATUS=2) and at least one accessible forest condition or measurable nonforest condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) exists within the 24-foot radius subplot"

- 9.6 INVASIVE PLANT NONSAMPLED REASON (Subplot-level variable). The *When collected* was changed from "On all subplots where INVASIVE PLANT SUBPLOT STATUS = 3" to "On all subplots where INVASIVE PLANT SUBPLOT SAMPLE STATUS = 3".

- 9.8 CONDITION CLASS NUMBER. The *When collected* was changed from "Any condition class where (INVASIVE PLANT SAMPLING STATUS=1 and CONDITION CLASS STATUS=1) or (INVASIVE PLANT SAMPLING STATUS=2 and NONFOREST CONDITION CLASS STATUS=2)." to "Any accessible measured land condition within subplots (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS =2) when invasive plants are being sampled on the subplot (INVASIVE PLANT SUBPLOT SAMPLE STATUS=1 or 2)".

- 9.9 SPECIES CODE. Updated the text for no appendix 9, and updated the reference to the PLANTS database. The *When collected* was changed from ": On all conditions within subplots where INVASIVE PLANT SUBPLOT STATUS=1 and ((INVASIVE PLANT SAMPLING STATUS=1 and CONDITION CLASS STATUS=1) or (INVASIVE PLANT SAMPLING STATUS=2 and NONFOREST CONDITION CLASS STATUS=2))." to "Any accessible measured land condition within subplots (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS =2) when

invasive plants are being sampled on the subplot (INVASIVE PLANT SUBPLOT SAMPLE STATUS=1 or 2)".

- 9.13 INVASIVE SPECIMEN COLLECTED. The *When collected* was changed from "Each record where INVASIVES PLANT SUBPLOT STATUS=1, INVASIVE PLANT SPECIMEN COLLECTION RULE = 1, and an unknown SPECIES CODE was used." to "All species records when INVASIVE PLANT SPECIMEN COLLECTION RULE = 1" Also, the text was clarified.

- **Chapter 10. Down Woody Materials. Added this new chapter. This chapter takes the place of the old P3 Down Woody Materials procedures.**

- List of APPENDICES. Modifications were made to number 3 and number 4 to match changes in the respective appendices. Added appendix 11 and appendix 12.

- Appendix 2. FIA Forest Type Codes. Code 962 description. Clarified the text.

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

  These changes were originally made in the online version of the FIA Field Guide version 5.0. The corrections are documented again here for the convenience of the user.

| FIA code | Changes (in red type) |
|---|---|
| 0583 | Corrected PLANTS code from HAPA3 to HAPA2 (Correct in pdr and database) |
| 7016 | Species changed to variegata var. orientalis |
| 7037 | Deleted this duplicate code for Tasmanian bluegum, Eucalyptus globulus |
| 7068 | Species changed to cordata var. sintenisii |
| 7466 | Species changed to urbaniana var. riedlaei |
| 7663 | Species changed to bidentata ssp. surinamensis |
| 8178 | Species changed to racemosa var. grisea |
| 8269 | Species changed to obtusa var. obtusa |
| 8349 | Species changed to serotina ssp. capuli |
| 8615 | Deleted this duplicate code for white bully, Sideroxylon, salicifolium |
| 8680 | Deleted this duplicate code for West Indian mahogany, Swietenia mahagoni |
| 8739 | Deleted this duplicate code for Montezuma bald cypress, Taxodium mucronatum |
| 8794 | Species changed to striata var. portoricensis |
| 8798 | Deleted this duplicate code for Florida thatch palm, Thrinax radiata |
| 8868 | Deleted this duplicate code for Vernicia fordii |

  These were additional changes from 5.1 to 6.0.

| FIA code | Changes (in red type) |
|---|---|
| 118 | Chihuahuan Pine |
| 748 | Fremont~~'s~~ Cottonwood |
| 840 | margaretti~~i~~ae |
| 859 | Added C to the Caribbean column |
| 891 | Added C to the Caribbean column |
| 940 | Added C to the Caribbean column |

- Appendix 4. Moved the text to 7.2.2 and changed the title to "Was previously: Site Tree Selection Criteria and Species list (This information is now located in 7.2.2 SPECIES".

- **Appendix 6. Glossary. Updated the definition of Accessible Forest Land to match the change in definition approved through the change process.**

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

- Appendix 9. Invasive Plant list. The table was deleted and the following text was added: "To obtain a current invasive plant list, contact the local region for the appropriate list."

- Appendix 10. Unknown Plant Specimen Collection. The text was clarified.

- **Appendix 11. Damage… Added this new appendix.** After the original file was posted (file dated 4/26/2012), the following correction were made:

  - Added codes and information for codes 11057,11058, 11059, 11060, 11800, 11900, 12200, 12201, 12202, 12203, 12204, 12205, 12206, 12207, 12208, 12209, 12300, 12800, 12900, 13030, 13800, 13900, 14071, 14072, 14073, 14074, 14075, 14800, 14900, 15088,15089, 15090, 15091, 15092, 15093, 15094, 15095, 15096, 15097,15800, 15900, 16050, 16051, 16052, 16053,16054, 16800, 16900, 17021, 17022, 17800, 17900, 21027, 21028, 21029, 21030, 21031, 21033, 21700, 21800, 21900, 22083, 22084, 22085, 22086, 22087, 22300, 22400, 22001, 22002, 22003, 22004, 22010, 22024, 22027, 22028, 22031, 22039, 22040, 22044, 22047, 22048, 22049, 22059, 22062, 22063, 22064, 22065, 22066, 22067, 22068, 22069,22070, 22071, 22072, 22074, 22081, 22800, 22900, 23022, 23023, 23024, 24029, 24030, 24031, 24032, 24800, 24900, 25074, 25075, 25076, 25077, 25800, 25900, 26012, 26013, 26800, 26900, 27003, 27004, 27800, 27900, 41015, 41017, 41800, 41900, 50019, 50020, 50800, 50900, 60001, 71001, 85000, 90011, 90012, 90013, 99000, 99999.
  - Code 11024 – the common name and scientific names were changed from "Ips latiens" to "Orthotomicus latidens".
  - Code 12021 – the common name was changed from "fruit tree leafroller" to "fruittree leafroller".
  - Code 12039 – the common name was changed from "western pine tortrix" to "western pine budworm".
  - Code 12164 – the common name was changed from "saddlebacked looper" to "saddleback looper".
  - Code 12182 – the scientific name was changed from "Neodiprion merkel1" to "Neodiprion merkeli".
  - Code 12195 – the common name was changed from "pine tip moth" to "pine tube moth".
  - Code 14001 – the common name was changed from "scale insect" to "scale insects".
  - Code 15030 – the common name was changed from "Eucosma species" to "Eucosma shoot borers".
  - Code 15034 – the common name was changed from "Warren's collar weevil" to "Warren root collar weevil".
  - Code 15038 – the common name was changed from "white pine bark miner" to "white pine barkminer moth".
  - Code 15052 – the threshold was changed from "Damage to ≥10% of the circumference" to "Damage to ≥10% of the bole circumference".
  - Code 16900 – the common and scientific names were changed from "unknown seed/cone/flower/fruit insects" to "unknown seed/cone/flower insects".
  - Code 22006 – the region was changed from "SRS" to "NRS; SRS".
  - Code 22087 – the region was changed from blank to "All".
  - Code 23001 – the scientific name was changed from blank to "mistletoe".
  - Code 23002 – the scientific name was changed from blank to "parasitic plants".
  - Code 23003 – the scientific name was changed from blank to "vine damage".
  - Code 25022 – the common name was changed from "Elytroderma disease" to "Elytroderma needle blight".
  - Code 25900 – the common and scientific names were changed from "unknown other/shoot disease" to "unknown foliage/shoot disease".
  - Code 30000 – the threshold was changed from "Damage ≥ 20% of bole circumference; ≥20% of stems on multi-stemmed woodland species affected; ≥20% of crown affected." to "Damage ≥ 20% of bole circumference; >20% of stems on multi-stemmed woodland species affected; ≥20% of crown affected."

- Code 41001 – the common name was changed from “bear” to bears”.
- Code 41002 – the common name was changed from “beaver” to “beavers”.
- Code 41003 – the common name was changed from “big game (deer)” to “big game”.
- Code 42004 was added.
- Code 42800 was added.
- Old code 42004 was changed to code 42900.
- Code 70007 – In the threshold, the duplicated phrase “Any damage to the terminal” was deleted.
- Code 70012 was deleted.
- The code number for 80000 was added.
- Code 90011 – the threshold was changed from “Damage ≥20% of bole” to “Damage ≥20% of bole circumference (in a running 3-foot section) at point of occurrence.”
- Code 90012 – the threshold was changed from “Damage ≥20% of bole” to “Damage ≥20% of bole circumference (in a running 3-foot section) at point of origin; ≥20% of branches affected”
- Code 90013 – the region was changed from blank to “PNW”.

- **Appendix 12. Reserved and Administratively Withdrawn Status by Owner and Land Designation. Added this new appendix.**

- **Appendix 13. Ownership Prefield Procedures**. Added this new appendix. Also, the following corrections have been made in appendix 13 since the first posting:

  - A13.10 COMPANY. Changed the *When collected* for Core from “All corporate and other private organization plot ownerships (OWNER CLASS = 41, 42, or 43 and OWNER TYPE = 1)” to “All corporate and other private organization plot ownerships (OWNER CLASS = 41, 42, 43, or 44 and OWNER TYPE = 1)”. And changed the Core Optional *When collected* from “All corporate and other organization ownerships and public agencies recorded for a plot (OWNER CLASS = 41, 42, or 43 and OWNER TYPE ≥ 1)” to “All corporate and other organization ownerships and public agencies recorded for a plot (OWNER CLASS = 41, 42, 43, or 44 and OWNER TYPE ≥ 1)”.
  - A13.11 MANAGEMENT UNIT. Change the *When collected* for Core from “All public and private plot ownerships (OWNER CLASS = 11, 12, 13, 21, 22, 23, 24, 25, 31, 32, or 33 and OWNER TYPE = 1)” to “All public and private plot ownerships (OWNER TYPE = 1)”. And changed the *When collected* for Core Optional from “All public and private ownerships recorded for a plot (OWNER CLASS = 11, 12, 13, 21, 22, 23, 24, 25, 31, 32, or 33 and OWNER TYPE ≥ 1)” to “All public and private ownerships recorded for a plot (OWNER TYPE ≥ 1)”.
  - A13.19 ADDRESS PROVINCE. Changed the *When collected* for Core “All private plot ownerships with mailing addresses in the United States (OWNER CLASS ≥ 41 and OWNER TYPE = 1 and ADDRESS COUNTRY ≠ “US”)” to “All private plot ownerships with mailing addresses outside of the United States (OWNER CLASS ≥ 41 and OWNER TYPE = 1 and ADDRESS COUNTRY ≠ “US”)”. And changed the Core Optional *When collected* from “All private plot ownerships with mailing addresses in the United States (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1 and ADDRESS COUNTRY ≠ “US”)” to “All private plot ownerships with mailing addresses outside of the United States (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1 and ADDRESS COUNTRY ≠ “US”)”
  - A13.47 OWNERSHIP CONTACT METHOD (CORE OPTIONAL). Change the *When collected* from “All ownerships contacted (OWNER CONTACTED = 1)” to “All ownerships contacted”.
  - A13.49 ACCESS GRANTED (CORE OPTIONAL). Change the *When collected* from “All ownerships contacted (OWNER CONTACTED = 1)” to “All ownerships contacted”.
  - A13.52 ACCESS NOTES (CORE OPTIONAL). Change the *When collected* from “All ownerships contacted (OWNER CONTACTED = 1)” to “All ownerships contacted”.
  - A13.53 OWNERSHIP REQUESTS NOTICE (CORE OPTIONAL). Change the *When collected* from “All ownerships contacted (OWNER CONTACTED = 1)” to “All ownerships contacted”.

- A13.54 OWNERSHIP REQUESTS INFORMATION (CORE OPTIONAL). Change the *When collected* from "All ownerships contacted (OWNER CONTACTED = 1)" to "All ownerships contacted".
- A13.56 INFORMATION REQUEST FULFILLED (CORE OPTIONAL). Change the *When collected* from "All ownerships contacted (OWNER CONTACTED = 1)" to "All ownerships contacted".

**Changes posted in November, 2012.**

- 2.5.29. LAND COVER CLASS. Modified the descriptive text. Changed the first paragraph from "Record this variable for all mapped conditions. When multiple LAND COVER CLASSes occur within a mapped condition, then classify based on first LAND COVER CLASS encountered within the condition. As with 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 defined due to developed land uses, such as roads and rights-of-ways). As with other condition attributes, inclusions (of less than 1 acre) within the condition should be ignored when assigning the LAND COVER CLASS." to "Record this variable for all mapped conditions. When multiple LAND COVER CLASSes occur within a mapped condition, then classify based on first LAND COVER CLASS encountered within the condition. As with 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."

  In the Land cover Classification Key, changed 1.1.1 from "Areas that are dominated 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"** to "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".** Changed 1.1.2 from "Areas where the dominant vegetation has highly-manipulated growth forms (usually by mechanical pruning, mowing, clipping, etc.) = **07 Developed, Vegetated**" to "Other areas predominantly covered by vegetation with highly-manipulated growth forms **= 07 Developed, Vegetated**".

**Changes posted in December, 2012**

- 5.20.1 DAMAGE AGENT 1. Under Values, in the table added code 0 No damage to match the MIDAS programming. Also changed the threshold for code 30000 to match the threshold in appendix 11; changed the threshold from "Damage ≥ 20% of stem circumference; ≥ 20% of crown affected." to "Damage ≥ 20% of bole circumference; >20% of stems on multi-stemmed woodland species affected; ≥20% of crown affected."

- Appendix 11. Damage Codes. The damage code list was reviewed again by all regions and final corrections were proposed and agreed on by the DAB. The explanatory statement before the table was change from "The REGION column means that only the region(s) listed are allowed to collect the code." to " The REGION column means that only the region(s) listed are allowed to collect the specific code, and must do so when the damage is present and meets or exceeds the required threshold."

  The following changes were made to the Appendix 11 table:
  - Added a new code 0 (no damage) to match MIDAS programming. Added ALL to the region column
  - Code 11009 spruce beetle – added IW and PNW to the region column and added a threshold
  - Code 12040 western spruce budworm – added IW and PNW to the region column and added a threshold
  - Code 13000 chewing insects – added IW to the region column (became ALL)
  - Code 14003 balsam woolly adelgid - added IW to the region column (became ALL)
  - Code 14004 hemlock woolly adelgid – added IW to the region column
  - Code 15000 Boring insects – changed region column designation to ALL, and corrected the threshold to read "…≥20%..."
  - Code 15065 Nantucket pine tip month – deleted SRS from the region column
  - Code 21019 littleleaf disease/ phytophthora root rot – added SRS to the region column and added a threshold
  - Code 22023 chestnut blight – deleted SRS from the region column
  - Code 22053 butternut canker - deleted SRS from the region column
  - Code 22087 nonrust canker - deleted SRS, NRS, and IW from the region column
  - Code 22001 heart rot – deleted NRS, IW and PNW from the region column
  - Code 22002 stem rot – deleted ALL from the region column
  - Code 22003 sap rot – deleted ALL from the region column
  - Code 22086 thousand cankers disease – added SRS to the region column and added a threshold
  - Code 23003 vine damage – deleted SRS from the region column
  - Code 23011 Douglas-fir dwarf mistletoe – added SRS to the region column and added a threshold
  - Code 23017 southwestern dwarf mistletoe – added SRS to the region column and added a threshold
  - Code 23023 dwarf mistletoe – deleted SRS from the region column
  - Code 24031 laurel wilt – added SRS to the region column and added a threshold
  - Code 41002 beavers – added a threshold
  - Code 41003 big game – added a threshold
  - Code 41005 pocket gophers – added a threshold
  - Code 41006 porcupines – added a threshold
  - Code 50003 drought – deleted SRS from the region column
  - Code 70005 land clearing – added SRS to the region column and added a threshold
  - Code 71000 Harvest – added a threshold
  - Code 80000 Multi-Damage (Insects/Disease) – listed the missing code number
  - Code 90004 forked top – deleted IW from the region column
  - Code 99999 No data – deleted this code from the list

**Changes posted in March 1, 2013**

- **2.5.7 Owner. This variable was deleted from the field guide to be consistent with the field procedures that were implemented as part of version 6.0.**

- 10.3.3 DWM NUMBER OF TRANSECTS ON SUBPLOT (BASE). Corrected text from "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 or 2, number of transects per subplot = 2. When DWM SAMPLING STATUS = 3, value can range from 1 to 3." to "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."

- **Appendix 13. A13.6.1 OWNERSHIP CONDITION LIST. Added this variable.**

**Changes posted April 16, 2013**

- 5.20.3 Damage Agent 3. Corrected the Tolerance from "1 of 2 damages correct" to "2 of 3 damages correct" to match the change proposal.

- 10.6.3.9.1 CWD LENGTH >=3 FEET (BASE). Corrected tolerance from "+/- 20%" to "No errors".

**Changes posted June 12, 2013**

- 10.9.2 Overview of Measurements. Last sentence of second paragraph. Corrected the sentence from "In this case the STATUS code is set to 1, with the DUFF/LITTER NONSAMPLED REASON code set to 10." to "In this case the STATUS code is set to 0, with the DUFF/LITTER NONSAMPLED REASON code set to 10. " to match the *When collected* statement.

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# FOREST INVENTORY AND ANALYSIS
# NATIONAL CORE FIELD GUIDE

## VOLUME I: FIELD DATA COLLECTION PROCEDURES FOR PHASE 2 PLOTS

Version 6.1

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

## 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.

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

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

DATA ELEMENT NAME -- <brief variable description>

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

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).

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:

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.

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]).

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.

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. |

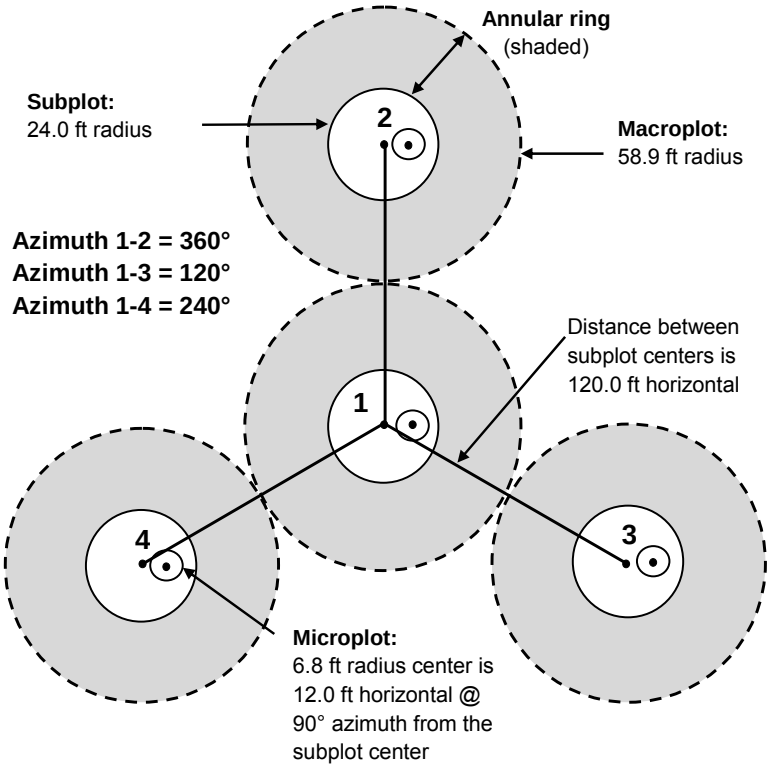



**Figure 1. FIA Phase 2 plot diagram. See individual Phase 3 chapters for Phase 3 plot figures.**

## 0.1 Plot Setup

Plots will be established according to the regional guidelines of each FIA unit. 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.

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

| Subplot Numbers From | To | Azimuth | Backsight | Distance |
|---|---|---|---|---|
| | | *degrees* | | *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.

## 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.

## 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. 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

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

When collected: All plots
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: See Appendix 1

1.2 COUNTY

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

When collected: All plots
Field width: 3 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: See Appendix 1

1.3 PLOT NUMBER

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

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

1.4 PLOT STATUS

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.

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

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

1.5 NONFOREST SAMPLING STATUS

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.

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

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

1.6 NONFOREST PLOT STATUS

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

When collected: When PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

1 Sampled – at least one accessible nonforest land condition present on the plot
2 Sampled – no nonforest land condition present on plot, i.e., plot is either census and/or noncensus water
3 Nonsampled nonforest

1.7 PLOT NONSAMPLED REASON

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

When collected: When PLOT STATUS = 3
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
Values:

01 Outside U.S. boundary – Entire plot is outside of the U.S. border.
02 Denied access – Access to the entire plot is denied by the legal owner, or by the owner of the only reasonable route to the plot. Because a denied-access plot can become accessible in the future, it remains in the sample and is re-examined at the next occasion to determine if access is available.

03 Hazardous – Entire plot cannot be accessed because of a hazard or danger, for example cliffs, quarries, strip mines, illegal substance plantations, high water, etc. Although most hazards will not change over time, a hazardous plot remains in the sample and is re-examined at the next occasion to determine if the hazard is still present.

05 Lost data – Plot data file was discovered to be corrupt after a panel was completed and submitted for processing. This code is applied at the time of processing after notification to the units. This code is for office use only.

06 Lost plot – Entire plot cannot be found. Whenever this code is assigned, a replacement plot is required. The plot that is lost is assigned SAMPLE KIND = 2 and 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.

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

## 1.8 NONFOREST PLOT NONSAMPLED REASON

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

When collected: When PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS = 3
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
Values:

02 Denied access – Access to the entire plot is denied by the legal owner, or by the owner of the only reasonable route to the plot. Because a denied-access plot can become accessible in the future, it remains in the sample and is re-examined at the next occasion to determine if access is available.

03 Hazardous – Entire plot cannot be accessed because of a hazard or danger, for example cliffs, quarries, strip mines, illegal substance plantations, high water, etc. Although most hazards will not change over time, a hazardous plot remains in the sample and is re-examined at the next occasion to determine if the hazard is still present.

08 Skipped visit – Entire plot skipped. Used for plots that are not completed prior to the time a panel is finished and submitted for processing. 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.

1.9 SUBPLOTS EXAMINED

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

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

1 Only subplot 1 center condition examined and all other subplots assumed (inferred) to be the same
4 All four subplots fully described (no assumptions/inferences)

1.10 SAMPLE KIND

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

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

1 Initial plot establishment - the initial establishment and sampling of a national design plot (FIA Field Guide versions 1.1 and higher). SAMPLE KIND 1 is assigned under the following circumstances:
- Initial activation of a panel or subpanel
- Reactivation of a panel or subpanel that was previously dropped
- Resampling of established plots that were not sampled at the previous visit

2 Remeasurement – remeasurement of a national design plot that was sampled at the previous inventory.
3 Replacement plot - a replacement plot for a previously established plot. Assign SAMPLE KIND = 3 if a plot is re-installed at a location other than the original location (i.e., plots that have been lost, moved, or otherwise replaced). Note that replacement plots require a separate plot file for the replaced plot. Replaced plots are assigned SAMPLE KIND = 2, 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

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

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

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.

When collected: All plots
Field width: 2 digits (x.y)
Tolerance: No errors
MQO: At least 99% of the time
Values: 6.1

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

1.13.1 YEAR
Record the year that the plot was completed.

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

1.13.2 MONTH
Record the month that the plot was completed.

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

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

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

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

1.14 DECLINATION (CORE OPTIONAL)
Record the azimuth correction used to adjust magnetic north to true north. All azimuths are assumed to be magnetic azimuths unless otherwise designated. The Portland FIA unit historically has corrected all compass readings for true north. This field is to be used only in cases where units are adjusting azimuths to correspond to true north; for units using magnetic azimuths, this field will always be set = 0 in the office. This field carries a decimal place because the USGS corrections are provided to the nearest half degree. DECLINATION is defined as:

DECLINATION = (TRUE NORTH - MAGNETIC NORTH)

When collected: CORE OPTIONAL: All plots
Field width: 5 digits including sign (+xxx.y)
Tolerance: No errors
MQO: At least 99% of the time
Values: +/- 50

1.15 HORIZONTAL DISTANCE TO IMPROVED ROAD

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

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

1 100 ft or less
2 101 to 300 ft
3 301 to 500 ft
4 501 to 1000 ft
5 1001 ft to 1/2 mile
6 1/2 to 1 mile
7 1 to 3 miles
8 3 to 5 miles
9 Greater than 5 miles

1.16 WATER ON PLOT

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

When collected: All plots with either at least one accessible forest land condition class (PLOT STATUS = 1) or one accessible nonforest land condition class when nonforest is field-measured (PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS = 1)
Field width: 1 digit
Tolerance: No errors
MQO: At least 90% of the time
Values:

0 None – no water sources within the accessible forest/nonforest land
1 Permanent streams or ponds too small to qualify as noncensus water
2 Permanent water in the form of deep swamps, bogs, marshes without standing trees present and less than 1.0 ac in size, or with standing trees
3 Ditch/canal – human-made channels used as a means of moving water, such as irrigation or drainage which are too small to qualify as noncensus water
4 Temporary streams
5 Flood zones – evidence of flooding when bodies of water exceed their natural banks
9 Other temporary water – specify in plot notes

1.17 QA STATUS

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

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

MQO: At least 99% of the time
Values:

1 Standard production plot
2 Cold check
3 Reference plot (off grid)
4 Training/practice plot (off grid)
5 Botched plot file (disregard during data processing)
6 Blind check
7 Hot check (production plot)

1.18 CREW NUMBER

Record up to 5 crew numbers as assigned to the field crew; always record the crew leader first. The first 2 digits are for the responsible unit's station number (NRS – 24xxxx, SRS – 33xxxx, RMRS – 22xxxx, and PNW – 26xxxx).

When collected: All plots
Field Width: 6 digits
Tolerance: No errors
MQO: At least 99% of the time
Values:

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

1.19 GPS Coordinates

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

1.19.1 GPS Unit Settings, Datum, and COORDINATE SYSTEM

Consult the GPS unit operating manual or other regional instructions to ensure that the GPS unit internal settings, including Datum and Coordinate system, are correctly configured. Each FIA unit will use the NAD83 Datum to collect coordinates.

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

1.19.2 Collecting Readings

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

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

If it is still not possible to get suitable coordinates from plot center, attempt to obtain them from a location within 200 feet of plot center. Obtain the azimuth and horizontal distance from the "offset" location to plot center. Record the azimuth and horizontal distance as described in Sections 1.19.14 and 1.19.15.

Coordinates may be collected further away than 200 feet from the plot center if a laser measuring device is used to determine the horizontal distance from the "offset" location to plot center. Record the azimuth and horizontal distance as described in Sections 1.19.14 and 1.19.15.

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

1.19.3 GPS UNIT

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

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

0 GPS coordinates not collected
1 Rockwell Precision Lightweight GPS Receiver (PLGR)
2 Other brand capable of field-averaging
3 Other brands capable of producing files that can be post-processed
4 Other brands not capable of field-averaging or post-processing

1.19.4 GPS SERIAL NUMBER

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

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

1.19.5 GPS ENTRY METHOD

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

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

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

0 GPS data manually entered
1 GPS data electronically transferred

1.19.6 GPS DATUM

Record the acronym indicating the map datum that the GPS coordinates are collected in (i.e., the map datum selected on the GPS unit to display the coordinates).

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

NAD83 North American Datum of 1983

1.19.7 COORDINATE SYSTEM

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

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

1 Geographic coordinate system
2 UTM coordinate system

1.19.8 Latitude

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

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

1.19.8.1 LATITUDE DEGREES

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

When collected: When COORDINATE SYSTEM = 1
Field width: 3 digits (1st digit is + or -, last 2 digits are numeric)
Tolerance: When GPS ENTRY METHOD = 0, No errors in data entry
When GPS ENTRY METHOD = 1, not applicable
MQO: When GPS ENTRY METHOD = 0, at least 99% of the time
When GPS ENTRY METHOD = 1, not applicable
Values: 0-90

1.19.8.2 LATITUDE MINUTES

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

When collected: When COORDINATE SYSTEM = 1
Field width: 2 digits
Tolerance: When GPS ENTRY METHOD = 0, No errors in data entry
When GPS ENTRY METHOD = 1, not applicable
MQO: When GPS ENTRY METHOD = 0, at least 99% of the time
When GPS ENTRY METHOD = 1, not applicable
Values: 0 – 59

1.19.8.3 LATITUDE SECONDS

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

When collected: When COORDINATE SYSTEM = 1
Field width: 4 digits
Tolerance: When GPS ENTRY METHOD = 0, No errors in data entry
When GPS ENTRY METHOD = 1, not applicable
MQO: When GPS ENTRY METHOD = 0, at least 99% of the time
When GPS ENTRY METHOD = 1, not applicable
Values: 0.00 - 59.99

1.19.9 Longitude

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

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

1.19.9.1 LONGITUDE DEGREES

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

When collected: When COORDINATE SYSTEM = 1
Field width: 4 digits (1st digit is + or -, last 3 digits are numeric)
Tolerance: When GPS ENTRY METHOD = 0, No errors in data entry
When GPS ENTRY METHOD = 1, not applicable
MQO: When GPS ENTRY METHOD = 0, at least 99% of the time
When GPS ENTRY METHOD = 1, not applicable
Values: 1-180

1.19.9.2 LONGITUDE MINUTES

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

When collected: When COORDINATE SYSTEM = 1
Field width: 2 digits
Tolerance: When GPS ENTRY METHOD = 0, No errors in data entry
When GPS ENTRY METHOD = 1, not applicable
MQO: When GPS ENTRY METHOD = 0, at least 99% of the time
When GPS ENTRY METHOD = 1, not applicable
Values: 0 – 59

1.19.9.3 LONGITUDE SECONDS

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

When collected: When COORDINATE SYSTEM = 1
Field width: 4 digits
Tolerance: When GPS ENTRY METHOD = 0, No errors in data entry
When GPS ENTRY METHOD = 1, not applicable
MQO: When GPS ENTRY METHOD = 0, at least 99% of the time
When GPS ENTRY METHOD = 1, not applicable
Values: 0.00 – 59.99

1.19.10 UTM ZONE

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

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

1.19.11 EASTING (X) UTM

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

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

1.19.12 NORTHING (Y) UTM

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

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

1.19.13 Correction For "Offset" Location

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

1.19.14 AZIMUTH TO PLOT CENTER

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

When collected: When GPS UNIT = 1, 2, 3 or 4
Field width: 3 digits
Tolerance: +/- 3 degrees
MQO: At least 99% of the time
Values: 000 when coordinates **are** collected at plot center
001 to 360 when coordinates **are not** collected at plot center

1.19.15 DISTANCE TO PLOT CENTER

Record the horizontal distance in feet from the location where coordinates were collected to the actual plot center. If coordinates are collected at plot center or are corrected in the field to plot center, record 000. As described in Section 1.19.2, if a laser range finder is used to determine

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

When collected: When GPS UNIT = 1, 2, 3 or 4
Field width: 3 digits
Tolerance: +/- 6 ft
MQO: At least 99% of the time
Values: 000 when coordinates **are** collected at plot center
001 to 200 when a Laser range finder **is not** used to determine distance
001 to 999 when a Laser range finder **is** used to determine distance

1.19.16 GPS ELEVATION

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

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

1.19.17 GPS ERROR

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

When collected: When GPS UNIT =1 or 2
Field width: 3 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: 000 - 999
071 to 999 if an error of less than 70 cannot be obtained

1.19.18 NUMBER OF READINGS

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

When collected: When GPS UNIT = 1 or 2
Field width: 3 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: 001 to 999

1.19.19 GPS FILENAME (CORE OPTIONAL)

Record the filename containing the GPS positions collected on the plot.

When collected: When GPS UNIT = 3
Field width: 15 characters
Tolerance: No errors
MQO: At least 99% of the time
Values: English words, phrases and numbers

1.20 MACROPLOT BREAKPOINT DIAMETER (CORE OPTIONAL)

When the macroplot core option is being utilized, record the value selected for breakpoint diameter for that particular plot. If macroplots are not being installed, this item will be left blank. A macroplot breakpoint diameter is the diameter (either DBH or DRC) above which trees are

measured on the plot extending from 0.01 to 58.9 feet horizontal distance from the center of each subplot. Examples of different breakpoint diameters used by western FIA units are 24 inches or 30 inches (Pacific Northwest), or 21 inches (Interior West). Installation of macroplots is core optional and is used to have a larger plot size in order to more adequately sample large trees.

When collected: All plots
Field width: 2 digits (xx)
Tolerance: No errors
MQO: At least 99% of the time
Values: 21, 24, and 30

1.21 PLOT NOTES

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

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

## 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.

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.

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

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

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

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

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

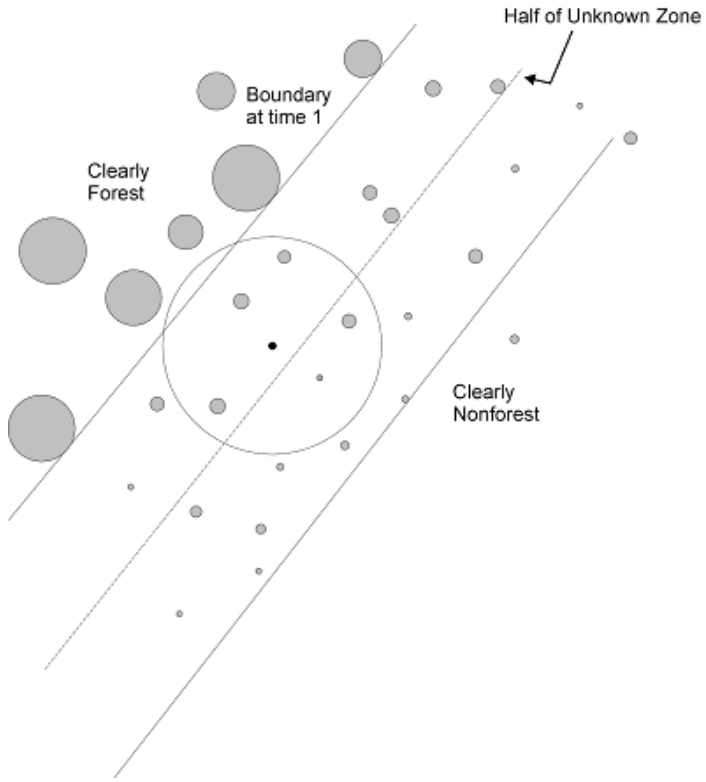



**Figure 2. Example of classifying the condition class of the subplot in a transition zone with forest/nonforest encroachment.**

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.

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

Indistinct boundary due to the condition minimum-width definition – Do not subdivide subplots where a condition class may change due only to the forest vs. nonforest minimum width (120.0 feet) definition. Although the point where the definition changes from forest to nonforest creates an invisible “line” between conditions, **this definitional boundary is not distinct and obvious**. See 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.

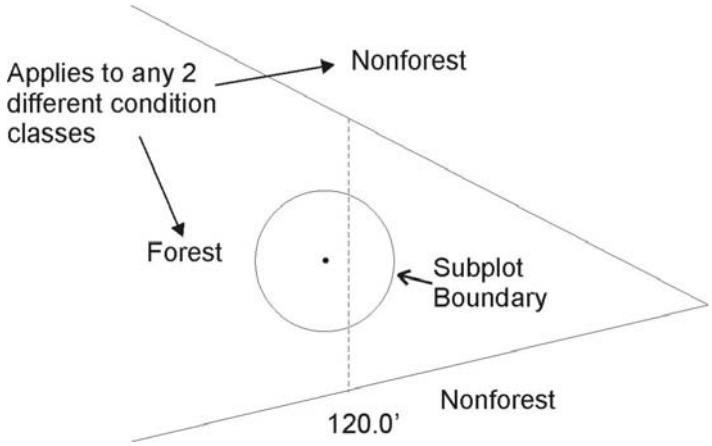



**Figure 3. Forest condition narrows within a nonforest land condition. Examine the location of the subplot center in reference to the approximate line where the forest narrows to 120.0 ft wide. In this example, the entire subplot is classified as forest.**

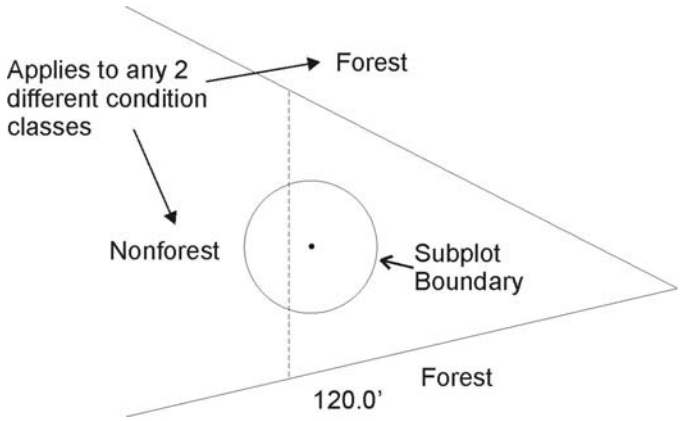



**Figure 4. Nonforest land condition narrows within a forest condition. Examine the location of the subplot center in reference to the approximate line where the nonforest narrows to 120.0 ft wide. In this example, the entire subplot is classified as forest.**

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 $\geq$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).

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.

## 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 | |

2.5.8 OWNER CLASS
2.5.14 ARTIFICIAL REGENERATION SPECIES
2.5.15 STAND AGE
2.5.16 DISTURBANCE (up to 3 coded)
2.5.17 DISTURBANCE YEAR (1 per disturbance)
2.5.22 TREATMENT (up to 3 coded)
2.5.23 TREATMENT YEAR (1 per treatment)
2.5.28 PHYSIOGRAPHIC CLASS

} Ancillary - changes do not delineate a new condition class

2.5.30 PRESENT NONFOREST LAND USE (for area converted from accessible forest land condition class to nonforest land since last inventory).

2.3.2 Nonforest Land

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

2.5.1 RESERVED STATUS
2.5.2 OWNER GROUP
2.5.30 PRESENT NONFOREST LAND USE

} Attributes where a change causes a separate condition class

2.5.8 OWNER CLASS
2.5.16 DISTURBANCE (up to 3 coded)
2.5.17 DISTURBANCE YEAR (1 per disturbance)
2.5.22 TREATMENT (up to 3 coded)
2.5.23 TREATMENT YEAR (1 per treatment)
2.5.28 PHYSIOGRAPHIC CLASS

} Ancillary - changes do not delineate a new condition class

## 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.

**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 (fig. 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 roads.

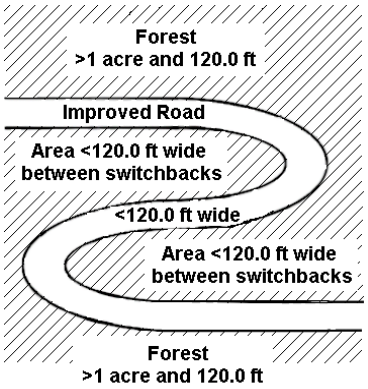



**Figure 5. Example of a switchback road. All the cross-hatched area is forest and the improved road is a nonforest condition.**

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

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

2. Distinct, alternating strips of forest and nonforest land: this situation occurs when a plot or subplot samples a condition class that is less than 1.0 acre in size and less than 120.0 feet in width. The condition class is one of a series of parallel strips of forest and nonforest land in which none of the strips meet the minimum width requirement. This exception applies only to nonforest land conditions that are not listed under #1, e.g., improved roads, maintained rights-of-way, and developments.

    (a) Many small intermingled strips: For many small intermingled strips, determine the total area that the intermingled strips occupy, and classify according to the CONDITION CLASS STATUS (forest land or nonforest land) that occupies the greater area. If the area of intermingled strips is so large or indistinct as to make a total area determination impractical, then classify the sample as forest land.

(b) Two alternating strips: For two alternating strips of forest and nonforest between two qualifying areas of nonforest land and forest land, see figure 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.

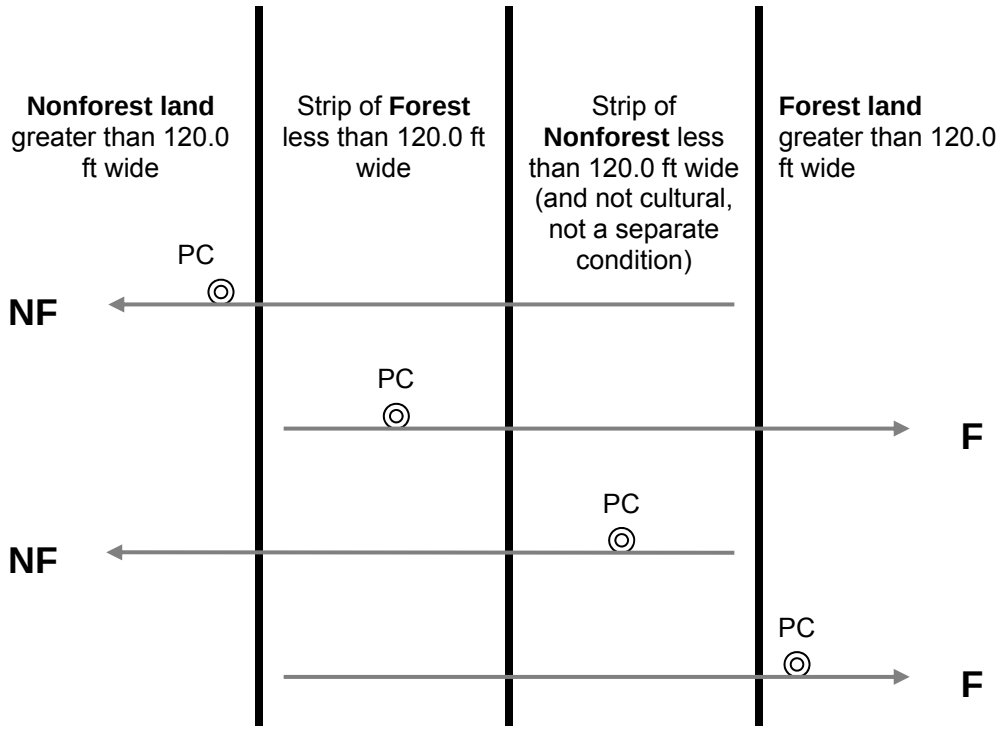



**Figure 6. Example of alternating strips of forested and nonforested conditions. PC is the plot center (center of subplot 1).**

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

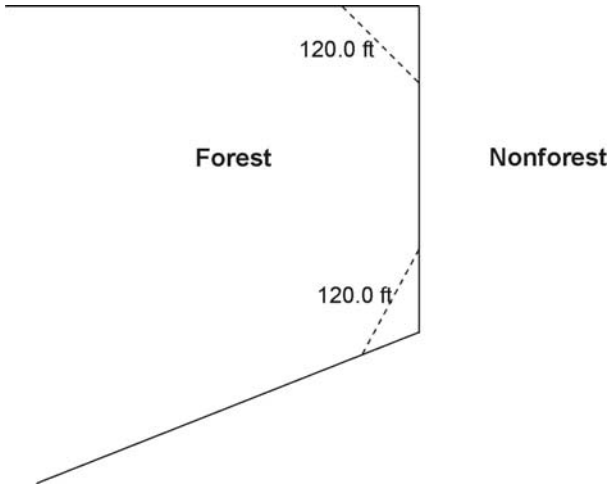



**Figure 7. Illustration of the 90 degree corner rule. The dotted lines do not create nonforest land conditions.**

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.

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

### 2.4.1 CONDITION CLASS NUMBER

On a plot, assign and record a number for each condition class. The condition class at plot center (the center of subplot 1) is designated condition class 1. Other condition classes are assigned numbers sequentially at the time each condition class is delineated.

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

### 2.4.2 CONDITION CLASS STATUS

Record the code that describes the sampling status of the condition class. The instructions in Sections 2.3 and 2.4 apply when delineating condition classes that differ by CONDITION CLASS STATUS. In situations where a condition is denied access or hazardous, but obviously contains no forest land, record CONDITION CLASS STATUS = 2, 3 or 4. In cases where a condition is access-denied or hazardous land use and has the possibility of forest, record CONDITION CLASS STATUS = 5.

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

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

When collected: When CONDITION CLASS STATUS = 5
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
Values:

01 Outside U.S. boundary – Assign this code to condition classes beyond the U.S. border.
02 Denied access area – Any area within the sampled area of a plot to which access is denied by the legal owner, or to which an owner of the only reasonable route to the plot denies access. There are no minimum area or width requirements for a condition class delineated by denied access. Because a denied-access condition can become accessible in the future, it remains in the sample and is re-examined at the next occasion to determine if access is available.
03 Hazardous situation – Any area within the sampled area on plot that cannot be accessed because of a hazard or danger, for example cliffs, quarries, strip mines, illegal substance plantations, temporary high water, etc. Although the hazard is not likely to change over time, a hazardous condition remains in the sample and is re-examined at the next occasion to determine if the hazard is still present. There are no minimum size or width requirements for a condition class delineated by a hazardous condition.
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.
11 Ocean – Condition falls in ocean water below mean high tide line.

### 2.4.4 NONFOREST CONDITION CLASS STATUS

Record the code that describes the sampling status of the condition class (see the nonforest nonsampled reasons below for additional information).

When collected: When CONDITION CLASS STATUS = 2 and NONFOREST SAMPLING STATUS = 1
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

2 Accessible nonforest land
5 Nonsampled nonforest

### 2.4.5 NONFOREST CONDITION NONSAMPLED REASON

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

When collected: When CONDITION CLASS STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST CONDITION CLASS STATUS = 5
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
Values:

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

## 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.

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.

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

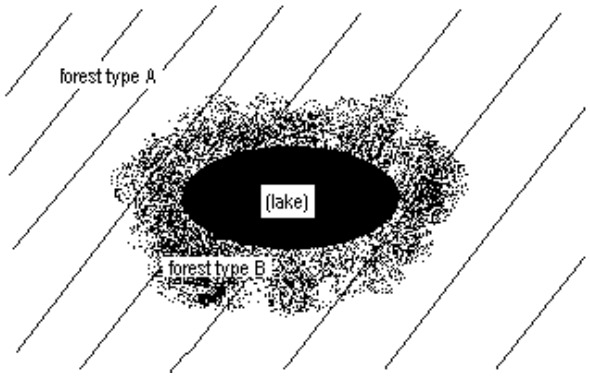



**Figure 8. Forest type B is a separate condition class (riparian) if the band of it is between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.**

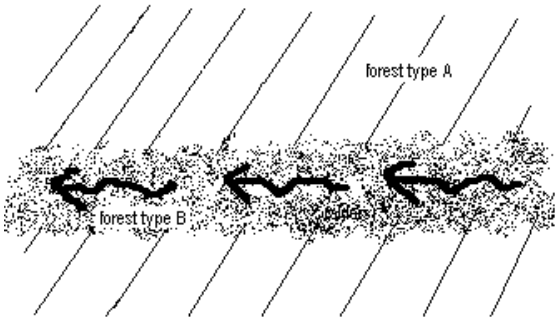



**Figure 9. Forest type B is a separate condition class (riparian) if the band of it is between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.**

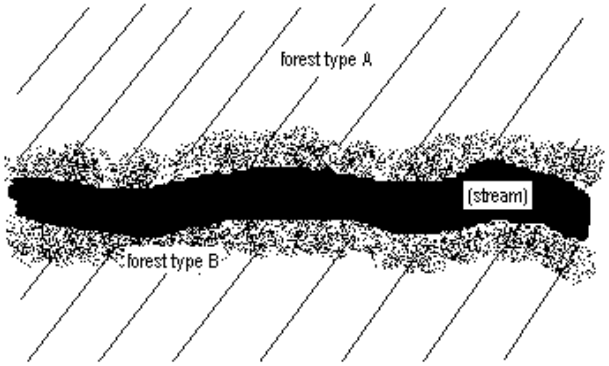



**Figure 10. If the stream is < 30.0 feet wide, forest type B is a separate condition class (riparian) if the sum of the two widths of the bands, including the stream falls between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.**

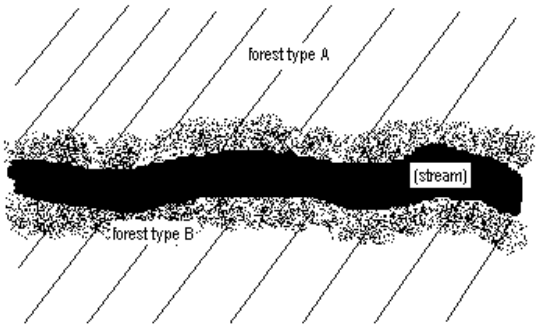



**Figure 11. If the stream is > 30.0 feet wide, forest type B is a separate condition class (riparian) if either of the two widths of the bands falls between 30.0 feet and 120.0 feet wide and is ≥ 1.0 acre in size.**

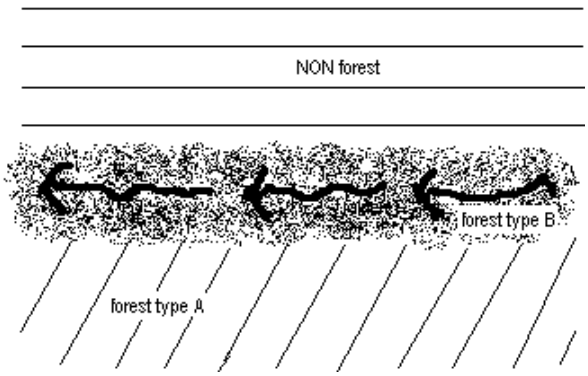



**Figure 12. Forest type B is a separate condition class (riparian) if the band of it is between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.**

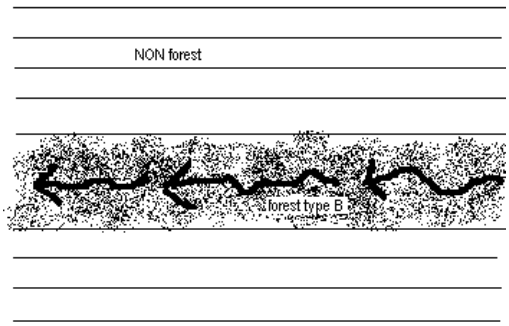



**Figure 13. In a nonforested area, a band of forest type B that is < 120.0 feet wide is NOT considered a riparian area. It is not a separate condition class at all.**

2.5.1 RESERVED STATUS

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

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.

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

| | |
|---|---|
| 0 | Not reserved |
| 1 | Reserved |

2.5.2 OWNER GROUP

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.

When collected: CORE: All accessible forest land condition classes (CONDITION CLASS STATUS = 1)
CORE OPTIONAL: All condition classes
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
Values:

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

2.5.3 FOREST TYPE

Record the code corresponding to the FOREST TYPE (from Appendix 2) that best describes the species with the plurality of stocking for all live trees in the condition class that are not overtopped. Note: Canopy cover is used to determine whether an area is forest or nonforest. Stocking is used with other variables such as this one.

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

- For SAMPLE KIND = 2 plots, record the FOREST TYPE of the condition at the previous inventory.
- For all other plots:
  1. Evaluate any seedlings available to determine the FOREST TYPE.
  2. If no seedlings exist, use adjacent stands and your best professional judgment to determine FOREST TYPE.

When collected: All accessible forest land condition classes (CONDITION CLASS STATUS = 1)
Field width: 3 digits
Tolerance: No errors in group or type
MQO: At least 99% of the time in group; at least 95% of the time in type. No MQO when STAND SIZE CLASS = 0.
Values: See Appendix 2

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

2.5.4 STAND SIZE CLASS

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

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

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

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

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

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

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

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

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

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

The instructions in 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

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

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

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

The instructions in section 2.1 and 2.4 apply when delineating, within accessible forest land, contrasting conditions based on differences in REGENERATION STATUS.

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

Note: Plot records or verbal evidence from landowner is acceptable for determining regeneration status.

### 2.5.6 TREE DENSITY

Record a code to indicate the relative tree density classification. Base the classification on the number of stems/unit area, basal area, tree cover, or stocking of all live trees, seedlings, and saplings in the 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.

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

| | |
|---|---|
| 1 | Initial density class |
| 2 | Density class 2 - density different than 1 |
| 3 | Density class 3 - density different than 1 and 2 |

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

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

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

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

### Ancillary (Non-Delineating) Variables

2.5.7 OWNER
[This variable has been deleted to match the procedures that have been implemented in version 6.0. Deleted 02/27/2013]

2.5.8 OWNER CLASS
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.

When collected: CORE: All accessible forest land condition classes (CONDITION CLASS STATUS = 1)
CORE OPTIONAL: All condition classes
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time

Values:

Owner Classes within Forest Service Lands (Owner Group 10)

11 National Forest
12 National Grassland and/or Prairie
13 Other Forest Service land

Owner Classes within Other Federal Lands (Owner Group 20)

21 National Park Service
22 Bureau of Land Management
23 Fish and Wildlife Service
24 Departments of Defense/Energy
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

2.5.9 OWNER SUB-CLASS (CORE OPTIONAL)

Record the OWNER SUB-CLASS code that best corresponds to the ownership (or the managing Agency for public lands) of the land. Currently, there are sub-classes for only the State category, but other sub-classes may be added in the future.

When collected: State owned condition classes (OWNER CLASS = 31)
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

1 State forestry agency
2 State wildlife agency
3 State park agency
4 Other state lands

2.5.10 PUBLIC ADMINISTRATIVELY WITHDRAWN STATUS (CORE OPTIONAL)

Record the code that best corresponds to the administratively withdrawn designation for the condition. Conditions will NOT be delineated based on this variable; if multiple administratively withdrawn status types occur on a single condition class, record the administratively withdrawn status closest to the plot center. Administratively withdrawn land is public land withdrawn by management plans or government regulations prohibiting the management of land for the production of wood products (not merely controlling or prohibiting wood-harvesting methods). Such plans and regulations are formally adopted by land managers and the prohibition against management for wood products cannot be changed through decision of the land manager except by a formal modification of management plans or regulations.

When collected: When OWNCD <40 and RESERVED STATUS=0
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

0 Not administratively withdrawn
1 Administratively withdrawn

2.5.11 ADMINISTRATIVELY WITHDRAWN AREA NAME
Record the specific name of the area that identifies the administratively withdrawn 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 CONDITION NOTES field.

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

2.5.12 ADMINISTRATIVELY WITHDRAWN NOTES (CORE OPTIONAL)
Describe the source of the information used to classify Administratively Withdrawn Status, the method used to assign the information to individual conditions, the geographic area (e.g. states and counties), condition status, and owner class combinations to which the designation was applied, and date stamp for which the information is current.

When collected: When ADMINISTRATIVELY WITHDRAWN STATUS is 0 or 1
Field width: Unlimited alphanumeric character field
Tolerance: N/A
MQO: N/A
Values: English language words, phrases and numbers

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

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

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

When collected: All accessible forest land condition classes (CONDITION CLASS STATUS = 1) with evidence of artificial regeneration (REGENERATION STATUS = 1)
Field width: 4 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: See Appendix 3

2.5.15 STAND AGE

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

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

To estimate STAND AGE, select two or three dominant or codominant trees from the overstory. If the overstory covers a wide range of tree sizes and species, try to select the trees accordingly, but it is not necessary to core additional trees in such stands. The variance associated with mean stand age increases with stand heterogeneity, and additional cores are not likely to improve the estimate. Core each tree at the point of diameter measurement and count the rings between the outside edge and the core to the pith. Add in the number of years that passed from germination until the tree reached the point of core extraction to determine the total age of the tree. Unless more specific information is provided at training or by the unit, add 5 years to all eastern species, 5 years to western hardwoods, and 10 years to western softwoods. Assign a weight to each core by visually estimating the percentage of total overstory trees it represents. Make sure the weights from all cores add up to 1.0, compute the weighted average age, and record. For example, if three trees aged 34, 62, and 59 years represent 25 percent, 60 percent, and 15 percent of the overstory, respectively, the weighted stand age should be:

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

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

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

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

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

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

2.5.16 DISTURBANCE 1

Record the code corresponding to the presence of the following disturbances. Disturbance can connote positive or negative effects. The area affected by any natural or human-caused disturbance must be at least 1.0 acre in size. Record up to three different disturbances per

condition class from most important to least important. This attribute is ancillary; that is, contrasting conditions are never delineated based on variation in this attribute.

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

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

When collected: All accessible forest land condition classes (CONDITION CLASS STATUS = 1) or accessible nonforest condition classes when nonforest is being sampled (NONFOREST CONDITION CLASS STATUS = 2)
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
Values:

- 00 None - no observable disturbance
- 10 Insect damage
  - 11 insect damage to understory vegetation
  - 12 insect damage to trees, including seedlings and saplings
- 20 Disease damage
  - 21 disease damage to understory vegetation
  - 22 disease damage to trees, including seedlings and saplings
- 30 Fire (from crown and ground fire, either prescribed or natural)
  - 31 ground fire
  - 32 crown fire
- 40 Animal damage
  - 41 beaver (includes flooding caused by beaver)
  - 42 porcupine
  - 43 deer/ungulate
  - 44 bear (CORE OPTIONAL)
  - 45 rabbit (CORE OPTIONAL)
  - 46 domestic animal/livestock (includes grazing)
- 50 Weather damage
  - 51 ice
  - 52 wind (includes hurricane, tornado)
  - 53 flooding (weather induced)
  - 54 drought
- 60 Vegetation (suppression, competition, vines)
- 70 Unknown/not sure/other (include in NOTES)
- 80 Human-caused damage – any significant threshold of human-caused damage not described in the DISTURBANCE codes listed or in the TREATMENT codes listed. Must include a condition-level note to describe further.
- 90 Geologic disturbances
  - 91 landslide
  - 92 avalanche track
  - 93 volcanic blast zone
  - 94 other geologic event
  - 95 earth movement/avalanches

2.5.17 DISTURBANCE YEAR 1

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

When collected: When DISTURBANCE 1 > 00
Field width: 4 digits
Tolerance: +/- 1 year for measurement cycles of 5 years
+/- 2 years for measurement cycles of > 5 years
MQO: At least 99% of the time
Values: Since the previous plot visit, or the past 5 years for plots visited for the first time; 9999

2.5.18 DISTURBANCE 2

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

2.5.19 DISTURBANCE YEAR 2

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

2.5.20 DISTURBANCE 3

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

2.5.21 DISTURBANCE YEAR 3

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

2.5.22 TREATMENT 1

Forestry treatments are a form of disturbance. These human disturbances are recorded separately here for ease of coding and analysis. The term treatment further implies that a silvicultural application has been prescribed. This does not include occasional stumps of unknown origin or sparse removals for firewood, Christmas trees, or other miscellaneous purposes. The area affected by any treatment must be at least 1.0 acre in size. Record up to three different treatments per condition class from most important to least important as best as can be determined. This attribute is ancillary; that is, contrasting conditions are never delineated based on variation in this attribute.

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

When collected: All accessible forest land condition classes (CONDITION CLASS STATUS = 1)
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
Values:

00 None - No observable treatment.

10 Cutting - The removal of one or more trees from a stand.

20 Site preparation - Clearing, slash burning, chopping, disking, bedding, or other practices clearly intended to prepare a site for either natural or artificial regeneration.

30 Artificial regeneration - Following a disturbance or treatment (usually cutting), a new stand where at least 50% of the live trees present resulted from planting or direct seeding.

40 Natural regeneration - Following a disturbance or treatment (usually cutting), a new stand where at least 50% of the live trees present (of any size) were established through the growth of existing trees and/or natural seeding or sprouting.

50 Other silvicultural treatment - The use of fertilizers, herbicides, girdling, pruning, or other activities (not covered by codes 10-40) designed to improve the commercial value of the residual stand, or chaining, which is a practice used on woodlands to encourage wildlife forage.

2.5.23 TREATMENT YEAR 1
Record the year in which TREATMENT 1 occurred.

When collected: When TREATMENT 1 > 00
Field width: 4 digits
Tolerance: +/- 1 year for measurement cycles of 5 years
+/- 2 years for measurement cycles of > 5 years
MQO: At least 99% of the time
Values: Since the previous plot visit, or the past 5 years for plots visited for the first time

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

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

2.5.26 TREATMENT 3
If a stand has experienced more than two treatments, record the third treatment here. See TREATMENT 1 for coding instructions; code 00 if none.

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

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

When collected: All accessible forest land condition classes (CONDITION CLASS STATUS = 1), or accessible nonforest condition classes when nonforest is being sampled (NONFOREST CONDITION CLASS STATUS = 2)
Field width: 2 digits
Tolerance: No errors
MQO: At least 80% of the time

Values:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

34 Beaver ponds

35 Cypress ponds

39 Other hydric - All other hydric physiographic sites.

2.5.29 LAND COVER CLASS

Record this variable for all mapped conditions. When multiple LANDCOVER CLASSes occur within a mapped condition, then classify based on the first LANDCOVER CLASS encountered within the condition. 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.

**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, <u>then look no further</u>**.

1. ≥10% vegetative Cover = **Vegetated**, else 2.
    1.1. Areas where the majority of vegetation (≥50% relative cover) has been highly-manipulated = **Anthropic Vegetation**, else 1.2
        1.1.1. Areas that are predominantly covered by vegetation grown for the production of food, non-woody fiber, and/or ornamental horticulture, including land in any stage of annual crop production, and land being regularly cultivated for production of crops from perennial plants = **06 Agricultural Vegetation**
        1.1.2. Other areas predominantly covered by vegetation with highly-manipulated growth forms = **07 Developed, Vegetated**
    1.2. Areas where majority of vegetation (≥50% relative cover) is natural or semi-natural = **Natural/Semi-natural Vegetation**

1.2.1. Areas on which trees provide 10% or greater canopy cover and are part of the dominant (uppermost) vegetation layer, including areas that have been planted to produce woody crops = **01 Treeland**
1.2.2. Areas on which shrubs provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer = **02 Shrubland**
1.2.3. Areas on which herbaceous vegetation provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer = **03 Grassland**
1.2.4. Areas on which non-vascular vegetation provide 10% or greater cover and are part of the dominant vegetation layer = **04 Non-vascular Vegetation**
1.2.5. Areas with 10% or greater vegetative cover but no one life form has 10% or more cover = **05 Mixed Vegetation**

2. <10% vegetative cover = **Sparsely Vegetated**
   2.1. Areas persistently and predominantly covered by water (census and noncensus water, permanent snow and ice) and with less that 10% cover of emergent vegetation. = **10 Water**
   2.2. Areas predominantly covered with constructed materials with limited plant life = **09 Developed**
   2.3. Natural areas with limited vegetation. Areas predominantly covered by bare rock, gravel, sand, silt, clay, or other earthen material, with little (<10% cover) or no "green" vegetation present regardless of its inherent ability to support life = **08 Barren**

When collected: All condition classes (CONDITION CLASS STATUS = 1, 2, 3, 4, 5)
Field width: 2 digits
Tolerance: No errors
MQO: At least 95% of the time
Values:

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

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

2.5.30 PRESENT NONFOREST LAND USE

Record this attribute for every nonforest condition class sampled. Recognizing multiple nonforest conditions on a plot is not required unless conducting a nonforest inventory (NONFOREST SAMPLING STATUS = 1); or when areas that were sampled and classified at last inventory as accessible forest land and are now nonforest or partially nonforest land. For those areas that have changed from forest to nonforest, this variable is used to track land use change. Conversions from forest to nonforest become new nonforest conditions whenever they occur, except when a previously defined nonforest condition has expanded into an adjacent previously defined forest condition. This expanded condition will be captured through boundary changes on respective subplots and does not constitute a new separate condition. Instructions in Sections 2.1 and 2.4 apply.

When collected: CONDITION CLASS STATUS = 2
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
Values:

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
- 12 Pasture (improved through cultural practices)
- 13 Idle farmland
- 14 Orchard
- 15 Christmas tree plantation
- 16 Maintained wildlife opening
- 17 Windbreak/Shelterbelt

20 Rangeland - Land primarily composed of grasses, forbs, or shrubs. This includes lands vegetated naturally or artificially to provide a plant cover managed like native vegetation and does not meet the definition of pasture. The area must be at least 1.0 acre in size and 120.0 feet wide.

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.
- 32 Rights-of-way: improved roads, railway, power lines, maintained canal
- 33 Recreation: parks, skiing, golf courses
- 34 Mining

40 Other - Land parcels greater than 1.0 acre in size and greater than 120.0 feet wide, which do not fall into one of the uses described above. 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
- 43 Beach
- 45 Nonforest-Chaparral

2.5.31 CANOPY COVER SAMPLE METHOD

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.

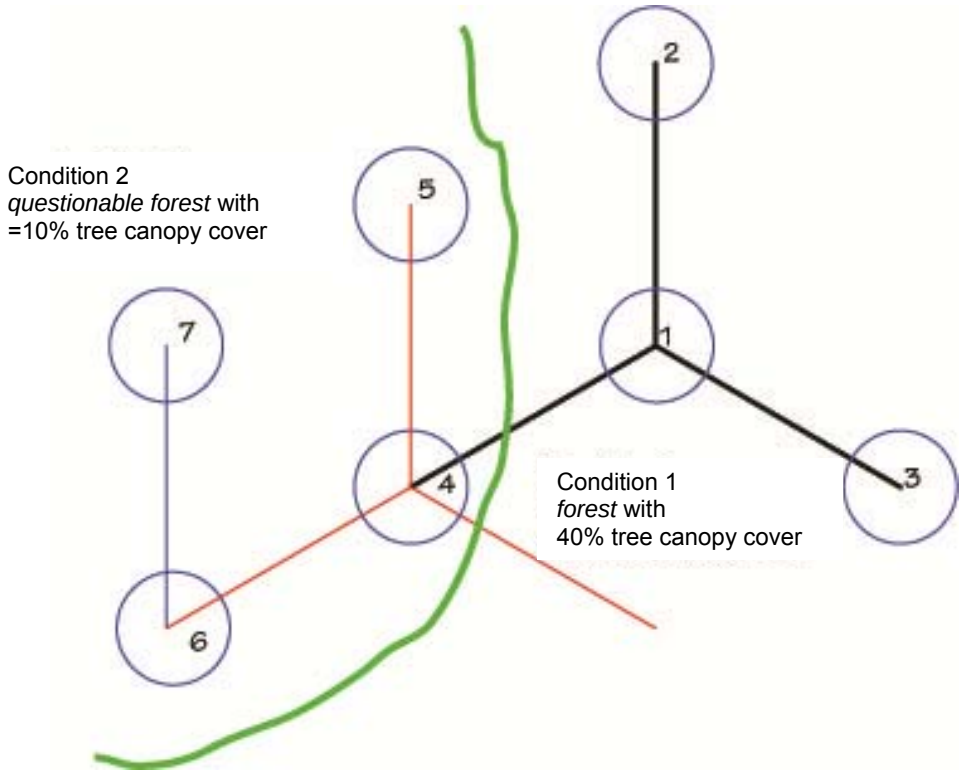



**Figure 14. Example of the subplot method phantom subplots.**

3. 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).

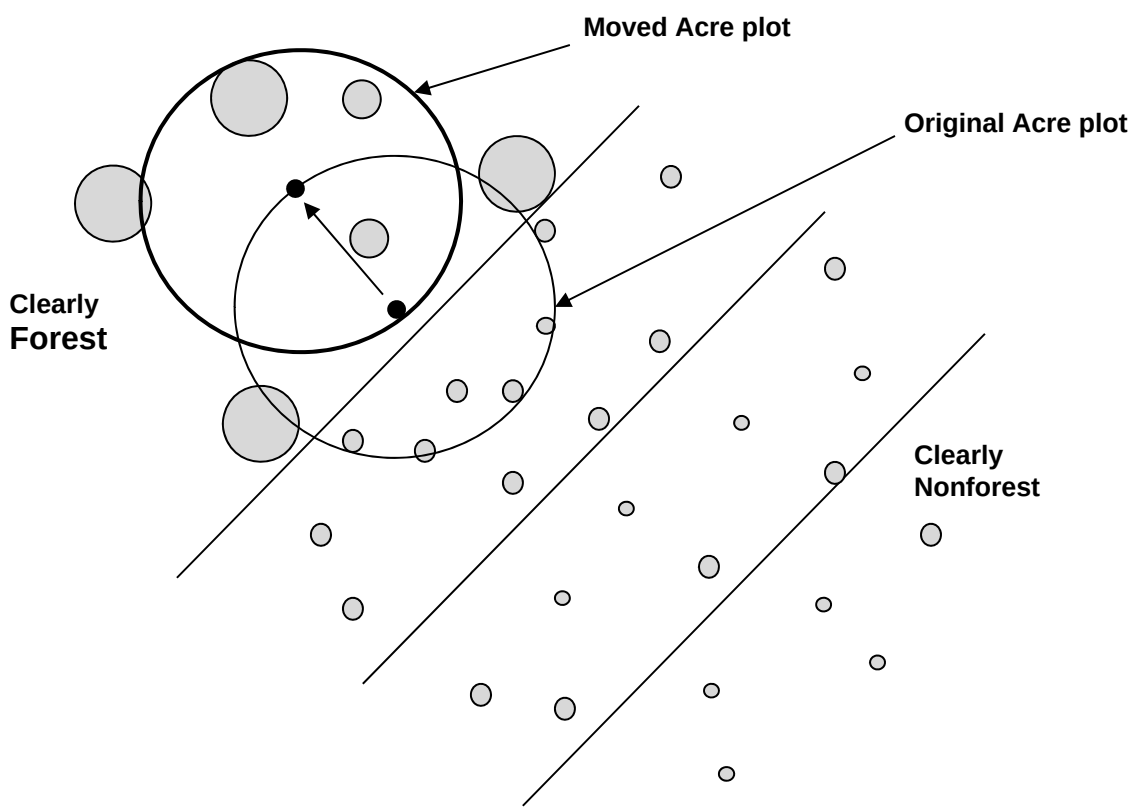



**Figure 15. Example of using the Acre plot method when determining CANOPY COVER when the Acre plot is in a transition zone with forest/nonforest encroachment.**

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:

| 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 |

When collected: CONDITION CLASS STATUS = 1, 2, or 5
Field width: 1 digit
Tolerance: None
MQO: At least 90% of the time
Values:

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

2.5.32 LIVE CANOPY COVER

Record the percentage of LIVE CANOPY COVER for the condition. Include live tally trees, saplings, and seedlings that cover the sample area. For conditions where the LIVE CANOPY COVER is low and there is a question whether it meets 10 percent LIVE 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)).

- 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.

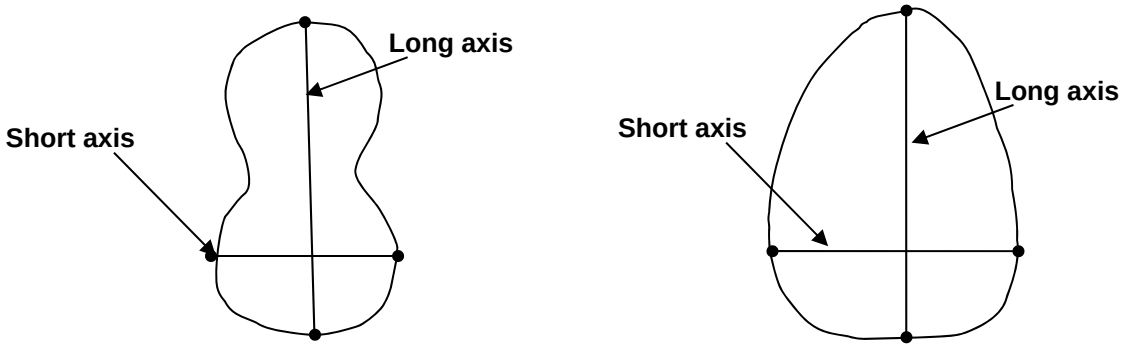



Figure 16. Examples of where to measure canopy widths.

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

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

2.5.33 LIVE PLUS MISSING CANOPY COVER

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%.

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

2.5.34 CURRENT AFFORESTATION CODE

Record the code identifying a condition that has no evidence of prior forest, but does have evidence suggesting deliberate afforestation attempts (planted or prepared to promote tree establishment) to convert to forest in the current inventory cycle or since the last measurement.

When collected: CONDITION CLASS STATUS = 1 or 2
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

0 No
1 Yes

2.5.35 PREVIOUS AFFORESTATION CODE

Record the code identifying a condition that has no evidence of prior forest, but does have evidence suggesting deliberate afforestation attempts (planted or prepared to promote tree establishment) to convert to forest the prior inventory cycle or prior to the last measurement.

When collected: When SAMPLE KIND = 2 and CONDITION CLASS STATUS = 1 or 2
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

0 No
1 Yes

2.5.36 TOTAL STEMS

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

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

2.5.37 CHAINING CODE

Record the code identifying if a condition has been chained, shear bladed, roller chopped, etc., for the purpose of increased forage production. These treatments contrast with silvicultural removals in that little or none of the woody material is removed from the site and there are few residual live trees.

When collected: When CONDITION CLASS STATUS = 1 or 2
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

| | |
|---|---|
| 0 | No |
| 1 | Yes |

## 3.0 SUBPLOT INFORMATION

Each subplot is described by a series of area parameters relating to topographic features and existing cover type. These data also relate to the microplot, since the microplot is contained within the subplot perimeter.

### 3.1 SUBPLOT NUMBER

Record the code corresponding to the number of the subplot.

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

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

### 3.2 SUBPLOT/MACROPLOT STATUS

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.

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

1 Sampled – at least one accessible forest land condition present on subplot
2 Sampled – no accessible forest 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

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

When collected: When SUBPLOT/MACROPLOT STATUS = 3
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
Values:

01 Outside U.S. boundary – Assign this code to condition classes beyond the U.S. border.
02 Denied access area – Any area within the sampled area of a plot to which access is denied by the legal owner, or to which an owner of the only reasonable route to the plot denies access. There are no minimum area or width requirements for a condition class delineated by denied access. Because a denied-access condition can become accessible in the future, it remains in the sample and is re-examined at the next occasion to determine if access is available.
03 Hazardous situation – Any area within the sampled area on plot that cannot be accessed because of a hazard or danger, for example cliffs, quarries, strip mines, illegal substance plantations, temporary high water, etc. Although the hazard is not likely to change over time, a hazardous condition remains in the sample and is re-examined at the next occasion to determine if the hazard is still present. There are no minimum size or width requirements for a condition class delineated by a hazardous condition
04 Time limitation – This code applies to full subplots that cannot be sampled due to a time restriction. This code is reserved for areas with limited access, and in situations where it is imperative for the crew to leave before the plot can be completed (e.g., scheduled helicopter rendezvous). Use of this code requires notification to the field supervisor. This code should not be used for an entire plot (use code 8 [skipped visit] when an entire plot is skipped; see Section 1.5).
05 Lost data – The plot data file was discovered to be corrupt after a panel was completed and submitted for processing. This code is assigned to entire plots or full subplots that could not be processed, and is applied at the time of processing after notification to the region. Note: This code is for office use only.
06 Lost plot – Entire plot cannot be found. Used for the 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.
11 Ocean – Subplot falls in ocean water below mean high tide line.

3.4 NONFOREST SUBPLOT/MACROPLOT STATUS

Record the code that describes the sampling status of the other-than-forest subplot, i.e., SUBPLOT/MACROPLOT STATUS = 2. In cases where subplot is denied access or hazardous,

but obviously contains no nonforest land, i.e., subplot is either noncensus water or census water, record NONFOREST SUBPLOT/MACROPLOT STATUS = 2.

When collected: When NONFOREST SAMPLING STATUS = 1 and SUBPLOT/MACROPLOT STATUS = 2
Field width: 1 digit
Tolerance: no errors
MQO: At least 99% of the time
Values:

1 Sampled – at least one accessible nonforest land condition present on the subplot.
2 Sampled – no nonforest land condition present on subplot, i.e., subplot is either census and/or noncensus water.
3 Nonsampled nonforest

3.5 NONFOREST SUBPLOT/MACROPLOT NONSAMPLED REASON
For entire nonforest subplots that cannot be sampled, record one of the following reasons.

When collected: When NONFOREST SAMPLING STATUS = 1 and SUBPLOT/MACROPLOT STATUS = 2 and NONFOREST SUBPLOT/MACROPLOT STATUS = 3
Field width: 2 digits
Tolerance: no errors
MQO: At least 99% of the time
Values:

02 Denied access – A subplot/macroplot to which access is denied by the legal owner, or to which an owner of the only reasonable route to the plot denies access. Because a denied-access subplot can become accessible in the future, it remains in the sample and is re-examined at the next occasion to determine if access is available.
03 Hazardous situation – A subplot/macroplot that cannot be accessed because of a hazard or danger, for example cliffs, quarries, strip mines, illegal substance plantations, temporary high water, etc. Although the hazard is not likely to change over time, a hazardous condition remains in the sample and is re-examined at the next occasion to determine if the hazard is still present.
04 Time limitation – This code applies to a full subplot/macroplot that cannot be sampled due to a time restriction. This code is reserved for areas with limited access, and in situations where it is imperative for the crew to leave before the plot can be completed (e.g., scheduled helicopter rendezvous). Use of this code requires notification to the field supervisor.
10 Other – This code is used whenever a subplot/macroplot is not sampled due to a reason other than one of the specific reasons already listed. A field note is required to describe the situation.

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

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

3.7 MICROPLOT CENTER CONDITION

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

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

3.8 SUBPLOT SLOPE

Record the angle of slope across the subplot to the nearest 1 percent. SUBPLOT SLOPE is determined by sighting the clinometer along a line parallel to the average incline (or decline) of each subplot. This angle is measured along the shortest pathway down slope before the drainage direction changes. To measure SUBPLOT SLOPE, Observer 1 should stand at the uphill edge of the subplot and sight Observer 2, who stands at the downhill edge of the subplot. Sight Observer 2 at the same height as the eye-level of Observer 1. Read the slope directly from the percent scale of the clinometer:

- If slope changes gradually across the subplot, record an average slope.
- If slope changes across the subplot but the slope is predominantly of one direction, code the predominant slope percentage rather than the average.
- If the subplot falls directly on or straddles a canyon bottom or narrow ridge top, code the average slope of the side hill(s).
- If the subplot falls on a canyon bottom or on a narrow ridge top, but most of the area lies on one side hill, code the slope of the side hill where most of the area lies.

When collected: 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)
Field width: 3 digits
Tolerance: +/- 10%
MQO: At least 90% of the time
Values: 000 to 155

3.9 SUBPLOT ASPECT

Record the aspect across the subplot, to the nearest 1 degree. SUBPLOT ASPECT is determined along the direction of slope for land surfaces with at least 5 percent slope in a generally uniform direction. SUBPLOT ASPECT is measured with a hand compass along the same direction used to determine slope.

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

When collected: 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)
Field width: 3 digits
Tolerance: +/- 10 degrees
MQO: At least 90% of the time
Values:

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

3.10 SNOW/WATER DEPTH

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

When collected: 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)
Field width: 2 digits (x.y)
Tolerance: +/- 0.5 ft
MQO: At the time of measurement (no MQO after initial date of visit)
Values: 0.0 to 9.9

3.11 SUBPLOT/MACROPLOT CONDITION LIST

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.

When collected: All plots
Field width: 4 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: 1000 to 9876

## 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.

### 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.

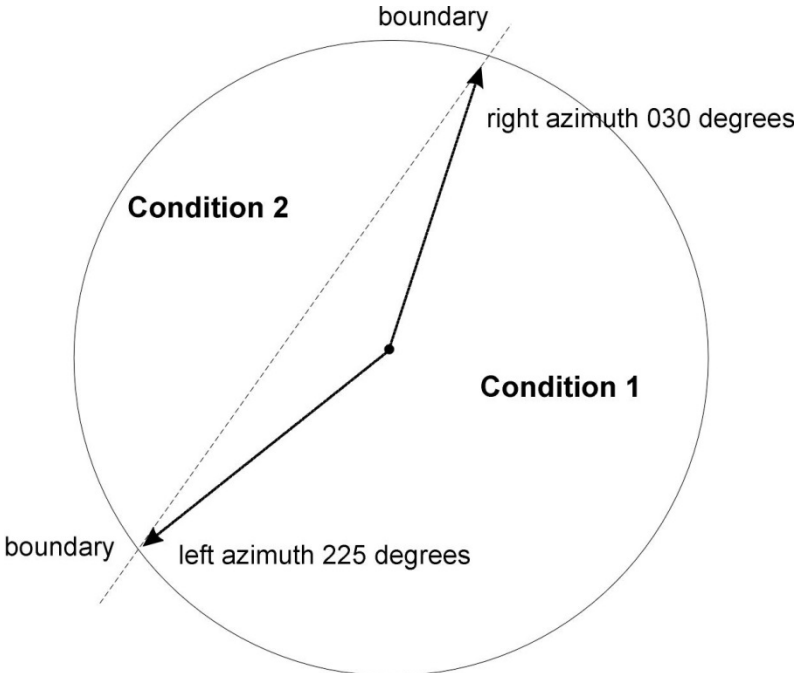



**Figure 17. How to measure a straight boundary on a microplot, subplot, or macroplot.**

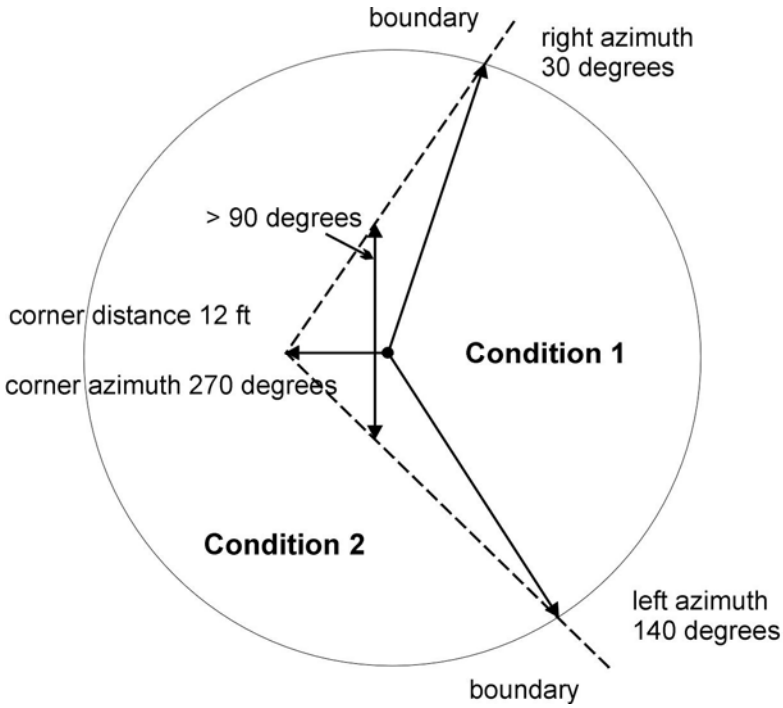



**Figure 18. How to measure a boundary with a corner on a subplot or macroplot.**

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.

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

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

### 4.2.2 PLOT TYPE

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

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

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

When collected: SAMPLE KIND = 2, All boundaries
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time

Values:

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

4.2.4 CONTRASTING CONDITION

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.

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

4.2.5 LEFT AZIMUTH

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.

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

4.2.6 CORNER AZIMUTH

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

When collected: All boundaries
Field width: 3 digits
Tolerance: +/- 10 degrees
MQO: At least 90% of the time
Values: 000 to 360

4.2.7 CORNER DISTANCE

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

When collected: All boundaries when CORNER AZIMUTH > 000
Field width: 3 digits
Tolerance: +/- 1 ft
MQO: At least 90% of the time
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

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.

When collected: All boundaries
Field width: 3 digits
Tolerance: +/- 10 degrees
MQO: At least 90% of the time
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 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.

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 5.0 inches 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 5.0 inches 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 5.0 inches 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, give one of the tree data lines a PRESENT TREE STATUS = 0, RECONCILE = 7 or 8, 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.

5.1 SUBPLOT NUMBER

Record the subplot number where the tree occurs.

When Collected: All live tally trees ≥ 1.0 in DBH/DRC and standing dead tally trees ≥ 5.0 in DBH/DRC
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

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

5.2 TREE RECORD NUMBER

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.

When Collected: All live tally trees ≥ 1.0 in DBH/DRC and standing dead tally trees ≥ 5.0 in DBH/DRC
Field width: 3 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: 000 or 001 to 999

5.3 CONDITION CLASS NUMBER

Record the CONDITION CLASS NUMBER in which each tree is located. Often, a referenced boundary is approximate, and trees selected for tally are assigned to the actual condition in which they lie regardless of the recorded approximate boundary (fig. 19).

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

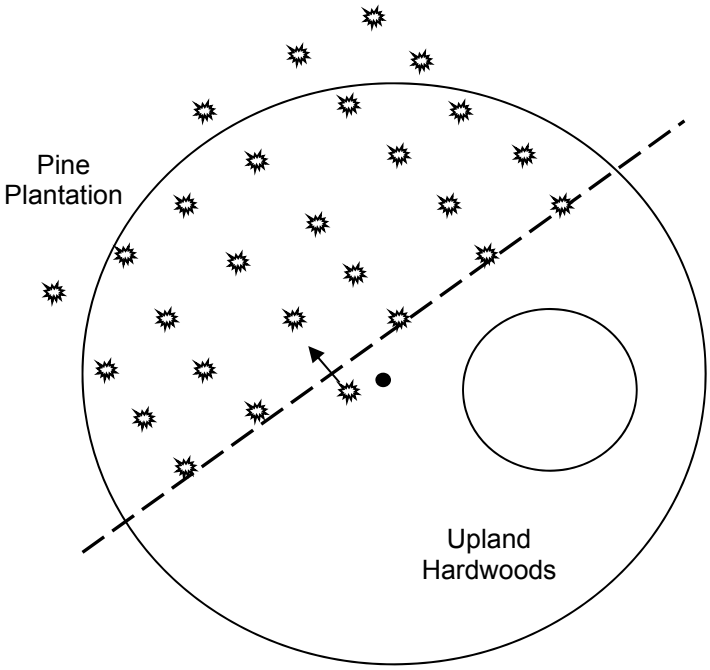



**Figure 19. Ragged CONDITION CLASS boundary and tree condition class designation.**

5.4 AZIMUTH

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.

When Collected: All live tally trees ≥ 1.0 in DBH/DRC and standing dead tally trees ≥ 5.0 in DBH/DRC
Field width: 3 digits
Tolerance: +/- 10 degrees
MQO: At least 90% of the time
Values: 001 to 360

5.5 HORIZONTAL DISTANCE

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.

**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. 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.**

When Collected: All live tally trees ≥ 1.0 inches DBH/DRC and standing dead tally trees ≥ 5.0 inches DBH/DRC
Field width: 3 digits (xx.y)
Tolerance: 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
MQO: At least 90% of the time
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

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

When collected: On remeasurement plots (SAMPLE KIND = 2), all previously tallied trees ≥ 1.0 in DBH
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

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

5.7 PRESENT TREE STATUS

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.

When Collected: All new live tally trees ≥ 1.0 in DBH/DRC
All new dead tally trees ≥ 5.0 in
On remeasurement plots, all previously tallied trees
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time

Values:

0 No status – tree is not presently in the sample (remeasurement plots only). Tree was incorrectly tallied at the previous inventory, currently is not tallied due to definition or procedural change, or is not tallied due to natural causes. Requires RECONCILE code = 5-9.
1 Live tree – any live tree (new, remeasured or ingrowth)
2 Dead tree – any dead tree (new, remeasured, or ingrowth), regardless of cause of death. Includes all previously standing dead trees that no longer qualify as standing dead, as well as trees killed by silvicultural or land clearing activity, and are assumed not to have been utilized.
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 subplot trees that shrink to become live saplings on the microplot, crews must collect new AZIMUTH and HORIZONTAL DISTANCE information from the microplot center.

5.7.1 RECONCILE

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.

When Collected: On SAMPLE KIND = 2; all new live tally trees $\geq$ 1.0 in DBH/DRC (PRESENT TREE STATUS = 1 and no PREVIOUS TREE STATUS), all new dead tally trees $\geq$ 5.0 in (PRESENT TREE STATUS = 2 and no PREVIOUS TREE STATUS), all no status trees (PRESENT TREE STATUS = 0)
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

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

1 Ingrowth – 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.
3 Missed live – a live tree missed at previous inventory and that is live or dead now. Includes previously nonsampled subplots.
4 Missed dead – a dead tree missed at previous inventory that is dead now. Includes previously nonsampled subplots.

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.

### 5.7.2 STANDING DEAD

Record the code that describes whether or not a tree qualifies as standing dead. To qualify as a standing dead tally tree, dead trees must be at least 5.0 inches 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. 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 5.0 inches in diameter, be at least 1.0 foot in unbroken ACTUAL LENGTH, and lean less than 45 degrees from vertical.

Live and dead standing tally trees, and partially separated boles of dead tally trees, do not have to be self-supported. They may be supported by other trees, branches, or their crown.

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

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

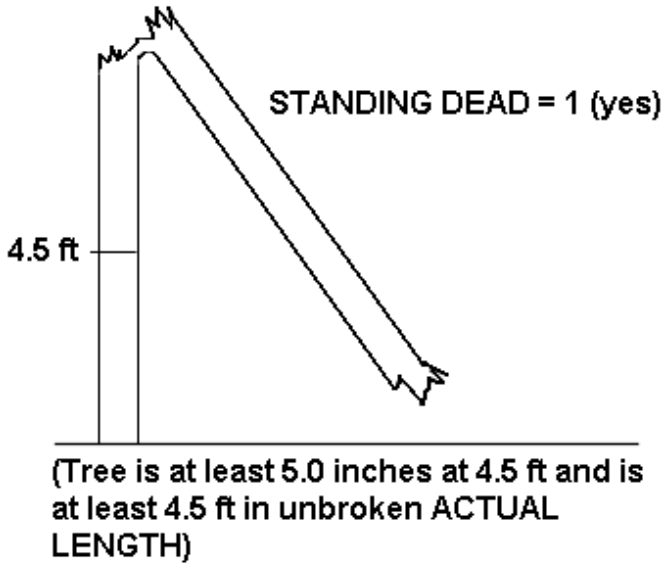



**Figure 20. Example of an unbroken bole to 4.5 feet.**

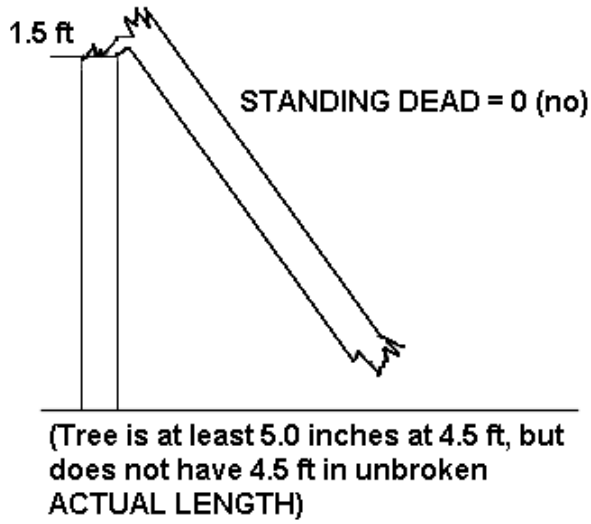



**Figure 21. Example of an unbroken length of < 1.5 feet.**

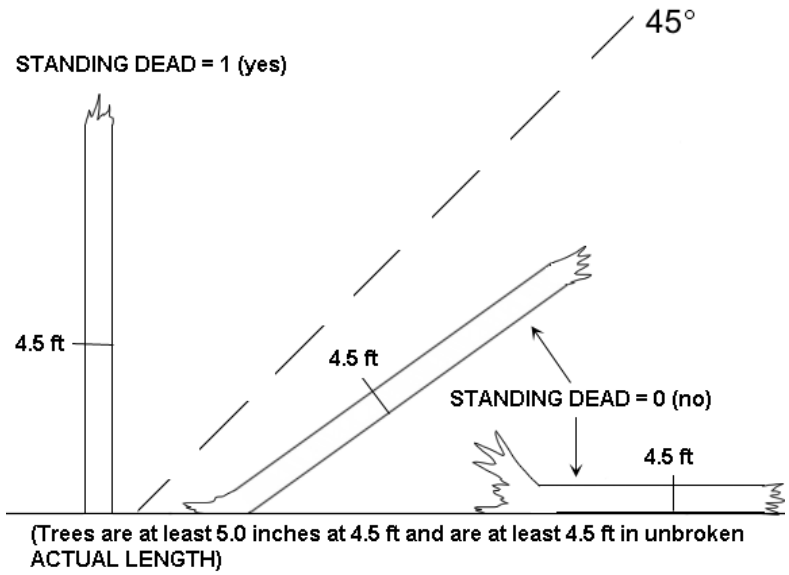



**Figure 22. Other examples of dead trees.**

5.7.3 MORTALITY (CORE OPTIONAL)

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

When Collected: All standing dead trees 5.0 inches DBH/DRC and larger that were live within the past 5 years if no previous inventory (PRESENT TREE STATUS = 2 on SAMPLE KIND = 1 or 3 plots).
Field width: 1 digit
Tolerance: No errors
MQO: At least 85% of the time
Values:

0 No - tree does not qualify as mortality.
1 Yes – tree does qualify as mortality.

5.8 SPECIES

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."

When Collected: All live tally trees ≥ 1.0 inches DBH/DRC and standing dead tally trees ≥ 5.0 inches DBH/DRC
Field width: 4 digits
Tolerance: No errors
MQO: At least 99% of the time for genus, at least 95% of the time for species
Values: See Appendix 3

5.9 DIAMETER

Diameters are measured at either breast height (DBH) or at the root collar (DRC). Species requiring DRC, referred to as woodland species, are denoted with a "w" in Appendix 3. Trees with diameters between 1.0- and 4.9-inches are measured on the 6.8-foot radius microplot, those with diameters of 5.0-inches and larger are measured on the 24-foot radius subplots. Macroplot tree diameter thresholds are determined according to regional specifications (see regional field guides for more information).

In order to accurately remeasure diameter (DBH or DRC) at the same point on the tree bole at successive visits, regions have the option of measuring and recording the distance from the ground to the point of diameter measurement, or marking the point of measurement with a scribe, crayon, paint, or aluminum nail. When marking trees for the first time, measure the diameter after the mark is in place. Use caution to avoid damaging trees with scribes and nails. Do not scribe or nail trees less than 3.0-inches in diameter, or species vulnerable to introduction of pathogens (e.g., aspen). Do not penetrate the cambium when using a bark scribe.

Remeasurement trees:

When remeasuring the diameter of a tree tallied at a previous survey, 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 Collected: All live tally trees ≥ 1.0 in DBH/DRC and standing dead tally trees ≥ 5.0 in DBH/DRC
Field width: 4 digits (xxx.y)
Tolerance: +/- 0.1 in per 20.0 in increment of measured diameter on all live trees and dead trees with DECAY CLASS = 1, 2
+/- 1.0 in per 20.0 in increment of measured diameter on dead trees with DECAY CLASS = 3, 4, 5
For woodland species: +/- 0.2 in per stem
MQO: At least 95% of the time. For example: a tree with a diameter of 41.0 in would have a tolerance of plus or minus 0.3 in. (Note: the MQO for point of measurement is +/- 0.2 in when the tree is first measured and within 1 ft of the location established by the previous crew when the tree is remeasured.)
Values: 001.0 to 999.9

5.9.1 PREVIOUS DIAMETER AT BREAST HEIGHT

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

5.9.2 DIAMETER AT BREAST HEIGHT (DBH)

Unless one of the following special situations is encountered, measure DBH at 4.5 feet above the ground line on the uphill side of the tree. Round each measurement down to the last 0.1 inch. For example, a reading of 3.68 inches is recorded as 3.6 inches.

Special DBH situations:

1. Forked tree: In order to qualify as a fork, the stem in question must be at least 1/3 the diameter of the main stem and must branch out from the main stem at an angle of 45 degrees or less. 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.

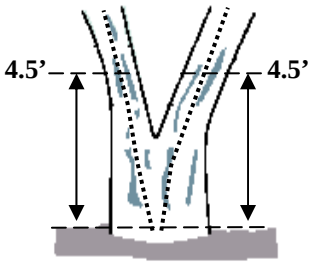



**Figure 23. Forked below 1.0 ft.**

   - Trees forked between 1.0 foot and 4.5 feet. Trees forked between 1.0 foot and 4.5 feet are also counted as separate trees (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.

     Multiple forks are possible if they all originate from approximately the same point on the main stem. In such cases, measure DBH on all stems at 3.5 feet above the common pith intersection (fig. 26-F).

     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 figure 26-E (i.e., do not move the point of diameter the entire 3.5 feet above the first fork).

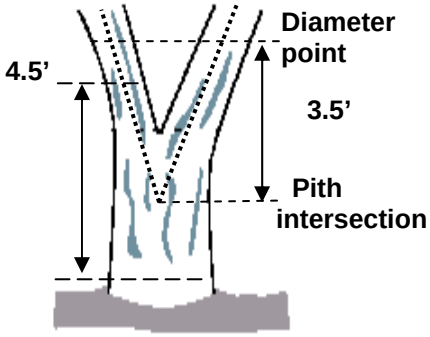



**Figure 24. Forked between 1.0-4.5 ft.**

- 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.

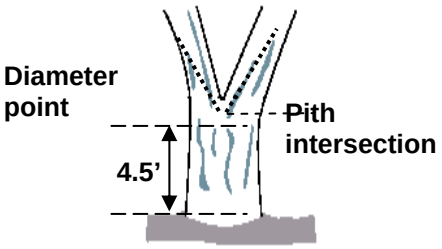



**Figure 25. One tree.**

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.

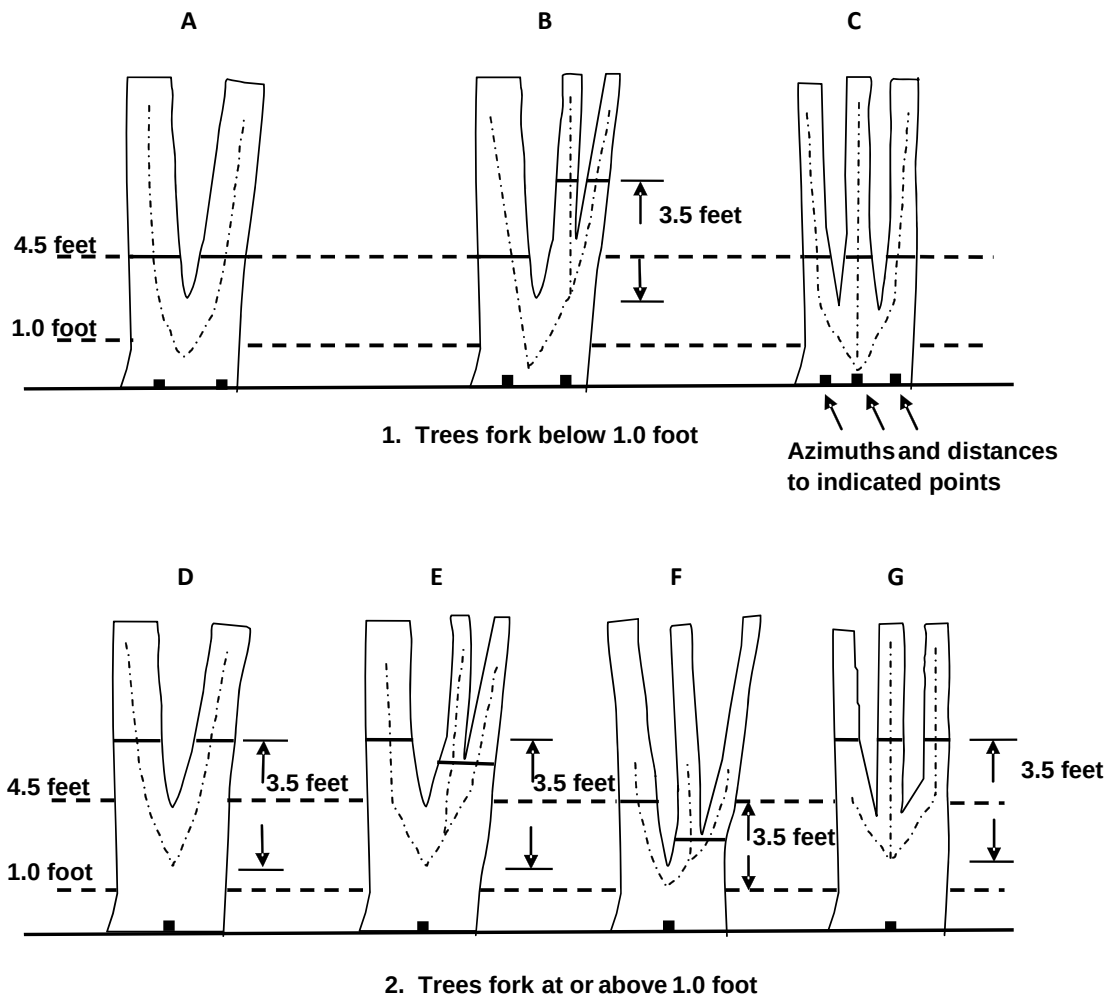



**Figure 26. Summary of where to measure DBH, distance, and azimuth on forked trees.**

3. <u>Tree with butt-swell or bottleneck:</u> Measure these trees 1.5 feet above the end of the swell or bottleneck if the swell or bottleneck extends 3.0 feet or more above the ground (fig. 27).

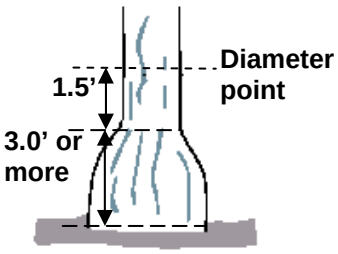



**Figure 27. Bottleneck tree.**

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.

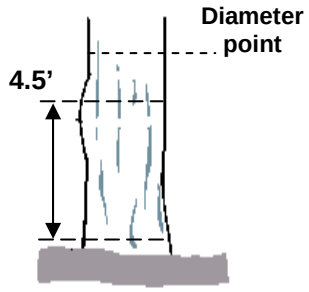



**Figure 28. Tree with swelling.**

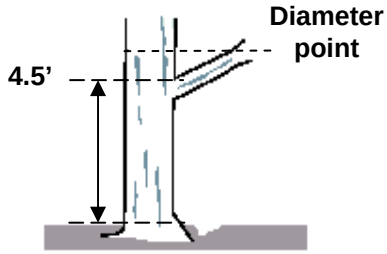



**Figure 29. Tree with branch.**

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).

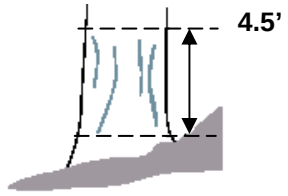



**Figure 30. Tree on a slope.**

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).

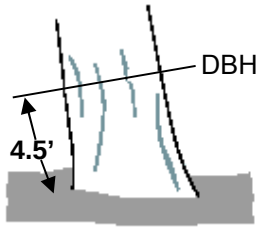



**Figure 31. Leaning tree.**

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).

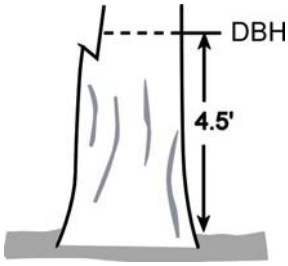



**Figure 32. Tree with part of stem missing.**

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

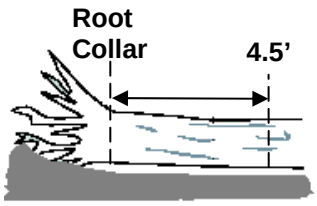



**Figure 33. Tree on the ground.**

11. Down live tree with tree-form branches growing vertical from main bole: When a down live tree, touching the ground, 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 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.

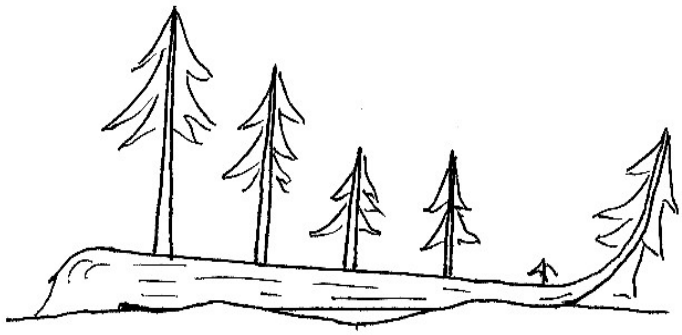


**Figure 34. Down tree above duff.**

- 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.

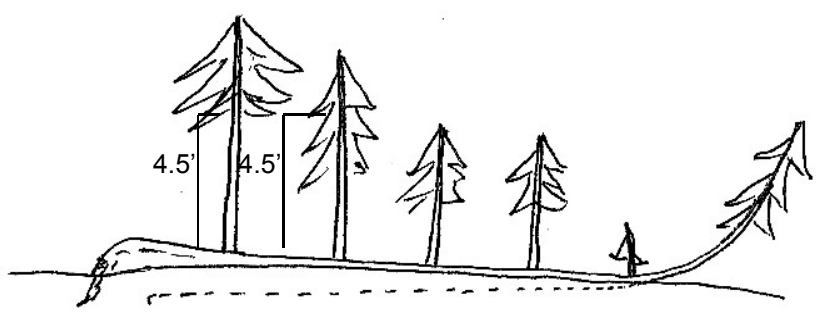



**Figure 35. Down tree below duff.**

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

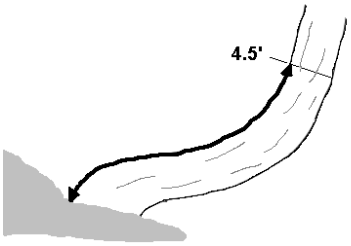



**Figure 36. Tree with curved bole (pistol butt tree).**

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:

$$DRC = SQRT\ [SUM\ (stem\ diameter^2)]$$

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:

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

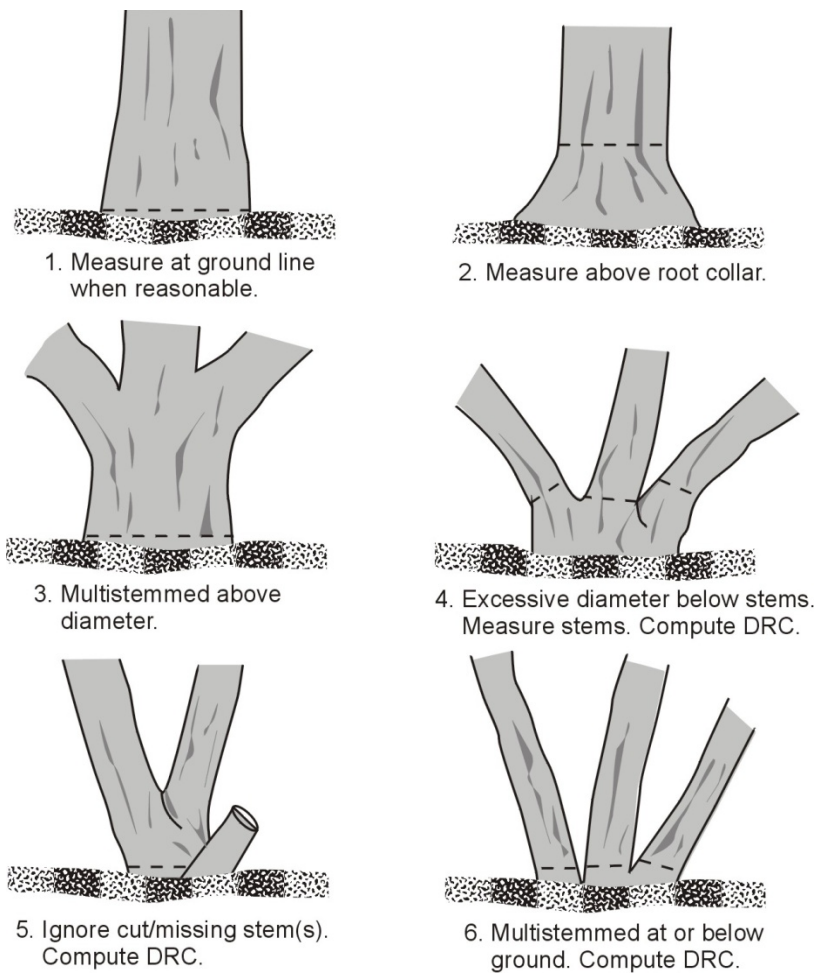



Figure 37. How to measure DRC in a variety of situations.

5.9.4.1 DRC STEM DIAMETER

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

When collected: All stems on woodland tree species that are at least 1 ft in length and at least 1.0 in in diameter 1 ft up from the stem diameter measurement point
Field width: 4 digits (xxx.y)
Tolerance: +/- 0.2 in per stem
MQO: At least 95% of the time
Values: 001.0 to 999.9

5.9.4.2 DRC STEM STATUS

Record the status of each individual stem on the woodland tally tree.

When collected: All stems on woodland tree species that are at least 1 ft in length and at least 1.0 in in diameter 1 ft up from the stem diameter measurement point
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

1 live stem
2 dead stem

5.10 PAST NUMBER OF STEMS

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

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

5.11 CURRENT NUMBER OF STEMS

Record the total number of stems that were measured for DRC (e.g., record 1 stem as 01; record 12 stems as 12). Count only the number of qualifying stems used to calculate DRC. Qualifying stems are those that are at least 1.0 foot in length and at least 1.0 inch in diameter, 1 foot up from the measurement point.

When collected: For tallied **woodland** species with at least one stem 1.0 in in diameter or larger; includes woodland species tallied on the microplot
Field width: 2 digits
Tolerance: No errors
MQO: At least 90% of the time
Values: 1 to 99

5.12 DIAMETER CHECK

Record this code to identify the accuracy of the diameter measurement (due to factors such as abnormal swellings, diseases, damage, new measurement positions, etc.) that may affect use of this tree in diameter growth/change analyses.

When Collected: All live tally trees $\geq$ 1.0 in DBH/DRC and standing dead tally trees $\geq$ 5.0 in DBH/DRC
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

0 Diameter measured accurately.
1 Diameter estimated.
2 Diameter measured at different location than previous measurement (remeasurement trees only).

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

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

5.13 ROTTEN/MISSING CULL

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

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

Rotten and missing volume loss is often difficult to estimate. Refer to supplemental disease and insect pests field guides and local defect guidelines as an aid in identifying damaging agents and their impact on volume loss. Use your best judgment and be alert to such defect indicators as the following:

- Cankers or fruiting bodies.
- Swollen or punky knots.
- Dull, hollow sound of bole (use regional standards).
- Large dead limbs, especially those with frayed ends.
- Sawdust around the base of the tree.
- Metal imbedded in the wood.

When Collected: CORE: All live tally trees ≥ 5.0 in DBH/DRC
CORE OPTIONAL: All live and standing dead tally trees ≥ 5.0 in DBH/DRC
Field width: 2 digits
Tolerance: +/- 10%
MQO: At least 90% of the time
Values: 00 to 99

5.14 TOTAL LENGTH

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

When Collected: Phase 2 CORE: All live tally trees ≥ 5.0 in DBH/DRC
Phase 2 CORE OPTIONAL: All live tally trees ≥ 1.0 in DBH/DRC and all standing dead tally trees ≥ 5.0 in DBH/DRC
Phase 3 CORE: All live tally trees ≥ 1.0 in DBH/DRC
Phase 3 CORE OPTIONAL: All live tally trees ≥ 1.0 in DBH/DRC, and all standing dead tally trees ≥ 5.0 in DBH/DRC
Field width: 3 digits
Tolerance: +/- 10% of true length
MQO: At least 90% of the time
Values: 005 to 400

5.15 ACTUAL LENGTH

Record for trees with missing tops (top on live trees is completely detached; top on dead trees is greater than 50 percent detached from the tree). If the top is intact, this item may be omitted. Record the ACTUAL LENGTH of the tree to the nearest 1.0 foot from ground level to the break. Use the length to the break for ACTUAL LENGTH until a new leader qualifies as the new top for TOTAL LENGTH; until that occurs, continue to record ACTUAL LENGTH to the break. Trees with previously broken tops are considered recovered (i.e., ACTUAL LENGTH = TOTAL LENGTH) when a new leader (dead or alive) is 1/3 the diameter of the broken top at the point where the top

was broken (not where the new leader originates from the trunk). Forked trees should be treated the same as unforked trees.

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

When Collected: Phase 2 CORE: All live and standing dead tally trees (with broken or missing tops) ≥ 5.0 in DBH/DRC
Phase 2 CORE OPTIONAL: All live tally trees (with broken or missing tops) ≥1.0 in DBH/DRC and standing dead tally trees (with broken or missing tops) ≥ 5.0 in DBH/DRC
Phase 3 CORE: All live tally trees (with broken or missing tops) ≥1.0 in DBH/DRC and standing dead tally trees (with broken or missing tops) ≥5.0 in DBH/DRC
Field width: 3 digits
Tolerance: +/- 10% of true length
MQO: At least 90% of the time
Values: 005 to 400

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

When Collected: Phase 2 CORE: All live tally trees ≥ 5.0 in DBH/DRC
Phase 2 CORE OPTIONAL: All live tally trees ≥ 1.0 in DBH/DRC and all standing dead tally trees ≥ 5.0 in DBH/DRC
Phase 3 CORE: All live tally trees ≥ 1.0 in DBH/DRC
Phase 3 CORE OPTIONAL: All live tally trees ≥ 1.0 in DBH/DRC and all standing dead tally trees ≥ 5.0 in DBH/DRC
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

1 Total and actual lengths are field measured with a measurement instrument (e.g., clinometer, relascope, tape).
2 Total length is visually estimated, actual length is measured with an instrument.
3 Total and actual lengths are visually estimated.

5.17 CROWN CLASS
Rate tree crowns in relation to the sunlight received and proximity to neighboring trees (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.

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

Values:

1 Open Grown – trees with crowns that received full light from above and from all sides throughout most of its life, particularly during its early developmental period.
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.

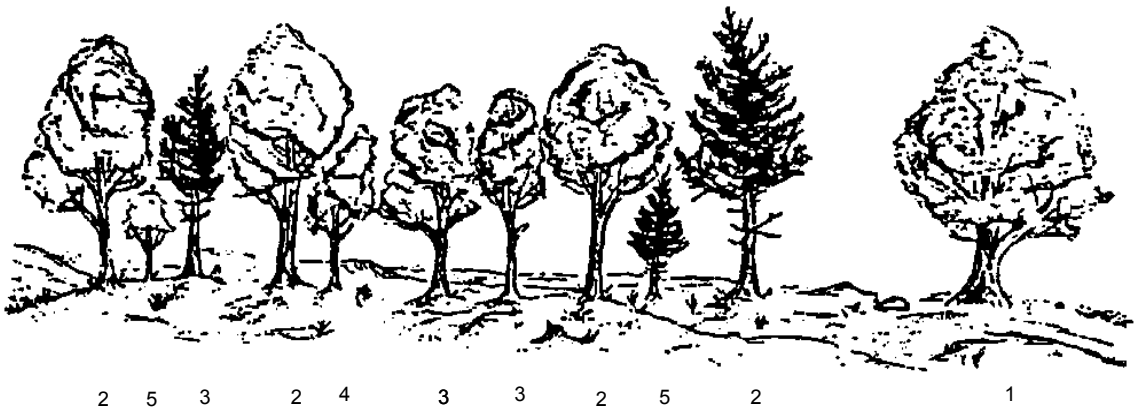



**Figure 38. Examples of CROWN CLASS code definitions (numbers are the CROWN CLASS codes).**

5.18 UNCOMPACTED LIVE CROWN RATIO (Phase 2 – CORE OPTIONAL, Phase 3 – CORE)
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.

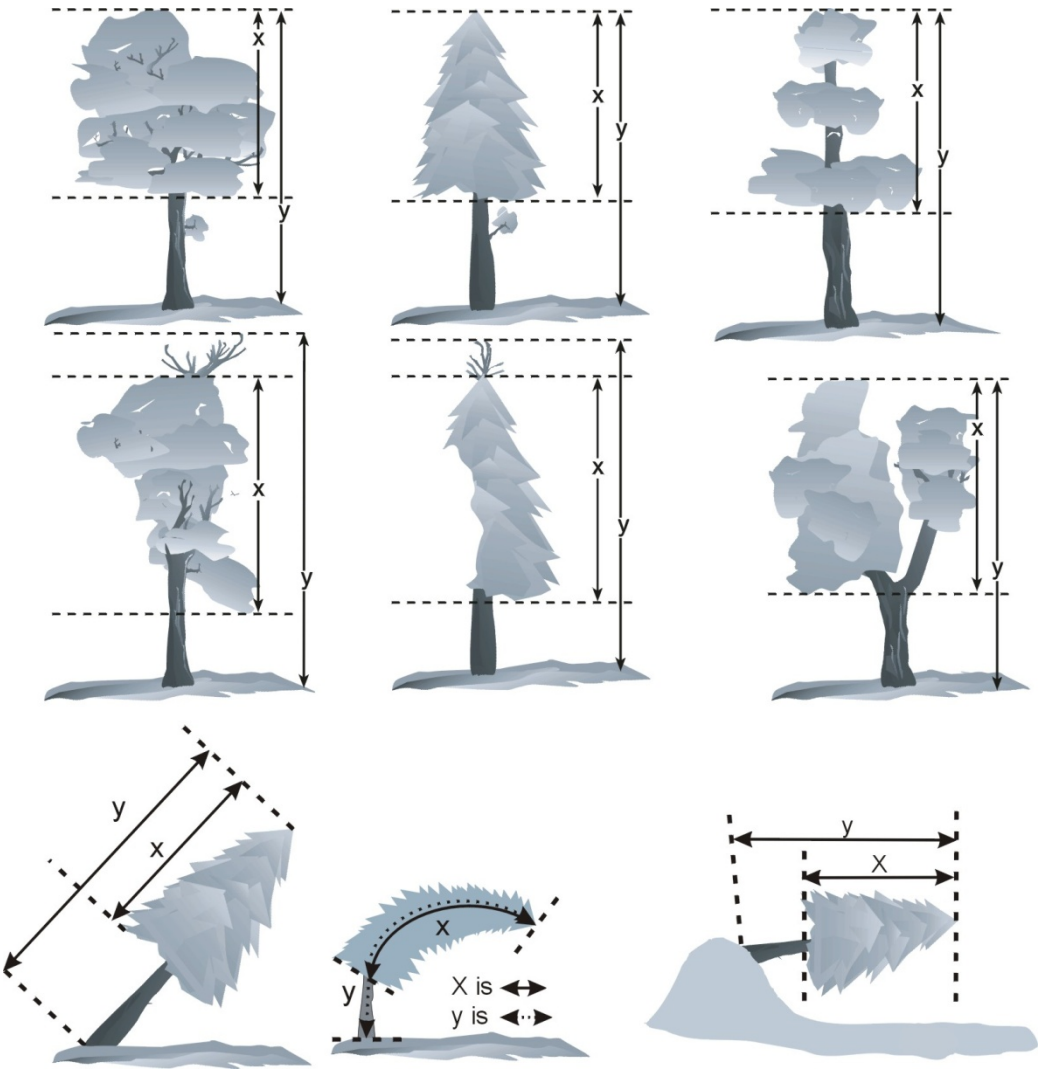



**Figure 39. UNCOMPACTED LIVE CROWN RATIO examples.**

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).

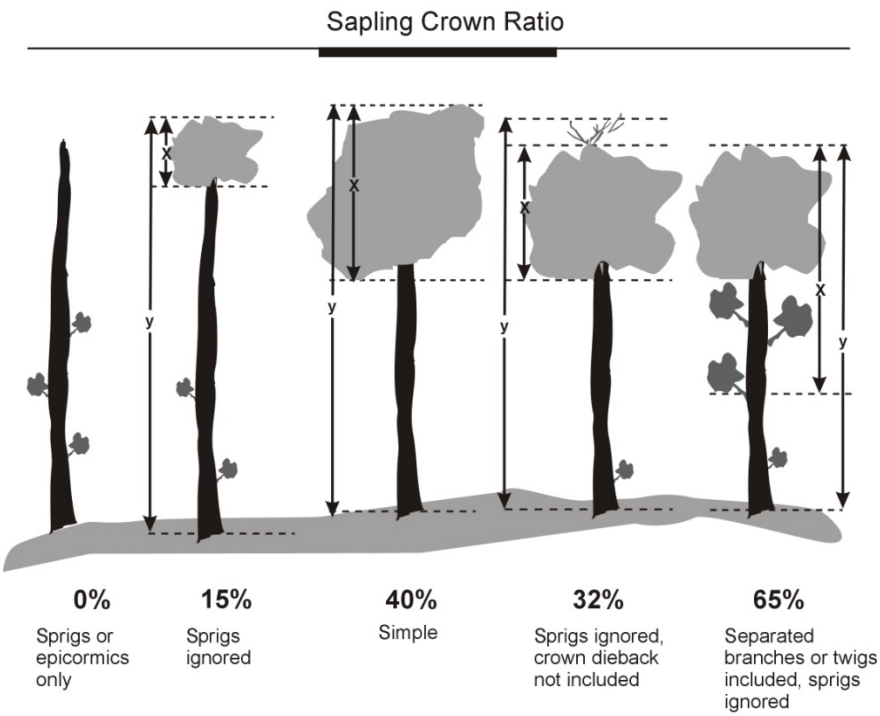



**Figure 40. Sapling ratio determination examples.**

When collected: Phase 2 CORE OPTIONAL: All live tally trees ≥ 5.0 in DBH/DRC
Phase 3 CORE: All live tally trees ≥ 1.0 in DBH/DRC
Field width: 2 digits
Tolerance: +/- 10%
MQO: At least 90% of the time
Values: 00 to 99 percent

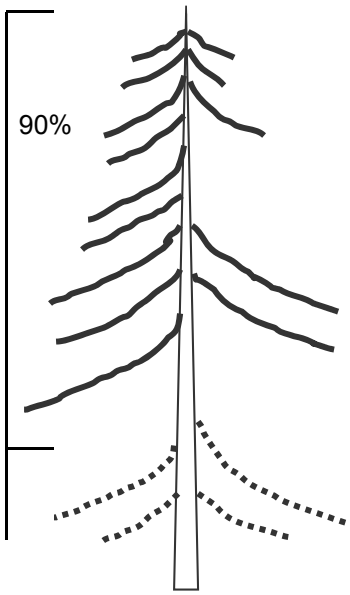
5.19 COMPACTED CROWN RATIO

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

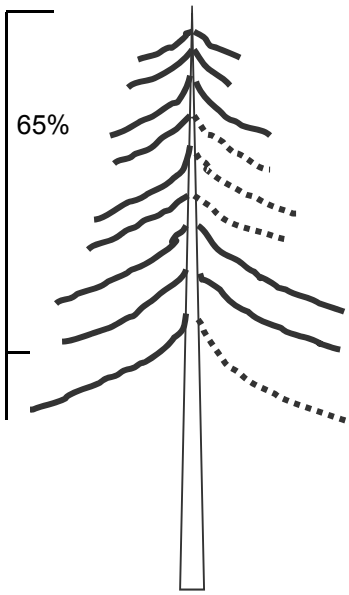
Do not over-compact trees beyond their typical full crown situation. For example, if tree branches tend to average 2 feet between whorls, do not compact crowns any tighter than the 2-foot spacing (fig. 41). Figure 42 shows an example of COMPACTED CROWN RATIO on a leaning tree.

Open-crown conifer (e.g., ponderosa pine) –

Uncompacted:

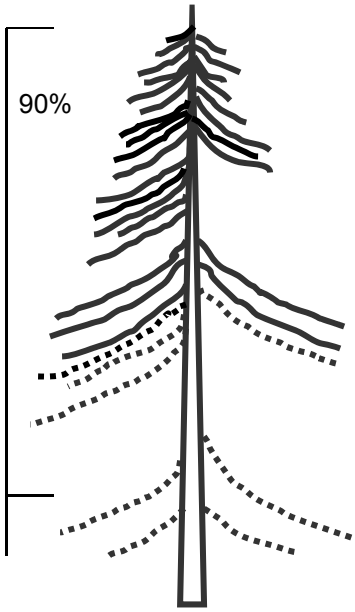



Compacted:




Dense-crown conifer (e.g., subalpine fir) –

Uncompacted:

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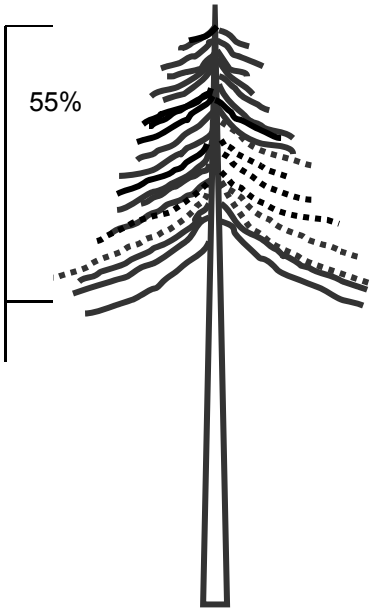


**Figure 41. Examples of and comparison between COMPACTED CROWN RATIO and UNCOMPACTED LIVE CROWN RATIO of conifers**.

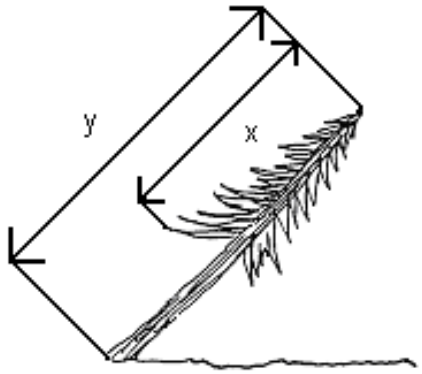


**Figure 42. COMPACTED CROWN RATIO on a leaning tree. CROWN RATIO = (x/y)100.**

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).

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

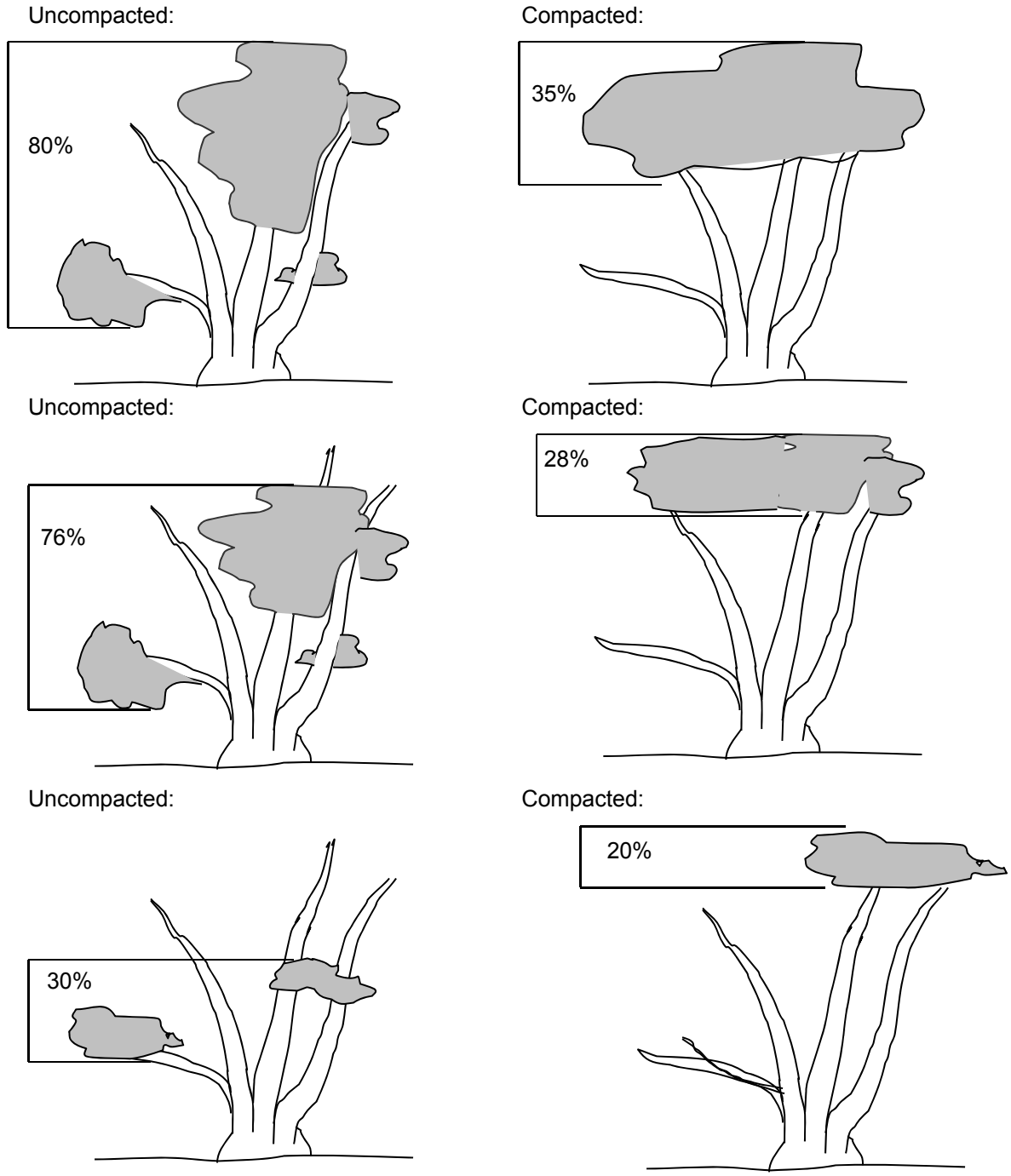


**Figure 43. Examples of and comparison between COMPACTED CROWN RATIO and UNCOMPACTED LIVE CROWN RATIO of woodland species.**

## 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.

### 5.20.1 DAMAGE AGENT 1

Inspect the tree from bottom to top – roots, bole, branches, foliage (including buds and shoots), Record the first damage agent observed from the list of agents (unless you observe more than 3 damages). If there are more than three agents, record only the most important ones using the list of impacts listed in section 5.20 as a guide (i.e., agents threatening survival are more important than agents that reduce wood quality). 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.

When Collected: CORE: All live tally trees ≥ 5.0 in DBH/DRC
CORE OPTIONAL: All live tally trees ≥ 1.0 in DBH/DRC
Field width: 5 digits
Tolerance: No errors
MQO: Will be established following blind audit results
Values:

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). |

| Code | General Agent | Damage Threshold* | Descriptions |
|---|---|---|---|
| 14000 | Sucking insects | Any damage to the terminal leader; damage ≥20% of the foliage with ≥50% of the leaf/needle affected | Adelgids, scales and aphids feed on all parts of the tree. Often they cause galling on branches and trunks. Some appear benign but enable fungi to invade where they otherwise could not (e.g., beech bark disease). The most important ones become conspicuous because of the mass of white, cottony wax that conceals eggs and young nymphs. |
| 15000 | Boring insects | Any damage to the terminal leader; damage ≥20% of the roots, stems, or branches. | Most wood boring insects attack only severely declining and dead trees. Certain wood boring insects cause significant damage to trees, especially the exotic Asian longhorn beetle, emerald ash borer, and Sirex wood wasp. Bark beetles have both larval and adult galleries in the phloem and adjacent surface of the wood. Wood borers have galleries caused only by larval feeding. Some, such as the genus *Agrilus* (including the emerald ash borer) have galleries only in the phloem and surface of the wood. Other wood borers, such as Asian longhorn beetle bore directly into the phloem and wood. Sirex adults oviposit their eggs through the bark, and developing larvae bore directly into the wood of pines. |
| 19000 | General diseases | Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected. | Diseases that cannot be placed in any of the following disease categories. |
| 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. |

| Code | General Agent | Damage Threshold* | Descriptions |
|---|---|---|---|
| | | | 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.<br><br>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. |

| Code | General Agent | Damage Threshold* | Descriptions |
|---|---|---|---|
| 25000 | Foliage diseases | Damage ≥20% of the foliage with ≥50% of the leaf/needle affected. | Foliage diseases are caused by fungi and result in needle shed, growth loss, and, potentially, tree mortality. This category includes needle casts, blights, and needle rusts. |
| 26000 | Stem rusts | Any occurrence on the bole or stems (on multi-stemmed woodland species), or on branches ≤1 foot from boles or stems; damage to ≥20% of branches | A stem rust is a disease caused by fungi that kill or deform all or a portion of the stem or branches of a tree. Stem rusts are obligate parasites and host specialization is very common. They infect and develop on fast-growing tissues and cause accelerated growth of infected tissues resulting in galls or cankers. Heavy resinosis is usually associated with infections. Sometimes yellow or reddish-orange spores are present giving a “rusty” appearance. Damage occurs when the disease attacks the cambium of the host, girdling and eventually killing the stem above the attack. Symptoms of rusts include galls (an abnormal and pronounced swelling or deformation of plant tissue that forms on branches or stems) and cankers (a sunken lesion on the stem caused by death of the cambium which often results in the death of tree tops and branches). |
| 27000 | Broom rusts | ≥50% of crown area affected. | Broom rust is a disease caused by fungi that kill or deform all or a portion of the branches of a tree. Broom rusts are obligate parasites and host specialization is very common. They infect and develop on fast-growing tissues and cause accelerated growth of infected tissues resulting in galls. Symptoms of rusts include galls, an abnormal and pronounced swelling or deformation of plant tissue that forms on branches or stems. |
| 30000 | Fire | Damage ≥ 20% of bole circumference; >20% of stems on multi-stemmed woodland species affected; ≥20% of crown affected. | Fire damage may be temporary, such as scorched foliage, or may be permanent, such as in cases where cambium is killed around some portion of the bole. The location and amount of fire damage will determine how the damage may affect the growth and survival of the tree. Fire often causes physiological stress, which may predispose the tree to attack by insects of other damaging agents. |
| 41000 | Wild animals | Any damage to the terminal leader; damage ≥20% of the roots or boles with> 20% of the circumference affected; damage >20% of the | Wild animals from birds to large mammals cause open wounds. Some common types of damage include: sapsucker bird peck, deer |

| Code | General Agent | Damage Threshold* | Descriptions |
|---|---|---|---|
| | | 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. | 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. | |

| Code | General Agent | Damage Threshold* | Descriptions |
|---|---|---|---|
| 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
Follow procedures described for DAMAGE AGENT 1

When Collected: CORE: All live tally trees ≥ 5.0 in DBH/DRC
CORE OPTIONAL: All live tally trees ≥ 1.0 in DBH/DRC
Field width: 5 digits
Tolerance: 1 of 2 damages correct
MQO: Will be established following blind audit results
Values: See 5.20.1

5.20.3 DAMAGE AGENT 3
Follow procedures described for DAMAGE AGENT 1

When Collected: CORE: All live tally trees ≥ 5.0 in DBH/DRC
CORE OPTIONAL: All live tally trees ≥ 1.0 in DBH/DRC
Field width: 5 digits
Tolerance: 2 of 3 damages correct
MQO: Will be established following blind audit results
Values: See 5.20.1

5.21 CAUSE OF DEATH
Record a cause of death for all trees that have died or been cut since the previous survey. If cause of death cannot be reliably estimated, record unknown/not sure/other.

When Collected: 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
Field width: 2 digits
Tolerance: No errors
MQO: At least 80% of the time
Values:

10 Insect
20 Disease
30 Fire
40 Animal
50 Weather
60 Vegetation (suppression, competition, vines/kudzu)
70 Unknown/not sure/other - includes death from human activity not related to silvicultural or 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)

Record the estimated year that remeasured trees died or were cut. For each remeasured tree that has died or been cut since the previous inventory, record the 4-digit year in which the tree died. Mortality year is also recorded for trees on land that has been converted to a nonforest land use, if it can be determined that a tree died before the land was converted.

When Collected: Plots where SAMPLE KIND = 2: all PREVIOUS TREE STATUS = 1 and PRESENT TREE STATUS = 2 or 3; or PRESENT TREE STATUS = 2 and RECONCILE = 1, 2, or 3.
Field width: 4 digits
Tolerance: +/- 1 year for remeasurement cycles of 5 years
+/- 2 years for remeasurement cycles of > 5 years
MQO: At least 70% of the time
Values: 1994 or higher

5.23 DECAY CLASS

Record for each standing dead tally tree, 5.0 inches in diameter and larger, the code indicating the tree's stage of decay.

When Collected: All standing dead tally trees ≥ 5.0 in DBH/DRC
Field width: 1 digit
Tolerance: +/- 1 class
MQO: At least 90% of the time
Values: Use the following table for guidelines:

| Decay class stage (code) | Limbs and branches | Top | % Bark Remaining | Sapwood presence and condition* | Heartwood condition* |
|---|---|---|---|---|---|
| 1 | All present | Pointed | 100 | Intact; sound, incipient decay, hard, original color | Sound, hard, original color |
| 2 | Few limbs, no fine branches | May be broken | Variable | Sloughing; advanced decay, fibrous, firm to soft, light brown | Sound at base, incipient decay in outer edge of upper bole, hard, light to reddish brown |
| 3 | Limb stubs only | Broken | Variable | Sloughing; fibrous, soft, light to reddish brown | Incipient decay at base, advanced decay throughout upper bole, fibrous, hard to firm, reddish brown |
| 4 | Few or no stubs | Broken | Variable | Sloughing; cubical, soft, reddish to dark brown | Advanced decay at base, sloughing from upper bole, fibrous to cubical, soft, dark reddish brown |
| 5 | None | Broken | Less than 20 | Gone | Sloughing, cubical, soft, dark brown, OR fibrous, very soft, dark reddish brown, encased in hardened shell |

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

5.24 LENGTH TO DIAMETER MEASUREMENT POINT (CORE OPTIONAL)

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

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

5.25 ROUGH CULL (CORE OPTIONAL)

For each live tally tree 5.0 inches DBH/DRC and larger, record the total percentage of cubic-foot volume that is cull due to sound dead material or tree form. Record to the nearest 1 percent. When estimating volume loss (tree cull), only consider the cull on the merchantable bole/portion of the tree, from a 1-foot stump to a 4-inch top.

For woodland species, the merchantable portion is between the point of DRC measurement to a 1.5-inch DOB top, and rough cull includes only sound dead.

Refer to local defect guidelines as an aid in determining cull volume for various damages such as crook, fork, sweep, pistol butt, etc. Small trees (5-9 inches for softwoods and 5-11 inches for hardwoods) that have poor form and are not expected to ever produce merchantable material should be coded 99% rough cull.

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

5.26 DWARF MISTLETOE CLASS (CORE OPTIONAL)

Rate all live conifer species, except juniper species, greater than or equal to 1.0 inch diameter for dwarf mistletoe (*Arceuthobium* spp.) infection. Use the Hawksworth six-class rating system: divide the live crown into thirds, and rate each third using the following scale (fig. 44):

| | |
|---|---|
| 0 | No visible infection |
| 1 | Light infection -- < 50 percent of the total branches infected |
| 2 | Heavy infection -- > 50 percent of the total branches infected |

Sum the three individual ratings to obtain and record a total mistletoe class (0 to 6) for the tree.

Note: In addition to these requirements, longleaf pine (0121) seedlings must be greater than or equal to 0.5 inches DRC.

When Collected: CORE OPTIONAL: All live conifer (except juniper) tally trees ≥ 1.0 in DBH/DRC
Field width: 1 digit
Tolerance: +/- 1 class
MQO: At least 90% of the time
Values: 0 to 6

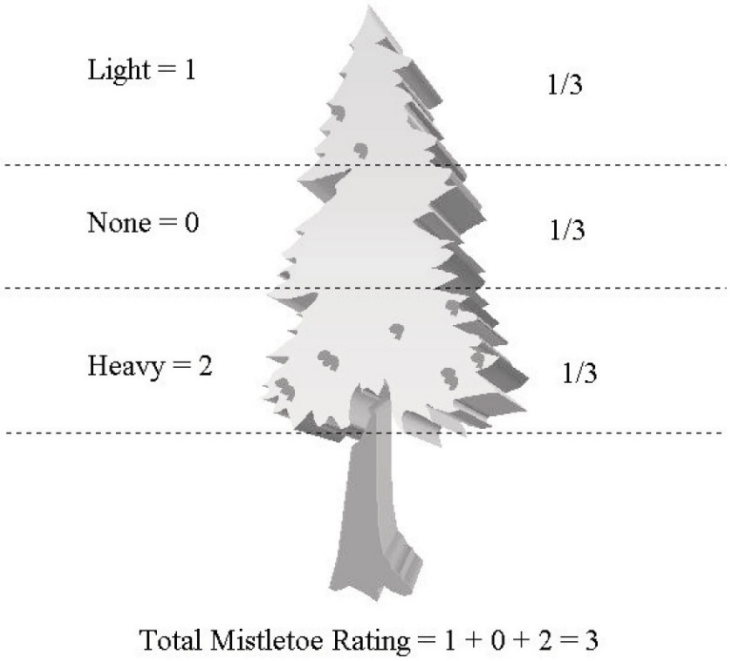


**Figure 44. Example of the Hawksworth six-class rating system.**

5.27 TREE NOTES

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

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

## 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.

When Collected: All counts of seedlings

### 6.2 SPECIES

Use the same procedures described in Section 5.8.

When Collected: All counts of seedlings
Field width: 4 digits
Tolerance: No errors for genus, no errors for species
MQO: At least 90% of the time for genus, at least 85% of the time for species
Values: See Appendix 3

### 6.3 CONDITION CLASS NUMBER

Use the same procedures described in Section 2.0.

When Collected: All counts of seedlings

### 6.4 SEEDLING COUNT

On each microplot, record the number of live tally tree seedlings, by species and condition class. Count up to five individuals by species: estimate the total count if there are more than five individuals of any given species in any given condition class. When seedlings are distributed evenly on a microplot, a suggested method of estimating is to count the number of seedlings on one quarter of the microplot and multiply by four (given that there is only one condition class on the microplot). Repeat for each species. Conifer seedlings must be at least 6.0 inches in length and less than 1.0 inch at DBH to qualify for counting. Hardwood seedlings must be at least 12.0 inches in length and less than 1.0 inch at DBH in order to qualify for counting.

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

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

When Collected: Each accessible forest land condition class on each microplot
Field width: 3 digits
Tolerance: No errors for 5 or less per species; +/- 20% over a count of 5
MQO: At least 90% of the time
Values: 001 through 999

## 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.

### 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.

### 7.2 Site Tree Data Variables

7.2.1 CONDITION CLASS LIST

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

When Collected: All site trees
Field width: 4 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: 1000 to 9876

7.2.2 SPECIES

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

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

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

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

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

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

| Code | Common Name | Region |
|---|---|---|
| | ---------- **Softwood Species** ---------- | |
| 0012 | balsam fir | NE, NC |
| 0043 | Atlantic white-cedar | NE |
| 0068 | eastern redcedar | NE, NC |
| 0070 | larch (introduced) | NE |
| 0071 | tamarack (native) | NE, NC |
| 0094 | white spruce | NE, NC |
| 0095 | black spruce | NE, NC |
| 0097 | red spruce | NE |
| 0105 | jack pine | NE, NC |
| 0107 | sand pine | SO |
| 0110 | shortleaf pine | NE, NC, SO |
| 0111 | slash pine | SO |
| 0121 | longleaf pine | SO |
| 0122 | Ponderosa pine | NC |
| 0125 | red pine | NE, NC |
| 0128 | pond pine | NE, SO |
| 0129 | eastern white pine | NE, NC, SO |
| 0130 | Scotch pine | NE, NC |
| 0131 | loblolly pine | NE, SO |
| 0132 | Virginia pine | NE, SO |
| 0241 | northern white cedar | NE, NC |
| 0261 | eastern hemlock | NE, NC |
| | ---------- **Hardwood Species** ---------- | |
| 0316 | red maple | NE, NC |
| 0317 | silver maple | NE, NC |
| 0318 | sugar maple | NE, NC |
| 0371 | yellow birch | NE, NC |
| 0375 | paper birch | NE, NC |
| 0402 | bitternut hickory | NE, NC |
| 0403 | pignut hickory | NC |
| 0404 | pecan | NC |
| 0405 | shellbark hickory | NC |
| 0407 | shagbark hickory | NE, NC |
| 0408 | black hickory | NC |
| 0409 | mockernut hickory | NC |
| 0462 | hackberry | NC |

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

| Code | Common Name | Region |
|---|---|---|
| 0531 | American beech | NE, NC |
| 0541 | white ash | NE, NC |
| 0543 | black ash | NE, NC |
| 0544 | green ash | NE, NC |
| 0602 | black walnut | NC |
| 0611 | sweetgum | NE, NC, SO |
| 0621 | yellow-poplar | NE, NC, SO |
| 0741 | balsam poplar | NC |
| 0742 | eastern cottonwood | NE, NC, SO |
| 0743 | bigtooth aspen | NE, NC |
| 0746 | quaking aspen | NE, NC |
| 0762 | black cherry | NC |
| 0802 | white oak | NE, NC, SO |
| 0806 | scarlet oak | NE, NC, SO |
| 0809 | northern pin oak | NC |
| 0812 | southern red oak | NE, SO |
| 0813 | cherrybark oak | NE, SO |
| 0817 | shingle oak | NE, NC, SO |
| 0823 | bur oak | NC |
| 0826 | chinkapin oak | NC |
| 0827 | water oak | NE, SO |
| 0830 | pin oak | NE, NC, SO |
| 0832 | chestnut oak | NE, SO |
| 0833 | northern red oak | NE, NC, SO |
| 0835 | post oak | NE, NC, SO |
| 0837 | black oak | NE, NC, SO |
| 0901 | black locust | NE, NC |
| 0951 | American basswood | NE, NC |
| 0972 | American elm | NE, NC |
| 0975 | slippery elm | NC |
| 0977 | rock elm | NC |

**Western U.S. Site-Tree Species: PNW = Pacific Northwest FIA, RMRS = Rocky Mountain FIA**

| Code | Common Name | Region |
|---|---|---|
| | ---------- **Softwood Species** | ---------- |
| 0011 | Pacific silver fir | PNW |
| 0015 | white fir | RMRS, PNW |
| 0017 | grand fir | RMRS, PNW |
| 0018 | corkbark fir | RMRS |
| 0019 | subalpine fir | RMRS, PNW |
| 0020 | California red fir | RMRS, PNW |
| 0021 | shasta red fir | PNW |
| 0022 | noble fir | PNW |
| 0042 | Alaska yellow-cedar | PNW |
| 0068 | eastern red cedar | RMRS |
| 0073 | western larch | RMRS, PNW |
| 0081 | incense-cedar | RMRS, PNW |
| 0093 | Engelmann spruce | RMRS, PNW |
| 0094 | white spruce | RMRS, PNW |
| 0095 | black spruce | PNW |
| 0096 | blue spruce | RMRS |
| 0098 | sitka spruce | PNW |
| 0101 | whitebark pine | RMRS, PNW |

**Western U.S. Site-Tree Species: PNW = Pacific Northwest FIA, RMRS = Rocky Mountain FIA**

| Code | Common Name | Region |
|---|---|---|
| 0104 | foxtail pine | RMRS |
| 0108 | lodgepole pine | RMRS, PNW |
| 0109 | Coulter pine | PNW |
| 0112 | Apache pine | RMRS |
| 0116 | Jeffrey pine | RMRS, PNW |
| 0117 | sugar pine | RMRS, PNW |
| 0119 | western white pine | RMRS, PNW |
| 0120 | bishop pine | PNW |
| 0122 | ponderosa pine | RMRS, PNW |
| 0135 | Arizona pine | RMRS |
| 0201 | bigcone Douglas-fir | PNW |
| 0202 | Douglas-fir | RMRS, PNW |
| 0211 | redwood | PNW |
| 0231 | Pacific yew | RMRS, PNW |
| 0242 | western redcedar | RMRS, PNW |
| 0263 | western hemlock | RMRS, PNW |
| 0264 | mountain hemlock | RMRS, PNW |
| | **---------- Hardwood Species ----------** | |
| 0312 | bigleaf maple | PNW |
| 0351 | red alder | RMRS, PNW |
| 0375 | paper birch | RMRS, PNW |
| 0462 | hackberry | RMRS |
| 0544 | green ash | RMRS |
| 0741 | balsam poplar | RMRS, PNW |
| 0742 | eastern cottonwood | RMRS |
| 0745 | plains cottonwood | RMRS |
| 0746 | quaking aspen | RMRS, PNW |
| 0747 | black cottonwood | RMRS, PNW |
| 0748 | Fremont poplar/cottonwood | RMRS |
| 0749 | narrowleaf cottonwood | RMRS |
| 0972 | American elm | RMRS |

7.2.3 DIAMETER

Use the same procedures described in Section 5.9.

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

7.2.4 SITE TREE LENGTH

With a clinometer or other approved instrument, measure the total length of the site tree from the ground to the top of the tree. Record to the nearest 1.0 foot. SITE TREE LENGTH must be measured; no estimates are permitted on site trees.

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

7.2.5 TREE AGE AT DIAMETER

Record the tree age as determined by an increment sample. Bore the tree at the point of diameter measurement (DBH) with an increment borer. Count the rings between the outside edge of the core and the pith. Do not add years to get total age.

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

7.2.6 SITE TREE NOTES

Record notes pertaining to an individual site tree.

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

7.2.7 SUBPLOT NUMBER (CORE OPTIONAL)

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

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

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

7.2.8 AZIMUTH (CORE OPTIONAL)

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

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

7.2.9 HORIZONTAL DISTANCE (CORE OPTIONAL)

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

When Collected: All site trees
Field width: 4 digits (xxx.y)
Tolerance: +/- 5 ft
MQO: At least 90% of the time
Values: 0001 to 2000

## 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 trees 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 have a total aerial canopy cover of at least 3 percent on the subplot and within the SPECIES GROWTH HABIT. Most trees 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* (8.5) – canopy cover by layer and total aerial canopy cover of each growth habit – with additional options to collect *Species Composition* (8.6) 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 8.4.2 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-dimentional 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* (8.5). 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* (8.6); 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%).

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 |

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

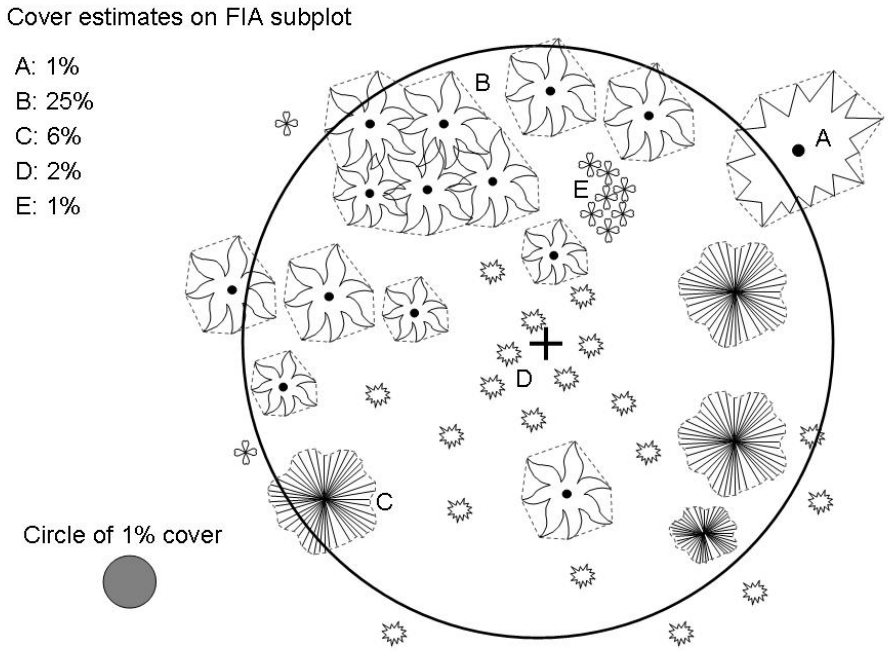


**Figure 45. Assessing canopy cover.**

**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* (8.5) 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 8.5 and 8.6 for more detail.

**Layer Codes –** Structure Growth Habits are assessed by layers in *Vegetation Structure* (8.5), and one of the following layer codes will be assigned to individual plant species' SPECIES GROWTH HABITs in *Species Composition* (8.6). 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 |

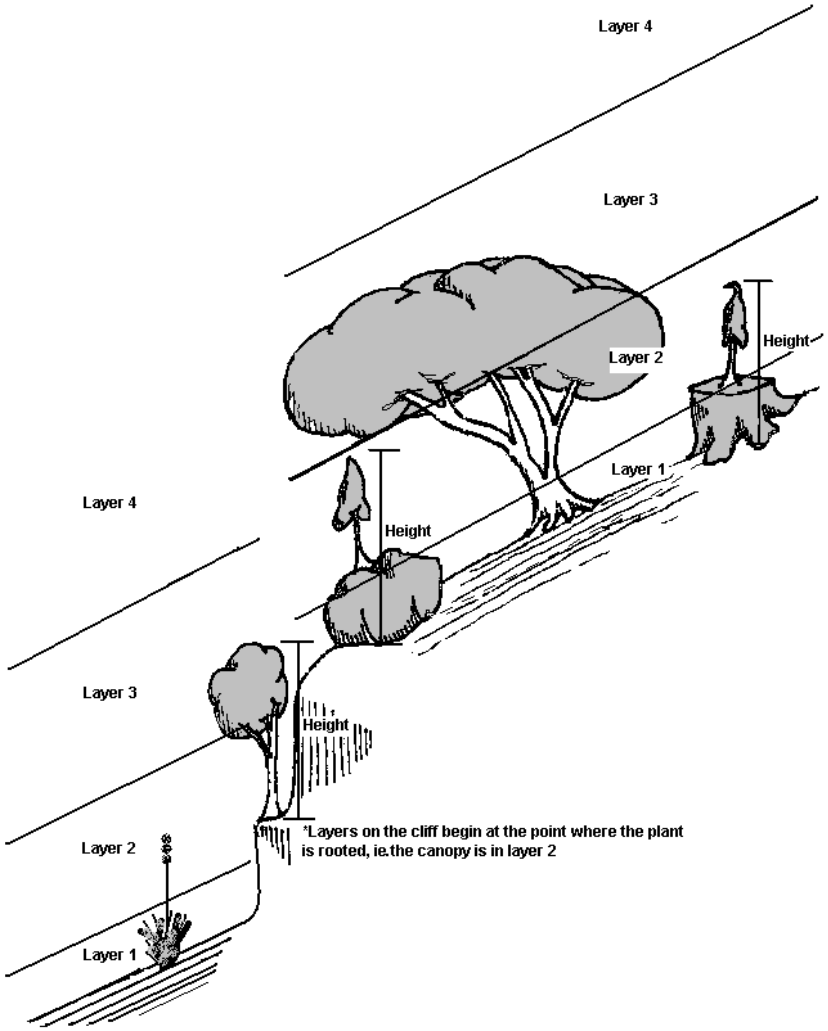


**Figure 46. To determine the layer of a plant, measure the height of the layer from the ground.**

**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.

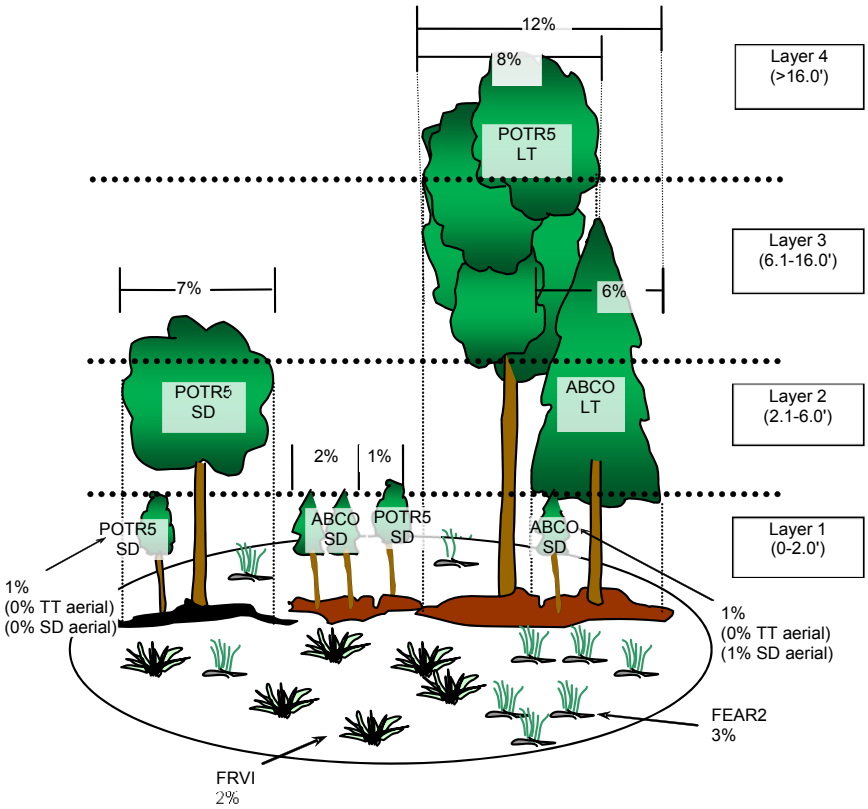


**Figure 47. Example of growth habit by layer and species composition**.

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 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.

### 8.3.1 P2 VEGETATION SAMPLING STATUS

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.

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

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)

### 8.3.2 LEVEL OF DETAIL

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).

When collected: On all plots where P2 Vegetation is being sampled (P2 VEGETATION SAMPLING STATUS = 1 or 2)
Field width: 1 digit
MQO: No errors
Tolerances: At least 99% of the time
Values:

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), 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.

## 8.4 Vegetation Data Collection Location – Subplot-Level Variables

### 8.4.1 SUBPLOT NUMBER

Record the code corresponding to the number of the subplot.

When collected: On all subplots where P2 Vegetation is being sampled (P2 VEGETATION SAMPLING STATUS = 1 or 2)
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

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

### 8.4.2 P2 VEG SUBPLOT SAMPLE STATUS

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.

When collected: On all subplots where P2 Vegetation is being sampled on accessible forest land (P2 VEGETATION SAMPLING STATUS=1) and at least one accessible forest land condition (CONDITION CLASS STATUS = 1) exists within the 24-foot radius subplot, or P2 Vegetation is being sampled on all accessible land conditions (P2 VEGETATION SAMPLING STATUS=2) and at least one accessible forest condition or measurable nonforest condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) exists within the 24-foot radius subplot.
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

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

### 8.4.3 VEGETATION NONSAMPLED REASON

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

When collected: On all subplots where P2 VEG SUBPLOT SAMPLE STATUS = 2
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
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)

8.4.4 CONDITION CLASS NUMBER

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.

When collected: Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS =1)
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values: 1 to 9

8.4.5 VEGETATION SUBPLOT NOTES

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

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

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

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

When collected: VEGETATION NONSAMPLED REASON = 10 or as needed
Field width: 2000 alphanumeric characters
Tolerance: N/A
MQO: N/A
Values: English language words, phrases, and numbers

## 8.5 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).

8.5.1 TALLY TREE SPECIES COVER LAYER 1

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

When Collected: Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)
Field Width: 3 digits
Tolerance: +/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%
MQO: at least 90% of the time
Values: 000-100

8.5.2 TALLY TREE SPECIES COVER LAYER 2

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.

8.5.3 TALLY TREE SPECIES COVER LAYER 3

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.

8.5.4 TALLY TREE SPECIES COVER LAYER 4
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.

8.5.5 TALLY TREE SPECIES COVER – AERIAL VIEW
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.

8.5.6 NON-TALLY TREE SPECIES COVER LAYER 1
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.

When Collected: Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)
Field Width: 3 digits
Tolerance: +/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%
MQO: at least 90% of the time
Values: 000-100

8.5.7 NON-TALLY TREE SPECIES COVER LAYER 2
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.

8.5.8 NON-TALLY TREE SPECIES COVER LAYER 3
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.

8.5.9 NON-TALLY TREE SPECIES COVER LAYER 4
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.

8.5.10 NON-TALLY TREE SPECIES COVER – AERIAL VIEW
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.

8.5.11 SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 1
Record canopy cover for shrubs/subshrubs/woody vines in layer 1 (0-2.0 feet) to the nearest percent.

When collected: Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)
Field width: 3 digits
Tolerance: +/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%
MQO: at least 90% of the time
Values: 000-100

8.5.12 SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 2
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.

8.5.13 SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 3
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.

8.5.14 SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 4
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.

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

8.5.16 FORB COVER LAYER 1
Record canopy cover for forbs in layer 1 (0-2.0 feet) to the nearest percent.

When collected: Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)
Field width: 3 digits
Tolerance: +/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%
MQO: at least 90% of the time
Values: 000-100

8.5.17 FORB COVER LAYER 2
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.

8.5.18 FORB COVER LAYER 3
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.

8.5.19 FORB COVER LAYER 4
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.

8.5.20 FORB COVER—AERIAL VIEW
Record the total aerial canopy cover for the forb growth habit over all layers. Follow the same procedures as for FORB COVER LAYER 1, but include all layers.

8.5.21 GRAMINOID COVER LAYER 1
Record canopy cover for graminoids in layer 1 (0-2.0 feet) to the nearest percent.

When collected: Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)
Field width: 3 digits
Tolerance: +/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%
MQO: at least 90% of the time
Values: 000-100

8.5.22 GRAMINOID COVER LAYER 2
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.

8.5.23 GRAMINOID COVER LAYER 3
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.

8.5.24 GRAMINOID COVER LAYER 4
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.

8.5.25 GRAMINOID COVER—AERIAL VIEW
Record the total aerial canopy cover for the graminoid growth habit over all layers. Follow the same procedures as for GRAMINOID COVER LAYER 1, but include all layers.

## 8.6 Species Composition

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 48 for an example of species total aerial canopy cover estimation. See figure 49 for a *Species Composition* subplot flow.

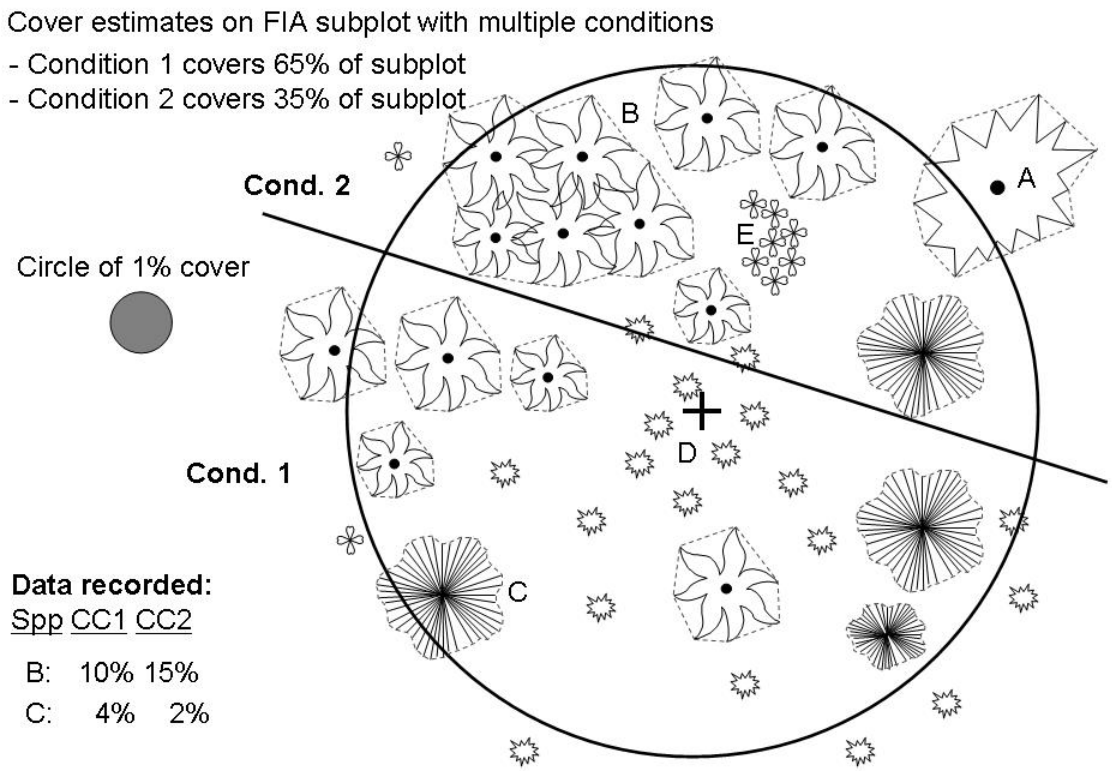


**Figure 48. Example of species total aerial canopy cover estimation on a subplot with 2 accessible conditions. See figure 45 for total aerial canopy cover across the subplot. In figure 45, species A, D, and E would be included in estimates of *Vegetation Structure* by Structure Growth Habit, but not 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%.**

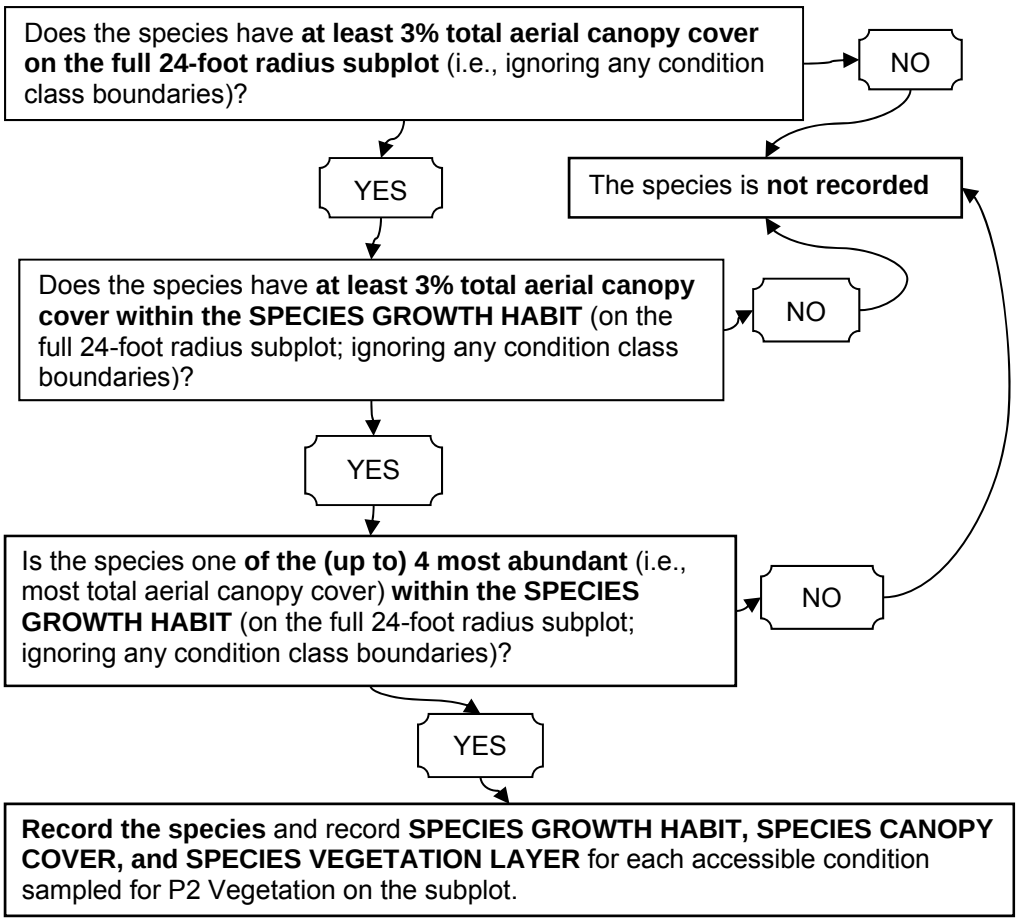


**Figure 49. *Species Composition* subplot flow chart.**

8.6.1 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 when LEVEL OF DETAIL 3).

[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.

For tally and non-tally tree species, both tree SPECIES GROWTH HABITs (SD and LT) are coded for the same species within the subplot-condition if LEVEL OF DETAIL = 3 and the species has a total aerial canopy cover of at least 3% in each SPECIES GROWTH HABIT.

When collected: LEVEL OF DETAIL = 2 or 3, and for each species recorded
Field width: 2 alphanumeric characters
Tolerance: No errors
MQO: At least 95% of the time
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 when LEVEL OF DETAIL = 2 or LEVEL OF DETAIL =3.

**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 when LEVEL OF DETAIL = 2 or LEVEL OF DETAIL =3.

**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 when LEVEL OF DETAIL = 2 or LEVEL OF DETAIL =3.

**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 when LEVEL OF DETAIL = 2 or LEVEL OF DETAIL =3.

**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), including tally and non-tally tree species. Up to four species of large trees (DBH or DRC at least 5 inches) are recorded if individual species aerial canopy cover is at least 3% on the subplot and within the SPECIES GROWTH HABIT when LEVEL OF DETAIL = 3.

8.6.2 SPECIES CODE

Record a code for each most abundant (see section 8.6) vascular plant species. Species codes must be the standardized codes in the Natural Resource Conservation Service (NRCS) PLANTS database (currently January 2010 version). 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 (8.6.6) applies. A

species is “locally sparse” if 5 or fewer plants are present in the entire plot (4 subplots) and immediate surrounding area. A species may be sparse and still meet the criteria for inclusion in species composition, but this will be rare. 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 |

When collected: 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.
Field width: 8 alpha-numeric characters
Tolerance: No errors
MQO: At least 80% of the time
Values: Accepted NRCS species code when the species is known, or an accepted NRCS genus or unknown code when the species is not known

8.6.3 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.

When collected: All species recorded
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: 1-99, assigned in sequential numbers

8.6.4 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. When LEVEL OF DETAIL = 3, a separate estimate is made for the SPECIES CANOPY COVER of trees greater than or equal to 5 inches DBH/DRC.

When collected: 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.
Field width: 3 digits
Tolerance: +/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%
MQO: at least 90% of the time
Values: 001-100

8.6.5 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.

When collected: For each species recorded.
Field width: 1 digits
Tolerance: No errors
MQO: At least 90% of the time
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

8.6.6 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.

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

0 No, a specimen was not collected
1 Yes, a specimen was collected

8.6.7 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.

When collected: SPECIMEN OFFICIALLY COLLECTED = 1
Field width: 5 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: 1 to 99999, as pre-printed and assigned by region or auto-generated in the PDR

8.6.8 P2 SPECIMEN NOT COLLECTED REASON CODE

Record the code that describes why a specimen has not been collected.

When collected: An unknown code or genus code is entered and SPECIMEN OFFICIALLY COLLECTED = 0
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
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)

8.6.9 VEGETATION SPECIES NOTES

Notes may be entered for any species encountered, but are required for each new species that is not identified. Enter text that describes the species. This text may be used in the specimen label and unknown report.

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

## 9.0 INVASIVE PLANTS (CORE OPTIONAL)

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

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

0 Not collecting invasive plant data
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)

9.4 SUBPLOT NUMBER
Record the code corresponding to the number of the subplot.

When collected: On all subplots where INVASIVE PLANT SAMPLING STATUS = 1 or 2
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

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

9.5 INVASIVE PLANT SUBPLOT SAMPLE STATUS (Subplot-level variable)
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.

When collected: On all subplots where invasive species are being sampled on accessible forest land (INVASIVE PLANT SAMPLING STATUS = 1 and at least one accessible forest land condition (CONDITION CLASS STATUS = 1) exists within the 24-foot radius subplot, or invasive species are being sampled on all accessible land conditions (INVASIVE PLANT SAMPLING STATUS = 2) and at least one accessible forest condition or measurable nonforest condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) exists within the 24-foot radius subplot
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time

Values:

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

9.6 INVASIVE PLANT NONSAMPLED REASON (Subplot-level variable)
Record the reason why a subplot cannot be sampled for invasive plants.

When collected: On all subplots where INVASIVE PLANT SUBPLOT SAMPLE STATUS = 3
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
Values:

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

9.7 INVASIVE PLANT DATA NOTES
Use this field to record any notes about the condition on the subplot, particularly any unusual conditions encountered.

When collected: INVASIVE PLANT NONSAMPLED REASON=10 or as needed
Field width: Unlimited alphanumeric character field
Tolerance: N/A
MQO: N/A
Values: English language words, phrases, and numbers

9.8 CONDITION CLASS NUMBER
Record the number for the measured condition class in which the invasive plant(s) is found. If multiple measured conditions occur on the same subplot, data will be collected for each condition separately.

When collected: Any accessible measured land condition within subplots (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when invasive plants are being sampled on the subplot (INVASIVE PLANT SUBPLOT SAMPLE STATUS = 1 or 2)
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values: 1-9

9.9 SPECIES CODE
Record the code for any species listed in your region's invasive plant species list that is found rooted in or overhanging (and rooted out of) the measured condition within the subplot. Species codes must be the standardized codes in the Natural Resource Conservation Service (NRCS) PLANTS database 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 |

When collected: Any accessible measured land condition within subplots (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when invasive plants are being sampled on the subplot (INVASIVE PLANT SUBPLOT SAMPLE STATUS = 1 or 2)
Field width: 8 alpha-numeric characters
Tolerance: No errors
MQO: At least 99% of the time
Values: Accepted NRCS species code from the appropriate list for the unit when the species is known, or a NRCS unknown code when the species is not known.

9.10 UNIQUE SPECIES NUMBER

When any species code is entered for the first time on a plot, the UNIQUE SPECIES NUMBER assigned is "1". If more than one unidentified species is recorded that is described by the same unknown code, the next sequential number is assigned. If a previously-recorded unidentified species is encountered again elsewhere on the plot, the UNIQUE SPECIES NUMBER that corresponds to the earlier encountered specimen must be entered. For example, an unknown thistle and unknown hawkweed would both be given a species code of "2FORB" but would need to be given different UNIQUE SPECIES NUMBERs when measured.

When collected: All species records
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: 1-99, assigned in sequential numbers

9.11 SPECIES CANOPY COVER

A rapid canopy cover estimate, to the nearest percent cover, is made for each species for all foliage across all layer heights. **Canopy cover is based on a vertically-projected polygon described by the outline of the foliage**, ignoring any normal spaces occurring between the leaves of plants (Daubenmire 1959), and ignoring overlap among multiple layers of a species. For each species, cover can never exceed 100 percent. Cover is estimated for each measured condition on the subplot separately. However, the foliage **cover is always estimated as a percent of an entire subplot**. For example, on a subplot with two sampled conditions, a species occurs with a cover equal to a circle with a radius of 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 |

When collected: All species records
Field width: 3 digits
Tolerance: +/- 1 class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%
MQO: At least 90% of the time
Values: 001 to 100

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

When collected: Downloaded on all plots where INVASIVE PLANT SAMPLING STATUS = 1 or 2
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

0 FIA unit does not require specimen collection for invasive plants
1 FIA unit requires specimen collection for invasive plants

9.13 INVASIVE SPECIMEN 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. If the record is an unknown code, your unit requires specimen collection, and a plant specimen is not collected, describe the reason it was not collected in 9.15, INVASIVE PLANT NOTES.

When collected: All species records when INVASIVE PLANT SPECIMEN COLLECTION RULE = 1
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

0 No, a specimen was not officially collected
1 Yes, a specimen was officially collected

9.14 SPECIMEN LABEL NUMBER

Record the label number for the collected specimen. Where plant specimen collection is required, numbered labels are provided to each crew.

When collected: Where INVASIVE SPECIMEN COLLECTED = 1
Field width: 5 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: 1 to 99999, as pre-printed and assigned by FIA unit.

9.15 INVASIVE PLANT NOTES

Notes are **required** for each species record with an unknown code. Enter text that describes the species or that explains why it was not collected if collection was required but not done. This text may be used on the specimen label and any spreadsheet used to track specimens.

When collected: Required for each record with an unknown code and SPECIMEN LABEL NUMBER.
Field width: Unlimited alphanumeric character field
Tolerance: N/A
MQO: N/A
Values: English language words, phrases, and numbers

## 9.16 References

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

## 10. 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

OPTION III. RAPID ASSESSMENT (CUSTOMIZED PROTOCOL)

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.

ADDITIONAL OPTIONAL VARIABLES

Optional CWD Variables (for all OPTIONs): IS THE PIECE HOLLOW?, PIECE INCLINATION, CWD HISTORY, PERCENT OF LOG CHARRED BY FIRE, LARGE END DIAMETER CLASS

Optional Fuels Variable: CONDITION FUELBED TYPE (Scott and Burgan 2005; RMRS-GTR-153)

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.

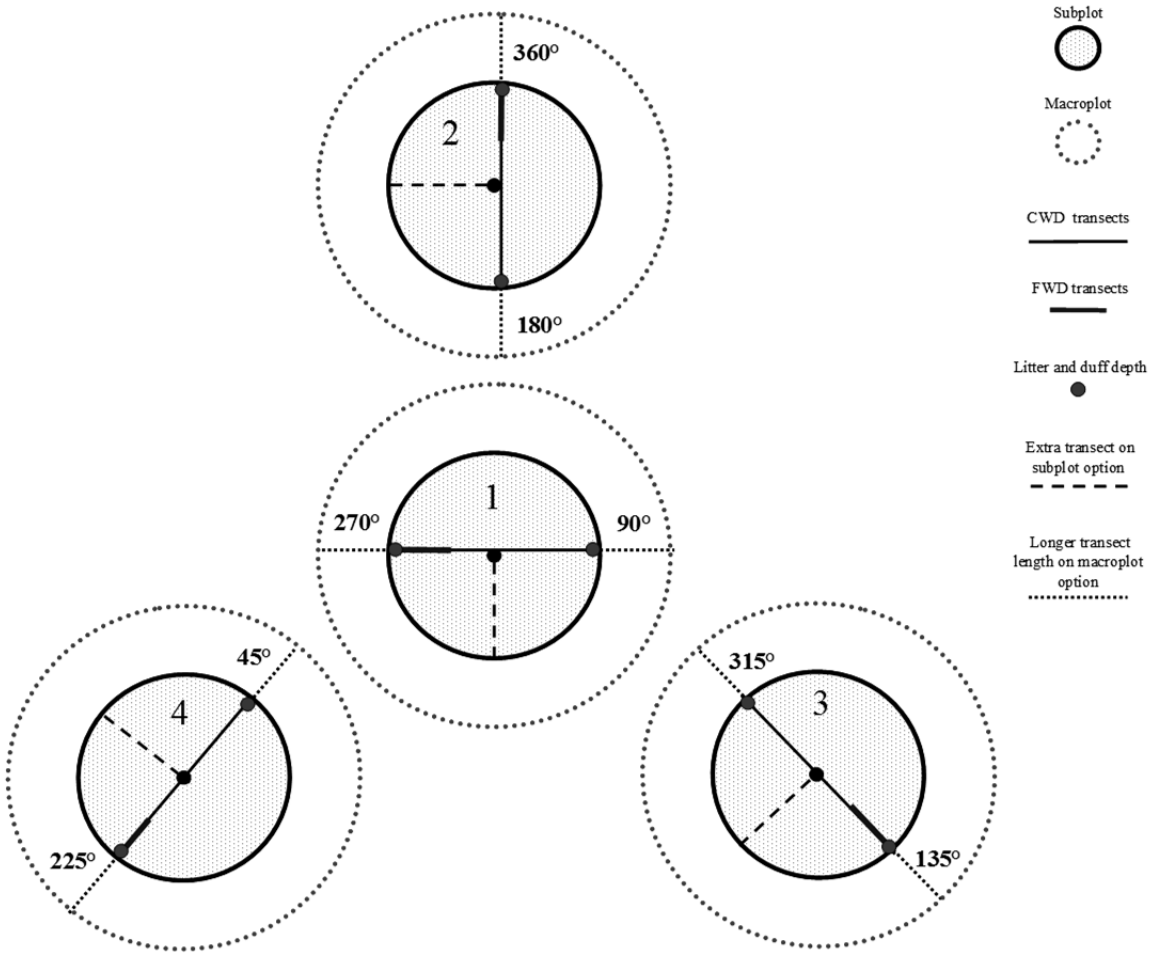


Figure 50. Plot layout for sampling CWD, FWD, and litter and duff depth. CWD transects include two 24-foot transects per subplot (starting at subplot center designated by its azimuth as labeled), optional extension onto condition mapped macroplots, and optional third transect for CWD.

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 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.

10.3.1 DWM SAMPLING STATUS (BASE)

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.

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

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

10.3.2 DWM NUMBER OF SUBPLOTS (BASE)

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.

When collected: All plots where DWM SAMPLING STATUS >0
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values: 1 to 4

10.3.3 DWM NUMBER OF TRANSECTS ON SUBPLOT (BASE)

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.

When collected: All plots where DWM SAMPLING STATUS >0
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values: 1 to 3

10.3.4 DWM TRANSECT LENGTH (BASE)

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).

When collected: All plots where DWM SAMPLING STATUS>0
Field width: 3 digits (xx.y)
Tolerance: +/- 1 ft
MQO: At least 95% of the time
Values: 24.0 to 58.9 feet

10.3.5 DWM NOTES (BASE)

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

When collected: All plots where DWM SAMPLING STATUS >0, as needed
Field width: Unlimited alphanumeric character field
Tolerance: N/A
MQO: N/A
Values: English language words, phrases and numbers

10.4 Optional Fuels Variables for DWM Protocol

10.4.1 CONDITION FUELBED TYPE (OPTIONAL)

Record the fuelbed code from the Scott and Burgan (2005; RMRS-GTR-153) fuel model guide that best corresponds with the combined fire behavior characteristics of live and dead materials on and near the ground surface. The visual appearance of the condition on the plot is not as important as the amount and packing density of live and dead fuels of different sizes. Refer to fuelbed descriptions, keys, and photos in Scott and Burgan (2005) to select the fuel model which best matches conditions on the condition class. This is a CORE-OPTIONAL field.

When collected: All conditions where DWM SAMPLING STATUS >0
Field width: 3 alpha-numeric characters
Tolerance: +/- 1 class within a type
MQO: At least 80% of the time
Values:

| | |
|---|---|
| GR1 | Short, Sparse Dry Climate Grass |
| GR2 | Low Load, Dry Climate Grass |
| GR3 | Low Load, Very Coarse, Humid Climate Grass |
| GR4 | Moderate Load, Dry Climate Grass |
| GR5 | Low Load, Humid Climate Grass |
| GR6 | Moderate Load, Humid Climate Grass |
| GR7 | High Load, Dry Climate Grass |
| GR8 | High Load, Very Coarse, Humid Climate Grass |
| GR9 | Very High Load, Humid Climate Grass |
| GS1 | Low Load, Dry Climate Grass-Shrub |
| GS2 | Moderate Load, Dry Climate Grass-Shrub |
| GS3 | Moderate Load, Humid Climate Grass-Shrub |
| GS4 | High Load, Humid Climate Grass-Shrub |
| SB1 | Slash-Blowdown: Low Load Activity Fuel |
| SB2 | Moderate Load Activity Fuel or Low Load Blowdown |
| SB3 | High Load Activity Fuel or Moderate Load Blowdown |
| SB4 | High Load Blowdown |
| SH1 | Low Load Dry Climate Shrub |
| SH2 | Moderate Load Dry Climate Shrub |
| SH3 | Moderate Load, Humid Climate Shrub |
| SH4 | Low Load, Humid Climate Timber-Shrub |
| SH5 | High Load, Dry Climate Shrub |
| SH6 | Low Load, Humid Climate Shrub |
| SH7 | Very High Load, Dry Climate Shrub |
| SH8 | High Load, Humid Climate Shrub |
| SH9 | Very High Load, Humid Climate Shrub |
| TL1 | Low Load Compact Conifer Litter |
| TL2 | Low Load Broadleaf Litter |
| TL3 | Moderate Load Conifer Litter |
| TL4 | Small downed logs |
| TL5 | High Load Conifer Litter |
| TL6 | Moderate Load Broadleaf Litter |
| TL7 | Large Downed Logs |
| TL8 | Long-Needle Litter |
| TL9 | Very High Load Broadleaf Litter |
| TU1 | Low Load Dry Climate Timber-Grass-Shrub |
| TU2 | Moderate Load, Humid Climate Timber-Shrub |
| TU3 | Moderate Load, Humid Climate Timber-Grass-Shrub |
| TU4 | Dwarf Conifer With Understory |
| TU5 | Very High Load, Dry Climate Timber-Shrub |
| NB1 | Nonburnable Urban/developed |
| NB2 | Nonburnable Snow/ice |
| NB3 | Nonburnable Agricultural |
| NB8 | Nonburnable Open water |
| NB9 | Nonburnable Bare ground |

## 10.5 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.

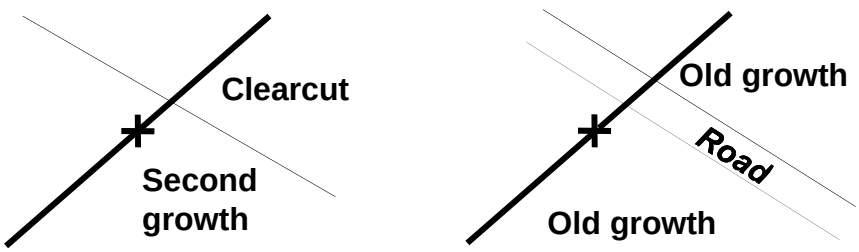

Figure 51. Transects are installed across condition class boundaries.

10.5.1 SUBPLOT NUMBER (BASE)
Record the code indicating the subplot center from which the transect originates.

When collected: All transect segments on plots where DWM SAMPLING STATUS >0
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

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

10.5.2 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.

When Collected: All transect segments where DWM SAMPLING STATUS > 0
Field width: 3 digits
Tolerance: No errors
MQO: At least 99% of the time
Values:

| Subplot | Transect direction (degrees) from center of subplot |
|---|---|
| 1 | 090 |
| | 270 |
| | 180 (Extra optional transect) |
| 2 | 360 |
| | 180 |
| | 270 (Extra optional transect) |
| 3 | 135 |
| | 315 |
| | 225 (Extra optional transect) |
| 4 | 045 |
| | 225 |
| | 315 (Extra optional transect) |

10.5.3 SEGMENT CONDITION CLASS NUMBER (BASE)
Record the code indicating the number of the condition class for the transect segment. Use the same code assigned to the condition class on the subplot or elsewhere on the plot. The first segment recorded for each transect will have the same CONDITION CLASS NUMBER as assigned to the subplot center.

When collected: All transect segments where DWM SAMPLING STATUS >0
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values: 1 to 9

10.5.4 SEGMENT BEGINNING DISTANCE (BASE)
Record the location (using horizontal distance to nearest 0.1 foot) on the transect line where the transect intersects the boundary with the adjacent condition class nearer to the subplot center. The first record for each transect will have a BEGINNING DISTANCE of 0 ft. Each subsequent record will have a BEGINNING DISTANCE equal to the ENDING DISTANCE of the previous record.

When collected: All transect segments where DWM SAMPLING STATUS >0
Field width: 3 digits (xx.y)
Tolerance: +/- 1 ft
MQO: At least 95% of the time
Values: 00.0 to 58.9 horizontal feet

10.5.5 SEGMENT ENDING DISTANCE (BASE)
Record the location (using horizontal distance to nearest 0.1 foot) on the transect line where the transect exits the condition class being delineated and intersects the boundary with a different condition class further away from the subplot center. If no other condition classes are encountered, record the location (using horizontal distance) of the end of the transect line.

When collected: All transect segments where DWM SAMPLING STATUS >0
Field width: 3 digits (xx.y)
Tolerance: +/- 1 ft
MQO: At least 95% of the time
Values: 00.1 to 58.9 horizontal feet

10.5.6 DWM TRANSECT SEGMENT SAMPLE STATUS (BASE)
Record the sample status for the transect segment. If any part of the segment is in an accessible condition that would be measured (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2), but the CWD is not measurable due to an obstruction such

as snow or water, do not measure DWM on any part of the transect segment, and set code to 0 for that segment. In all other situations, set the code to 1. For conditions on which DWM would not be measured regardless (CONDITION CLASS STATUS = 3 or NONFOREST CONDITION CLASS STATUS = 2), will automatically be coded 1; those conditions should be identified in the transect segmenting.

When Collected: All transect segments on plots where DWM SAMPLING STATUS >0
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

0 Transect segment not sampled
1 Transect segment sampled

10.5.7 DWM TRANSECT SEGMENT NONSAMPLED REASON (BASE)
Record the reason that DWM cannot be measured on the transect.

When Collected: All transects where DWM TRANSECT SEGMENT SAMPLE STATUS = 0
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
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 Sampling Methods for COARSE WOODY DEBRIS (CWD)

### 10.6.1 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.

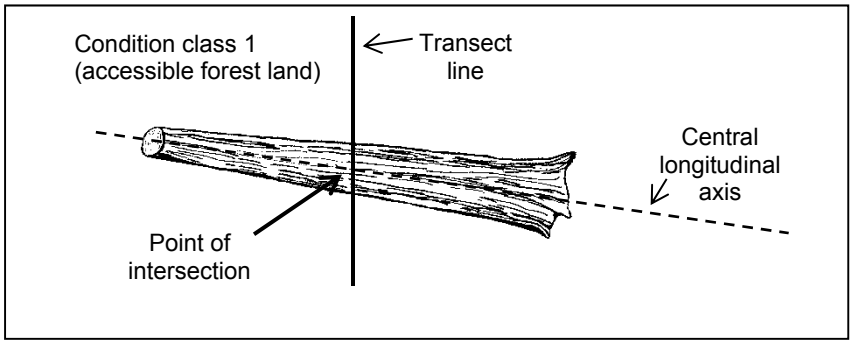


Figure 52. Tally rules for CWD.

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. Decay class of the piece determines whether or not the piece is tallied (see section 10.6.3.6).

   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.

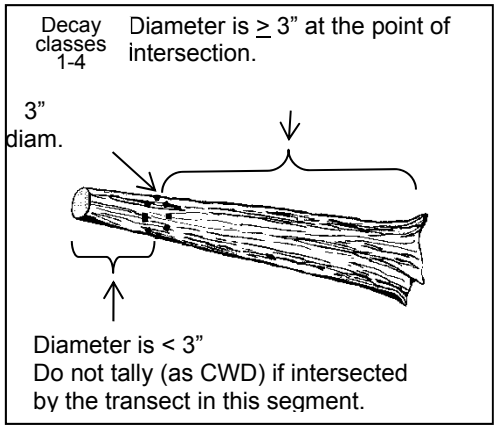

Figure 53. Tally rules for CWD decay classes 1-4.

5. Tally pieces created by natural causes (examples: natural breakage or uprooting) or by human activities such as cutting. In some cases it may be impossible to measure or estimate individual pieces—for example when CWD pieces are in machine-piled slash piles or windrows, or are part of 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.

6. Tally a piece only if the point of intersection occurs above the ground. If one end of a piece is buried in the litter, duff, or mineral soil, the piece ends at the point where it is no longer visible. Measure the diameter and length at this point.

7. If the central longitudinal axis of a piece is intersected more than once on a transect line or if it is intersected by two transect lines, tally the piece each time it is intersected (uncommon situation, see fig. 54).

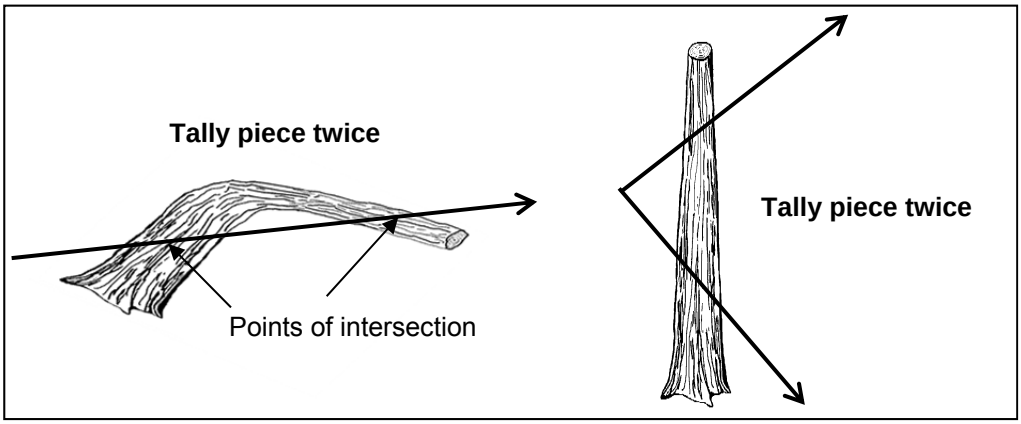

Figure 54. CWD tally rules: intersections.

8. Tally a piece only once if the subplot center falls directly on the central longitudinal axis of the piece. Tally the piece on the smallest azimuth degree transect.

9. If a piece is fractured across its diameter or length, and would pull apart at the fracture if pulled from either end or sides, treat it as two separate pieces. If judged that it would not pull apart, tally as one piece. Tally only the piece intersected by the transect line.

10. Do not tally a piece if it intersects the transect on the root side of the root collar. Do not tally roots.

11. When the transect crosses a forked down tree bole or large branch connected to a down tree, tally each qualifying piece separately. To be tallied, each individual piece must meet the minimum diameter requirements.

12. In the case of forked trees, consider the "main bole" to be the piece with the largest diameter at the fork. Variables for this fork such as TOTAL LENGTH and DECAY CLASS should pertain to the entire main bole. For smaller forks or branches connected to a main bole (even if the main bole is not a tally piece), variables pertain only to that portion of the piece up to the point where it attaches to the main bole (see figure 55).

13. If a transect intersects a non-measured condition (e.g., a road when NONFOREST CONDITION CLASS STATUS = 5, or an inaccessible condition class, or a non-sampled code for CWD), CWD is not tallied.

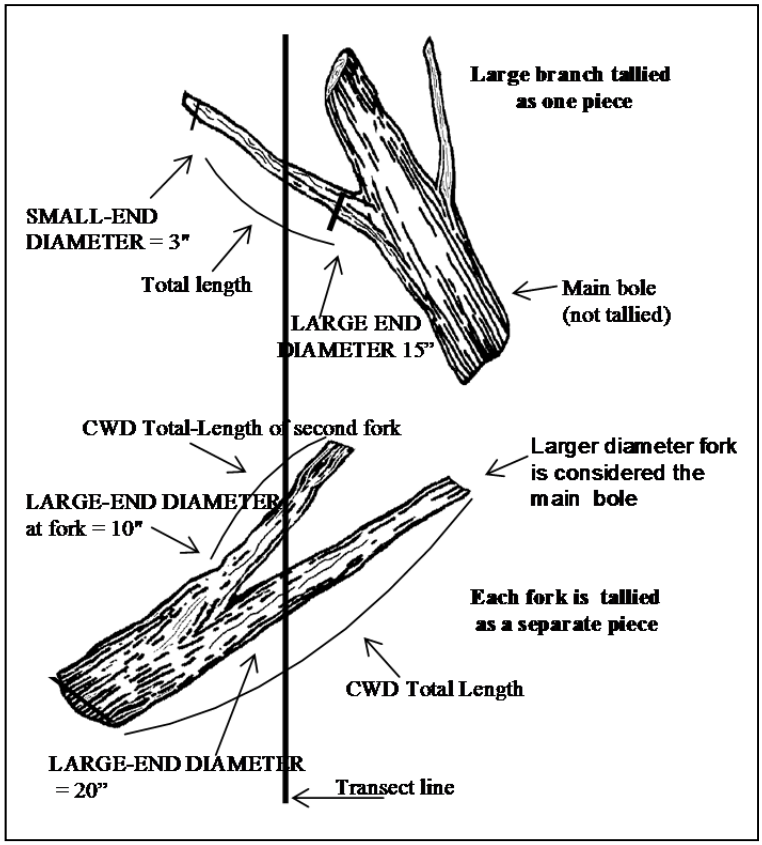


Figure 55. CWD tally rules for forked trees.

10.6.2 Marking CWD (OPTIONAL)

Marking CWD is highly recommended if allowed by the landowner—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.

10.6.3 Recording Procedures for CWD

10.6.3.1 SUBPLOT NUMBER (BASE)
Record the code indicating the number of the subplot center from which the transect originates.

When collected: All tally pieces in CONDITION CLASS STATUS = 1 OR NONFOREST CONDITION CLASS STATUS = 2 where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

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

10.6.3.2 TRANSECT (BASE)
Record the azimuth of the transect on which the CWD piece is sampled.

When Collected: All tally pieces where DWM TRANSECT SAMPLE STATUS = 1
Field width: 3 digits
Tolerance: No errors
MQO: At least 99% of the time
Values:

| Subplot | Transect direction (degrees) from center of subplot |
|---|---|
| **1** | 090 |
| | 270 |
| | 180 (Extra optional transect) |
| **2** | 360 |
| | 180 |
| | 270 (Extra optional transect) |
| **3** | 135 |
| | 315 |
| | 225 (Extra optional transect) |
| **4** | 045 |
| | 225 |
| | 315 (Extra optional transect) |

10.6.3.3 CWD CONDITION CLASS (BASE)
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.

When Collected: All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST C0NDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 1 digit

Tolerance: No errors
MQO: At least 90% of the time
Values: 1 to 9

10.6.3.4 PIECE ON SUBPLOT OR ANNULAR PLOT? (BASE)
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.

When Collected: All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST C0NDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 1 digit
Tolerance: No errors
MQO: At least 90% of the time
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)

10.6.3.5 CWD HORIZONTAL DISTANCE (WILDLIFE OPTION)
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.

When Collected: 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
Field width: 3 digits (xx.y)
Tolerance: +/- 1.0 ft
MQO: At least 90% of the time
Values: 00.0 to 58.9

10.6.3.6 CWD DECAY CLASS (BASE)
Record a 1-digit code indicating the decay class of the piece. Code the decay class that predominates along the observed length of the piece. Use the guide below to determine CWD DECAY CLASS.

When Collected: All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2 where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 1 digit
Tolerance: +/- 1 class
MQO: At least 90% of the time
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).

10.6.3.7 SPECIES (BASE)

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).

When Collected: All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2 where DWM TRANSECT SEGMENT SAMPLE STATUS = 1 and CWD DECAY CLASS = 1 to 4
Field width: 4 digits
Tolerance: No errors
MQO: At least 80% of the time
Values: See species codes in appendix 3

10.6.3.8 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.

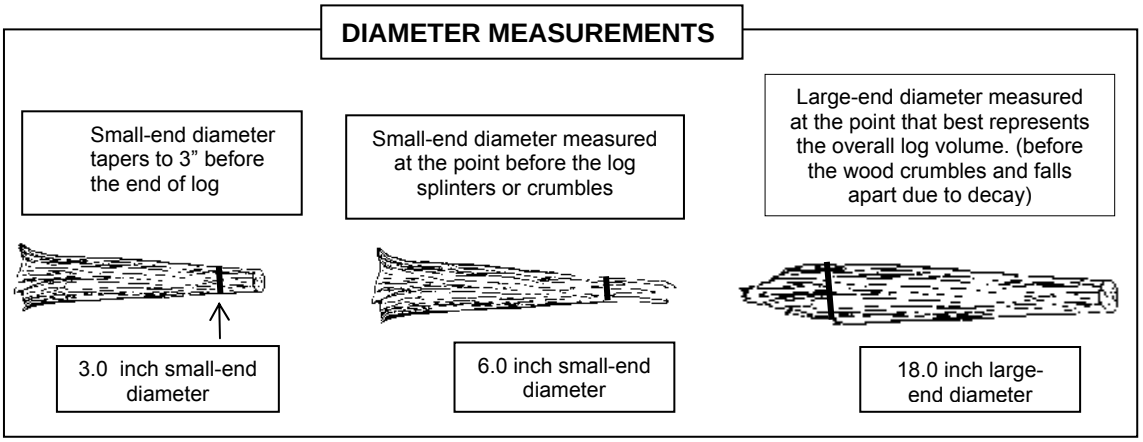


Figure 56. Diameter measurements

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.

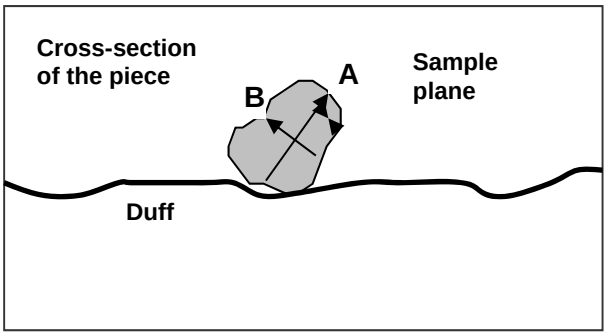


Figure 57. Estimating the diameter of pieces that are not round in cross-section.

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.

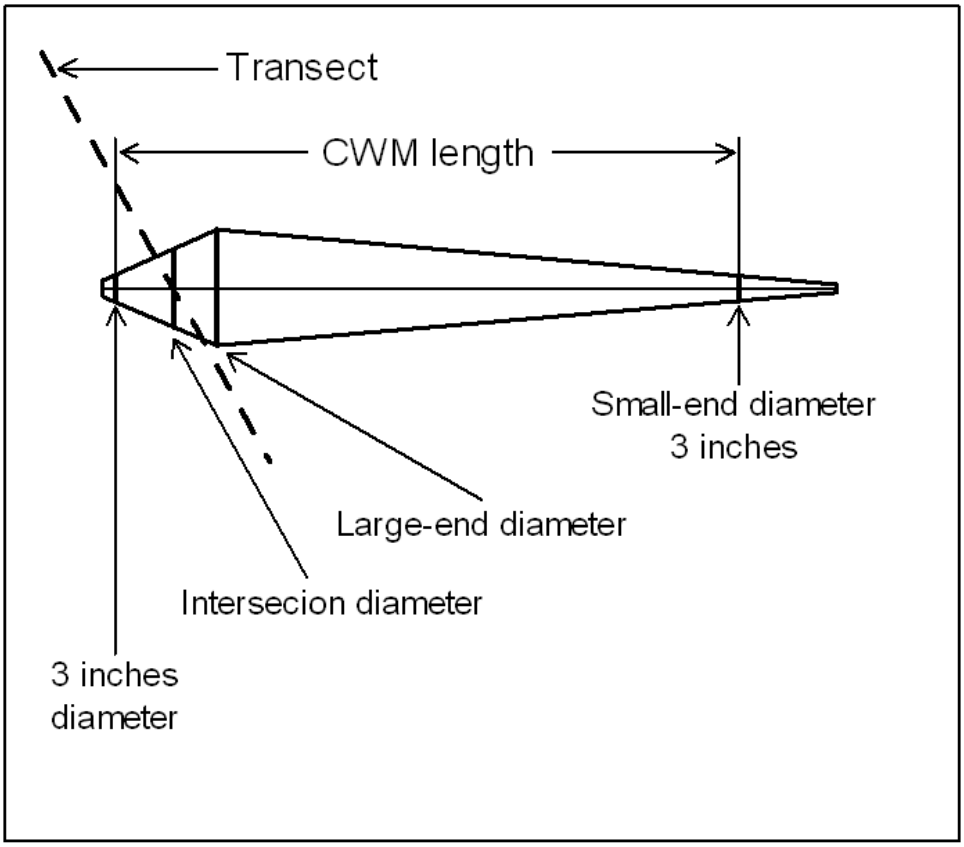


Figure 58. Example of decayed end intersecting the transect

10.6.3.8.1 DIAMETER AT POINT OF INTERSECTION (BASE)

Record the piece's diameter at the point where the transect intersects the longitudinal center of the piece. Record the diameter to the nearest inch. If the diameter is close to 3 inches,

measure the diameter to the nearest 0.1 inch to determine if the piece is actually ≥3.0 inches and a valid tally piece.

When Collected: All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 3 digits
Tolerance: Pieces <20.0 inches diameter: +/- 1 inch for decay class 1-4, +/- 2 inches for decay class 5
Pieces >20.0 inches diameter (decay classes 1-4): +/- 2 inches for each 20-inch increment >20.0 inches
Pieces >20.0 inches diameter (decay class 5): +/- 3 inches for each 20-inch increment above 20.0 inches
MQO: At least 90% of the time
Values: 003 to 200 inches

10.6.3.8.2 DIAMETER OF HOLLOW AT POINT OF INTERSECTION (BASE)
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 10.6.3.10, there is no hollow size requirement for this variable.

When Collected: All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1 and CWD DECAY CLASS = 1 to 4
Field width: 3 digits
Tolerance: Pieces <20.0 inches diameter: +/- 1 inch
Pieces >20.0 inches diameter: +/- 2 inches for each 20-inch increment above 20.0 inches
MQO: At least 80% of the time
Values: 000, 001 to 200 inches

10.6.3.8.3 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 10.6.3.8 (see figure 56).

When Collected: 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
Field width: 3 digits

Tolerance Pieces <20.0 inches diameter: +/- 1 inch
Pieces >20.0 inches diameter: +/- 2 inches for each 20-inch increment above 20.0 inches
MQO: At least 90% of the time
Values: 003 to 200 inches

10.6.3.8.4 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 10.6.3.8.

When Collected: 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
Field width: 3 digits
Tolerance: Pieces <20.0 inches diameter: +/- 1 inch
Pieces >20.0 inches diameter: +/- 2 inches for each 20-inch increment above 20.0 inches
MQO: At least 90% of the time
Values: 003 to 250 inches

10.6.3.9 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.

10.6.3.9.1 CWD LENGTH >= 3 FEET (BASE)
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.

When Collected: All tally pieces >0.5 foot long, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 1 digit
Tolerance: No errors
MQO: At least 90% of the time
Values: 1 to 2

1 CWD TOTAL LENGTH ≥3 feet
2 CWD TOTAL LENGTH ≥0.5 foot and < 3 feet

10.6.3.9.2 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.

When Collected: 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

Field width: 3 digits
Tolerance: +/- 20%
MQO: At least 90% of the time
Values: 003 to 250 feet

10.6.3.10 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.

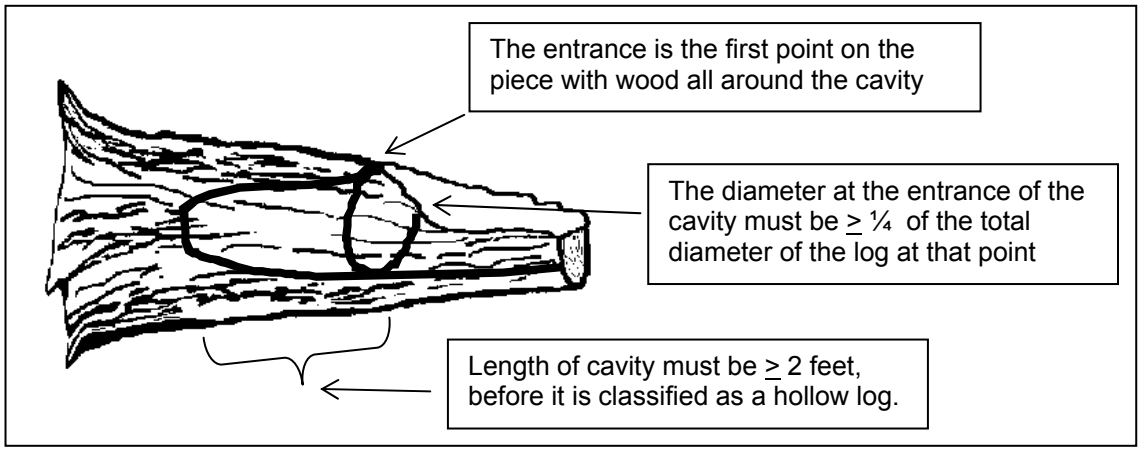


Figure 59. Determining if the piece is hollow.

When Collected: All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1 and CWD DECAY CLASS = 1 to 4 and CWD LENGTH <= 3 FEET = 1

Field width: 1 digit
Tolerance: No errors
MQO: At least 90% of the time
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 10.6.3.8.2 DIAMETER OF HOLLOW AT POINT OF INTERSECTION.

10.6.3.11 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.

When Collected: All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 2 digits
Tolerance: +/- 5 degrees
MQO:At least 90% of the time
Values: 00 to 90 degrees

10.6.3.12 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”.

When Collected: All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1 and CWD DECAY CLASS = 1 to 4
Field width: 1 digit
Tolerance: No errors

MQO: At least 90% of the time
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

10.6.3.13 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.

When Collected: All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1, DIAMETER AT POINT OF INTERSECTION >20, and CWD DECAY CLASS = 1 to 3
Field width: 1 digit
Tolerance: +/- 1 class
MQO: At least 90% of the time
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

10.6.3.14 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).

When Collected: All tally pieces where DWM TRANSECT SEGMENT SAMPLE STATUS = 1 and CWD DECAY CLASS = 1 to 4
Field width: 1 digit
Tolerance: No errors
MQO: At least 90% of the time
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

## 10.7 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.

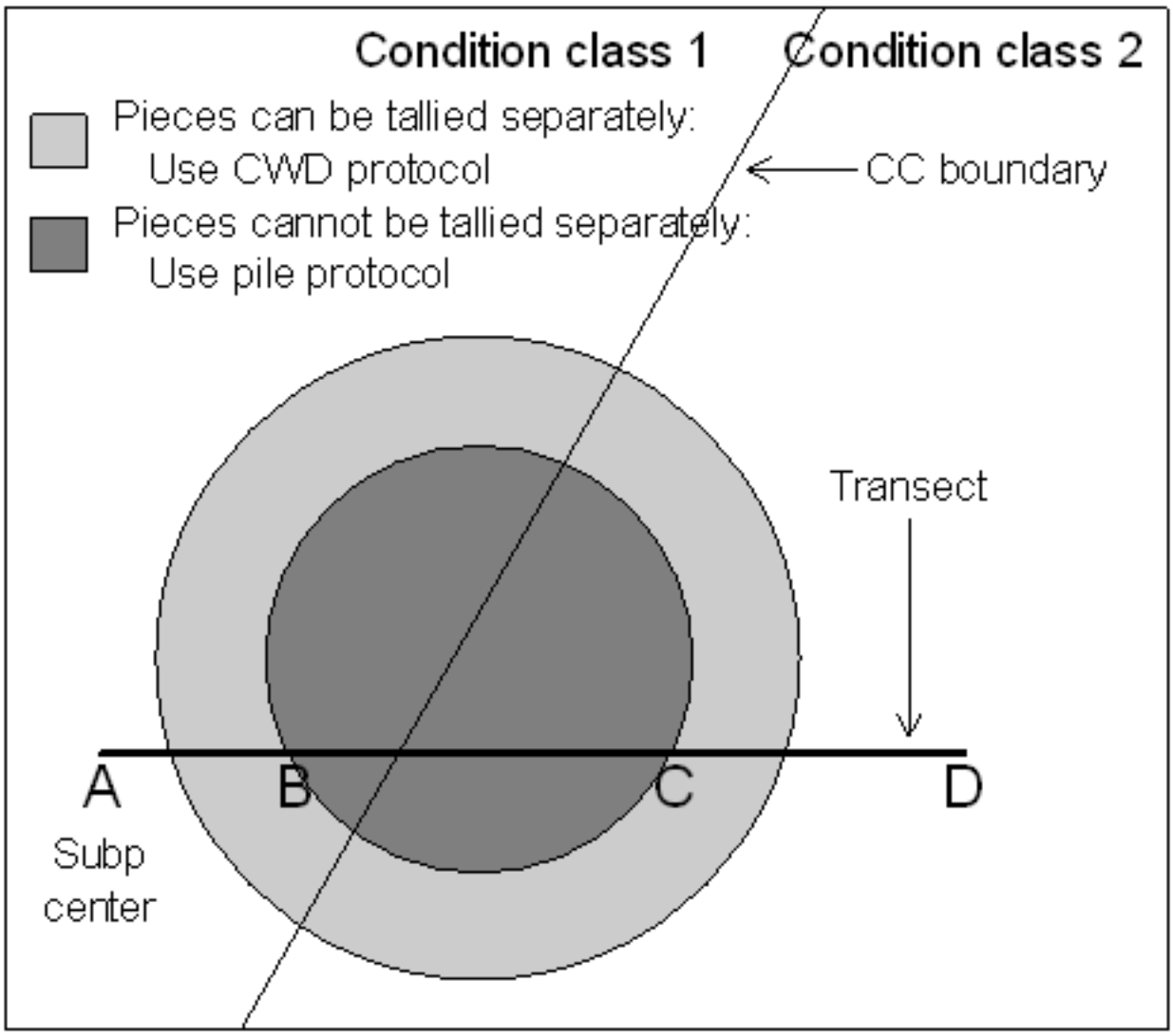


Figure 60. Example for measuring a pile. Pieces can be identified and tallied separately between points A-B and C-D, so the CWD protocols are used, even though part of the transect may be within the pile. Between points B and C, pieces cannot be tallied separately and the pile protocol is used. Enter 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.

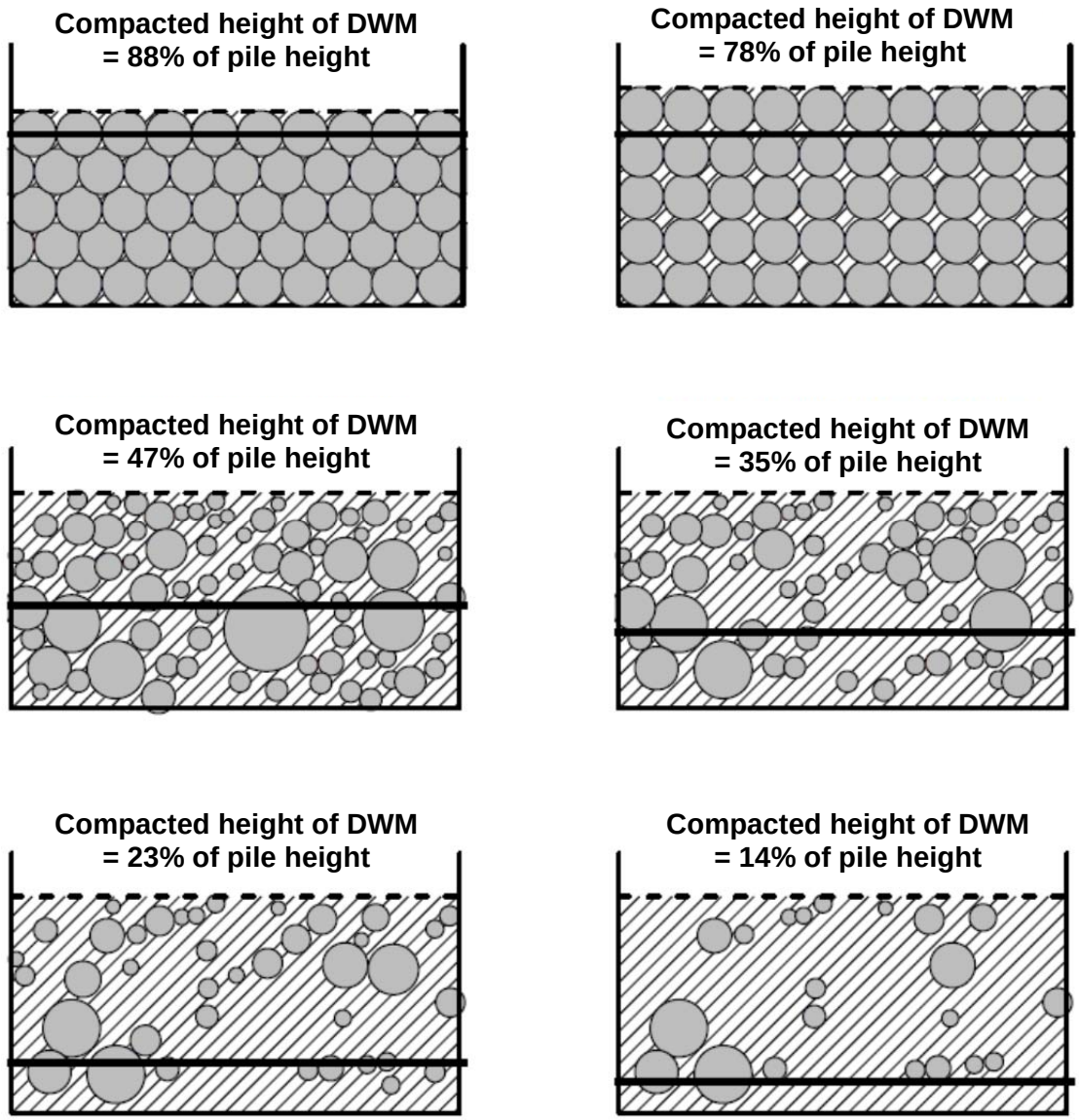


Figure 61. Calculating compacted height of CWD. The dashed line represents the height of the pile, the solid, thick line the compacted height of wood. Grey circles are cross sections of woody pieces greater than 3 inches of diameter and the fill represents debris, air and smaller pieces of wood.

10.7.1 PILE SUBPLOT NUMBER (BASE)

Record the code indicating the number of the subplot center from which the transect originates.

When collected: All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1

Field width: 1 digit

Tolerance: No errors

MQO: At least 99% of the time

Values:

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

10.7.2 PILE TRANSECT (BASE)

Record the azimuth of the transect on which the pile is sampled.

When Collected: All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 3 digits
Tolerance: No errors
MQO: At least 99% of the time
Values:

| Subplot | Transect direction (degrees) from center of subplot |
|---|---|
| 1 | 090 |
| | 270 |
| | 180 (Extra optional transect) |
| 2 | 360 |
| | 180 |
| | 270 (Extra optional transect) |
| 3 | 135 |
| | 315 |
| | 225 (Extra optional transect) |
| 4 | 045 |
| | 225 |
| | 315 (Extra optional transect) |

10.7.3 PILE CONDITION CLASS NUMBER (BASE)

Record the code indicating the number of the condition class. If the pile straddles two condition classes, assign it to the one closest to subplot center along the transect.

When collected: All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field Width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values: 1 to 9

10.7.4 PILE BEGINNING DISTANCE (BASE)

Record the horizontal length of the transect to the beginning of the pile (to the nearest 0.1 foot), defined as the point when pieces cannot be tallied individually. If the pile occupies subplot center, record 00.0 for the beginning distance.

When collected: All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 3 digits
Tolerance: +/- 10%
MQO: At least 90% of the time
Values: 00.0 to 58.8 feet

10.7.5 PILE ENDING DISTANCE (BASE)

Record the horizontal length of the transect to the end of the pile, defined as the point when pieces can be tallied individually again. If the transect ends within the pile, record DWM TRANSECT LENGTH.

When collected: All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 3 digits (xx.y)
Tolerance: +/- 10%
MQO: At least 90% of the time
Values: 00.1 to 58.9 feet

10.7.6 COMPACTED HEIGHT OF CWD IN PILE (BASE)

Record average height of wood pieces greater than 3 inches in diameter at the intersection of the transect with the pile. Record value to the nearest foot. Visually compact the pile to estimate the height of wood, excluding air, debris and pieces of wood less than 3 inches in diameter at the point of intersection with the transect. If the transect starts or ends within a pile, only consider the portion of cross-section of the pile above the measured transect.

When collected: All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 2 digits
Tolerance: +/- 10%
MQO: At least 90% of the time
Values: 1 to 99 feet

10.7.7 PILE DECAY CLASS (BASE)

Record a 1-digit code indicating the predominant decay class in the pile. Use the guide below to determine CWD DECAY CLASS.

When Collected: All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 1 digit
Tolerance: +/- 1 decay class
MQO: At least 90% of the time
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 |

| Decay Class | Structural Integrity | Texture of Rotten Portions | Color of Wood | Invading Roots | Branches and Twigs |
|---|---|---|---|---|---|
| **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 |

10.7.8 PILE SPECIES (BASE)

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.

When Collected: All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1 and PILE DECAY CLASS = 1 to 4
Field width: 4 digits
Tolerance: No errors
MQO: At least 90% of the time
Values: See species codes in appendix 3

10.8 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 (NONFOREST 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 SEGMENT SAMPLE 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 10.5.7 ). 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.

10.8.1 FWD SUBPLOT NUMBER (BASE)

Record the code indicating the subplot center from which the transect originates.

When collected: All FWD transect segments where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

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

10.8.2 FWD TRANSECT (BASE)

Record the azimuth (degrees) of the transect on which FWD is sampled.

When collected: All FWD transect segments where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 3 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: degrees

| Subplot | Transect direction (degrees) from center of subplot |
|---|---|
| 1 | 270 |
| 2 | 360 |
| 3 | 135 |
| 4 | 225 |

10.8.3 FWD CONDITION CLASS NUMBER (BASE)

Record the code indicating the number of the condition class at the start of the transect (14.0 feet horizontal distance from subplot center).

When collected: All FWD transect segments where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values: 1 to 9

10.8.4 FWD TRANSECT SEGMENT SAMPLE STATUS (BASE)
Record the sample status for FWD on the transect. There may be situations where the CWD is measurable, but the FWD is hidden from view by snow or water and not measurable. If any part of the FWD transect segment is on a measured condition but the FWD is not measurable, do not count any FWD and set the STATUS code to 0 and the FWD TRANSECT NONSAMPLED REASON code to 10.

In all other situations, set the code to 1. Conditions on which FWD would not be measured regardless (CONDITION CLASS STATUS = 3 or CONDITION CLASS STATUS = 2 AND NONFOREST CONDITION CLASS STATUS = 5) should always be coded 1.

When collected: All FWD transect segments where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

0 FWD transect segment not sampled
1 FWD transect segment sampled

10.8.5 FWD TRANSECT SEGMENT NONSAMPLED REASON (BASE)
Record the reason that FWD cannot be measured on the transect.

When Collected: All FWD transect segments where FWD TRANSECT SEGMENT SAMPLE STATUS = 0
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
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.

10.8.6 SMALL FWD COUNT (BASE)
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 10.8, #8).

When collected: All FWD transect segments in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2 where FWD TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 3 digits
Tolerance: 0 to 50 = +/- 20% of the total count for the transect
51 to 100 = +/- 25% of the total count for the transect
100 + = +/- 50% of the total count for the transect

MQO: At least 90% of the time
Values: 000 to 999 pieces

10.8.7 MEDIUM FWD COUNT (BASE)
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 10.8, # 8).

When collected: All FWD transect segments in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2 where FWD TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 3 digits
Tolerance: +/- 20% of the total count for the transect
MQO: At least 90% of the time
Values: 000 to 999 pieces

10.8.8 LARGE FWD COUNT (BASE)
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 10.8, # 8).

When collected: All FWD transect segments in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2 where FWD TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 3 digits
Tolerance: +/- 20% of the total count for the transect
MQO: At least 90% of the time
Values: 000 to 500 pieces

10.8.9 HIGH COUNT REASON (BASE)
Enter a code that applies to the situation encountered on the transect. Enter a code if any of the counts on the transect are greater than 100 pieces.

When collected: All FWD transect segments in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2 where FWD TRANSECT SEGMENT SAMPLE STATUS = 1 and SMALL FWD COUNT ≥ 100 or MEDIUM FWD COUNT ≥100 or LARGE FWD COUNT ≥100
Field width: 1 digit
Tolerance: No errors
MQO: At least 90% of the time
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

## 10.9 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.

10.9.1 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.

10.9.2 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.

### 10.9.3 DUFF/LITTER SUBPLOT NUMBER (BASE)

Record the code indicating the number of the subplot center from which the transect originates.

When collected: All duff/litter transects where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

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

### 10.9.4 DUFF/LITTER TRANSECT (BASE)

Record the azimuth (degrees) of the transect on which duff/litter is sampled.

When collected: All duff/litter transects where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 3 digits
Tolerance: No errors
MQO: At least 99% of the time
Values:

| Subplot | Transect direction (degrees) from center of subplot |
|---|---|
| 1 | 090 |
| | 270 |
| 2 | 360 |
| | 180 |
| 3 | 135 |
| | 315 |
| 4 | 045 |
| | 225 |

10.9.5 DUFF/LITTER CONDITION CLASS NUMBER (BASE)
Record the code indicating the number of the condition class at the sample point (24.0 feet horizontal distance from subplot center)

When Collected: All duff/litter transects where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values: 1 to 9

10.9.6 DUFF/LITTER SAMPLE STATUS (BASE)
Record the sample status for duff and litter depth on the transect. There may be situations where the CWD is measurable (e.g., shallow depth of snow or water), but the duff and litter are not measurable. If the measurement point is on a measured condition but the duff/litter is not measurable, do not measure duff/litter and set code to 0 with the DUFF/LITTER NONSAMPLED REASON code set to 10.

In all other situations (including where duff and litter depth = 0), set the code to 1. For example, conditions on which duff/litter would not be measured regardless (CONDITION CLASS STATUS = 3 or NONFOREST CONDITION CLASS STATUS = 5) should always be coded 1.

When collected: All duff/litter transects where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

0 Duff and litter point not sampled
1 Duff and litter point sampled

10.9.7 DUFF/LITTER NONSAMPLED REASON (BASE)
Record the reason that duff/litter cannot be measured on the transect.

When Collected: All duff/litter transects where DUFF/LITTER SAMPLE STATUS = 0
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
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

10.9.8 DUFF DEPTH (BASE)
Record the code indicating the depth of the duff layer to the nearest 0.1 inch. Record 24.0 inches when DUFF DEPTH is >24.0 inches and enter Code #4 (Litter depth was measured, duff (peat) depth exceeds 24.0 inches) for 10.9.8 DUFF AND LITTER METHOD.

When Collected: All duff/litter transects in measureable conditions (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) where DUFF/LITTER SAMPLE STATUS = 1
Field width: 3 digits (xx.y)

Tolerance: +/- 0.5 inch
MQO: At least 90% of the time
Values: 00.0 to 24.0 inches

10.9.9 LITTER DEPTH (BASE)
Record the code indicating the depth of the litter layer to the nearest 0.1 inch.

When Collected: All duff/litter transects in measureable conditions (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) where DUFF/LITTER SAMPLE STATUS = 1
Field width: 3 digits (xx.y)
Tolerance: +/- 0.5 inch
MQO: At least 90% of the time
Values: 00.0 to 99.9 inches

10.9.10 DUFF AND LITTER METHOD (BASE)
Record the code indicating whether duff and litter depths were measured or estimated.

When Collected: All duff/litter transects where DUFF/LITTER SAMPLE STATUS = 1 and duff/litter transect is in a measureable condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2)
Field width: 1 digit
Tolerance: No errors
MQO: At least 90% of the time
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)

## 10.10 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.

## 10.11 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**

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. Was previously: Site Tree Selection Criteria and Species List

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

13. Ownership Pre-field Procedures

## Appendix 1. State and County, Parish, or Borough FIPS Codes

**(01) Alabama**
(001) Autauga
(003) Baldwin
(005) Barbour
(007) Bibb
(009) Blount
(011) Bullock
(013) Butler
(015) Calhoun
(017) Chambers
(019) Cherokee
(021) Chilton
(023) Choctaw
(025) Clarke
(027) Clay
(029) Cleburne
(031) Coffee
(033) Colbert
(035) Conecuh
(037) Coosa
(039) Covington
(041) Crenshaw
(043) Cullman
(045) Dale
(047) Dallas
(049) De Kalb
(051) Elmore
(053) Escambia
(055) Etowah
(057) Fayette
(059) Franklin
(061) Geneva
(063) Greene
(065) Hale
(067) Henry
(069) Houston
(071) Jackson
(073) Jefferson
(075) Lamar
(077) Lauderdale
(079) Lawrence
(081) Lee
(083) Limestone
(085) Lowndes
(087) Macon
(089) Madison
(091) Marengo
(093) Marion
(095) Marshall
(097) Mobile
(099) Monroe
(101) Montgomery
(103) Morgan
(105) Perry
(107) Pickens
(109) Pike
(111) Randolph
(113) Russell
(115) St Clair
(117) Shelby
(119) Sumter
(121) Talladega
(123) Tallapoosa
(125) Tuscaloosa
(127) Walker
(129) Washington
(131) Wilcox
(133) Winston

**(02) Alaska**
(013) Aleutians East Borough
(016) Aleutians West Census Area
(020) Anchorage Borough
(050) Bethel Census Area
(060) Bristol Bay Borough
(068) Denali Borough
(070) Dillingham Census Area
(090) Fairbanks North Star Borough
(100) Haines Borough
(110) Juneau Borough
(122) Kenai Peninsula Borough
(130) Ketchikan Gateway Borough
(150) Kodiak Island Borough
(164) Lake and Peninsula Borough
(170) Matanuska-Susitna Borough
(180) Nome Census Area
(185) North Slope Borough
(188) Northwest Arctic Borough
(201) Prince of Wales-Outer Ketchikan Census Area
(220) Sitka Borough
(232) Skagway-Hoonah-Angoon Census Area
(240) Southeast Fairbanks Census Area
(261) Valdez-Cordova Census Area
(270) Wade Hampton Census Area
(280) Wrangell-Petersburg Census Area
(282) Yakutat Borough
(290) Yukon-Koyukuk Census Area

**(04) Arizona**
(001) Apache
(003) Cochise
(005) Coconino
(007) Gila
(009) Graham
(011) Greenlee
(012) La Paz
(013) Maricopa
(015) Mohave
(017) Navajo
(019) Pima
(021) Pinal
(023) Santa Cruz
(025) Yavapai
(027) Yuma

**(05) Arkansas**
(001) Arkansas
(003) Ashley
(005) Baxter
(007) Benton
(009) Boone
(011) Bradley
(013) Calhoun
(015) Carroll
(017) Chicot
(019) Clark
(021) Clay
(023) Cleburne
(025) Cleveland
(027) Columbia
(029) Conway
(031) Craighead
(033) Crawford
(035) Crittenden
(037) Cross
(039) Dallas
(041) Desha
(043) Drew
(045) Faulkner
(047) Franklin
(049) Fulton
(051) Garland
(053) Grant
(055) Greene
(057) Hempstead

(059) Hot Spring
(061) Howard
(063) Independence
(065) Izard
(067) Jackson
(069) Jefferson
(071) Johnson
(073) Lafayette
(075) Lawrence
(077) Lee
(079) Lincoln
(081) Little River
(083) Logan
(085) Lonoke
(087) Madison
(089) Marion
(091) Miller
(093) Mississippi
(095) Monroe
(097) Montgomery
(099) Nevada
(101) Newton
(103) Ouachita
(105) Perry
(107) Phillips
(109) Pike
(111) Poinsett
(113) Polk
(115) Pope
(117) Prairie
(119) Pulaski
(121) Randolph
(123) St. Francis
(125) Saline
(127) Scott
(129) Searcy
(131) Sebastian
(133) Sevier
(135) Sharp
(137) Stone
(139) Union
(141) Van Buren
(143) Washington
(145) White
(147) Woodruff
(149) Yell

**(06) California**
(001) Alameda
(003) Alpine
(005) Amador
(007) Butte
(009) Calaveras
(011) Colusa
(013) Contra Costa
(015) Del Norte
(017) El Dorado
(019) Fresno
(021) Glenn
(023) Humboldt
(025) Imperial
(027) Inyo
(029) Kern
(031) Kings
(033) Lake
(035) Lassen
(037) Los Angeles
(039) Madera
(041) Marin
(043) Mariposa
(045) Mendocino
(047) Merced
(049) Modoc
(051) Mono
(053) Monterey
(055) Napa
(057) Nevada
(059) Orange
(061) Placer
(063) Plumas
(065) Riverside
(067) Sacramento
(069) San Benito
(071) San Bernardino
(073) San Diego
(075) San Francisco
(077) San Joaquin
(079) San Luis Obispo
(081) San Mateo
(083) Santa Barbara
(085) Santa Clara
(087) Santa Cruz
(089) Shasta
(091) Sierra
(093) Siskiyou
(095) Solano
(097) Sonoma
(099) Stanislaus
(101) Sutter
(103) Tehama
(105) Trinity
(107) Tulare
(109) Tuolumne
(111) Ventura
(113) Yolo
(115) Yuba

**(08) Colorado**
(001) Adams
(003) Alamosa
(005) Arapahoe
(007) Archuleta
(009) Baca
(011) Bent
(013) Boulder
(015) Chaffee
(017) Cheyenne
(019) Clear Creek
(021) Conejos
(023) Costilla
(025) Crowley
(027) Custer
(029) Delta
(031) Denver
(033) Dolores
(035) Douglas
(037) Eagle
(039) Elbert
(041) El Paso
(043) Fremont
(045) Garfield
(047) Gilpin
(049) Grand
(051) Gunnison
(053) Hinsdale
(055) Huerfano
(057) Jackson
(059) Jefferson
(061) Kiowa
(063) Kit Carson
(065) Lake
(067) La Plata
(069) Larimer
(071) Las Animas
(073) Lincoln
(075) Logan
(077) Mesa
(079) Mineral
(081) Moffat
(083) Montezuma
(085) Montrose
(087) Morgan
(089) Otero
(091) Ouray
(093) Park
(095) Phillips
(097) Pitkin
(099) Prowers
(101) Pueblo
(103) Rio Blanco
(105) Rio Grande
(107) Routt
(109) Saguache
(111) San Juan
(113) San Miguel
(115) Sedgewick
(117) Summit
(119) Teller

(121) Washington
(123) Weld
(125) Yuma

**(09) Connecticut**
(001) Fairfield
(003) Hartford
(005) Litchfield
(007) Middlesex
(009) New Haven
(011) New London
(013) Tolland
(015) Windham

**(10) Delaware**
(001) Kent
(003) New Castle
(005) Sussex

**(11) District of Columbia**
(001) District of Columbia

**(12) Florida**
(001) Alachua
(003) Baker
(005) Bay
(007) Bradford
(009) Brevard
(011) Broward
(013) Calhoun
(015) Charlotte
(017) Citrus
(019) Clay
(021) Collier
(023) Columbia
(025) Dade
(027) De Soto
(029) Dixie
(031) Duval
(033) Escambia
(035) Flagler
(037) Franklin
(039) Gadsden
(041) Gilchrist
(043) Glades
(045) Gulf
(047) Hamilton
(049) Hardee
(051) Hendry
(053) Hernando
(055) Highlands
(057) Hillsborough
(059) Holmes
(061) Indian River
(063) Jackson
(065) Jefferson
(067) Lafayette
(069) Lake
(071) Lee
(073) Leon
(075) Levy
(077) Liberty
(079) Madison
(081) Manatee
(083) Marion
(085) Martin
(087) Monroe
(089) Nassau
(091) Okaloosa
(093) Okeechobee
(095) Orange
(097) Osceola
(099) Palm Beach
(101) Pasco
(103) Pinellas
(105) Polk
(107) Putnam
(109) St. Johns
(111) St. Lucie
(113) Santa Rosa
(115) Sarasota
(117) Seminole
(119) Sumter
(121) Suwannee
(123) Taylor
(125) Union
(127) Volusia
(129) Wakulla
(131) Walton
(133) Washington

**(13) Georgia**
(001) Appling
(003) Atkinston
(005) Bacon
(007) Baker
(009) Baldwin
(011) Banks
(013) Barrow
(015) Bartow
(017) Ben Hill
(019) Berrien
(021) Bibb
(023) Bleckley
(025) Brantley
(027) Brooks
(029) Bryan
(031) Bulloch
(033) Burke
(035) Butts
(037) Calhoun
(039) Camden
(043) Candler
(045) Carroll
(047) Catoosa
(049) Charlton
(051) Chatham
(053) Chattahoochee
(055) Chattooga
(057) Cherokee
(059) Clarke
(061) Clay
(063) Clayton
(065) Clinch
(067) Cobb
(069) Coffee
(071) Colquitt
(073) Columbia
(075) Cook
(077) Coweta
(079) Crawford
(081) Crisp
(083) Dade
(085) Dawson
(087) Decatur
(089) De Kalb
(091) Dodge
(093) Dooly
(095) Dougherty
(097) Douglas
(099) Early
(101) Echols
(103) Effingham
(105) Elbert
(107) Emanuel
(109) Evans
(111) Fannin
(113) Fayette
(115) Floyd
(117) Forsyth
(119) Franklin
(121) Fulton
(123) Gilmer
(125) Glascock
(127) Glynn
(129) Gordon
(131) Grady
(133) Greene
(135) Gwinnett
(137) Habersham
(139) Hall
(141) Hancock
(143) Haralson
(145) Harris
(147) Hart
(149) Heard
(151) Henry
(153) Houston

(155) Irwin
(157) Jackson
(159) Jasper
(161) Jeff Davis
(163) Jefferson
(165) Jenkins
(167) Johnson
(169) Jones
(171) Lamar
(173) Lanier
(175) Laurens
(177) Lee
(179) Liberty
(181) Lincoln
(183) Long
(185) Lowndes
(187) Lumpkin
(189) Mc Duffie
(191) Mc Intosh
(193) Macon
(195) Madison
(197) Marion
(199) Meriwether
(201) Miller
(205) Mitchell
(207) Monroe
(209) Montgomery
(211) Morgan
(213) Murray
(215) Muscogee
(217) Newton
(219) Oconee
(221) Oglethorpe
(223) Paulding
(225) Peach
(227) Pickens
(229) Pierce
(231) Pike
(233) Polk
(235) Pulaski
(237) Putnam
(239) Quitman
(241) Rabun
(243) Randolph
(245) Richmond
(247) Rockdale
(249) Schley
(251) Screven
(253) Seminole
(255) Spalding
(257) Stephens
(259) Stewart
(261) Sumter
(263) Talbot
(265) Taliaferro
(267) Tattnall
(269) Taylor
(271) Telfair
(273) Terrell
(275) Thomas
(277) Tift
(279) Toombs
(281) Towns
(283) Treutlen
(285) Troup
(287) Turner
(289) Twiggs
(291) Union
(293) Upson
(295) Walker
(297) Walton
(299) Ware
(301) Warren
(303) Washington
(305) Wayne
(307) Webster
(309) Wheeler
(311) White
(313) Whitfield
(315) Wilcox
(317) Wilkes
(319) Wilkinson
(321) Worth

**(15) Hawaii**
(001) Hawaii
(005) Kalawao
(003) Honolulu
(007) Kauai
(009) Maui

**(16) Idaho**
(001) Ada
(003) Adams
(005) Bannock
(007) Bear Lake
(009) Benewah
(011) Bingham
(013) Blaine
(015) Boise
(017) Bonner
(019) Bonneville
(021) Boundary
(023) Butte
(025) Camas
(027) Canyon
(029) Caribou
(031) Cassia
(033) Clark
(035) Clearwater
(037) Custer
(039) Elmore
(041) Franklin
(043) Fremont
(045) Gem
(047) Gooding
(049) Idaho
(051) Jefferson
(053) Jerome
(055) Kootenai
(057) Latah
(059) Lemhi
(061) Lewis
(063) Lincoln
(065) Madison
(067) Minidoka
(069) Nez Perce
(071) Oneida
(073) Owyhee
(075) Payette
(077) Power
(079) Shoshone
(081) Teton
(083) Twin Falls
(085) Valley
(087) Washington
(089) Yellowstone National Park

**(17) Illinois**
(001) Adams
(003) Alexander
(005) Bond
(007) Boone
(009) Brown
(011) Bureau
(013) Calhoun
(015) Carroll
(017) Cass
(019) Champaign
(021) Christian
(023) Clark
(025) Clay
(027) Clinton
(029) Coles
(031) Cook
(033) Crawford
(035) Cumberland
(037) DeKalb
(039) De Witt
(041) Douglas
(043) DuPage
(045) Edgar
(047) Edwards
(049) Effingham
(051) Fayette
(053) Ford
(055) Franklin

(057) Fulton
(059) Gallatin
(061) Greene
(063) Grundy
(065) Hamilton
(067) Hancock
(069) Hardin
(071) Henderson
(073) Henry
(075) Iroquois
(077) Jackson
(079) Jasper
(081) Jefferson
(083) Jersey
(085) Jo Daviess
(087) Johnson
(089) Kane
(091) Kankakee
(093) Kendall
(095) Knox
(097) Lake
(099) La Salle
(101) Lawrence
(103) Lee
(105) Livingston
(107) Logan
(109) McDonough
(111) McHenry
(113) McLean
(115) Macon
(117) Macoupin
(119) Madison
(121) Marion
(123) Marshall
(125) Mason
(127) Massac
(129) Menard
(131) Mercer
(133) Monroe
(135) Montgomery
(137) Morgan
(139) Moultrie
(141) Ogle
(143) Peoria
(145) Perry
(147) Piatt
(149) Pike
(151) Pope
(153) Pulaski
(155) Putnam
(157) Randolph
(159) Richland
(161) Rock Island
(163) St. Clair
(165) Saline
(167) Sangamon
(169) Schuyler
(171) Scott
(173) Shelby
(175) Stark
(177) Stephenson
(179) Tazewell
(181) Union
(183) Vermilion
(185) Wabash
(187) Warren
(189) Washington
(191) Wayne
(193) White
(195) Whiteside
(197) Will
(199) Williamson
(201) Winnebago
(203) Woodford

**(18) Indiana**

(001) Adams
(003) Allen
(005) Bartholomew
(007) Benton
(009) Blackford
(011) Boone
(013) Brown
(015) Carroll
(017) Cass
(019) Clark
(021) Clay
(023) Clinton
(025) Crawford
(027) Daviess
(033) De Kalb
(029) Dearborn
(031) Decatur
(035) Delaware
(037) Dubois
(039) Elkhart
(041) Fayette
(043) Floyd
(045) Fountain
(047) Franklin
(049) Fulton
(051) Gibson
(053) Grant
(055) Greene
(057) Hamilton
(059) Hancock
(061) Harrison
(063) Hendricks
(065) Henry
(067) Howard
(069) Huntington
(071) Jackson
(073) Jasper
(075) Jay
(077) Jefferson
(079) Jennings
(081) Johnson
(083) Knox
(085) Kosciusko
(087) Lagrange
(089) Lake
(091) La Porte
(093) Lawrence
(095) Madison
(097) Marion
(099) Marshall
(101) Martin
(103) Miami
(105) Monroe
(107) Montgomery
(109) Morgan
(111) Newton
(113) Noble
(115) Ohio
(117) Orange
(119) Owen
(121) Parke
(123) Perry
(125) Pike
(127) Porter
(129) Posey
(131) Pulaski
(133) Putnam
(135) Randolph
(137) Ripley
(139) Rush
(143) Scott
(145) Shelby
(147) Spencer
(141) St. Joseph
(149) Starke
(151) Steuben
(153) Sullivan
(155) Switzerland
(157) Tippecanoe
(159) Tipton
(161) Union
(163) Vanderburgh
(165) Vermillion
(167) Vigo
(169) Wabash
(171) Warren
(173) Warrick
(175) Washington
(177) Wayne
(179) Wells
(181) White
(183) Whitley

**(19) Iowa**
(001) Adair
(003) Adams
(005) Allamakee
(007) Appanoose
(009) Audubon
(011) Benton
(013) Black Hawk
(015) Boone
(017) Bremer
(019) Buchanan
(021) Buena Vista
(023) Butler
(025) Calhoun
(027) Carroll
(029) Cass
(031) Cedar
(033) Cerro Gordo
(035) Cherokee
(037) Chickasaw
(039) Clarke
(041) Clay
(043) Clayton
(045) Clinton
(047) Crawford
(049) Dallas
(051) Davis
(053) Decatur
(055) Delaware
(057) Des Moines
(059) Dickinson
(061) Dubuque
(063) Emmet
(065) Fayette
(067) Floyd
(069) Franklin
(071) Fremont
(073) Greene
(075) Grundy
(077) Guthrie
(079) Hamilton
(081) Hancock
(083) Hardin
(085) Harrison
(087) Henry
(089) Howard
(091) Humboldt
(093) Ida
(095) Iowa
(097) Jackson
(099) Jasper
(101) Jefferson
(103) Johnson
(105) Jones
(107) Keokuk
(109) Kossuth
(111) Lee
(113) Linn
(115) Louisa
(117) Lucas
(119) Lyon
(121) Madison
(123) Mahaska
(125) Marion
(127) Marshall
(129) Mills
(131) Mitchell
(133) Monona
(135) Monroe
(137) Montgomery
(139) Muscatine
(141) O'Brien
(143) Osceola
(145) Page
(147) Palo Alto
(149) Plymouth
(151) Pocahontas
(153) Polk
(155) Pottawattamie
(157) Poweshiek
(159) Ringgold
(161) Sac
(163) Scott
(165) Shelby
(167) Sioux
(169) Story
(171) Tama
(173) Taylor
(175) Union
(177) Van Buren
(179) Wapello
(181) Warren
(183) Washington
(185) Wayne
(187) Webster
(189) Winnebago
(191) Winneshiek
(193) Woodbury
(195) Worth
(197) Wright

**(20) Kansas**
(001) Allen
(003) Anderson
(005) Atchison
(007) Barber
(009) Barton
(011) Bourbon
(013) Brown
(015) Butler
(017) Chase
(019) Chautauqua
(021) Cherokee
(023) Cheyenne
(025) Clark
(027) Clay
(029) Cloud
(031) Coffey
(033) Comanche
(035) Cowley
(037) Crawford
(039) Decatur
(041) Dickinson
(043) Doniphan
(045) Douglas
(047) Edwards
(049) Elk
(051) Ellis
(053) Ellsworth
(055) Finney
(057) Ford
(059) Franklin
(061) Geary
(063) Gove
(065) Graham
(067) Grant
(069) Gray
(071) Greeley
(073) Greenwood
(075) Hamilton
(077) Harper
(079) Harvey
(081) Haskell
(083) Hodgeman
(085) Jackson
(087) Jefferson
(089) Jewell
(091) Johnson
(093) Kearny
(095) Kingman
(097) Kiowa
(099) Labette
(101) Lane
(103) Leavenworth
(105) Lincoln
(107) Linn
(109) Logan
(111) Lyon
(113) McPherson
(115) Marion
(117) Marshall
(119) Meade
(121) Miami
(123) Mitchell
(125) Montgomery
(127) Morris
(129) Morton

(131) Nemaha
(133) Neosho
(135) Ness
(137) Norton
(139) Osage
(141) Osborne
(143) Ottawa
(145) Pawnee
(147) Phillips
(149) Pottawatomie
(151) Pratt
(153) Rawlins
(155) Reno
(157) Republic
(159) Rice
(161) Riley
(163) Rooks
(165) Rush
(167) Russell
(169) Saline
(171) Scott
(173) Sedgwick
(175) Seward
(177) Shawnee
(179) Sheridan
(181) Sherman
(183) Smith
(185) Stafford
(187) Stanton
(189) Stevens
(191) Sumner
(193) Thomas
(195) Trego
(197) Wabaunsee
(199) Wallace
(201) Washington
(203) Wichita
(205) Wilson
(207) Woodson
(209) Wyandotte

**(21) Kentucky**
(001) Adair
(003) Allen
(005) Anderson
(007) Ballard
(009) Barren
(011) Bath
(013) Bell
(015) Boone
(017) Bourbon
(019) Boyd
(021) Boyle
(023) Bracken
(025) Breathitt
(027) Breckinridge
(029) Bullitt
(031) Butler
(033) Caldwell
(035) Calloway
(037) Campbell
(039) Carlisle
(041) Carroll
(043) Carter
(045) Casey
(047) Christian
(049) Clark
(051) Clay
(053) Clinton
(055) Crittenden
(057) Cumberland
(059) Daviess
(061) Edmonson
(063) Elliott
(065) Estill
(067) Fayette
(069) Fleming
(071) Floyd
(073) Franklin
(075) Fulton
(077) Gallatin
(079) Garrard
(081) Grant
(083) Graves
(085) Grayson
(087) Green
(089) Greenup
(091) Hancock
(093) Hardin
(095) Harlan
(097) Harrison
(099) Hart
(101) Henderson
(103) Henry
(105) Hickman
(107) Hopkins
(109) Jackson
(111) Jefferson
(113) Jessamine
(115) Johnson
(117) Kenton
(119) Knott
(121) Knox
(123) Larue
(125) Laurel
(127) Lawrence
(129) Lee
(131) Leslie
(133) Letcher
(135) Lewis
(137) Lincoln
(139) Livingston
(141) Logan
(143) Lyon
(145) McCracken
(147) McCreary
(149) McLean
(151) Madison
(153) Magoffin
(155) Marion
(157) Marshall
(159) Martin
(161) Mason
(163) Meade
(165) Menifee
(167) Mercer
(169) Metcalfe
(171) Monroe
(173) Montgomery
(175) Morgan
(177) Muhlenberg
(179) Nelson
(181) Nicholas
(183) Ohio
(185) Oldham
(187) Owen
(189) Owsley
(191) Pendleton
(193) Perry
(195) Pike
(197) Powell
(199) Pulaski
(201) Robertson
(203) Rockcastle
(205) Rowan
(207) Russell
(209) Scott
(211) Shelby
(213) Simpson
(215) Spencer
(217) Taylor
(219) Todd
(221) Trigg
(223) Trimble
(225) Union
(227) Warren
(229) Washington
(231) Wayne
(233) Webster
(235) Whitley
(237) Wolfe
(239) Woodford

**(22) Louisiana**
(001) Acadia
(003) Allen
(005) Ascension
(007) Assumption

(009) Avoyelles
(011) Beauregard
(013) Bienville
(015) Bossier
(017) Caddo
(019) Calcasieu
(021) Caldwell
(023) Cameron
(025) Catahoula
(027) Claiborne
(029) Concordia
(031) De Soto
(033) East Baton Rouge
(035) East Carroll
(037) East Feliciana
(039) Evangeline
(041) Franklin
(043) Grant
(045) Iberia
(047) Iberville
(049) Jackson
(051) Jefferson
(053) Jefferson Davis
(055) Lafayette
(057) LaFourche
(059) La Salle
(061) Lincoln
(063) Livingston
(065) Madison
(067) Morehouse
(069) Natchitoches
(071) Orleans
(073) Ouachita
(075) Plaquemines
(077) Pointe Coupee
(079) Rapides
(081) Red River
(083) Richland
(085) Sabine
(087) St. Bernard
(089) St. Charles
(091) St. Helena
(093) St. James
(095) St. John the Baptist
(097) St. Landry
(099) St. Martin
(101) St. Mary
(103) St. Tammany
(105) Tangipahoa
(107) Tensas
(109) Terrebonne
(111) Union
(113) Vermilion
(115) Vernon
(117) Washington
(119) Webster
(121) West Baton Rouge
(123) West Carroll
(125) West Feliciana
(127) Winn

**(23) Maine**
(001) Androscoggin
(003) Aroostook
(005) Cumberland
(007) Franklin
(009) Hancock
(011) Kennebec
(013) Knox
(015) Lincoln
(017) Oxford
(019) Penobscot
(021) Piscataquis
(023) Sagadahoc
(025) Somerset
(027) Waldo
(029) Washington
(031) York

**(24) Maryland**
(100) Allegany
(003) Anne Arundel
(005) Baltimore
(009) Calvert
(011) Caroline
(013) Carroll
(015) Cecil
(017) Charles
(019) Dorchester
(021) Frederick
(023) Garrett
(025) Harford
(027) Howard
(029) Kent
(031) Montgomery
(033) Prince Georges
(035) Queen Annes
(037) St. Marys
(039) Somerset
(041) Talbot
(043) Washington
(045) Wicomico
(047) Worcester
(510) Baltimore City

**(25) Massachusetts**
(001) Barnstable
(003) Berkshire
(005) Bristol
(007) Dukes
(009) Essex
(011) Franklin
(013) Hampden
(015) Hampshire
(017) Middlesex
(019) Nantucket
(021) Norfolk
(023) Plymouth
(025) Suffolk
(027) Worcester
(029) Washington
(031) York

**(26) Michigan**
(001) Alcona
(003) Alger
(005) Allegan
(007) Alpena
(009) Antrim
(011) Arenac
(013) Baraga
(015) Barry
(017) Bay
(019) Benzie
(021) Berrien
(023) Branch
(025) Calhoun
(027) Cass
(029) Charlevoix
(031) Cheboygan
(033) Chippewa
(035) Clare
(037) Clinton
(039) Crawford
(041) Delta
(043) Dickinson
(045) Eaton
(047) Emmet
(049) Genesee
(051) Gladwin
(053) Gogebic
(055) Grand Traverse
(057) Gratiot
(059) Hillsdale
(061) Houghton
(063) Huron
(065) Ingham
(067) Ionia
(069) Iosco
(071) Iron
(073) Isabella
(075) Jackson
(077) Kalamazoo
(079) Kalkaska
(081) Kent
(083) Keweenaw
(085) Lake
(087) Lapeer

(089) Leelanau
(091) Lenawee
(093) Livingston
(095) Luce
(097) Mackinac
(099) Macomb
(101) Manistee
(103) Marquette
(105) Mason
(107) Mecosta
(109) Menominee
(111) Midland
(113) Missaukee
(115) Monroe
(117) Montcalm
(119) Montmorency
(121) Muskegon
(123) Newaygo
(125) Oakland
(127) Oceana
(129) Ogemaw
(131) Ontonagon
(133) Osceola
(135) Oscoda
(137) Otsego
(139) Ottawa
(141) Presque Isle
(143) Roscommon
(145) Saginaw
(147) St. Clair
(149) St. Joseph
(151) Sanilac
(153) Schoolcraft
(155) Shiawassee
(157) Tuscola
(159) Van Buren
(161) Washtenaw
(163) Wayne
(165) Wexford

**(27) Minnesota**
(001) Aitkin
(003) Anoka
(005) Becker
(007) Beltrami
(009) Benton
(011) Big Stone
(013) Blue Earth
(015) Brown
(017) Carlton
(019) Carver
(021) Cass
(023) Chippewa
(025) Chisago
(027) Clay
(029) Clearwater
(031) Cook
(033) Cottonwood
(035) Crow Wing
(037) Dakota
(039) Dodge
(041) Douglas
(043) Faribault
(045) Fillmore
(047) Freeborn
(049) Goodhue
(051) Grant
(053) Hennepin
(055) Houston
(057) Hubbard
(059) Isanti
(061) Itasca
(063) Jackson
(065) Kanabec
(067) Kandiyohi
(069) Kittson
(071) Koochiching
(073) Lac qui Parle
(075) Lake
(077) Lake of the Woods
(079) Le Sueur
(081) Lincoln
(083) Lyon
(085) McLeod
(087) Mahnomen
(089) Marshall
(091) Martin
(093) Meeker
(095) Mille Lacs
(097) Morrison
(099) Mower
(101) Murray
(103) Nicollet
(105) Nobles
(107) Norman
(109) Olmsted
(111) Otter Tail
(113) Pennington
(115) Pine
(117) Pipestone
(119) Polk
(121) Pope
(123) Ramsey
(125) Red Lake
(127) Redwood
(129) Renville
(131) Rice
(133) Rock
(135) Roseau
(137) St. Louis
(139) Scott
(141) Sherburne
(143) Sibley
(145) Stearns
(147) Steele
(149) Stevens
(151) Swift
(153) Todd
(155) Traverse
(157) Wabasha
(159) Wadena
(161) Waseca
(163) Washington
(165) Watonwan
(167) Wilkin
(169) Winona
(171) Wright
(173) Yellow Medicine

**(28) Mississippi**
(001) Adams
(003) Alcorn
(005) Amite
(007) Attala
(009) Benton
(011) Bolivar
(013) Calhoun
(015) Carroll
(017) Chickasaw
(019) Choctaw
(021) Claiborne
(023) Clarke
(025) Clay
(027) Coahoma
(029) Copiah
(031) Covington
(033) De Soto
(035) Forrest
(037) Franklin
(039) George
(041) Greene
(043) Grenada
(045) Hancock
(047) Harrison
(049) Hinds
(051) Holmes
(053) Humphreys
(055) Issaquena
(057) Itawamba
(059) Jackson
(061) Jasper
(063) Jefferson
(065) Jefferson Davis
(067) Jones
(069) Kemper
(071) Lafayette
(073) Lamar
(075) Lauderdale

(077) Lawrence
(079) Leake
(081) Lee
(083) Leflore
(085) Lincoln
(087) Lowndes
(089) Madison
(091) Marion
(093) Marshall
(095) Monroe
(097) Montgomery
(099) Neshoba
(101) Newton
(103) Noxubee
(105) Oktibbeha
(107) Panola
(109) Pearl River
(111) Perry
(113) Pike
(115) Pontotoc
(117) Prentiss
(119) Quitman
(121) Rankin
(123) Scott
(125) Sharkey
(127) Simpson
(129) Smith
(131) Stone
(133) Sunflower
(135) Tallahatchie
(137) Tate
(139) Tippah
(141) Tishomingo
(143) Tunica
(145) Union
(147) Walthall
(149) Warren
(151) Washington
(153) Wayne
(155) Webster
(157) Wilkinson
(159) Winston
(161) Yalobusha
(163) Yazoo

**( 29) Missouri**
(001) Adair
(003) Andrew
(005) Atchison
(007) Audrain
(009) Barry
(011) Barton
(013) Bates
(015) Benton
(017) Bollinger
(019) Boone
(021) Buchanan
(023) Butler
(025) Caldwell
(027) Callaway
(029) Camden
(031) Cape Girardeau
(033) Carroll
(035) Carter
(037) Cass
(039) Cedar
(041) Chariton
(043) Christian
(045) Clark
(047) Clay
(049) Clinton
(051) Cole
(053) Cooper
(055) Crawford
(057) Dade
(059) Dallas
(061) Daviess
(063) De Kalb
(065) Dent
(067) Douglas
(069) Dunklin
(071) Franklin
(073) Gasconade
(075) Gentry
(077) Greene
(079) Grundy
(081) Harrison
(083) Henry
(085) Hickory
(087) Holt
(089) Howard
(091) Howell
(093) Iron
(095) Jackson
(097) Jasper
(099) Jefferson
(101) Johnson
(103) Knox
(105) Laclede
(107) Lafayette
(109) Lawrence
(111) Lewis
(113) Lincoln
(115) Linn
(117) Livingston
(119) McDonald
(121) Macon
(123) Madison
(125) Maries
(127) Marion
(129) Mercer
(131) Miller
(133) Mississippi
(135) Moniteau
(137) Monroe
(139) Montgomery
(141) Morgan
(143) New Madrid
(145) Newton
(147) Nodaway
(149) Oregon
(151) Osage
(153) Ozark
(155) Pemiscot
(157) Perry
(159) Pettis
(161) Phelps
(163) Pike
(165) Platte
(167) Polk
(169) Pulaski
(171) Putnam
(173) Ralls
(175) Randolph
(177) Ray
(179) Reynolds
(181) Ripley
(183) St. Charles
(185) St. Clair
(186) Ste. Genevieve
(187) St. Francois
(189) St. Louis
(195) Saline
(197) Schuyler
(199) Scotland
(201) Scott
(203) Shannon
(205) Shelby
(207) Stoddard
(209) Stone
(211) Sullivan
(213) Taney
(215) Texas
(217) Vernon
(219) Warren
(221) Washington
(223) Wayne
(225) Webster
(227) Worth
(229) Wright
(510) St. Louis City

**(30) Montana**
(001) Beaverhead
(003) Big Horn
(005) Blaine
(007) Broadwater
(009) Carbon

(011) Carter
(013) Cascade
(015) Chouteau
(017) Custer
(019) Daniels
(021) Dawson
(023) Deer Lodge
(025) Fallon
(027) Fergus
(029) Flathead
(031) Gallatin
(033) Garfield
(035) Glacier
(037) Golden Valley
(039) Granite
(041) Hill
(043) Jefferson
(045) Judith Basin
(047) Lake
(049) Lewis and Clark
(051) Liberty
(053) Lincoln
(055) McCone
(057) Madison
(059) Meagher
(061) Mineral
(063) Missoula
(065) Musselshell
(067) Park
(069) Petroleum
(071) Phillips
(073) Pondera
(075) Powder River
(077) Powell
(079) Prairie
(081) Ravalli
(083) Richland
(085) Roosevelt
(087) Rosebud
(089) Sanders
(091) Sheridan
(093) Silver Bow
(095) Stillwater
(097) Sweet Grass
(099) Teton
(101) Toole
(103) Treasure
(105) Valley
(107) Wheatland
(109) Wibaux
(111) Yellowstone
(113) Yellowstone National Park

**(31) Nebraska**
(001) Adams
(003) Antelope
(005) Arthur
(007) Banner
(009) Blaine
(011) Boone
(013) Box Butte
(015) Boyd
(017) Brown
(019) Buffalo
(021) Burt
(023) Butler
(025) Cass
(027) Cedar
(029) Chase
(031) Cherry
(033) Cheyenne
(035) Clay
(037) Colfax
(039) Cuming
(041) Custer
(043) Dakota
(045) Dawes
(047) Dawson
(049) Deuel
(051) Dixon
(053) Dodge
(055) Douglas
(057) Dundy
(059) Fillmore
(061) Franklin
(063) Frontier
(065) Furnas
(067) Gage
(069) Garden
(071) Garfield
(073) Gosper
(075) Grant
(077) Greeley
(079) Hall
(081) Hamilton
(083) Harlan
(085) Hayes
(087) Hitchcock
(089) Holt
(091) Hooker
(093) Howard
(095) Jefferson
(097) Johnson
(099) Kearney
(101) Keith
(103) Keya Paha
(105) Kimball
(107) Knox
(109) Lancaster
(111) Lincoln
(113) Logan
(115) Loup
(117) McPherson
(119) Madison
(121) Merrick
(123) Morrill
(125) Nance
(127) Nemaha
(129) Nuckolls
(131) Otoe
(133) Pawnee
(135) Perkins
(137) Phelps
(139) Pierce
(141) Platte
(143) Polk
(145) Red Willow
(147) Richardson
(149) Rock
(151) Saline
(153) Sarpy
(155) Saunders
(157) Scotts Bluff
(159) Seward
(161) Sheridan
(163) Sherman
(165) Sioux
(167) Stanton
(169) Thayer
(171) Thomas
(173) Thurston
(175) Valley
(177) Washington
(179) Wayne
(181) Webster
(183) Wheeler
(185) York

**(32) Nevada**
(001) Churchill
(003) Clark
(005) Douglas
(007) Elko
(009) Esmeralda
(011) Eureka
(013) Humboldt
(015) Lander
(017) Lincoln
(019) Lyon
(021) Mineral
(023) Nye
(027) Pershing
(029) Storey
(031) Washoe
(033) White Pine
(510) Carson City

**(33) New Hampshire**
(001) Belknap
(003) Carroll
(007) Coos
(005) Cheshire
(009) Grafton
(011) Hillsborough
(013) Merrimack
(015) Rockingham
(017) Strafford
(019) Sullivan

**(34) New Jersey**
(001) Atlantic
(003) Bergen
(005) Burlington
(007) Camden
(009) Cape May
(011) Cumberland
(013) Essex
(015) Gloucester
(017) Hudson
(019) Hunterdon
(021) Mercer
(023) Middlesex
(025) Monmouth
(027) Morris
(029) Ocean
(031) Passaic
(033) Salem
(035) Somerset
(037) Sussex
(039) Union
(041) Warren

**(35) New Mexico**
(001) Bernalillo
(003) Catron
(005) Chaves
(006) Cibola
(007) Colfax
(009) Curry
(011) De Baca
(013) Dona Ana
(015) Eddy
(017) Grant
(019) Guadalupe
(021) Harding
(023) Hidalgo
(025) Lea
(027) Lincoln
(028) Los Alamos
(029) Luna
(031) McKinley
(033) Mora
(035) Otero
(037) Quay
(039) Rio Arriba
(041) Roosevelt
(043) Sandoval
(045) San Juan
(047) San Miguel
(049) Santa Fe
(051) Sierra
(053) Socorro
(055) Taos
(057) Torrance
(059) Union
(061) Valencia

**(36) New York**
(001) Albany
(003) Allegany
(005) Bronx
(007) Broome
(009) Cattaraugus
(011) Cayuga
(013) Chautauqua
(015) Chemung
(017) Chenango
(019) Clinton
(021) Columbia
(023) Cortland
(025) Delaware
(027) Dutchess
(029) Erie
(031) Essex
(033) Franklin
(035) Fulton
(037) Genesee
(039) Greene
(041) Hamilton
(043) Herkimer
(045) Jefferson
(047) Kings
(049) Lewis
(051) Livingston
(053) Madison
(055) Monroe
(057) Montgomery
(059) Nassau
(061) New York
(063) Niagara
(065) Oneida
(067) Onondaga
(069) Ontario
(071) Orange
(073) Orleans
(075) Oswego
(077) Otsego
(079) Putnam
(081) Queens
(083) Rensselaer
(085) Richmond
(087) Rockland
(089) St. Lawrence
(091) Saratoga
(093) Schenectady
(095) Schoharie
(097) Schuyler
(099) Seneca
(101) Steuben
(103) Suffolk
(105) Sullivan
(107) Tioga
(109) Tompkins
(111) Ulster
(113) Warren
(115) Washington
(117) Wayne
(119) Westchester
(121) Wyoming
(123) Yates

**(37) North Carolina**
(001) Alamance
(003) Alexander
(005) Alleghany
(007) Anson
(009) Ashe
(011) Avery
(013) Beaufort
(015) Bertie
(017) Bladen
(019) Brunswick
(021) Buncombe
(023) Burke
(025) Cabarrus
(027) Caldwell
(029) Camden
(031) Carteret
(033) Caswell
(035) Catawba
(037) Chatham
(039) Cherokee
(041) Chowan
(043) Clay
(045) Cleveland
(047) Columbus
(049) Craven
(051) Cumberland
(053) Currituck
(055) Dare
(057) Davidson
(059) Davie
(061) Duplin
(063) Durham
(065) Edgecombe

(067) Forsyth
(069) Franklin
(071) Gaston
(073) Gates
(075) Graham
(077) Granville
(079) Greene
(081) Guilford
(083) Halifax
(085) Harnett
(087) Haywood
(089) Henderson
(091) Hertford
(093) Hoke
(095) Hyde
(097) Iredell
(099) Jackson
(101) Johnston
(103 Jones
(105) Lee
(107) Lenoir
(109) Lincoln
(111) McDowell
(113) Macon
(115) Madison
(117) Martin
(119) Mecklenburg
(121) Mitchell
(123) Montgomery
(125) Moore
(127) Nash
(129) New Hanover
(131) Northhampton
(133) Onslow
(135) Orange
(137) Pamlico
(139) Pasquotank
(141) Pender
(143) Perquimans
(145) Person
(147) Pitt
(149) Polk
(151) Randolph
(153) Richmond
(155) Robeson
(157) Rockingham
(159) Rowan
(161) Rutherford
(163) Sampson
(165) Scotland
(167) Stanly
(169) Stokes
(171) Surry
(173) Swain
(175) Transylvania
(177) Tyrrell
(179) Union
(181) Vance
(183) Wake
(185) Warren
(187) Washington
(189) Watauga
(191) Wayne
(193) Wilkes
(195) Wilson
(197) Yadkin
(199) Yancey

**(38) North Dakota**
(001) Adams
(003) Barnes
(005) Benson
(007) Billings
(009) Bottineau
(011) Bowman
(013) Burke
(015) Burleigh
(017) Cass
(019) Cavalier
(021) Dickey
(023) Divide
(025) Dunn
(027) Eddy
(029) Emmons
(031) Foster
(033) Golden Valley
(035) Grand Forks
(037) Grant
(039) Griggs
(041) Hettinger
(043) Kidder
(045) La Moure
(047) Logan
(049) McHenry
(051) McIntosh
(053) McKenzie
(055) McLean
(057) Mercer
(059) Morton
(061) Mountrial
(063) Nelson
(065) Oliver
(067) Pembina
(069) Pierce
(071) Ramsey
(073) Ransom
(075) Renville
(077) Richland
(079) Rolette
(081) Sargent
(083) Sheridan
(085) Sioux
(087) Slope
(089) Stark
(091) Steele
(093) Stutsman
(095) Towner
(097) Traill
(099) Walsh
(101) Ward
(103) Wells
(105) Williams

**(39) Ohio**
(001) Adams
(003) Allen
(005) Ashland
(007) Ashtabula
(009) Athens
(011) Auglaize
(013) Belmont
(015) Brown
(017) Butler
(019) Carroll
(021) Champaign
(023) Clark
(025) Clermont
(027) Clinton
(029) Columbiana
(031) Coshocton
(033) Crawford
(035) Cuyahoga
(037) Darke
(039) Defiance
(041) Delaware
(043) Erie
(045) Fairfield
(047) Fayette
(049) Franklin
(051) Fulton
(053) Gallia
(055) Geauga
(057) Greene
(059) Guernsey
(061) Hamilton
(063) Hancock
(065) Hardin
(067) Harrison
(069) Henry
(071) Highland
(073) Hocking
(075) Holmes
(077) Huron
(079) Jackson
(081) Jefferson
(083) Knox
(085) Lake
(087) Lawrence

(089) Licking
(091) Logan
(093) Lorain
(095) Lucas
(097) Madison
(099) Mahoning
(101) Marion
(103) Medina
(105) Meigs
(107) Mercer
(109) Miami
(111) Monroe
(113) Montgomery
(115) Morgan
(117) Morrow
(119) Muskingum
(121) Noble
(123) Ottawa
(125) Paulding
(127) Perry
(129) Pickaway
(131) Pike
(133) Portage
(135) Preble
(137) Putnam
(139) Richland
(141) Ross
(143) Sandusky
(145) Scioto
(147) Seneca
(149) Shelby
(151) Stark
(153) Summit
(155) Trumbull
(157) Tuscarawas
(159) Union
(161) Van Wert
(163) Vinton
(165) Warren
(167) Washington
(169) Wayne
(171) Williams
(173) Wood
(175) Wyandot

**(40) Oklahoma**
(001) Adair
(003) Alfalfa
(005) Atoka
(007) Beaver
(009) Beckham
(011) Blaine
(013) Bryan
(015) Caddo
(017) Canadian
(019) Carter
(021) Cherokee
(023) Choctaw
(025) Cimarron
(027) Cleveland
(029) Coal
(031) Comanche
(033) Cotton
(035) Craig
(037) Creek
(039) Custer
(041) Delaware
(043) Dewey
(045) Ellis
(047) Garfield
(049) Garvin
(051) Grady
(053) Grant
(055) Greer
(057) Harmon
(059) Harper
(061) Haskell
(063) Hughes
(065) Jackson
(067) Jefferson
(069) Johnston
(071) Kay
(073) Kingfisher
(075) Kiowa
(077) Latimer
(079) Le Flore
(081) Lincoln
(083) Logan
(085) Love
(087) McClain
(089) McCurtain
(091) McIntosh
(093) Major
(095) Marshall
(097) Mayes
(099) Murray
(101) Muskogee
(103) Noble
(105) Nowata
(107) Okfuskee
(109) Oklahoma
(111) Okmulgee
(113) Osage
(115) Ottawa
(117) Pawnee
(119) Payne
(121) Pittsburg
(123) Pontotoc
(125) Pottawatomie
(127) Pushmataha
(129) Roger Mills
(131) Rogers
(133) Seminole
(135) Sequoyah
(137) Stephens
(139) Texas
(141) Tillman
(143) Tulsa
(145) Wagoner
(147) Washington
(149) Washita
(151) Woods
(153) Woodward

**(41) Oregon**
(001) Baker
(003) Benton
(005) Clackamas
(007) Clatsop
(009) Columbia
(011) Coos
(013) Crook
(015) Curry
(017) Deschutes
(019) Douglas
(021) Gilliam
(023) Grant
(025) Harney
(027) Hood River
(029) Jackson
(031) Jefferson
(033) Josephine
(035) Klamath
(037) Lake
(039) Lane
(041) Lincoln
(043) Linn
(045) Malheur
(047) Marion
(049) Morrow
(051) Multnomah
(053) Polk
(055) Sherman
(057) Tillamook
(059) Umatilla
(061) Union
(063) Wallowa
(065) Wasco
(067) Washington
(069) Wheeler
(071) Yamhill

**(42) Pennsylvania**
(001) Adams
(003) Allegheny
(005) Armstrong
(007) Beaver
(009) Bedford

(011) Berks
(013) Blair
(015) Bradford
(017) Bucks
(019) Butler
(021) Cambria
(023) Cameron
(025) Carbon
(027) Centre
(029) Chester
(031) Clarion
(033) Clearfield
(035) Clinton
(037) Columbia
(039) Crawford
(041) Cumberland
(043) Dauphin
(045) Delaware
(047) Elk
(049) Erie
(051) Fayette
(053) Forest
(055) Franklin
(057) Fulton
(059) Greene
(061) Huntingdon
(063) Indiana
(065) Jefferson
(067) Juniata
(069) Lackawanna
(071) Lancaster
(073) Lawrence
(075) Lebanon
(077) Lehigh
(079) Luzerne
(081) Lycoming
(083) McKean
(085) Mercer
(087) Mifflin
(089) Monroe
(091) Montgomery
(093) Montour
(095) Northampton
(097) Northumberland
(099) Perry
(101) Philadelphia
(103) Pike
(105) Potter
(107) Schuylkill
(109) Snyder
(111) Somerset
(113) Sullivan
(115) Susquehanna
(117) Tioga
(119) Union
(121) Venango
(123) Warren
(125) Washington
(127) Wayne
(129) Westmoreland
(131) Wyoming
(133) York
(447) Elk-Anf
(453) Forest-Anf
(483) McKean-Anf
(523) Warren-Anf

**(44) Rhode Island**
(001) Bristol
(003) Kent
(005) Newport
(007) Providence
(009) Washington

**(45) South Carolina**
(001) Abbeville
(003) Aiken
(005) Allendale
(007) Anderson
(009) Bamberg
(011) Barnwell
(013) Beaufort
(015) Berkeley
(017) Calhoun
(019) Charleston
(021) Cherokee
(023) Chester
(025) Chesterfield
(027) Clarendon
(029) Colleton
(031) Darlington
(033) Dillon
(035) Dorchester
(037) Edgefield
(039) Fairfield
(041) Florence
(043) Georgetown
(045) Greenville
(047) Greenwood
(049) Hampton
(051) Horry
(053) Jasper
(055) Kershaw
(057) Lancaster
(059) Laurens
(061) Lee
(063) Lexington
(065) Mc Cormick
(067) Marion
(069) Marlboro
(071) Newberry
(073) Oconee
(075) Orangeburg
(077) Pickens
(079) Richland
(081) Saluda
(083) Spartanburg
(085) Sumter
(087) Union
(089) Williamsburg
(091) York

**(46) South Dakota**
(003) Aurora
(005) Beadle
(007) Bennett
(009) Bon Homme
(011) Brookings
(013) Brown
(015) Brule
(017) Buffalo
(019) Butte
(021) Campbell
(023) Charles Mix
(025) Clark
(027) Clay
(029) Codington
(031) Corson
(033) Custer
(035) Davison
(037) Day
(039) Deuel
(041) Dewey
(043) Douglas
(045) Edmunds
(047) Fall River
(049) Faulk
(051) Grant
(053) Gregory
(055) Haakon
(057) Hamlin
(059) Hand
(061) Hanson
(063) Harding
(065) Hughes
(067) Hutchinson
(069) Hyde
(071) Jackson
(073) Jerauld
(075) Jones
(077) Kingsbury
(079) Lake
(081) Lawrence
(083) Lincoln
(085) Lyman
(087) McCook
(089) McPherson
(091) Marshall

(093) Meade
(095) Mellette
(097) Miner
(099) Minnehaha
(101) Moody
(103) Pennington
(105) Perkins
(107) Potter
(109) Roberts
(111) Sanborn
(113) Shannon
(115) Spink
(117) Stanley
(119) Sully
(121) Todd
(123) Tripp
(125) Turner
(127) Union
(129) Walworth
(135 Yankton
(137) Ziebach

**(47) Tennessee**
(001) Anderson
(003) Bedford
(005) Benton
(007) Bledsoe
(009) Blount
(011) Bradley
(013) Campbell
(015) Cannon
(017) Carroll
(019) Carter
(021) Cheatham
(023) Chester
(025) Claiborne
(027) Clay
(029) Cocke
(031) Coffee
(033) Crockett
(035) Cumberland
(037) Davidson
(039) Decatur
(041) De Kalb
(043) Dickson
(045) Dyer
(047) Fayette
(049) Fentress
(051) Franklin
(053) Gibson
(055) Giles
(057) Grainger
(059) Greene
(061) Grundy
(063) Hamblen
(065) Hamilton
(067) Hancock
(069) Hardeman
(071) Hardin
(073) Hawkins
(075) Haywood
(077) Henderson
(079) Henry
(081) Hickman
(083) Houston
(085) Humphreys
(087) Jackson
(089) Jefferson
(091) Johnson
(093) Knox
(095) Lake
(097) Lauderdale
(099) Lawrence
(101) Lewis
(103) Lincoln
(105) Loudon
(107) Mc Minn
(109) Mc Nairy
(111) Macon
(113) Madison
(115) Marion
(117) Marshall
(119) Maury
(121) Meigs
(123) Monroe
(125) Montgomery
(127) Moore
(129) Morgan
(131) Obion
(133) Overton
(135) Perry
(137) Pickett
(139) Polk
(141) Putnam
(143) Rhea
(145) Roane
(147) Robertson
(149) Rutherford
(151) Scott
(153) Sequatchie
(155) Sevier
(157) Shelby
(159) Smith
(161) Stewart
(163) Sullivan
(165) Sumner
(167) Tipton
(169) Trousdale
(171) Unicoi
(173) Union
(175) Van Buren
(177) Warren
(179) Washington
(181) Wayne
(183) Weakley
(185) White
(187) Williamson
(189) Wilson

**(48) Texas**
(001) Anderson
(003) Andrews
(005) Angelina
(007) Aransas
(009) Archer
(011) Armstrong
(013) Atascosa
(015) Austin
(017) Bailey
(019) Bandera
(021) Bastrop
(023) Baylor
(025) Bee
(027) Bell
(029) Bexar
(031) Blanco
(033) Borden
(035) Bosque
(037) Bowie
(039) Brazoria
(041) Brazos
(043) Brewster
(045) Briscoe
(047) Brooks
(049) Brown
(051) Burleston
(053) Burnet
(055) Caldwell
(057) Calhoun
(059) Callahan
(061) Cameron
(063) Camp
(065) Carson
(067) Cass
(069) Castro
(071) Chambers
(073) Cherokee
(075) Childress
(077) Clay
(079) Cochran
(081) Coke
(083) Coleman
(085) Collin
(087) Collingsworth
(089) Colorado
(091) Comal
(093) Comanche
(095) Concho

(097) Cooke
(099) Coryell
(101) Cottle
(103) Crane
(105) Crockett
(107) Crosby
(109) Culberson
(111) Dallam
(113) Dallas
(115) Dawson
(117) Deaf Smith
(119) Delta
(121) Denton
(123) De Witt
(125) Dickens
(127) Dimmit
(129) Donley
(131) Duval
(133) Eastland
(135) Ector
(137) Edwards
(139) Ellis
(141) El Paso
(143) Erath
(145) Falls
(147) Fannin
(149) Fayette
(151) Fisher
(153) Floyd
(155) Foard
(157) Fort Bend
(159) Franklin
(161) Freestone
(163) Frio
(165) Gaines
(167) Galveston
(169) Garza
(171) Gillespie
(173) Glasscock
(175) Goliad
(177) Gonzales
(179) Gray
(181) Grayson
(183) Gregg
(185) Grimes
(187) Guadalupe
(189) Hale
(191) Hall
(193) Hamilton
(195) Hansford
(197) Hardeman
(199) Hardin
(201) Harris
(203) Harrison
(205) Hartley
(207) Haskell
(209) Hays
(211) Hemphill
(213) Henderson
(215) Hidalgo
(217) Hill
(219) Hockley
(221) Hood
(223) Hopkins
(225) Houston
(227) Howard
(229) Hudspeth
(231) Hunt
(233) Hutchinson
(235) Irion
(237) Jack
(239) Jackson
(241) Jasper
(243) Jeff Davis
(245) Jefferson
(247) Jim Hogg
(249) Jim Wells
(251) Johnson
(253) Jones
(255) Karnes
(257) Kaufman
(259) Kendall
(261) Kenedy
(263) Kent
(265) Kerr
(267) Kimble
(269) King
(271) Kinney
(273) Kleberg
(275) Knox
(277) Lamar
(279) Lamb
(281) Lampasas
(283) La Salle
(285) Lavaca
(287) Lee
(289) Leon
(291) Liberty
(293) Limestone
(295) Lipscomb
(297) Live Oak
(299) Llano
(301) Loving
(303) Lubbock
(305) Lynn
(307) McCulloch
(309) McLennan
(311) McMullen
(313) Madison
(315) Marion
(317) Martin
(319) Mason
(321) Matagorda
(323) Maverick
(325) Medina
(327) Menard
(329) Midland
(331) Milam
(333) Mills
(335) Mitchell
(337) Montague
(339) Montgomery
(341) Moore
(343) Morris
(345) Motley
(347) Nacogdoches
(349) Navarro
(351) Newton
(353) Nolan
(355) Nueces
(357) Ochiltree
(359) Oldham
(361) Orange
(363) Palo Pinto
(365) Panola
(367) Parker
(369) Parmer
(371) Pecos
(373) Polk
(375) Potter
(377) Presidio
(379) Rains
(381) Randall
(383) Reagan
(385) Real
(387) Red River
(389) Reeves
(391) Refugio
(393) Roberts
(395) Robertson
(397) Rockwall
(399) Runnels
(401) Rusk
(403) Sabine
(405) San Augustine
(407) San Jacinto
(409) San Patricio
(411) San Saba
(413) Schleicher
(415) Scurry
(417) Shackelford
(419) Shelby
(421) Sherman
(423) Smith
(425) Somervell
(427) Starr
(429) Stephens
(431) Sterling

(433) Stonewall
(435) Sutton
(437) Swisher
(439) Tarrant
(441) Taylor
(443) Terrell
(445) Terry
(447) Throckmorton
(449) Titus
(451) Tom Green
(453) Travis
(455) Trinity
(457) Tyler
(459) Upshur
(461) Upton
(463) Uvalde
(465) Val Verde
(467) Van Zandt
(469) Victoria
(471) Walker
(473) Waller
(475) Ward
(477) Washington
(479) Webb
(481) Wharton
(483) Wheeler
(485) Wichita
(487) Wilbarger
(489) Willacy
(491) Williamson
(493) Wilson
(495) Winkler
(497) Wise
(499) Wood
(501) Yoakum
(503) Young
(505) Zapata
(507) Zavala

**(49) Utah**
(001) Beaver
(003) Box Elder
(005) Cache
(007) Carbon
(009) Daggett
(011) Davis
(013) Duchesne
(015) Emery
(017) Garfield
(019) Grand
(021) Iron
(023) Juab
(025) Kane
(027) Millard
(029) Morgan
(031) Piute
(033) Rich
(035) Salt Lake
(037) San Juan
(039) Sanpete
(041) Sevier
(043) Summit
(045) Tooele
(047) Uintah
(049) Utah
(051) Wasatch
(053) Washington
(055) Wayne
(057) Weber

**(50) Vermont**
(001) Addison
(003) Bennington
(005) Caledonia
(007) Chittenden
(009) Essex
(011) Franklin
(013) Grand Isle
(015) Lamoille
(017) Orange
(019) Orleans
(021) Rutland
(023) Washington
(025) Windham
(027) Windsor

**(51) Virginia**
(001) Accomack
(003) Albemarle
(005) Alleghany
(007) Amelia
(009) Amherst
(011) Appomattox
(013) Arlington
(015) Augusta
(017) Bath
(019) Bedford
(021) Bland
(023) Botetourt
(025) Brunswick
(027) Buchanan
(029) Buckingham
(031) Campbell
(033) Caroline
(035) Carroll
(036) Charles City
(037) Charlotte
(041) Chesterfield
(043) Clarke
(045) Craig
(047) Culpeper
(049) Cumberland
(051) Dickenson
(053) Dinwiddie
(057) Essex
(059) Fairfax
(061) Fauquier
(063) Floyd
(065) Fluvanna
(067) Franklin
(069) Frederick
(071) Giles
(073) Gloucester
(075) Goochland
(077) Grayson
(079) Greene
(081) Greensville
(083) Halifax
(085) Hanover
(087) Henrico
(089) Henry
(091) Highland
(093) Isle of Wight
(095) James City
(097) King and Queen
(099) King George
(101) King William
(103) Lancaster
(105) Lee
(107) Loudoun
(109) Louisa
(111) Lunenberg
(113) Madison
(115) Mathews
(117) Mecklenburg
(119) Middlesex
(121) Montgomery
(125) Nelson
(127) New Kent
(131) Northampton
(133) Northumberland
(135) Nottoway
(137) Orange
(139) Page
(141) Patrick
(143) Pittsylvania
(145) Powhatan
(147) Prince Edward
(149) Prince George
(153) Prince William
(155) Pulaski
(157) Rappahannock
(159) Richmond
(161) Roanoke
(163) Rockbridge
(165) Rockingham
(167) Russell
(169) Scott

(171) Shenandoah
(173) Smyth
(175) Southampton
(177) Spotsylvania
(179) Stafford
(181) Surry
(183) Sussex
(185) Tazewell
(187) Warren
(191) Washington
(193) Westmoreland
(195) Wise
(197) Wythe
(199) York
(510) Alexandria City
(515) Bedford City
(520) Bristol City
(530) Buena Vista City
(540) Charlottesville City
(550) Chesapeake City
(560) Clifton Gorge City
(570) Colonial Heights City
(580) Covington City
(590) Danville City
(595) Emporia City
(600) Fairfax City
(610) Falls Church City
(620) Franklin City
(630) Fredericksburg City
(640) Galax City
(650) Hampton City
(660) Harrisonburg City
(670) Hopewell City
(678) Lexington City
(680) Lynchburg City
(683) Manassas City
(685) Manassas Park
(690) Martinsville City
(700) Newport News City
(710) Norfolk City
(720) Norton City
(730) Petersburg City
(735) Poquoson
(740) Portsmouth City
(750) Radford City
(760) Richmond City
(770) Roanoke City
(775) Salem City
(780) South Boston City
(790) Staunton City
(800) Suffolk City
(810) Virginia Beach City
(820) Waynesboro City
(830) Williamsburg City
(840) Winchester City

**(53) Washington**
(001) Adams
(003) Asotin
(005) Benton
(007) Chelan
(009) Clallam
(011) Clark
(013) Columbia
(015) Cowlitz
(017) Douglas
(019) Ferry
(021) Franklin
(023) Garfield
(025) Grant
(027) Grays Harbor
(029) Island
(031) Jefferson
(033) King
(035) Kitsap
(037) Kittitas
(039) Klickitat
(041) Lewis
(043) Lincoln
(045) Mason
(047) Okanogan
(049) Pacific
(051) Pend Oreille
(053) Pierce
(055) San Juan
(057) Skagit
(059) Skamania
(061) Snohomish
(063) Spokane
(065) Stevens
(067) Thurston
(069) Wahkiakum
(071) Walla Walla
(073) Whatcom
(075) Whitman
(077) Yakima

**(54) West Virginia**
(001) Barbour
(003) Berkeley
(005) Boone
(007) Braxton
(009) Brooke
(011) Cabell
(013) Calhoun
(015) Clay
(017) Doddridge
(019) Fayette
(021) Gilmer
(023) Grant
(025) Greenbriar
(027) Hampshire
(029) Hancock
(031) Hardy
(033) Harrison
(035) Jackson
(037) Jefferson
(039) Kanawha
(041) Lewis
(043) Lincoln
(045) Logan
(049) Marion
(051) Marshall
(053) Mason
(047) McDowell
(055) Mercer
(057) Mineral
(059) Mingo
(065) Morgan
(061) Monongalia
(063) Monroe
(067) Nicholas
(069) Ohio
(071) Pendleton
(073) Pleasant
(075) Pocahontas
(077) Preston
(079) Putnam
(081) Raleigh
(083) Randolph
(085) Ritchie
(087) Roane
(089) Summers
(091) Taylor
(093) Tucker
(095) Tyler
(097) Upshur
(099) Wayne
(101) Webster
(103) Wetzel
(105) Wirt
(107) Wood
(109) Wyoming

**(55) Wisconsin**
(001) Adams
(003) Ashland
(005) Barron
(007) Bayfield
(009) Brown
(011) Buffalo
(013) Burnett
(015) Calumet
(017) Chippewa
(019) Clark
(021) Columbia
(023) Crawford
(025) Dane

(027) Dodge
(029) Door
(031) Douglas
(033) Dunn
(035) Eau Claire
(037) Florence
(039) Fond du Lac
(041) Forest
(043) Grant
(045) Green
(047) Green Lake
(049) Iowa
(051) Iron
(053) Jackson
(055) Jefferson
(057) Juneau
(059) Kenosha
(061) Kewaunee
(063) La Crosse
(065) Lafayette
(067) Langlade
(069) Lincoln
(071) Manitowoc
(073) Marathon
(075) Marinette
(077) Marquette
(078) Menominee
(079) Milwaukee
(081) Monroe
(083) Oconto
(085) Oneida
(087) Outagamie
(089) Ozaukee
(091) Pepin
(093) Pierce
(095) Polk
(097) Portage
(099) Price
(101) Racine
(103) Richland
(105) Rock
(107) Rusk
(109) St. Croix
(111) Sauk
(113) Sawyer
(115) Shawano
(117) Sheboygan
(119) Taylor
(121) Trempealeau
(123) Vernon
(125) Vilas
(127) Walworth
(129) Washburn
(131) Washington
(133) Waukesha
(135) Waupaca
(137) Waushara
(139) Winnebago
(141) Wood

**(56) Wyoming**
(001) Albany
(003) Big Horn
(005) Campbell
(007) Carbon
(009) Converse
(011) Crook
(013) Fremont
(015) Goshen
(017) Hot Springs
(019) Johnson
(021) Laramie
(023) Lincoln
(025) Natrona
(027) Niobrara
(029) Park
(031) Platte
(033) Sheridan
(035) Sublette
(037) Sweetwater
(039) Teton
(041) Uinta
(043) Washakie
(045) Weston

**(72) Puerto Rico**
(001) Adjuntas
(003) Aguada
(005) Aguadilla
(007) Aguas Buenas
(009) Aibonito
(011) Anasco
(013) Arecibo
(015) Arroyo
(017) Barceloneta
(019) Barranquitas
(021) Bayamon
(023) Cabo Rojo
(025) Caguas
(027) Camuy
(029) Canovanas
(031) Carolina
(033) Catano
(035) Cayey
(037) Ceiba
(039) Ciales
(041) Cidra
(043) Coamo
(045) Comerio
(047) Corozal
(049) Culebra
(051) Dorado
(053) Fajardo
(054) Florida
(055) Guanica
(057) Guayama
(059) Guayanilla
(061) Guaynabo
(063) Gurabo
(065) Hatillo
(067) Hormigueros
(069) Humacao
(071) Isabela Municipio
(073) Jayuya
(075) Juana Diaz
(077) Juncos
(079) Lajas
(081) Lares
(083) Las Marias
(085) Las Piedras
(087) Loiza
(089) Luquillo
(091) Manati
(093) Maricao
(095) Maunabo
(097) Mayaguez
(099) Moca
(101) Morovis
(103) Naguabo
(105) Naranjito
(107) Orocovis
(109) Patillas
(111) Penuelas
(113) Ponce
(115) Quebradillas
(117) Rincon
(119) Rio Grande
(121) Sabana Grande
(123) Salinas
(125) San German
(127) San Juan
(129) San Lorenzo
(131) San Sebastian
(133) Santa Isabel
(135) Toa Alta
(137) Toa Baja
(139) Trujillo Alto
(141) Utuado
(143) Vega Alta
(145) Vega Baja
(147) Vieques
(149) Villalba
(151) Yabucoa
(153) Yuaco

**(78) U.S. Virgin Islands**
(010) St. Croix Island
(020) St. John Island
(030) St. Thomas Island

**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 |

| East | West | Code | Species Type |
|---|---|---|---|
| | 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 |
| | | | **Lodgepole Pine Group** |
| | W | 281 | Lodgepole pine |
| | | | **Hemlock / Sitka Spruce Group** |
| | W | 301 | Western hemlock |
| | W | 304 | Western redcedar |
| | W | 305 | Sitka spruce |
| | | | **Western Larch Group** |
| | W | 321 | Western larch |
| | | | **Redwood Group** |
| | W | 341 | Redwood |
| | W | 342 | Giant sequoia |
| | | | **Other Western Softwoods Group** |
| | W | 361 | Knobcone pine |
| | W | 362 | Southwestern white pine |
| | W | 363 | Bishop pine |
| | W | 364 | Monterey pine |
| | W | 365 | Foxtail pine / bristlecone pine |
| | W | 366 | Limber pine |
| | W | 367 | Whitebark pine |
| | W | 368 | Misc. western softwoods |
| | W | 369 | Western juniper |
| | | | **California Mixed Conifer Group** |
| | W | 371 | California mixed conifer |

| East | West | Code | Species Type |
|---|---|---|---|
| | | | **Exotic Softwoods Group** |
| E | | 381 | Scotch pine |
| E | W | 383 | Other exotic softwoods |
| E | | 384 | Norway spruce |
| E | | 385 | Introduced larch |
| | | | **Other Softwoods Group** |
| | | 391 | Other softwoods |
| | | | **Oak / Pine Group** |
| E | | 401 | Eastern white pine / N. red oak / white ash |
| E | | 402 | Eastern redcedar / hardwood |
| E | | 403 | Longleaf pine / oak |
| E | | 404 | Shortleaf pine / oak |
| E | | 405 | Virginia pine / southern red oak |
| E | | 406 | Loblolly pine / hardwood |
| E | | 407 | Slash pine / hardwood |
| E | | 409 | Other pine / hardwood |
| | | | **Oak / Hickory Group** |
| E | | 501 | Post oak / blackjack oak |
| E | | 502 | Chestnut oak |
| E | | 503 | White oak / red oak / hickory |
| E | | 504 | White oak |
| E | | 505 | Northern red oak |
| E | | 506 | Yellow-poplar / white oak / N. red oak |
| E | | 507 | Sassafras / persimmon |
| E | | 508 | Sweetgum / yellow-poplar |
| E | | 509 | Bur oak |
| E | | 510 | Scarlet oak |
| E | | 511 | Yellow-poplar |
| E | | 512 | Black walnut |
| E | | 513 | Black locust |
| E | | 514 | Southern scrub oak |
| E | | 515 | Chestnut oak / black oak / scarlet oak |
| E | | 516 | Cherry / white ash / yellow-poplar |
| E | | 517 | Elm / ash / black locust |
| E | | 519 | Red maple / oak |
| E | | 520 | Mixed upland hardwoods |
| | | | **Oak / Gum / Cypress Group** |
| E | | 601 | Swamp chestnut oak / cherrybark oak |
| E | | 602 | Sweetgum / Nuttall oak / willow oak |
| E | | 605 | Overcup oak / water hickory |
| E | | 606 | Atlantic white-cedar |
| E | | 607 | Baldcypress / water tupelo |
| E | | 608 | Sweetbay / swamp tupelo / red maple |
| E | | 609 | Baldcypress / pondcypress |
| | | | **Elm / Ash / Cottonwood Group** |
| E | | 701 | Black ash / American elm / red maple |
| E | | 702 | River birch / sycamore |
| E | W | 703 | Cottonwood |

| East | West | Code | Species Type |
|---|---|---|---|
| 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 |

| East | West | Code | Species Type |
|---|---|---|---|
| E | W | 983 | Palms |
| | | 984 | Dry forest |
| | | 985 | Moist forest |
| | | 986 | Wet and rain forest |
| | | 987 | Lower montane rainforest |
| 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 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.).

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". Note: The NRS uses the PLANTS common names.

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | E | W | | | 0010 | ABIES | Fir spp. | | | | | Abies | spp. |
| X | | W | | | 0011 | ABAM | Pacific silver fir | | | | | Abies | amabilis |
| X | E | W | | | 0012 | ABBA | balsam fir | | | | | Abies | balsamea |
| X | | W | | | 0014 | ABBR | Santa Lucia fir, bristlecone fir | | | Santa Lucia fir | | Abies | bracteata |
| X | | W | | | 0015 | ABCO | white fir | | | | | Abies | concolor |
| X | E | | | | 0016 | ABFR | Fraser fir | | | | | Abies | fraseri |
| X | | W | | | 0017 | ABGR | grand fir | | | | | Abies | grandis |
| X | | W | | | 0018 | ABLAA | corkbark fir | | | | | Abies | lasiocarpa var. arizonica |
| X | | W | | | 0019 | ABLA | subalpine fir | | | | | Abies | lasiocarpa |
| X | | W | | | 0020 | ABMA | California red fir | | | | | Abies | magnifica |
| X | | W | | | 0021 | ABSH | Shasta red fir | | | | | Abies | shastensis |
| X | | W | | | 0022 | ABPR | noble fir | | | | | Abies | procera |
| | E | W | | | 0040 | CHAMA4 | cedar spp. | | | | | Chamaecyparis | spp. |
| X | | W | | | 0041 | CHLA | Port-Orford-cedar | | | | | Chamaecyparis | lawsoniana |
| X | | W | | | 0042 | CHNO | Alaska yellow-cedar | | | | | Chamaecyparis | nootkatensis |
| X | E | | | | 0043 | CHTH2 | Atlantic white-cedar | | | | | Chamaecyparis | thyoides |
| | | W | C | | 0050 | CUPRE | cypress | | | | | Cupressus | spp. |
| X | | W | | | 0051 | CUAR | Arizona cypress | | | | | Cupressus | arizonica |
| X | | W | | | 0052 | CUBA | Baker cypress, Modoc cypress | | | Baker cypress | | Cupressus | bakeri |
| X | | W | | | 0053 | CUFO2 | tecate cypress | | | | | Cupressus | forbesii |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X | | W | | | 0054 | CUMA2 | Monterey cypress | | | | | Cupressus | macrocarpa |
| | | W | | | 0055 | CUSA3 | Sargent's cypress | | | | | Cupressus | sargentii |
| X | | W | | | 0056 | CUMA | MacNab's cypress | | | | | Cupressus | macnabiana |
| | E | W | | | 0057 | JUNIP | redcedar, juniper spp. | | | | | Juniperus | spp. |
| X | | W | | w | 0058 | JUPI | Pinchot juniper | | | | | Juniperus | pinchotii |
| X | | W | | w | 0059 | JUCO11 | redberry juniper | | | | | Juniperus | coahuilensis |
| | E | | | w | 0060 | JUFL | drooping juniper | | | | | Juniperus | flaccida |
| X | E | | | w | 0061 | JUAS | Ashe juniper | | | | | Juniperus | ashei |
| X | | W | | w | 0062 | JUCA7 | California juniper | | | | | Juniperus | californica |
| X | | W | | w | 0063 | JUDE2 | alligator juniper | | | | | Juniperus | deppeana |
| X | | W | | | 0064 | JUOC | western juniper | | | | | Juniperus | occidentalis |
| X | | W | | w | 0065 | JUOS | Utah juniper | | | | | Juniperus | osteosperma |
| X | E | W | | w | 0066 | JUSC2 | Rocky Mountain juniper | | | | | Juniperus | scopulorum |
| | E | | | | 0067 | JUVIS | southern redcedar | | | | | Juniperus | virginiana var. silicicola |
| X | E | | | | 0068 | JUVI | eastern redcedar | | | | | Juniperus | virginiana |
| X | | W | | w | 0069 | JUMO | oneseed juniper | | | | | Juniperus | monosperma |
| | E | W | | | 0070 | LARIX | larch spp. | | | | | Larix | spp. |
| X | E | W | | | 0071 | LALA | tamarack (native) | | | | | Larix | laricina |
| X | | W | | | 0072 | LALY | subalpine larch | | | | | Larix | lyallii |
| X | | W | | | 0073 | LAOC | western larch | | | | | Larix | occidentalis |
| X | | W | | | 0081 | CADE27 | incense-cedar | | | | | Calocedrus | decurrens |
| | E | W | | | 0090 | PICEA | spruce spp. | | | | | Picea | spp. |
| X | E | | | | 0091 | PIAB | Norway spruce | | | | | Picea | abies |
| X | | W | | | 0092 | PIBR | Brewer spruce | | | | | Picea | breweriana |
| X | | W | | | 0093 | PIEN | Engelmann spruce | | | | | Picea | engelmannii |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X | E | W | | | 0094 | PIGL | white spruce | | | | | Picea | glauca |
| X | E | W | | | 0095 | PIMA | black spruce | | | | | Picea | mariana |
| X | E | W | | | 0096 | PIPU | blue spruce | | | | | Picea | pungens |
| X | E | | | | 0097 | PIRU | red spruce | | | | | Picea | rubens |
| X | | W | | | 0098 | PISI | Sitka spruce | | | | | Picea | sitchensis |
| | E | W | C | | 0100 | PINUS | pine spp. | | | | | Pinus | spp. |
| X | | W | | | 0101 | PIAL | whitebark pine | | | | | Pinus | albicaulis |
| X | | W | | | 0102 | PIAR | Rocky Mountain bristlecone pine | | | | | Pinus | aristata |
| X | | W | | | 0103 | PIAT | knobcone pine | | | | | Pinus | attenuata |
| X | | W | | | 0104 | PIBA | foxtail pine | | | | | Pinus | balfouriana |
| X | E | | | | 0105 | PIBA2 | jack pine | | | | | Pinus | banksiana |
| X | | W | | w | 0106 | PIED | Common pinyon, two-needle pinyon | | | common pinyon | | Pinus | edulis |
| X | E | | | | 0107 | PICL | sand pine | | | | | Pinus | clausa |
| X | | W | | | 0108 | PICO | lodgepole pine | | | | | Pinus | contorta |
| X | | W | | | 0109 | PICO3 | Coulter pine | | | | | Pinus | coulteri |
| X | E | | | | 0110 | PIEC2 | shortleaf pine | | | | | Pinus | echinata |
| X | E | | | | 0111 | PIEL | slash pine | | | | | Pinus | elliottii |
| X | | W | | | 0112 | PIEN2 | Apache pine | | | | | Pinus | engelmannii |
| X | | W | | | 0113 | PIFL2 | limber pine | | | | | Pinus | flexilis |
| X | | W | | | 0114 | PIST3 | southwestern white pine | | | | | Pinus | strobiformis |
| X | E | | | | 0115 | PIGL2 | spruce pine | | | | | Pinus | glabra |
| X | | W | | | 0116 | PIJE | Jeffrey pine | | | | | Pinus | jeffreyi |
| X | | W | | | 0117 | PILA | sugar pine | | | | | Pinus | lambertiana |
| X | | W | | | 0118 | PILE | Chihuahuan pine | | | | | Pinus | leiophylla |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X | | W | | | 0119 | PIMO3 | western white pine | | | | | Pinus | monticola |
| X | | W | | | 0120 | PIMU | bishop pine | | | | | Pinus | muricata |
| X | E | | | | 0121 | PIPA2 | longleaf pine | | | | | Pinus | palustris |
| X | E | W | | | 0122 | PIPO | ponderosa pine | | | | | Pinus | ponderosa |
| X | E | | | | 0123 | PIPU5 | Table Mountain pine | | | | | Pinus | pungens |
| X | | W | | | 0124 | PIRA2 | Monterey pine | | | | | Pinus | radiata |
| X | E | | | | 0125 | PIRE | red pine | | | | | Pinus | resinosa |
| X | E | | | | 0126 | PIRI | pitch pine | | | | | Pinus | rigida |
| X | | W | | | 0127 | PISA2 | gray pine, California foothill pine | | | gray pine | | Pinus | sabiniana |
| X | E | | | | 0128 | PISE | pond pine | | | | | Pinus | serotina |
| X | E | | | | 0129 | PIST | eastern white pine | | | | | Pinus | strobus |
| X | E | W | | | 0130 | PISY | Scotch pine | | | | | Pinus | sylvestris |
| X | E | | | | 0131 | PITA | loblolly pine | | | | | Pinus | taeda |
| X | E | | | | 0132 | PIVI2 | Virginia pine | | | | | Pinus | virginiana |
| X | | W | | w | 0133 | PIMO | singleleaf pinyon | | | | | Pinus | monophylla |
| X | | W | | w | 0134 | PIDI3 | border pinyon | | | | | Pinus | discolor |
| X | | W | | | 0135 | PIAR5 | Arizona pine | | | | | Pinus | arizonica |
| X | E | | | | 0136 | PINI | Austrian pine | | | | | Pinus | nigra |
| X | | W | | | 0137 | PIWA | Washoe pine | | | | | Pinus | washoensis |
| X | | W | | w | 0138 | PIQU | four-leaf pine, Parry pinyon pine | | | four-leaf pine | | Pinus | quadrifolia |
| X | | W | | | 0139 | PITO | Torrey pine | | | torreya pine | | Pinus | torreyana |
| X | | W | | w | 0140 | PICE | Mexican pinyon pine | | | | | Pinus | cembroides |
| | E | | | w | 0141 | PIRE5 | papershell pinyon pine | | | | | Pinus | remota |
| X | | W | | | 0142 | PILO | Great Basin bristlecone pine | | | | | Pinus | longaeva |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X | | W | | w | 0143 | PIMOF | Arizona pinyon pine | | | | | Pinus | monophylla var. fallax |
| X | E | | | | 0144 | PIELE2 | Caribbean pine | | | | | Pinus | elliottii var. elliottii |
| | | W | | | 0200 | PSEUD7 | Douglas-fir spp. | | | | | Pseudotsuga | spp. |
| X | | W | | | 0201 | PSMA | bigcone Douglas-fir | | | | | Pseudotsuga | macrocarpa |
| X | | W | | | 0202 | PSME | Douglas-fir | | | | | Pseudotsuga | menziesii |
| X | | W | | | 0211 | SESE3 | redwood | | | | | Sequoia | sempervirens |
| X | | W | | | 0212 | SEGI2 | giant sequoia | | | | | Sequoiadendron | giganteum |
| | E | | | | 0220 | TAXOD | cypress spp. | | | | | Taxodium | spp. |
| X | E | | | | 0221 | TADI2 | baldcypress | | | | | Taxodium | distichum |
| X | E | | | | 0222 | TAAS | pondcypress | | | | | Taxodium | ascendens |
| | E | | | | 0223 | TAMU | Montezuma baldcypress | | | | | Taxodium | mucronatum |
| | E | W | | | 0230 | TAXUS | yew spp. | | | | | Taxus | spp. |
| | | W | | | 0231 | TABR2 | Pacific yew | | | | | Taxus | brevifolia |
| X | E | | | | 0232 | TAFL | Florida yew | | | | | Taxus | floridana |
| | E | W | C | | 0240 | THUJA | Thuja spp. | | | | | Thuja | spp. |
| X | E | | | | 0241 | THOC2 | northern white-cedar | | | | | Thuja | occidentalis |
| X | | W | | | 0242 | THPL | western redcedar | | | | | Thuja | plicata |
| | E | W | | | 0250 | TORRE | torreya (nutmeg) spp. | | | | | Torreya | spp. |
| X | | W | | | 0251 | TOCA | California torreya (nutmeg) | | | | | Torreya | californica |
| X | E | | | | 0252 | TOTA | Florida torreya (nutmeg) | | | | | Torreya | taxifolia |
| | E | W | | | 0260 | TSUGA | hemlock spp. | | | | | Tsuga | spp. |
| X | E | | | | 0261 | TSCA | eastern hemlock | | | | | Tsuga | canadensis |
| X | E | | | | 0262 | TSCA2 | Carolina hemlock | | | | | Tsuga | caroliniana |
| X | | W | | | 0263 | TSHE | western hemlock | | | | | Tsuga | heterophylla |
| X | | W | | | 0264 | TSME | mountain hemlock | | | | | Tsuga | mertensiana |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X | E | W | C | | 0299 | 2TE | unknown dead conifer | | | | | Tree | evergreen |
| | E | W | C | w | 0300 | ACACI | acacia spp. | | | | | Acacia | spp. |
| | E | W | C | w | 0303 | ACFA | sweet acacia | | | | | Acacia | farnesiana |
| | E | W | | w | 0304 | ACGR | catclaw acacia | | | | | Acacia | greggii |
| | E | W | | | 0310 | ACER | maple spp. | | | | | Acer | spp. |
| X | E | | | | 0311 | ACBA3 | Florida maple | | | | | Acer | barbatum |
| X | | W | | | 0312 | ACMA3 | bigleaf maple | | | | | Acer | macrophyllum |
| X | E | W | | | 0313 | ACNE2 | boxelder | | | | | Acer | negundo |
| X | E | | | | 0314 | ACNI5 | black maple | | | | | Acer | nigrum |
| X | E | | | | 0315 | ACPE | striped maple | | | | | Acer | pensylvanicum |
| X | E | | | | 0316 | ACRU | red maple | | | | | Acer | rubrum |
| X | E | | | | 0317 | ACSA2 | silver maple | | | | | Acer | saccharinum |
| X | E | | | | 0318 | ACSA3 | sugar maple | | | | | Acer | saccharum |
| | E | | | | 0319 | ACSP2 | mountain maple | | | | | Acer | spicatum |
| | E | | | | 0320 | ACPL | Norway maple | | | | | Acer | platanoides |
| | | W | | w | 0321 | ACGL | Rocky Mountain maple | | | | | Acer | glabrum |
| | | W | | w | 0322 | ACGR3 | bigtooth maple | | | | | Acer | grandidentatum |
| X | E | | | | 0323 | ACLE | chalk maple | | | | | Acer | leucoderme |
| | E | W | | | 0330 | AESCU | buckeye, horsechestnut spp. | | | | | Aesculus | spp. |
| X | E | | | | 0331 | AEGL | Ohio buckeye | | | | | Aesculus | glabra |
| X | E | | | | 0332 | AEFL | yellow buckeye | | | | | Aesculus | flava |
| | | W | | | 0333 | AECA | California buckeye | | | | | Aesculus | californica |
| | E | | | | 0334 | AEGLA | Texas buckeye | | | | | Aesculus | glabra var. arguta |
| | E | | | | 0336 | AEPA | red buckeye | | | | | Aesculus | pavia |
| X | E | | | | 0337 | AESY | painted buckeye | | | | | Aesculus | sylvatica |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X | E | W | | | 0341 | AIAL | ailanthus | | | | | Ailanthus | altissima |
| X | E | W | | | 0345 | ALJU | mimosa/silktree | | | | | Albizia | julibrissin |
| | | W | | | 0350 | ALNUS | alder spp. | | | | | Alnus | spp. |
| X | | W | | | 0351 | ALRU2 | red alder | | | | | Alnus | rubra |
| X | | W | | | 0352 | ALRH2 | white alder | | | | | Alnus | rhombifolia |
| X | | W | | | 0353 | ALOB2 | Arizona alder | | | | | Alnus | oblongifolia |
| X | E | | | | 0355 | ALGL2 | European alder | | | | | Alnus | glutinosa |
| | E | W | | | 0356 | AMELA | serviceberry spp. | | | | | Amelanchier | spp. |
| | E | W | | | 0357 | AMAR3 | common serviceberry | | | | | Amelanchier | arborea |
| | E | W | | | 0358 | AMSA | roundleaf serviceberry | | | | | Amelanchier | sanguinea |
| | | W | | | 0360 | ARBUT | Madrone spp. | | | | | Arbutus | spp. |
| X | | W | | | 0361 | ARME | Pacific madrone | | | | | Arbutus | menziesii |
| X | | W | | | 0362 | ARAR2 | Arizona madrone | | | | | Arbutus | arizonica |
| | E | W | | w | 0363 | ARXA80 | Texas madrone | | | | | Arbutus | xalapensis |
| X | E | | | | 0367 | ASTR | Pawpaw | | | | | Asimina | triloba |
| | E | W | | | 0370 | BETUL | birch spp. | | | | | Betula | spp. |
| X | E | | | | 0371 | BEAL2 | yellow birch | | | | | Betula | alleghaniensis |
| X | E | | | | 0372 | BELE | sweet birch | | | | | Betula | lenta |
| X | E | | | | 0373 | BENI | river birch | | | | | Betula | nigra |
| X | E | W | | | 0374 | BEOC2 | water birch | | | | | Betula | occidentalis |
| X | E | W | | | 0375 | BEPA | paper birch | | | | | Betula | papyrifera |
| X | E | | | | 0377 | BEUB | Virginia roundleaf birch | | | | | Betula | uber |
| X | | W | | | 0378 | BEUT | northwestern paper birch | | | | | Betula | X utahensis |
| X | E | | | | 0379 | BEPO | gray birch | | | | | Betula | populifolia |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | E | | | | 0381 | SILAL3 | Chittamwood, gum bumelia | | | | | Sideroxylon | lanuginosum ssp. lanuginosum |
| X | E | | | | 0391 | CACA18 | American hornbeam, musclewood | | | | | Carpinus | caroliniana |
| | E | | | | 0400 | CARYA | hickory spp. | | | | | Carya | spp. |
| X | E | | | | 0401 | CAAQ2 | water hickory | | | | | Carya | aquatica |
| X | E | | | | 0402 | CACO15 | bitternut hickory | | | | | Carya | cordiformis |
| X | E | | | | 0403 | CAGL8 | pignut hickory | | | | | Carya | glabra |
| X | E | | | | 0404 | CAIL2 | pecan | | | | | Carya | illinoinensis |
| X | E | | | | 0405 | CALA21 | shellbark hickory | | | | | Carya | laciniosa |
| X | E | | | | 0406 | CAMY | nutmeg hickory | | | | | Carya | myristiciformis |
| X | E | | | | 0407 | CAOV2 | shagbark hickory | | | | | Carya | ovata |
| X | E | | | | 0408 | CATE9 | black hickory | | | | | Carya | texana |
| X | E | | | | 0409 | CAAL27 | mockernut hickory | | | | | Carya | alba |
| X | E | | | | 0410 | CAPA24 | sand hickory | | | | | Carya | pallida |
| X | E | | | | 0411 | CAFL6 | scrub hickory | | | | | Carya | floridana |
| X | E | | | | 0412 | CAOV3 | red hickory | | | | | Carya | ovalis |
| X | E | | | | 0413 | CACA38 | southern shagbark hickory | | | | | Carya | carolinae-septentrionalis |
| | E | W | | | 0420 | CASTA | chestnut spp. | | | | | Castanea | spp. |
| | E | | | | 0421 | CADE12 | American chestnut | | | | | Castanea | dentata |
| X | E | | | | 0422 | CAPU9 | Allegheny chinkapin | | | | | Castanea | pumila |
| | E | | | | 0423 | CAPUO | Ozark chinkapin | | | | | Castanea | pumila var. ozarkensis |
| X | E | W | | | 0424 | CAMO83 | Chinese chestnut | | | | | Castanea | mollissima |
| | | W | | | 0431 | CHCHC4 | giant chinkapin, golden chinkapin | | | | | Chrysolepis | chrysophylla var. chrysophylla |
| | E | | C | | 0450 | CATAL | catalpa spp. | | | | | Catalpa | spp. |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X | E | | | | 0451 | CABI8 | southern catalpa | | | | | Catalpa | bignonioides |
| X | E | | | | 0452 | CASP8 | northern catalpa | | | | | Catalpa | speciosa |
| | E | W | C | | 0460 | CELTI | hackberry spp. | | | | | Celtis | spp. |
| X | E | W | | | 0461 | CELA | sugarberry | | | | | Celtis | laevigata |
| X | E | W | | | 0462 | CEOC | hackberry | | | | | Celtis | occidentalis |
| | E | W | | | 0463 | CELAR | netleaf hackberry | | | | | Celtis | laevigata var. reticulata |
| X | E | | | | 0471 | CECA4 | eastern redbud | | | | | Cercis | canadensis |
| | | W | | w | 0475 | CELE3 | curlleaf mountain-mahogany | | | | | Cercocarpus | ledifolius |
| X | E | | | | 0481 | CLKE | yellowwood | | | | | Cladrastis | kentukea |
| | E | W | | | 0490 | CORNU | dogwood spp. | | | | | Cornus | spp. |
| X | E | | | | 0491 | COFL2 | flowering dogwood | | | | | Cornus | florida |
| X | | W | | | 0492 | CONU4 | Pacific dogwood | | | | | Cornus | nuttallii |
| | E | | | | 0500 | CRATA | hawthorn spp. | | | | | Crataegus | spp. |
| | E | | | | 0501 | CRCR2 | cockspur hawthorn | | | | | Crataegus | crus-galli |
| | E | | | | 0502 | CRMO2 | downy hawthorn | | | | | Crataegus | mollis |
| | E | | | | 0503 | CRBR3 | Brainerd hawthorn | | | | | Crataegus | brainerdii |
| | E | | | | 0504 | CRCA | pear hawthorn | | | | | Crataegus | calpodendron |
| | E | | | | 0505 | CRCH | fireberry hawthorn | | | | | Crataegus | chrysocarpa |
| | E | | | | 0506 | CRDI | broadleaf hawthorn | | | | | Crataegus | dilatata |
| | E | | | | 0507 | CRFL | fanleaf hawthorn | | | | | Crataegus | flabellata |
| | E | | | | 0508 | CRMO3 | oneseed hawthorn | | | | | Crataegus | monogyna |
| | E | | | | 0509 | CRPE | scarlet hawthorn | | | | | Crataegus | pedicellata |
| | E | | | | 5091 | CRPH | Washington hawthorn | | | | | Crataegus | phaenopyrum |
| | E | | | | 5092 | CRSU5 | fleshy hawthorn | | | | | Crataegus | succulenta |
| | E | | | | 5093 | CRUN | dwarf hawthorn | | | | | Crataegus | uniflora |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | E | W | C | | 0510 | EUCAL | eucalyptus spp. | | | | | Eucalyptus | spp. |
| X | | W | | | 0511 | EUGL | Tasmanian bluegum | | | Tasmanian bluegum, eucalyptus | | Eucalyptus | globulus |
| X | E | | | | 0512 | EUCA2 | river redgum | | | | | Eucalyptus | camaldulensis |
| X | E | | C | | 0513 | EUGR12 | grand eucalyptus | | | | | Eucalyptus | grandis |
| X | E | | C | | 0514 | EURO2 | swamp mahogany | | | | | Eucalyptus | robusta |
| | E | | C | | 0520 | DIOSP | persimmon spp. | | | | | Diospyros | spp. |
| X | E | | | | 0521 | DIVI5 | common persimmon | | | | | Diospyros | virginiana |
| X | E | | | | 0522 | DITE3 | Texas persimmon | | | | | Diospyros | texana |
| | E | | | w | 0523 | EHAN | Anacua | knockaway | | | | Ehretia | anacua |
| X | E | | | | 0531 | FAGR | American beech | | | | | Fagus | grandifolia |
| | E | W | C | | 0540 | FRAXI | ash spp. | | | | | Fraxinus | spp. |
| X | E | | | | 0541 | FRAM2 | white ash | | | | | Fraxinus | americana |
| X | | W | | | 0542 | FRLA | Oregon ash | | | | | Fraxinus | latifolia |
| X | E | | | | 0543 | FRNI | black ash | | | | | Fraxinus | nigra |
| X | E | | | | 0544 | FRPE | green ash | | | | | Fraxinus | pennsylvanica |
| X | E | | | | 0545 | FRPR | pumpkin ash | | | | | Fraxinus | profunda |
| X | E | | | | 0546 | FRQU | blue ash | | | | | Fraxinus | quadrangulata |
| X | | W | | | 0547 | FRVE2 | velvet ash | | | | | Fraxinus | velutina |
| X | E | | | | 0548 | FRCA3 | Carolina ash | | | | | Fraxinus | caroliniana |
| X | E | | | | 0549 | FRTE | Texas ash | | | | | Fraxinus | texensis |
| | E | | | | 5491 | FRBE | Berlandier ash | Mexican ash | | | | Fraxinus | berlandieriana |
| | E | | | | 0550 | GLEDI | locust spp. | | | | | Gleditsia | spp. |
| X | E | | | | 0551 | GLAQ | waterlocust | | | | | Gleditsia | aquatica |
| X | E | | | | 0552 | GLTR | honeylocust | | | | | Gleditsia | triacanthos |
| X | E | | | | 0555 | GOLA | loblolly bay | | | | | Gordonia | lasianthus |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X | E | W | | | 0561 | GIBI2 | Ginkgo, maidenhair tree | | | | | Ginkgo | biloba |
| X | E | | | | 0571 | GYDI | Kentucky coffeetree | | | | | Gymnocladus | dioicus |
| | E | | | | 0580 | HALES | silverbell spp. | | | | | Halesia | spp. |
| X | E | | | | 0581 | HACA3 | Carolina silverbell | | | | | Halesia | carolina |
| X | E | | | | 0582 | HADI3 | two-wing silverbell | | | | | Halesia | diptera |
| X | E | | | | 0583 | HAPA2 | little silverbell | | | | | Halesia | parviflora |
| X | E | | | | 0591 | ILOP | American holly | | | | | Ilex | opaca |
| | E | W | C | | 0600 | JUGLA | walnut spp. | | | | | Juglans | spp. |
| X | E | | | | 0601 | JUCI | butternut | | | | | Juglans | cinerea |
| X | E | W | | | 0602 | JUNI | black walnut | | | | | Juglans | nigra |
| | | W | | | 0603 | JUHI | Northern California black walnut | | | California black walnut | | Juglans | hindsii |
| X | | W | | | 0604 | JUCA | Southern California black walnut | | | | | Juglans | californica |
| | E | W | | | 0605 | JUMI | Texas walnut | | | | | Juglans | microcarpa |
| X | | W | | | 0606 | JUMA | Arizona walnut | | | | | Juglans | major |
| X | E | | | | 0611 | LIST2 | sweetgum | | | | | Liquidambar | styraciflua |
| X | E | | | | 0621 | LITU | yellow-poplar | | | | | Liriodendron | tulipifera |
| X | | W | | | 0631 | LIDE3 | tanoak | | | | | Lithocarpus | densiflorus |
| X | E | | | | 0641 | MAPO | Osage-orange | | | | | Maclura | pomifera |
| | E | | C | | 0650 | MAGNO | magnolia spp. | | | | | Magnolia | spp. |
| X | E | | | | 0651 | MAAC | cucumbertree | | | | | Magnolia | acuminata |
| X | E | | | | 0652 | MAGR4 | southern magnolia | | | | | Magnolia | grandiflora |
| X | E | | | | 0653 | MAVI2 | sweetbay | | | | | Magnolia | virginiana |
| X | E | | | | 0654 | MAMA2 | bigleaf magnolia | | | | | Magnolia | macrophylla |
| X | E | | | | 0655 | MAFR | mountain magnolia, Fraser magnolia | | | mountain magnolia | | Magnolia | fraseri |
| X | E | | | | 0657 | MAPY | pyramid magnolia | | | | | Magnolia | pyramidata |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X | E | | | | 0658 | MATR | umbrella magnolia | | | | | Magnolia | tripetala |
| | E | W | | | 0660 | MALUS | apple spp. | | | | | Malus | spp. |
| X | | W | | | 0661 | MAFU | Oregon crabapple | | | Oregon crab apple | | Malus | fusca |
| X | E | | | | 0662 | MAAN3 | southern crabapple | | | | | Malus | angustifolia |
| X | E | | | | 0663 | MACO5 | sweet crabapple | | | | | Malus | coronaria |
| X | E | | | | 0664 | MAIO | prairie crabapple | | | | | Malus | ioensis |
| | E | | C | | 0680 | MORUS | mulberry spp. | | | | | Morus | spp. |
| X | E | | C | | 0681 | MOAL | white mulberry | | | | | Morus | alba |
| X | E | | | | 0682 | MORU2 | red mulberry | | | | | Morus | rubra |
| | E | W | | | 0683 | MOMI | Texas mulberry | | | | | Morus | microphylla |
| X | E | | C | | 0684 | MONI | black mulberry | | | | | Morus | nigra |
| | E | | | | 0690 | NYSSA | tupelo spp. | | | | | Nyssa | spp. |
| X | E | | | | 0691 | NYAQ2 | water tupelo | | | | | Nyssa | aquatica |
| X | E | | | | 0692 | NYOG | Ogeechee tupelo | | | | | Nyssa | ogeche |
| X | E | | | | 0693 | NYSY | blackgum | | | | | Nyssa | sylvatica |
| X | E | | | | 0694 | NYBI | swamp tupelo | | | | | Nyssa | biflora |
| X | E | | | | 0701 | OSVI | eastern hophornbeam | | | | | Ostrya | virginiana |
| X | E | | | | 0711 | OXAR | sourwood | | | | | Oxydendrum | arboreum |
| X | E | | | | 0712 | PATO2 | paulownia, empress-tree | | | | | Paulownia | tomentosa |
| | E | W | C | | 0720 | PERSE | bay spp. | | | | | Persea | spp. |
| X | E | | | | 0721 | PEBO | redbay | | | | | Persea | borbonia |
| X | | W | C | | 7211 | PEAM3 | avocado | | | | | Persea | americana |
| X | E | | | | 0722 | PLAQ | water-elm, planertree | | | | | Planera | aquatica |
| | E | W | | | 0729 | PLATA | sycamore spp. | | | | | Platanus | spp. |
| X | | W | | | 0730 | PLRA | California sycamore | | | | | Platanus | racemosa |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X | E | | | | 0731 | PLOC | American sycamore | | | | | Platanus | occidentalis |
| X | | W | | | 0732 | PLWR2 | Arizona sycamore | | | | | Platanus | wrightii |
| | E | W | | | 0740 | POPUL | cottonwood and poplar spp. | | | | | Populus | spp. |
| X | E | W | | | 0741 | POBA2 | balsam poplar | | | | | Populus | balsamifera |
| X | E | | | | 0742 | PODE3 | eastern cottonwood | | | | | Populus | deltoides |
| X | E | | | | 0743 | POGR4 | bigtooth aspen | | | | | Populus | grandidentata |
| X | E | | | | 0744 | POHE4 | swamp cottonwood | | | | | Populus | heterophylla |
| X | E | W | | | 0745 | PODEM | plains cottonwood | | | | | Populus | deltoides ssp. monilifera |
| X | E | W | | | 0746 | POTR5 | quaking aspen | | | | | Populus | tremuloides |
| X | | W | | | 0747 | POBAT | black cottonwood | | | | | Populus | balsamifera ssp. trichocarpa |
| X | | W | | | 0748 | POFR2 | Fremont cottonwood | | Rio Grande cottonwood, Fremont's poplar | | | Populus | fremontii |
| X | | W | | | 0749 | POAN3 | narrowleaf cottonwood | | | | | Populus | angustifolia |
| X | E | | | | 0752 | POAL7 | silver poplar | | | | | Populus | alba |
| X | E | | | | 0753 | PONI | Lombardy poplar | | | | | Populus | nigra |
| | E | W | C | w | 0755 | PROSO | mesquite spp. | | | | | Prosopis | spp. |
| X | E | W | | w | 0756 | PRGL2 | honey mesquite | | western honey mesquite | western honey mesquite | | Prosopis | glandulosa |
| X | E | W | | w | 0757 | PRVE | velvet mesquite | | | | | Prosopis | velutina |
| X | E | W | | w | 0758 | PRPU | screwbean mesquite | | | | | Prosopis | pubescens |
| | E | W | C | | 0760 | PRUNU | cherry and plum spp. | | | | | Prunus | spp. |
| | E | W | | | 0761 | PRPE2 | pin cherry | | | | | Prunus | pensylvanica |
| X | E | | | | 0762 | PRSE2 | black cherry | | | | | Prunus | serotina |
| | E | W | | | 0763 | PRVI | common chokecherry | | | chokecherry | | Prunus | virginiana |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | E | | | | 0764 | PRPE3 | peach | | | | | Prunus | persica |
| X | E | | | | 0765 | PRNI | Canada plum | | | | | Prunus | nigra |
| X | E | | | | 0766 | PRAM | American plum | | | wild plum | | Prunus | americana |
| | | W | | | 0768 | PREM | bitter cherry | | | | | Prunus | emarginata |
| | E | | | | 0769 | PRAL5 | Allegheny plum | | | | | Prunus | alleghaniensis |
| | E | W | | | 0770 | PRAN3 | Chickasaw plum | | | | | Prunus | angustifolia |
| X | E | | | | 0771 | PRAV | sweet cherry (domesticated) | | | | | Prunus | avium |
| | E | | | | 0772 | PRCE | sour cherry (domesticated) | | | | | Prunus | cerasus |
| | E | | | | 0773 | PRDO | European plum (domesticated) | | | | | Prunus | domestica |
| | E | | | | 0774 | PRMA | Mahaleb plum (domesticated) | | | | | Prunus | mahaleb |
| | E | W | | | 0800 | QUERC | oak spp. | | | | | Quercus | spp. |
| X | | W | | | 0801 | QUAG | California live oak | | | coast live oak | | Quercus | agrifolia |
| X | E | | | | 0802 | QUAL | white oak | | | | | Quercus | alba |
| X | | W | | w | 0803 | QUAR | Arizona white oak | | | Arizona white and gray oak | | Quercus | arizonica |
| X | E | | | | 0804 | QUBI | swamp white oak | | | | | Quercus | bicolor |
| | | W | | | 0805 | QUCH2 | canyon live oak | | | | | Quercus | chrysolepis |
| X | E | | | | 0806 | QUCO2 | scarlet oak | | | | | Quercus | coccinea |
| X | | W | | | 0807 | QUDO | blue oak | | | | | Quercus | douglasii |
| X | E | | | | 0808 | QUSIS | Durand oak | | | | | Quercus | sinuata var. sinuata |
| X | E | | | | 0809 | QUEL | northern pin oak | | | | | Quercus | ellipsoidalis |
| X | | W | | w | 0810 | QUEM | Emory oak | | | | | Quercus | emoryi |
| X | | W | | | 0811 | QUEN | Engelmann oak | | | | | Quercus | engelmannii |
| X | E | | | | 0812 | QUFA | southern red oak | | | | | Quercus | falcata |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X | E | | | | 0813 | QUPA5 | cherrybark oak | | | | | Quercus | pagoda |
| X | | W | | w | 0814 | QUGA | Gambel oak | | | | | Quercus | gambelii |
| X | | W | | | 0815 | QUGA4 | Oregon white oak | | | | | Quercus | garryana |
| X | E | | | | 0816 | QUIL | scrub oak | | | | | Quercus | ilicifolia |
| X | E | | | | 0817 | QUIM | shingle oak | | | | | Quercus | imbricaria |
| X | | W | | | 0818 | QUKE | California black oak | | | | | Quercus | kelloggii |
| X | E | | | | 0819 | QULA2 | turkey oak | | | | | Quercus | laevis |
| X | E | | | | 0820 | QULA3 | laurel oak | | | | | Quercus | laurifolia |
| X | | W | | | 0821 | QULO | California white oak | | | | | Quercus | lobata |
| X | E | | | | 0822 | QULY | overcup oak | | | | | Quercus | lyrata |
| X | E | | | | 0823 | QUMA2 | bur oak | | | | | Quercus | macrocarpa |
| X | E | | | | 0824 | QUMA3 | blackjack oak | | | | | Quercus | marilandica |
| X | E | | | | 0825 | QUMI | swamp chestnut oak | | | | | Quercus | michauxii |
| X | E | | | | 0826 | QUMU | chinkapin oak | | | | | Quercus | muehlenbergii |
| X | E | | | | 0827 | QUNI | water oak | | | | | Quercus | nigra |
| X | E | | | | 0828 | QUTE | Nuttall oak, Texas red oak | | | | | Quercus | texana |
| X | | W | | w | 0829 | QUOB | Mexican blue oak | | | | | Quercus | oblongifolia |
| X | E | | | | 0830 | QUPA2 | pin oak | | | | | Quercus | palustris |
| X | E | | | | 0831 | QUPH | willow oak | | | | | Quercus | phellos |
| X | E | | | | 0832 | QUPR2 | chestnut oak | | | | | Quercus | prinus |
| X | E | | | | 0833 | QURU | northern red oak | | | | | Quercus | rubra |
| X | E | | | | 0834 | QUSH | Shumard’s oak | | | Shumard oak | | Quercus | shumardii |
| X | E | | | | 0835 | QUST | post oak | | | | | Quercus | stellata |
| | E | | | | 0836 | QUSI2 | Delta post oak | | | | | Quercus | similis |
| X | E | | | | 0837 | QUVE | black oak | | | | | Quercus | velutina |
| X | E | | | | 0838 | QUVI | live oak | | | | | Quercus | virginiana |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X | | W | | | 0839 | QUWI2 | interior live oak | | | | | Quercus | wislizeni |
| X | E | | | | 0840 | QUMA6 | dwarf post oak | | | | | Quercus | margarettae |
| X | E | | | | 0841 | QUMI2 | dwarf live oak | | | | | Quercus | minima |
| X | E | | | | 0842 | QUIN | bluejack oak | | | | | Quercus | incana |
| X | | W | | w | 0843 | QUHY | silverleaf oak | | | | | Quercus | hypoleucoides |
| X | E | | | | 0844 | QUOG | Oglethorpe oak | | | | | Quercus | oglethorpensis |
| | E | | | | 0845 | QUPR | dwarf chinkapin oak | | | | | Quercus | prinoides |
| X | | W | | w | 0846 | QUGR3 | gray oak | | | | | Quercus | grisea |
| X | | W | | w | 0847 | QURU4 | netleaf oak | | | | | Quercus | rugosa |
| | E | | | | 0851 | QUGR | Chisos oak | | | | | Quercus | graciliformis |
| | 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 | | | | Quercus | buckleyi |
| | E | | | | 8514 | QULA | lacey oak | | | | | Quercus | laceyi |
| | E | | C | | 0852 | AMEL | torchwood | | | | sea torch-wood | Amyris | elemifera |
| | E | | C | | 0853 | ANGL4 | pond apple | | | | | Annona | glabra |
| | E | | C | | 0854 | BUSI | gumbo limbo | | | | | Bursera | simaruba |
| | E | | C | | 0855 | CASUA | sheoak spp. | | | | | Casuarina | spp. |
| X | E | | C | | 0856 | CAGL11 | gray sheoak | | | | | Casuarina | glauca |
| X | E | | C | | 0857 | CALE28 | Australian pine | | | | Casuarina lepidophloia | Casuarina | lepidophloia |
| | E | | C | | 0858 | CICA | camphor tree | | | | | Cinnamomum | camphora |
| | E | | C | | 0859 | CIFR | fiddlewood | | | | | Citharexylum | fruticosum |
| | E | | C | | 0860 | CITRU2 | citrus spp. | | | | | Citrus | spp. |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | E | | C | | 0863 | CODI8 | pigeon plum, tietongue | | | | tietongue | Coccoloba | diversifolia |
| | E | | C | | 0864 | COEL2 | soldierwood | | | | | Colubrina | elliptica |
| | E | | C | | 0865 | COSE2 | geiger tree | | | | largeleaf geigertree | Cordia | sebestena |
| | E | | | | 8651 | COBO2 | anacahuita | Texas olive | | | | Cordia | boissieri |
| | E | | | | 0866 | CUAN4 | carrotwood | | | | | Cupaniopsis | anacardioides |
| | E | | | w | 0867 | COHO | bluewood | Brazilian bluewood | | | | Condalia | hookeri |
| | E | | | | 0868 | EBEB | blackbead ebony | Texas ebony | | | | Ebenopsis | ebano |
| | E | | | | 0869 | LEPU3 | great leucaena | great leadtree | | | | Leucaena | pulverulenta |
| | E | | | | 0870 | SOAF | Texas sophora | Eve's necklacepod | | | | Sophora | affinis |
| | E | | C | | 0873 | EURH | red stopper | | | | | Eugenia | rhombea |
| | E | | C | | 0874 | EXPA | Inkwood, butterbough | | | | butterbough | Exothea | paniculata |
| | E | | | | 0876 | FIAU | strangler fig | | | | | Ficus | aurea |
| | E | | C | | 0877 | FICI | shortleaf fig, wild banyantree | | | | wild banyantree | Ficus | citrifolia |
| | E | | C | | 0882 | GUDI | Blolly, beeftree | | | | beeftree | Guapira | discolor |
| | E | | C | | 0883 | HIMA2 | manchineel | | | | | Hippomane | mancinella |
| | E | | C | | 0884 | LYLA3 | false tamarind | | | | | Lysiloma | latisiliquum |
| | E | | C | | 0885 | MAIN3 | mango | | | | | Mangifera | indica |
| | E | | C | | 0886 | METO3 | poisonwood | | | | Florida poisontree | Metopium | toxiferum |
| | E | | | | 0887 | PIPI3 | fishpoison tree | | | | | Piscidia | piscipula |
| | E | | C | | 0888 | SCAC2 | schefflera, octopus tree | | | | schefflera actinophylla | Schefflera | actinophylla |
| | E | | C | | 0890 | SIFO | false mastic | | | | | Sideroxylon | foetidissimum |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | E | | C | | 0891 | SISA6 | white bully, willow bustic | | | | | Sideroxylon | salicifolium |
| | E | | | | 0895 | SIGL3 | paradise tree | | | | | Simarouba | glauca |
| | E | | | | 0896 | SYCU | Java plum | | | | | Syzygium | cumini |
| | E | | C | | 0897 | TAIN2 | tamarind | | | | | Tamarindus | indica |
| X | E | W | | | 0901 | ROPS | black locust | | | | | Robinia | pseudoacacia |
| | | W | | w | 0902 | RONE | New Mexico locust | | | | | Robinia | neomexicana |
| | E | | | | 0906 | ACWR4 | paurotis palm | | | | | Acoelorraphe | wrightii |
| | E | | | | 0907 | COAR | silver palm | | | | | Coccothrinax | argentata |
| | E | | C | | 0908 | CONU | coconut palm | | | | | Cocos | nucifera |
| | E | | C | | 0909 | ROYST | royal palm spp. | | | | | Roystonea | spp. |
| | E | | | | 0911 | SAME8 | Mexican palmetto | Rio Grande palmetto | | | | Sabal | mexicana |
| X | E | | | | 0912 | SAPA | cabbage palmetto | | | | | Sabal | palmetto |
| | E | | C | | 0913 | THMO4 | key thatch palm | | | | | Thrinax | morrisii |
| | E | | | | 0914 | THRA2 | Florida thatch palm | | | | | Thrinax | radiata |
| | E | | | | 0915 | ARECA | other palms | | | | | Family Arecaceae | not listed above |
| | E | W | | | 0919 | SASAD | western soapberry | | | | | Sapindus | saponaria var. drummondii |
| | E | W | C | | 0920 | SALIX | willow spp. | | | | | Salix | spp. |
| | E | W | | | 0921 | SAAM2 | peachleaf willow | | | | | Salix | amygdaloides |
| | E | W | | | 0922 | SANI | black willow | | | | | Salix | nigra |
| | E | W | | | 0923 | SABE2 | Bebb willow | | | | | Salix | bebbiana |
| | | W | | | 0924 | SABO | red willow | | | | | Salix | bonplandiana |
| X | E | | | | 0925 | SACA5 | coastal plain willow | | | | | Salix | caroliniana |
| X | E | | | | 0926 | SAPY | balsam willow | | | | | Salix | pyrifolia |
| | E | W | | | 0927 | SAAL2 | white willow | | | | | Salix | alba |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | W | | | 0928 | SASC | Scouler's willow | | | | | Salix | scouleriana |
| X | E | | | | 0929 | SASE10 | weeping willow | | | | | Salix | sepulcralis |
| X | E | | | | 0931 | SAAL5 | sassafras | | | | | Sassafras | albidum |
| | E | | | | 0934 | SORBU | mountain ash spp. | | | | | Sorbus | spp. |
| | E | | | | 0935 | SOAM3 | American mountain ash | | | | | Sorbus | americana |
| X | E | | | | 0936 | SOAU | European mountain ash | | | | | Sorbus | aucuparia |
| X | E | | | | 0937 | SODE3 | northern mountain ash | | | | | Sorbus | decora |
| | E | | C | | 0940 | SWMA2 | mahogany | | | | | Swietenia | mahagoni |
| | E | | | | 0950 | TILIA | basswood spp. | | | | | Tilia | spp. |
| X | E | | | | 0951 | TIAM | American basswood | | | | | Tilia | americana |
| | E | | | | 0952 | TIAMH | white basswood | | | | | Tilia | americana var. heterophylla |
| | E | | | | 0953 | TIAMC | Carolina basswood | | | | | Tilia | americana var. caroliniana |
| | E | | | | 0970 | ULMUS | elm spp. | | | | | Ulmus | spp. |
| X | E | | | | 0971 | ULAL | winged elm | | | | | Ulmus | alata |
| X | E | | | | 0972 | ULAM | American elm | | | | | Ulmus | americana |
| X | E | | | | 0973 | ULCR | cedar elm | | | | | Ulmus | crassifolia |
| X | E | | | | 0974 | ULPU | Siberian elm | | | | | Ulmus | pumila |
| X | E | | | | 0975 | ULRU | slippery elm | | | | | Ulmus | rubra |
| X | E | | | | 0976 | ULSE | September elm | | | | | Ulmus | serotina |
| X | E | | | | 0977 | ULTH | rock elm | | | | | Ulmus | thomasii |
| X | | W | | | 0981 | UMCA | California laurel | | | | | Umbellularia | californica |
| | | W | | | 0982 | YUBR | Joshua tree | | | | | Yucca | brevifolia |
| | E | | C | | 0986 | AVGE | black mangrove | | | | | Avicennia | germinans |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | E | | C | | 0987 | COER2 | buttonwood mangrove | | | | button mangrove | Conocarpus | erectus |
| | E | | C | | 0988 | LARA2 | white mangrove | | | | | Laguncularia | racemosa |
| X | E | | C | | 0989 | RHMA2 | American mangrove | | | | red mangrove | Rhizophora | mangle |
| | | W | | w | 0990 | OLTE | desert ironwood | | | tesota, Arizona-ironwood | | Olneya | tesota |
| | E | W | C | | 0991 | TAMAR2 | saltcedar | | | | | Tamarix | spp. |
| X | E | | C | | 0992 | MEQU | melaleuca | | | | punktree | Melaleuca | quinquenervia |
| X | E | | C | | 0993 | MEAZ | chinaberry | | | | Chinaberry-tree | Melia | azedarach |
| X | E | | | | 0994 | TRSE6 | Chinese tallowtree | | | | | Triadica | sebifera |
| X | E | | | | 0995 | VEFO | tungoil tree | | | | | Vernicia | fordii |
| X | E | | | | 0996 | COOB2 | smoketree | | | | | Cotinus | obovatus |
| | E | W | | | 0997 | ELAN | Russian-olive | | | | | Elaeagnus | angustifolia |
| X | E | W | C | | 0998 | 2TB | unknown dead hardwood | | | | | Tree | broadleaf |
| X | E | W | C | | 0999 | 2TREE | other, or unknown live tree | | | | | Tree | unknown |
| | | | 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 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | C | | 6028 | ADPA | red beadtree | | | | | Adenanthera | pavonina |
| | | | C | | 6032 | AEMA | Caribbean spiritweed | | | | | Aegiphila | martinicensis |
| | | | 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 |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |
| | | | 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 |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |
| | | | C | | 6427 | CAGU3 | goatwood | | | | | Cassipourea | guianensis |
| | | | C | | 6429 | CAER3 | goatbush | | | | | Castela | erecta |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 | grapefruit | | | | | Citrus | ×aurantiifolia |
| | | | C | | 6574 | CIAU8 | Citrus ×aurantium | | | | | Citrus | ×aurantium |
| | | | C | | 6575 | CILI5 | shaddock | | | | | Citrus | ×limon |
| | | | C | | 6576 | CIPA3 | citron | | | | | Citrus | ×paradisi |
| | | | C | | 6577 | CISI3 | tangerine | | | | | 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 |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |
| | | | 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 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |
| | | | 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 |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | C | | 7093 | EUSE9 | serrasuela | | | | | Eugenia | serrasuela |
| | | | C | | 7094 | EUSE10 | sessileleaf stopper | | | | | Eugenia | sessiliflora |
| | | | C | | 7098 | EUST3 | Stahl's stopper | | | | | Eugenia | stahlii |
| | | | 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 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |
| | | | 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 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 | | | | | Guajacum | officinale |
| | | | C | | 7280 | GUSA | holywood | | | | | Guajacum | 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 |
| | | | 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 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |
| | | | C | | 7506 | KLHO | guest tree | | | | | Kleinhovia | hospita |
| | | | C | | 7508 | KOPO | Koanophyllon polyodon | | | | | Koanophyllon | polyodon |
| | | | C | | 7514 | KRFE | leadwood | | | | | Krugiodendron | ferreum |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |
| | | | 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 |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |
| | | | 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 |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |
| | | | 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 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |
| | | | C | | 8529 | SASA4 | wingleaf soapberry | | | | | Sapindus | saponaria |
| | | | 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 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | C | | 8644 | SPCA2 | African tuliptree | | | | | Spathodea | campanulata |
| | | | C | | 8649 | SPDU3 | Spondias dulcis | | | | | Spondias | dulcis |
| | | | C | | 8650 | SPMO | yellow mombin | | | | | Spondias | mombin |
| | | | 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 |
| | | | 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 |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | C | | 8744 | TEGR | teak | | | | | Tectona | grandis |
| | | | C | | 8748 | TERMI | tropical almond | | | | | Terminalia | spp. |
| | | | C | | 8750 | TECA | troipical 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. |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |

| Core | East | West | Caribbean | Woodland | FIA Code | PLANTS Code | Common Name | Common name SRS | Common name RMRS | Common name PNWRS | Common name Caribbean | Genus | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 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 |
| | | | 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 |

**Appendix 4. Was previously: Site Tree Selection Criteria and Species List** (This information is now located in 7.2.2 SPECIES)

## 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: 5$^{th}$ row, 1$^{st}$ 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 $\geq$ 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 $0^{o}$ azimuth from the subplot center. If this location is unsuitable, consider in order locations at azimuth $120^{o}$, and $240^{o}$. 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 |

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** |
| 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 |

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** |
| 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 |

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** |
| 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 |
| 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 |

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** |
| 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 |

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+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 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 |

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** |
| 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 |

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** |
| 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 |

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** |
| 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 |
| 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 |

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** |
| 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 |

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+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 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 |

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** |
| 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 |

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** |
| 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 |

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** |
| 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 |
| 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 |

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** |
| 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 |

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+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 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 |

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+** |
| 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 |
| 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 |

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+** |
| 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.

**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.

**Blind check** – a re-installation of a production plot done by a qualified crew without production crew data on hand. A full re-installation of the plot is recommended for the purpose of obtaining a measure of uncertainty in the data. If a full plot re-installation is not possible, then full subplots will

be completed with a minimum of 15 total trees being remeasured. All plot-level information (e.g., boundary and condition information) will be collected on each blind check plot. The two data sets are maintained separately. Discrepancies between the two sets of data are not reconciled. Blind checks are done on production plots only.

**Bole** – The main stem of a tree, extending from one foot above the ground to the point on the tree where DOB reaches 4 inches.

**Botched plot** – A plot that should not be included in the standard inventory data base due to data collection errors or other problems.

**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.

**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.

**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.

**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.

**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.

**RESERVE STATUS** – An indication of whether the land in a condition has been reserved.

**Saplings** – Live trees 1.0 to 4.9 inches DBH.

**Seedlings** – Conifer seedlings must be at least 6.0 inches in length and less than 1.0 inch at DBH/DRC in order to qualify for tallying. Hardwood seedlings must be at least 12.0 inches in length and less than 1.0 inch at DBH/DRC in order to qualify for tallying. For woodland species, each stem on a single tree must be less than 1.0 inch in DRC.

**Softwoods** – Coniferous trees, usually evergreen having needles or scale-like leaves.

**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.

## Appendix 7. Tolerance / MQO / Value / Units 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 |
|---|---|---|---|---|
| **General Description** | | | | |
| New Subplot Location | +/- 7 feet | At least 95% of the time | n/a | feet |
| New Microplot Location | +/- 1 foot | At least 95% of the time | n/a | feet |
| **Plot Level Data** | | | | |
| STATE | No errors | At least 99% of the time | Appendix 1 | n/a |
| COUNTY | No errors | At least 99% of the time | Appendix 1 | n/a |
| PLOT NUMBER | No errors | At least 99% of the time | 00001 to 99999 | n/a |
| PLOT STATUS | No errors | At least 99% of the time | 1 to 3 | n/a |
| NONFOREST SAMPLING STATUS | No errors | At least 99% of the time | 0 to 1 | n/a |
| NONFOREST PLOT STATUS | No errors | At least 99% of the time | 1 to 3 | n/a |
| PLOT NONSAMPLED REASON | No errors | At least 99% of the time | 01 to 03 and 05 to 11 | n/a |
| NONFOREST PLOT NONSAMPLED REASON | No errors | At least 99% of the time | 02, 03, 08, 09, 10 | n/a |
| SUBPLOTS EXAMINED | No errors | At least 90% of the time | 1, 4 | n/a |
| SAMPLE KIND | No errors | At least 99% of the time | 1 to 3 | n/a |
| PREVIOUS PLOT NUMBER | No errors | At least 99% of the time | 00001 to 99999 | n/a |
| FIELD GUIDE VERSION | No errors | At least 99% of the time | 6.1 | n/a |
| YEAR | No errors | At least 99% of the time | ≥ 2003 | year |
| MONTH | No errors | At least 99% of the time | Jan – Dec (01 – 12) | month |
| DAY | No errors | At least 99% of the time | 01 to 31 | day |
| *DECLINATION* | *No errors* | *At least 99% of the time* | *+/- 50* | *degrees* |
| HORIZONTAL DISTANCE TO IMPROVED ROAD | No errors | At least 90% of the time | 1 to 9 | n/a |
| WATER ON PLOT | No errors | At least 90% of the time | 0 to 5, 9 | n/a |
| QA STATUS | No errors | At least 99% of the time | 1 to 7 | n/a |
| CREW NUMBER | No errors | At least 99% of the time | NRS 240001-249999<br>SRS 330001-339999<br>RMRS 220001-229999<br>PNW 260001-269999 | n/a |
| GPS UNIT | No errors | At least 99% of the time | 0 to 4 | n/a |
| GPS SERIAL NUMBER | No errors | At least 99% of the time | 000001 to 999999 | n/a |
| GPS ENTRY METHOD | No errors | At least 99% of the time | 0, 1 | n/a |
| GPS DATUM | No errors | At least 99% of the time | NAD83 | n/a |
| COORDINATE SYSTEM | No errors | At least 99% of the time | 1, 2 | n/a |

| Variable Name | Tolerance | MQO | Values | Units |
|---|---|---|---|---|
| LATITUDE DEGREES | When GPS ENTRY METHOD = 0, no errors in data entry<br>When GPS ENTRY METHOD = 1, not applicable | When GPS ENTRY METHOD = 0, at least 99% of the time<br>When GPS ENTRY METHOD = 1, not applicable | 0-90 | degrees |
| LATITUDE MINUTES | When GPS ENTRY METHOD = 0, no errors in data entry<br>When GPS ENTRY METHOD = 1, not applicable | When GPS ENTRY METHOD = 0, at least 99% of the time<br>When GPS ENTRY METHOD = 1, not applicable | 0 – 59 | minutes |
| LATITUDE SECONDS | When GPS ENTRY METHOD = 0, no errors in data entry<br>When GPS ENTRY METHOD = 1, not applicable | When GPS ENTRY METHOD = 0, at least 99% of the time<br>When GPS ENTRY METHOD = 1, not applicable | 0.00 – 59.99 | seconds |
| LONGITUDE DEGREES | When GPS ENTRY METHOD = 0, no errors in data entry<br>When GPS ENTRY METHOD = 1, not applicable | When GPS ENTRY METHOD = 0, at least 99% of the time<br>When GPS ENTRY METHOD = 1, not applicable | 1 – 180 | degrees |
| LONGITUDE MINUTES | When GPS ENTRY METHOD = 0, no errors in data entry<br>When GPS ENTRY METHOD = 1, not applicable | When GPS ENTRY METHOD = 0, at least 99% of the time<br>When GPS ENTRY METHOD = 1, not applicable | 0 – 59 | minutes |
| LONGITUDE SECONDS | When GPS ENTRY METHOD = 0, no errors in data entry<br>When GPS ENTRY METHOD = 1, not applicable | When GPS ENTRY METHOD = 0, at least 99% of the time<br>When GPS ENTRY METHOD = 1, not applicable | 0.00 – 59.99 | seconds |

| Variable Name | Tolerance | MQO | Values | Units |
|---|---|---|---|---|
| UTM ZONE | When GPS ENTRY METHOD = 0, no errors in data entry<br>When GPS ENTRY METHOD = 1, not applicable | When GPS ENTRY METHOD = 0, at least 99% of the time<br>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 |
| EASTING (X) UTM | When GPS ENTRY METHOD = 0, no errors in data entry<br>When GPS ENTRY METHOD = 1, not applicable | When GPS ENTRY METHOD = 0, at least 99% of the time<br>When GPS ENTRY METHOD = 1, not applicable | 0000000-9999999 | |
| NORTHING (Y) UTM | When GPS ENTRY METHOD = 0, no errors in data entry<br>When GPS ENTRY METHOD = 1, not applicable | When GPS ENTRY METHOD = 0, at least 99% of the time<br>When GPS ENTRY METHOD = 1, not applicable | 0000000-9999999 | |
| AZIMUTH TO PLOT CENTER | +/- 3 degrees | At least 99% of the time | 000 at plot center<br>001 to 360 not at plot center | degrees |
| DISTANCE TO PLOT CENTER | +/- 6 ft | At least 99% of the time | 000 at plot center<br>001 to 200 if a Laser range finder not used<br>001 to 999 if a Laser range finder is used | feet |
| GPS ELEVATION | No errors | At least 99% of the time | -00100 to 20000 | feet |
| GPS ERROR | No errors | At least 99% of the time | 000 to 999<br>071 to 999 if an error < 70 cannot be obtained | feet |
| NUMBER OF READINGS | No errors | At least 99% of the time | 001 to 999 | n/a |
| *GPS FILENAME* | *No errors* | *At least 99% of the time* | *English words, phrases and numbers* | *n/a* |
| *MACROPLOT BREAKPOINT DIAMETER* | *No errors* | *At least 99% of the time* | *21, 24, and 30* | *inches* |
| PLOT NOTES | n/a | n/a | English, alpha-numeric | n/a |

| Variable Name | Tolerance | MQO | Values | Units |
|---|---|---|---|---|
| **Condition Class Information** | | | | |
| CONDITION CLASS NUMBER | No errors | At least 99% of the time | 1 to 9 | n/a |
| CONDITION CLASS STATUS | No errors | At least 99% of the time | 1, 2, 3, 4, 5 | n/a |
| CONDITION NONSAMPLED REASON | No errors | At least 99% of the time | 01, 02, 03, 05, 06, 07, 08, 09, 10, 11 | n/a |
| NONFOREST CONDITION CLASS STATUS | No errors | At least 99% of the time | 2, 5 | n/a |
| NONFOREST CONDITION NONSAMPLED REASON | No errors | At least 99% of the time | 02, 03, 10 | n/a |
| RESERVED STATUS* | No errors | At least 99% of the time | 0, 1 | n/a |
| OWNER GROUP* | No errors | At least 99% of the time | 10, 20, 30, 40 | n/a |
| FOREST TYPE | No errors in group or type | At least 99% of the time in group<br>At least 95% of the time in type<br>no MQO when STAND SIZE CLASS = 0 | Appendix 2 | n/a |
| STAND SIZE CLASS | No errors | At least 99% of the time | 0, 1, 2, 3, 4, 5 | class |
| REGENERATION STATUS | No errors | At least 99% of the time | 0, 1 | n/a |
| TREE DENSITY | No errors | At least 99% of the time | 1, 2, 3 | n/a |
| OWNER* | No errors | At least 95% of the time | English words and numbers | n/a |
| OWNER CLASS* | No errors | At least 99% of the time | 11-13; 21-25; 31-33; 41-45 | class |
| *OWNER SUB-CLASS* | *No errors* | *At least 95% of the time* | *1-4* | *n/a* |
| *PUBLIC ADMINISTRATIVELY WITHDRAWN STATUS* | *No errors* | *At least 99% of the time* | *0, 1* | *n/a* |
| ADMINISTRATIVELY WITHDRAWN AREA NAME | No errors | At least 99% of the time | English language word, phrases, and numbers | n/a |
| *ADMINISTRATIVELY WITHDRAWN NOTES* | *n/a* | *n/a* | *English language word, phrases, and numbers* | *n/a* |
| RESERVED AREA NAME | No errors | At least 99% of the time | English language word, phrases, and numbers | n/a |
| ARTIFICIAL REGENERATION SPECIES | No errors | At least 99% of the time | Appendix 3 | n/a |
| STAND AGE | +/- 10% | At least 95% of the time | 000 to 997, 998, 999 | year |
| 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 |

| Variable Name | Tolerance | MQO | Values | Units |
|---|---|---|---|---|
| DISTURBANCE YEAR 1 | +/- 1 year for 5-year measurement cycles<br>+/ 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 |
| 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 |
| DISTURBANCE YEAR 2 | +/- 1 year for 5-year measurement cycles<br>+/ 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 |
| 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 |
| DISTURBANCE YEAR 3 | +/- 1 year for 5-year measurement cycles<br>+/ 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 |
| TREATMENT 1 | No errors | At least 99% of the time | 00, 10, 20, 30, 40, 50 | n/a |
| TREATMENT YEAR 1 | +/- 1 year for 5-year measurement cycles<br>+/- 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 |
| TREATMENT 2 | No errors | At least 99% of the time | 00, 10, 20, 30, 40, 50 | n/a |
| TREATMENT YEAR 2 | +/- 1 year for 5-year measurement cycles<br>+/- 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 |
| TREATMENT 3 | No errors | At least 99% of the time | 00, 10, 20, 30, 40, 50 | n/a |

| Variable Name | Tolerance | MQO | Values | Units |
|---|---|---|---|---|
| TREATMENT YEAR 3 | +/- 1 year for 5-year measurement cycles<br>+/- 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 |
| PHYSIOGRAPHIC CLASS | No errors | At least 80% of the time | xeric: 11, 12, 13, 19<br>mesic: 21, 22, 23, 24, 25, 29<br>hydric: 31, 32, 33, 34, 35, 39 | n/a |
| LAND COVER CLASS | No errors | At least 95% of the time | 01-10 | n/a |
| PRESENT NONFOREST LAND USE | No errors | At least 99% of the time | 10-17; 20; 30-34; 40, 41, 42, 43, 45 | n/a |
| CANOPY COVER SAMPLE METHOD | None | At least 90% of the time | 1-4 | n/a |
| 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 |
| 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 |
| CURRENT AFFORESTATION CODE | No errors | At least 99% of the time | 0, 1 | n/a |
| PREVIOUS AFFORESTATION CODE | No errors | At least 99% of the time | 0, 1 | n/a |
| TOTAL STEMS | 10% | At least 90% of the time | 00000-99999 | n/a |
| CHAINING CODE | No errors | At least 99% of the time | 0, 1 | n/a |
| **Subplot Information** | | | | |
| SUBPLOT NUMBER | No errors | At least 99% of the time | 1, 2, 3, 4 | n/a |
| SUBPLOT/ MACROPLOT STATUS | No errors | At least 99% of the time | 1, 2, 3, 4 | n/a |
| SUBPLOT NONSAMPLED REASON | No errors | At least 99% of the time | 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11 | n/a |
| NONFOREST SUBPLOT/MACROPLOT STATUS | No errors | At least 99% of the time | 1, 2, 3 | n/a |

| Variable Name | Tolerance | MQO | Values | Units |
|---|---|---|---|---|
| NONFOREST SUBPLOT/MACROPLOT NONSAMPLED REASON | No errors | At least 99% of the time | 02, 03, 04, 10 | n/a |
| SUBPLOT CENTER CONDITION | No errors | At least 99% of the time | 1 to 9 | n/a |
| MICROPLOT CENTER CONDITION | No errors | At least 99% of the time | 1 to 9 | n/a |
| SUBPLOT SLOPE | +/- 10 % | At least 90% of the time | 000 to 155 | percent |
| SUBPLOT ASPECT | +/- 10 degrees | At least 90% of the time | 000 to 360 | degrees |
| SNOW/WATER DEPTH | +/- 0.5 ft | At the time of measurement | 0.0 to 9.9 | feet |
| SUBPLOT/ MACROPLOT CONDITION LIST | No errors | At least 99% of the time | 1000 to 9876 | n/a |
| **Boundary Data** | | | | |
| SUBPLOT NUMBER | No errors | At least 99% of the time | 1, 2, 3  4 | n/a |
| PLOT TYPE | No errors | At least 99% of the time | 1, 2, 3, 4 | n/a |
| BOUNDARY CHANGE | No errors | At least 99% of the time | 0, 1, 2, 3 | n/a |
| CONTRASTING CONDITION | No errors | At least 99% of the time | 1 to 9 | n/a |
| LEFT AZIMUTH | +/- 10 degrees | At least 90% of the time | 001 to 360 | degrees |
| CORNER AZIMUTH | +/- 10 degrees | At least 90% of the time | 000 to 360 | degrees |
| 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 |
| RIGHT AZIMUTH | +/- 10 degrees | At least 90% of the time | 001 to 360 | degrees |
| **Tree and Sapling Data** | | | | |
| SUBPLOT NUMBER | No errors | At least 99% of the time | 1, 2, 3, 4 | n/a |
| TREE RECORD NUMBER | No errors | At least 99% of the time | 000, 001 to 999 | n/a |
| CONDITION CLASS NUMBER | No errors | At least 99% of the time | 1 to 9 | n/a |
| AZIMUTH | +/- 10 degrees | At least 90% of the time | 001 to 360 | degrees |

| Variable Name | Tolerance | MQO | Values | Units |
|---|---|---|---|---|
| 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 |
| PREVIOUS TREE STATUS | No errors | At least 95% of the time | 1, 2 | n/a |
| PRESENT TREE STATUS | No errors | At least 95% of the time | 0, 1, 2, 3 | n/a |
| 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 |
| STANDING DEAD | No errors | At least 99% of the time | 0, 1 | n/a |
| *MORTALITY* | *No errors* | *At least 85% of the time* | *0, 1* | *n/a* |
| SPECIES | No errors | At least 99% of the time for genus At least 95% of the time for species | Appendix 3 | n/a |
| 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; For woodland species: +/- 0.2 inch per stem | At least 95% of the time | 001.0 to 999.9 | inches |

| Variable Name | Tolerance | MQO | Values | Units |
|---|---|---|---|---|
| DRC STEM DIAMETER | +/- 0.2 inch per stem | At least 95% of the time | 001.0 to 999.9 | inch |
| DRC STEM STATUS | No errors | At least 95% of the time | 1, 2 | n/a |
| PAST NUMBER OF STEMS | No errors | At least 90% of the time | 1 to 99 | n/a |
| CURRENT NUMBER OF STEMS | No errors | At least 90% of the time | 1 to 99 | n/a |
| DIAMETER CHECK | No errors | At least 99% of the time | 0, 1, 2 | n/a |
| ROTTEN / MISSING CULL* | +/- 10% | At least 90% of the time | 00 to 99 | percent |
| TOTAL LENGTH* | +/- 10% of true length | At least 90% of the time | 005 to 400 | feet |
| ACTUAL LENGTH* | +/- 10% of true length | At least 90% of the time | 005 to 400 | feet |
| LENGTH METHOD* | No errors | At least 99% of the time | 1,2, 3 | n/a |
| CROWN CLASS | No errors | At least 85% of the time | 1, 2, 3, 4, 5 | n/a |
| UNCOMPACTED LIVE CROWN RATIO* | +/- 10% | At least 90% of the time | 00 to 99 | percent |
| COMPACTED CROWN RATIO | +/- 10% | At least 80% of the time | 00 to 99 | percent |
| DAMAGE AGENT 1* | No errors | Will be established following blind audit results | 10000, 11000, 12000, 13000, 14000, 15000, 16000, 17000, 18000, 19000, 20000, 21000, 22000, 22500, 23000, 24000, 25000, 26000, 27000, 30000, 41000, 42000, 50000, 60000, 70000, 71000, 80000, 90000, 99000 | n/a |
| DAMAGE AGENT 2* | No errors | Will be established following blind audit results | 10000, 11000, 12000, 13000, 14000, 15000, 16000, 17000, 18000, 19000, 20000, 21000, 22000, 22500, 23000, 24000, 25000, 26000, 27000, 30000, 41000, 42000, 50000, 60000, 70000, 71000, 80000, 90000, 99000 | n/a |

| Variable Name | Tolerance | MQO | Values | Units |
|---|---|---|---|---|
| DAMAGE AGENT 3* | No errors | Will be established following blind audit results | 10000, 11000, 12000, 13000, 14000, 15000, 16000, 17000, 18000, 19000, 20000, 21000, 22000, 22500, 23000, 24000, 25000, 26000, 27000, 30000, 41000, 42000, 50000, 60000, 70000, 71000, 80000, 90000, 99000 | n/a |
| CAUSE OF DEATH* | No errors | At least 80% of the time | 10, 20, 30, 40, 50, 60, 70, 80 | n/a |
| *MORTALITY YEAR* | *+/- 1year for 5-year measure. cycles +/- 2years for > 5-year measure. cycles* | *At least 70% of the time* | *1994 or higher* | *year* |
| DECAY CLASS | +/- 1 class | At least 90% of the time | 1, 2, 3, 4, 5 | class |
| *LENGTH TO DIAMETER MEASUREMENT POINT* | *+/- 0.2 ft* | *At least 90% of the time* | *00.1 – 15.0* | *feet* |
| *ROUGH CULL* | *+/- 10%* | *At least 90% of the time* | *00 to 99* | *percent* |
| *DWARF MISTLETOE CLASS* | *+/- 1 class* | *At least 90% of the time* | *0 to 6* | *class* |
| TREE NOTES | n/a | n/a | English, alpha-numeric | n/a |
| **Seedling Data** | | | | |
| SUBPLOT NUMBER | No errors | At least 99% of the time | 1, 2, 3, 4 | n/a |
| SPECIES | No errors | At least 90% of the time for genus<br>At least 85% of the time for species | Appendix 3 | n/a |
| CONDITION CLASS NUMBER | No errors | At least 99% of the time | 1-9 | n/a |
| SEEDLING COUNT | No errors for 5 or less per species<br>+/- 20% over a count of 5 | At least 90% of the time | 001-999 | number |
| **Site Tree Information** | | | | |
| CONDITION CLASS LIST | No errors | At least 99% of the time | 1000 to 9876 | n/a |

| Variable Name | Tolerance | MQO | Values | Units |
|---|---|---|---|---|
| SPECIES | No errors | At least 99% of the time for genus<br>At least 95% of the time for species | See code list in text | n/a |
| DIAMETER | +/- 0.1 inch per 20.0 inch increment of measured diameter on all live trees and dead trees with DECAY CLASS = 1, 2;<br>+/- 1.0 inch per 20.0 inch increment of measured diameter on dead trees with DECAY CLASS = 3, 4, 5;<br>For woodland species: +/- 0.2 inch per stem | At least 95% of the time | 001.0 to 999.9 | inches |
| SITE TREE LENGTH | +/- 10% of true length | At least 90% of the time | 005 to 999 | feet |
| TREE AGE AT DIAMETER | +/- 5 years | At least 95% of the time | 001 to 999 | year |
| SITE TREE NOTES | n/a | n/a | English, language words, phrases and numbers | n/a |
| *SUBPLOT NUMBER* | *No errors* | *At least 99% of the time* | *1, 2, 3, 4* | *n/a* |
| *AZIMUTH* | *+/- 10 degrees* | *At least 90% of the time* | *001 to 360* | *degrees* |
| *HORIZONTAL DISTANCE* | *+/-5 ft* | *At least 90% of the time* | *000.1 to 200.0* | *feet* |
| ***Phase 2 (P2) Vegetation Profile*** | | | | |
| *P2 VEGETATION SAMPLING STATUS* | *No errors* | *At least 99% of the time* | *0, 1,2* | *n/a* |
| *LEVEL OF DETAIL* | *No errors* | *At least 99% of the time* | *1, 2, 3* | *n/a* |
| *SUBPLOT NUMBER* | *No errors* | *At least 99% of the time* | *1,2 ,3, 4* | *n/a* |
| *P2 VEG SUBPLOT SAMPLE STATUS* | *No errors* | *At least 99% of the time* | *1, 2* | *n/a* |
| *VEGETATION NONSAMPLED REASON* | *No errors* | *At least 99% of the time* | *04, 05, 10* | *n/a* |
| *CONDITION CLASS NUMBER* | *No errors* | *At least 99% of the time* | *1 to 9* | *n/a* |
| *VEGETATION SUBPLOT NOTES* | *n/a* | *n/a* | *English language words, phrases, and numbers* | *n/a* |

| Variable Name | Tolerance | MQO | Values | Units |
|---|---|---|---|---|
| *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* |
| *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* |
| *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* |
| *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* |
| *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* |
| *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* |

| Variable Name | Tolerance | MQO | Values | Units |
|---|---|---|---|---|
| *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* |
| *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* |
| *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* |
| *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* |
| *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* |
| *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* |

| Variable Name | Tolerance | MQO | Values | Units |
|---|---|---|---|---|
| *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* |
| *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* |
| *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* |
| *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* |
| *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* |
| *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* |

| Variable Name | Tolerance | MQO | Values | Units |
|---|---|---|---|---|
| *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* |
| *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* |
| *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* |
| *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* |
| *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* |
| *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* |

| Variable Name | Tolerance | MQO | Values | Units |
|---|---|---|---|---|
| *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* |
| *SPECIES GROWTH HABIT* | *No errors* | *At least 95% of the time* | *SD, SH, FB, GR, LT* | *n/a* |
| *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* |
| *UNIQUE SPECIES NUMBER* | *No errors* | *At least 99% of the time* | *1-99, assigned in sequential numbers* | *n/a* |
| *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* |
| *SPECIES VEGETATION LAYER* | *No errors* | *At least 90% of the time* | *1, 2, 3, 4* | *n/a* |
| *SPECIMEN OFFICIALLY COLLECTED* | *No errors* | *At least 99% of the time* | *0, 1* | *n/a* |
| *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* |
| *P2 SPECIMEN NOT COLLECTED REASON CODE* | *No errors* | *At least 99% of the time* | *01, 02, 03, 04, 05, 06, 07, 10* | *n/a* |
| *VEGETATION SPECIES NOTES* | *n/a* | *n/a* | *English language words, phrases, and numbers* | *n/a* |
| **Invasive Plants** | | | | |
| *INVASIVE PLANT SAMPLING STATUS* | *No errors* | *At least 99% of the time* | *0, 1, 2* | *n/a* |
| *SUBPLOT NUMBER* | *No errors* | *At least 99% of the time* | *1, 2, 3, 4* | *n/a* |

| Variable Name | Tolerance | MQO | Values | Units |
|---|---|---|---|---|
| *INVASIVE PLANT SUBPLOT SAMPLE STATUS* | *No errors* | *At least 99% of the time* | *1, 2, 3* | *n/a* |
| *INVASIVE PLANT NONSAMPLED REASON* | *No errors* | *At least 99% of the time* | *4, 5, 10* | *n/a* |
| *INVASIVE PLANT DATA NOTES* | *n/a* | *n/a* | *English language words, phrases, and numbers* | *n/a* |
| *CONDITION CLASS NUMBER* | *No errors* | *At least 99% of the time* | *1-9* | *n/a* |
| *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* |
| *UNIQUE SPECIES NUMBER* | *No errors* | *At least 99% of the time* | *1-99, assigned in sequential numbers* | *n/a* |
| *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* |
| *INVASIVE PLANT SPECIMEN COLLECTION RULE* | *No errors* | *At least 99% of the time* | *0, 1* | *n/a* |
| *INVASIVE SPECIMEN COLLECTED* | *No errors* | *At least 99% of the time* | *0, 1* | *n/a* |
| *SPECIMEN LABEL NUMBER* | *No errors* | *At least 99% of the time* | *1 to 99999, as pre-printed and assigned by FIA unit* | *n/a* |
| *INVASIVE PLANT NOTES* | *n/a* | *n/a* | *English language words, phrases, and numbers* | *n/a* |
| **Down Woody Materials** | | | | |
| *DWM SAMPLING STATUS (BASE)* | *No errors* | *At least 99% of the time* | *0, 1, 2, 3* | *n/a* |
| *DWM NUMBER OF SUBPLOTS (BASE)* | *No errors* | *At least 99% of the time* | *1 to 4* | *n/a* |
| *DWM NUMBER OF TRANSECTS ON SUBPLOT (BASE)* | *No errors* | *At least 99% of the time* | *1, 2, 3* | *n/a* |
| *DWM TRANSECT LENGTH (BASE)* | *+/- 1 ft* | *At least 95% of the time* | *24.0 to 58.9* | *feet* |

| Variable Name | Tolerance | MQO | Values | Units |
|---|---|---|---|---|
| *DWM NOTES (BASE)* | *n/a* | *n/a* | *English language words, phrases, and numbers* | *n/a* |
| *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* |
| *SUBPLOT NUMBER* | *No errors* | *At least 99% of the time* | *1, 2, 3, 4* | *n/a* |
| *TRANSECT (BASE)* | *No errors* | *At least 99% of the time* | *Subplot 1: 090, 270, 180 (extra optional transect) Subplot 2: 360, 180, 270 (extra optional transect) Subplot 3: 135, 315, 225 (extra optional transect) Subplot 4: 045, 225, 315 (extra optional transect)* | *degrees* |
| *SEGMENT CONDITION CLASS NUMBER (BASE)* | *No errors* | *At least 99% of the time* | *1 to 9* | *n/a* |
| *SEGMENT BEGINNING DISTANCE (BASE)* | *+/- 1 ft* | *At least 95% of the time* | *00.0 to 58.9* | *horizontal feet* |
| *SEGMENT ENDING DISTANCE (BASE)* | *+/- 1 ft* | *At least 95% of the time* | *00.1 to 58.9* | *horizontal feet* |
| *DWM TRANSECT SEGMENT SAMPLE STATUS (BASE)* | *No errors* | *At least 99% of the time* | *0, 1* | *n/a* |
| *DWM TRANSECT SEGMENT NONSAMPLED REASON (BASE)* | *No errors* | *At least 99% of the time* | *04, 05,10* | *n/a* |
| *SUBPLOT NUMBER (BASE)* | *No errors* | *At least 99% of the time* | *1, 2, 3, 4* | *n/a* |

| Variable Name | Tolerance | MQO | Values | Units |
|---|---|---|---|---|
| *TRANSECT (BASE)* | *No errors* | *At least 99% of the time* | *Subplot 1: 090, 270, 180 (extra optional transect) Subplot 2: 360, 180, 270 (extra optional transect) Subplot 3: 135, 315, 225 (extra optional transect) Subplot 4: 045, 225, 315 (extra optional transect)* | *degrees* |
| *CWD CONDITION CLASS (BASE)* | *No errors* | *At least 90% of the time* | *1 to 9* | *n/a* |
| *PIECE ON SUBPLOT OR ANNULAR PLOT? (BASE)* | *No errors* | *At least 90% of the time* | *1, 2* | *n/a* |
| *CWD HORIZONTAL DISTANCE (WILDLIFE OPTION)** | *+/- 1.0 ft* | *At least 90% of the time* | *00.0 to 58.9* | *feet* |
| *CWD DECAY CLASS (BASE)* | *+/- 1 class* | *At least 90% of the time* | *1, 2, 3, 4, 5* | *class* |
| *SPECIES (BASE)* | *No errors* | *At least 80% of the time* | *See appendix 3* | *n/a* |
| *DIAMETER AT POINT OF INTERSECTION (BASE)* | *Pieces <20.0 inches diameter: +/- 1 inch for decay class 1-4, +/- 2 inches for decay class 5*<br><br>*Pieces ≥ 20.0 inches diameter (decay classes 1-4): +/- 2 inches for each 20-inch increment >20.0 inches*<br><br>*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* |

| Variable Name | Tolerance | MQO | Values | Units |
|---|---|---|---|---|
| *DIAMETER OF HOLLOW AT POINT OF INTERSECTION (BASE)* | *Pieces < 20.0 inches diameter: +/- 1 inch*<br><br>*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* |
| *DIAMETER AT THE SMALL END (WILDLIFE OPTION)* | *Pieces < 20.0 inches diameter: +/- 1 inch*<br><br>*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* |
| *DIAMETER AT THE LARGE END (WILDLIFE OPTION)* | *Pieces < 20.0 inches diameter: +/- 1 inch*<br><br>*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* |
| *CWD LENGTH >= 3 FEET (BASE)* | *+/- 20%* | *At least 90% of the time* | *1, 2* | *n/a* |
| *CWD TOTAL LENGTH (WILDLIFE OPTION)* | *+/- 20%* | *At least 90% of the time* | *003 to 250* | *feet* |
| *IS THE PIECE HOLLOW? (OPTIONAL)* | *No errors* | *At least 90% of the time* | *0, 1* | *n/a* |
| *PIECE INCLINATION (OPTIONAL)* | *+/- 5 degrees* | *At least 90% of the time* | *00 to 90* | *degrees* |
| *CWD HISTORY (OPTIONAL)* | *No errors* | *At least 90% of the time* | *1, 2, 3, 4, 5* | *n/a* |
| *PERCENT OF LOG CHARRED BY FIRE (OPTIONAL)* | *+/- 1 class* | *At least 90% of the time* | *0, 1, 2, 3* | *class* |
| *LARGE END DIAMETER CLASS (OPTIONAL)* | *No errors* | *At least 90% of the time* | *1, 2, 3, 4, 5, 6* | *n/a* |
| *PILE SUBPLOT NUMBER (BASE)* | *No errors* | *At least 99% of the time* | *1, 2, 3, 4* | *n/a* |

| Variable Name | Tolerance | MQO | Values | Units |
|---|---|---|---|---|
| *PILE TRANSECT (BASE)* | *No errors* | *At least 99% of the time* | *Subplot 1: 090, 270, 180 (extra optional transect)*<br>*Subplot 2: 360, 180, 270 (extra optional transect)*<br>*Subplot 3: 135, 315, 225 (extra optional transect)*<br>*Subplot 4: 045, 225, 315 (extra optional transect)* | *n/a* |
| *PILE CONDITION CLASS NUMBER (BASE)* | *No errors* | *At least 99% of the time* | *1 to 9* | *n/a* |
| *PILE BEGINNING DISTANCE (BASE)* | *+/- 10 %* | *At least 90% of the time* | *00.0 to 58.8* | *feet* |
| *PILE ENDING DISTANCE (BASE)* | *+/- 10%* | *At least 90% of the time* | *00.1 to 58.9* | *feet* |
| *COMPACTED HEIGHT OF CWD IN PILE (BASE)* | *+/- 10%* | *At least 90% of the time* | *1 to 99* | *feet* |
| *PILE DECAY CLASS (BASE)* | *+/- 1 decay class* | *At least 90% of the time* | *1, 2, 3, 4, 5* | *class* |
| *PILE SPECIES (BASE)* | *No errors* | *At least 90% of the time* | *See appendix 3* | *n/a* |
| *FWD SUBPLOT NUMBER (BASE)* | *No errors* | *At least 99% of the time* | *1, 2, 3, 4* | *n/a* |
| *FWD TRANSECT (BASE)* | *No errors* | *At least 99% of the time* | *Subplot 1: 270*<br>*Subplot 2: 360*<br>*Subplot 3: 135*<br>*Subplot 4: 225* | *n/a* |
| *FWD CONDITION CLASS NUMBER (BASE)* | *No errors* | *At least 99% of the time* | *1 to 9* | *n/a* |
| *FWD TRANSECT SEGMENT SAMPLE STATUS (BASE)* | *No errors* | *At least 99% of the time* | *0, 1* | *n/a* |
| *FWD TRANSECT SEGMENT NONSAMPLED REASON (BASE)* | *No errors* | *At least 99% of the time* | *04, 05, 10* | *n/a* |
| *SMALL FWD COUNT (BASE)* | *0 to 50 = +/- 20% of the total count for the transect*<br><br>*51 to 100 = +/- 25% of the total count for the transect*<br><br>*100 + = +/- 50% of the total count for the transect* | *At least 90% of the time* | *000 to 999* | *pieces* |

| Variable Name | Tolerance | MQO | Values | Units |
|---|---|---|---|---|
| *MEDIUM FWD COUNT (BASE)* | *+/- 20% of the total count for the transect* | *At least 90% of the time* | *000 to 999* | *pieces* |
| *LARGE FWD COUNT (BASE)* | *+/- 20% of the total count for the transect* | *At least 90% of the time* | *000 to 500* | *pieces* |
| *HIGH COUNT REASON (BASE)* | *No errors* | *At least 90% of the time* | *1, 2, 3, 4, 5* | *n/a* |
| *DUFF/LITTER SUBPLOT NUMBER (BASE)* | *No errors* | *At least 99% of the time* | *1, 2, 3, 4* | *n/a* |
| *DUFF/LITTER TRANSECT (BASE)* | *No errors* | *At least 99% of the time* | *Subplot 1: 090, 270*<br>*Subplot 2: 360, 180*<br>*Subplot 3: 135, 315*<br>*Subplot 4: 045, 225* | *degrees* |
| *DUFF/LITTER CONDITION CLASS NUMBER (BASE)* | *No errors* | *At least 99% of the time* | *1 to 9* | *n/a* |
| *DUFF/LITTER SAMPLE STATUS (BASE)* | *No errors* | *At least 99% of the time* | *0, 1* | *n/a* |
| *DUFF/LITTER NONSAMPLED REASON (BASE)* | *No errors* | *At least 99% of the time* | *04, 05, 10* | *n/a* |
| *DUFF DEPTH (BASE)* | *+/- 0.5 inch* | *At least 90% of the time* | *00.0 to 24.0* | *inches* |
| *LITTER DEPTH (BASE)* | *+/- 0.5 inch* | *At least 90% of the time* | *00.0 to 99.9* | *Inches* |
| *DUFF AND LITTER METHOD (BASE)* | *No errors* | *At least 90% of the time* | *1, 2, 3, 4* | *n/a* |

## 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 | | | |
| | Dead 5.0+ DBH/DRC | | 2 | | | |
| **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 | 1 | 1 | | | |
| Live 1.0-4.9 DBH/DRC on microplot | Live 1.0-4.9 DBH/DRC on microplot | 1 | 1 | | | |
| Live 5.0+ DBH/DRC | Live but shrank < 5.0 and on microplot | 1 | 1 | | | |
| Live 1 inch + | Live but land no longer qualifies as forest | 1 | 1 | | | |
| Live 5.0+ DBH/DRC | Standing dead 5.0+ | 1 | 2 | | 1 | 10-80 |
| Live 5.0+ DBH/DRC | Down dead 5.0+ | 1 | 2 | | 0 | 10-80 |
| Live 1.0-4.9 DBH/DRC on microplot | Dead 1.0-4.9 DBH/DRC | 1 | 2 | | 0 | 10-80 |
| Live 1.0-4.9 DBH/DRC on microplot | Dead 5.0+ (standing or down) | 1 | 2 | | 0 or 1 | 10-80 |
| Live 1.0+ DBH/DRC | Cruiser unable to locate tree due to a weather (including geologic, such as landslide) or fire event & assume tree is down dead **or** you can see tree and it is dead and off the plot | 1 | 2 | | 0 | 30 or 50 |
| Live 1.0+ DBH/DRC | Cut and left in the woods | 1 | 2 | | 0 | 80 |
| Live 1 inch + | Dead and land no longer qualifies as forest (land clearing or conversion to nonforest land use) | 1 | 2 | | 0 or 1 | 10-80 |
| Live 1.0+ DBH/DRC | Tree removed (cut and hauled away) | 1 | 3 | | | 80 |

| Previous Measurement | Present Measurement | PREVIOUS TREE STATUS | PRESENT TREE STATUS | RECONCILE | Standing Dead | CAUSE OF DEATH |
|---|---|---|---|---|---|---|
| Live 1 inch + | Gone (cut and removed?) and land no longer qualifies as forest | 1 | 3 | | | 80 |
| Dead 5.0+ DBH/DRC | Dead standing 5.0 DBH/DRC | 2 | 2 | | 1 | |
| Dead 5.0+ DBH/DRC | Dead down 5.0+ | 2 | 2 | | 0 | |
| Dead 5.0+ DBH/DRC | Dead DBH/DRC < 5.0 | 2 | 2 | | 0 | |
| Dead 5.0+ DBH/DRC | Cruiser is unable to locate tree due to a weather (including geologic) or fire event & assume it is down dead | 2 | 2 | | 0 | |
| Dead 5.0+ DBH/DRC | Tree removed (cut and hauled away) | 2 | 3 | | | |
| Live 5.0+ DBH/DRC | Tree shrank <5.0 and NOT on microplot | 1 | 0 | 5 | | |
| Live 1.0-4.9 DBH/DRC | Tree shrank <1.0 | 1 | 0 | 5 | | |
| Live 1.0-4.9 DBH/DRC | Live 1.0-4.9 DBH/DRC, shouldn't have been tallied—beyond 6.8—cruiser error | 1 | 0 | 7 | | |
| Live 5.0+ DBH/DRC | Live 5.0+ DBH/DRC, shouldn't have been tallied – beyond 24.0—cruiser error | 1 | 0 | 7 | | |
| Live 1.0+ DBH/DRC | No longer a tally species | 1 | 0 | 8 | | |
| Live 1.0+ DBH/DRC | Tree moved off plot due to a geologic (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 inch + | Nonsampled area now | 1 | 0 | 9 | | |
| Dead 5.0+ DBH/DRC | No longer a tally species | 2 | 0 | 8 | | |
| Dead 5.0 DBH/DRC | Tree moved off plot due to a geologic (e.g., small earth movement) or weather event (e.g., hurricane) and you can still see the tree | 2 | 0 | 6 | | |
| Dead 5 inch + | Nonsampled area now | 2 | 0 | 9 | | |

| Previous Measurement | Present Measurement | PREVIOUS TREE STATUS | PRESENT TREE STATUS | RECONCILE | Standing Dead | CAUSE OF DEATH |
|---|---|---|---|---|---|---|
| Missed live | Live 1.0+ DBH/DRC | - | 1 | 3 | | |
| < 5.0 live | 5.0+ DBH/DRC live (not on the microplot) | - | 1 | 1 | | |
| < 1.0 live | 1.0-4.9 DBH/DRC live | - | 1 | 1 | | |
| < 1.0 live | 5.0+ DBH/DRC live (on the microplot) (Through growth) | - | 1 | 2 | | |
| Nonsampled area before | Live 1 inch + | - | 1 | 3 | | |
| Nonforest before | Forest now, Live 1 inch+ | - | 1 | 1 | | |
| Missed dead | Dead 5.0+ DBH/DRC | - | 2 | 4 | 1 | |
| Missed live | Dead 5.0+ DBH/DRC | - | 2 | 3 | 1 | 10-80 |
| < 5.0 live | 5.0+ DBH/DRC dead (very rare) | - | 2 | 1 | 0 or 1 | 10-80 |
| Nonsampled area before | Standing Dead 5 inch+ | - | 2 | 3 or 4 | | |
| Nonforest before | Forest now, Standing Dead 5 inch+ | - | 2 | 1 | | |

## Appendix 9. Invasive Plant List

To obtain a current invasive plant list, contact the local region for the appropriate list.

## 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 specific code, and must do so when the damage is present and meets or exceeds the required threshold.

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 00000 | | | No damage | | | | **ALL** |
| 10000 | **10** | **000** | **General Insects** | | | Any damage to the terminal leader; damage ≥ 20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected ; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **ALL** |
| 10001 | 10 | 001 | thrips | | General Insects | | |
| 10002 | 10 | 002 | Pine tip moth | | General Insects | | |
| 10003 | 10 | 003 | wasp | | General Insects | | |
| 10004 | 10 | 004 | Chinese rose beetle | Adoretus sinicus | General Insects | | |
| 10005 | 10 | 005 | rose beetle | Adoretus versutus | General Insects | | |
| 10006 | 10 | 006 | coconut hispid beetle | Brontispa longissima | General Insects | | |
| 10007 | 10 | 007 | clerid beetle | Cleridae | General Insects | | |
| 10008 | 10 | 008 | weevil | Curculionidae | General Insects | | |
| 10009 | 10 | 009 | green rose chafer | Dichelonyx backi | General Insects | | |
| 10010 | 10 | 010 | Allegheny mound ant | Formica exsectoides | General Insects | | |
| 10011 | 10 | 011 | ant | Formicidae | General Insects | | |
| 10012 | 10 | 012 | stick insect | Graeffea crovanii | General Insects | | |
| 10013 | 10 | 013 | Hulodes cranea | Hulodes cranea | General Insects | | |
| 10014 | 10 | 014 | conifer swift moth | Korsheltellus gracilis | General Insects | | |
| 10015 | 10 | 015 | Caroline shortnosed weevil | Lophothetes spp. | General Insects | | |
| 10016 | 10 | 016 | coconut rhinoceros beetle | Oryctes rhinoceros | General Insects | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 10017 | 10 | 017 | bagworm moth | Psychidae | General Insects | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **NRS** |
| 10018 | 10 | 018 | coconut palm weevil | Rhobdoscelus asperipennis | General Insects | | |
| 10019 | 10 | 019 | scarab | Scarabaeidae | General Insects | | |
| 10020 | 10 | 020 | ash white fly | Siphoninus phillyreae | General Insects | | |
| 10021 | 10 | 021 | conifer seedling weevil | Steremnius carinatus | General Insects | | |
| 10022 | 10 | 022 | pyralid moth | Thliptoceras octoquttale | General Insects | | |
| 10023 | 10 | 023 | wood wasps | Siricidae spp. | General Insects | | |
| 11000 | **11** | **000** | **Bark Beetles** | | | Any evidence of a successful attack (successful attacks generally exhibit boring dust, many pitch tubes and/or fading crowns) | **ALL** |
| 11001 | 11 | 001 | roundheaded pine beetle | Dendroctonus adjunctus | Bark Beetles | | |
| 11002 | 11 | 002 | western pine beetle | Dendroctonus brevicomis | Bark Beetles | | |
| 11003 | 11 | 003 | southern pine beetle | Dendroctonus frontalis | Bark Beetles | Any occurrence | **SRS** |
| 11004 | 11 | 004 | Jeffery pine beetle | Dendroctonus jeffreyi | Bark Beetles | | |
| 11005 | 11 | 005 | lodgepole pine beetle | Dendroctonus murrayanae | Bark Beetles | | |
| 11006 | 11 | 006 | mountain pine beetle | Dendroctonus ponderosae | Bark Beetles | Any evidence of a successful attack | **IW** |
| 11007 | 11 | 007 | Douglas-fir beetle | Dendroctonus pseudotsugae | Bark Beetles | | |
| 11008 | 11 | 008 | Allegheny spruce beetle | Dendroctonus punctatus | Bark Beetles | | |
| 11009 | 11 | 009 | spruce beetle | Dendroctonus rufipennis | Bark Beetles | Any evidence of a successful attack | **IW; PNW** |
| 11010 | 11 | 010 | eastern larch beetle | Dendroctonus simplex | Bark Beetles | | |
| 11011 | 11 | 011 | black turpentine beetle | Dendroctonus terebrans | Bark Beetles | Any evidence of a successful attack | **SRS** |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 11012 | 11 | 012 | red turpentine beetle | Dendroctonus valens | Bark Beetles | Any evidence of a successful attack | **NRS** |
| 11013 | 11 | 013 | Dryocoetes affaber | Dryocoetes affaber | Bark Beetles | | |
| 11014 | 11 | 014 | Dryocoetes autographus | Dryocoetes autographus | Bark Beetles | | |
| 11015 | 11 | 015 | western balsam bark beetle | Dryocoetes confusus | Bark Beetles | | |
| 11016 | 11 | 016 | Dryocoetes sechelti | Dryocoetes sechelti | Bark Beetles | | |
| 11017 | 11 | 017 | ash bark beetles | Hylesinus spp. | Bark Beetles | | |
| 11018 | 11 | 018 | native elm bark beetle | Hylurgopinus rufipes | Bark Beetles | | |
| 11019 | 11 | 019 | pinon ips | Ips confusus | Bark Beetles | | |
| 11020 | 11 | 020 | small southern pine engraver | Ips avulsus | Bark Beetles | | |
| 11021 | 11 | 021 | sixspined ips | Ips calligraphus | Bark Beetles | | |
| 11022 | 11 | 022 | emarginate ips | Ips emarginatus | Bark Beetles | | |
| 11023 | 11 | 023 | southern pine engraver beetle | Ips grandicollis | Bark Beetles | | |
| 11024 | 11 | 024 | Orthotomicus latidens | Orthotomicus latidens | Bark Beetles | | |
| 11025 | 11 | 025 | Arizona five-spined ips | Ips lecontei | Bark Beetles | | |
| 11026 | 11 | 026 | Monterey pine ips | Ips mexicanus | Bark Beetles | | |
| 11027 | 11 | 027 | California fivespined ips | Ips paraconfusus | Bark Beetles | | |
| 11028 | 11 | 028 | northern spruce engraver beetle | Ips perturbatus | Bark Beetles | | |
| 11029 | 11 | 029 | pine engraver | Ips pini | Bark Beetles | | |
| 11030 | 11 | 030 | Ips engraver beetles | Ips spp. | Bark Beetles | Any evidence of a successful attack | **IW; SRS** |
| 11031 | 11 | 031 | Ips tridens | Ips tridens | Bark Beetles | | |
| 11032 | 11 | 032 | western ash bark beetle | Leperisinus californicus | Bark Beetles | | |
| 11033 | 11 | 033 | Oregon ash bark beetle | Leperisinus oregonus | Bark Beetles | | |
| 11034 | 11 | 034 | Orthotomicus caelatus | Orthotomicus caelatus | Bark Beetles | | |
| 11035 | 11 | 035 | cedar bark beetles | Phloeosinus spp. | Bark Beetles | | |
| 11036 | 11 | 036 | western cedar bark beetle | Phloeosinus punctatus | Bark Beetles | | |
| 11037 | 11 | 037 | tip beetles | Pityogenes spp. | Bark Beetles | | |
| 11038 | 11 | 038 | Douglas-fir twig beetle | Pityophthorus pseudotsugae | Bark Beetles | | |
| 11039 | 11 | 039 | twig beetles | Pityophthorus spp. | Bark Beetles | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 11040 | 11 | 040 | foureyed spruce bark beetle | Polygraphus rufipennis | Bark Beetles | | |
| 11041 | 11 | 041 | fir root bark beetle | Pseudohylesinum granulatus | Bark Beetles | | |
| 11042 | 11 | 042 | Pseudohylesinus dispar | Pseudohylesinus dispar | Bark Beetles | | |
| 11043 | 11 | 043 | Douglas-fir pole beetle | Pseudohylesinus nebulosus | Bark Beetles | | |
| 11044 | 11 | 044 | silver fir beetle | Pseudohylesinus sericeus | Bark Beetles | | |
| 11045 | 11 | 045 | small European elm bark beetle | Scolytus multistriatus | Bark Beetles | | |
| 11046 | 11 | 046 | spruce engraver | Scolytus piceae | Bark Beetles | | |
| 11047 | 11 | 047 | hickory bark beetle | Scolytus quadrispinosus | Bark Beetles | | |
| 11048 | 11 | 048 | true fir bark beetles | Scolytus spp. | Bark Beetles | | |
| 11049 | 11 | 049 | Douglas-fir engraver | Scolytus unispinosus | Bark Beetles | | |
| 11050 | 11 | 050 | fir engraver | Scolytus ventralis | Bark Beetles | | |
| 11051 | 11 | 051 | striped ambrosia beetle | Tryachykele lineatum | Bark Beetles | | |
| 11052 | 11 | 052 | Sitka spruce engraver beetle | Ips conncinnus | Bark Beetles | | |
| 11053 | 11 | 053 | four-eyed bark beetle | Polygraphus spp. | Bark Beetles | | |
| 11054 | 11 | 054 | hemlock beetle | Pseudohylesinus tsugae | Bark Beetles | | |
| 11055 | 11 | 055 | spruce ips | Ips pilifrons | Bark Beetles | | |
| 11056 | 11 | 056 | (smaller) Mexican pine beetle | Dendroctonus mexicanus | Bark Beetles | | |
| 11057 | 11 | 057 | banded elm bark beetle | Scolytus schevyrewi | Bark Beetles | | |
| 11058 | 11 | 058 | redbay ambrosia beetle | Xyleborus glabratus | Bark Beetles | | |
| 11059 | 11 | 059 | southern cypress beetle | Phloeosinus taxodii | Bark Beetles | | |
| 11060 | 11 | 060 | Mediterranean pine engraver | Orthotomicus erosus | Bark Beetles | | |
| 11800 | 11 | 800 | other bark beetle (known) | other bark beetle (known) | Bark Beetles | | |
| 11900 | 11 | 900 | unknown bark beetle | unknown bark beetle | Bark Beetles | | |
| 11999 | 11 | 999 | western bark beetle complex | western bark beetle complex | Bark Beetles | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 12000 | **12** | **000** | **Defoliators** | | | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **ALL** |
| 12001 | 12 | 001 | casebearer | | Defoliators | | |
| 12002 | 12 | 002 | leaftier | | Defoliators | | |
| 12003 | 12 | 003 | loopers | | Defoliators | | |
| 12004 | 12 | 004 | needleminers | | Defoliators | | |
| 12005 | 12 | 005 | sawflies | | Defoliators | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **NRS** |
| 12006 | 12 | 006 | skeletonizer | | Defoliators | | |
| 12007 | 12 | 007 | larger elm leaf beetle | Monocesta coryli | Defoliators | | |
| 12008 | 12 | 008 | spanworm | | Defoliators | | |
| 12009 | 12 | 009 | webworm | | Defoliators | | |
| 12010 | 12 | 010 | pine false webworm | Acantholyda erythrocephala | Defoliators | | |
| 12011 | 12 | 011 | western blackheaded budworm | Acleris gloverana | Defoliators | | |
| 12012 | 12 | 012 | eastern blackheaded budworm | Acleris variana | Defoliators | | |
| 12013 | 12 | 013 | whitefly | Aleyrodoidae | Defoliators | | |
| 12014 | 12 | 014 | fall cankerworm | Alsophila pometaria | Defoliators | | |
| 12015 | 12 | 015 | alder flea beetle | Altica ambiens | Defoliators | | |
| 12016 | 12 | 016 | mountain mahogany looper | Anacamptodes clivinaria profanata | Defoliators | | |
| 12017 | 12 | 017 | birch leaffolder | Ancylis disigerana | Defoliators | | |
| 12018 | 12 | 018 | oak worms | Anisota spp. | Defoliators | | |
| 12019 | 12 | 019 | orange-striped oakworm | Anisota senatoria | Defoliators | | |
| 12020 | 12 | 020 | western larch sawfly | Anoplonyx occidens | Defoliators | | |
| 12021 | 12 | 021 | fruittree leafroller | Archips argyrospila | Defoliators | | |
| 12022 | 12 | 022 | uglynest caterpillar | Archips cerasivorana | Defoliators | | |
| 12023 | 12 | 023 | boxelder defoliator | Archips negundanus | Defoliators | | |
| 12024 | 12 | 024 | oak leafroller | Archips semiferana | Defoliators | | |
| 12025 | 12 | 025 | birch sawfly | Arge pectoralis | Defoliators | | |
| 12026 | 12 | 026 | arborvitae leafminer | Argyresthia thuiella | Defoliators | | |
| 12027 | 12 | 027 | coconut scale | Aspidiotus destructor | Defoliators | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 12028 | 12 | 028 | texas leafcutting ant | Atta texana | Defoliators | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **SRS** |
| 12029 | 12 | 029 | oak skeletonizer | Bucculatrix ainsliella | Defoliators | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **NRS** |
| 12030 | 12 | 030 | pear sawfly | Caliroa cerasi | Defoliators | | |
| 12031 | 12 | 031 | scarlet oak sawfly | Caliroa quercuscoccineae | Defoliators | | |
| 12032 | 12 | 032 | elm calligrapha | Calligrapha scalaris | Defoliators | | |
| 12033 | 12 | 033 | boxelder leafroller | Caloptilia negundella | Defoliators | | |
| 12034 | 12 | 034 | maple petiole borer | Caulocampus acericaulis | Defoliators | | |
| 12035 | 12 | 035 | spruce webspinning sawfly | Cephalcia fascipennis | Defoliators | | |
| 12036 | 12 | 036 | two-year budworm | Choristoneura biennis | Defoliators | | |
| 12037 | 12 | 037 | large aspen tortrix | Choristoneura conflictana | Defoliators | | |
| 12038 | 12 | 038 | spruce budworm | Choristoneura fumiferana | Defoliators | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **NRS** |
| 12039 | 12 | 039 | western pine budworm | Choristoneura lambertiana | Defoliators | | |
| 12040 | 12 | 040 | western spruce budworm | Choristoneura occidentalis | Defoliators | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **IW, PNW** |
| 12041 | 12 | 041 | jack pine budworm | Choristoneura pinus | Defoliators | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **NRS** |
| 12042 | 12 | 042 | Modoc budworm | Choristoneura retiniana | Defoliators | | |
| 12043 | 12 | 043 | aspen leaf beetle | Chrysomela crotchi | Defoliators | | |
| 12044 | 12 | 044 | cottonwood leaf beetle | Chrysomela scripta | Defoliators | | |
| 12045 | 12 | 045 | leafhopper | Cicadellidae | Defoliators | | |
| 12046 | 12 | 046 | poplar tentmaker | Clostera inclusa | Defoliators | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 12047 | 12 | 047 | larch casebearer | Coleophora laricella | Defoliators | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **NRS** |
| 12048 | 12 | 048 | birch casebearer | Coleophora serratella | Defoliators | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **NRS** |
| 12049 | 12 | 049 | lodgepole needleminer | Coleotechnites milleri | Defoliators | | |
| 12050 | 12 | 050 | Gelechiid moths/ needleminers | Coleotechnites spp. | Defoliators | | |
| 12051 | 12 | 051 | Black Hills pandora moth | Coloradia doris | Defoliators | | |
| 12052 | 12 | 052 | pandora moth | Coloradia pandora | Defoliators | | |
| 12053 | 12 | 053 | sycamore lace bug | Corythucha ciliata | Defoliators | | |
| 12054 | 12 | 054 | lace bugs | Corythucha spp. | Defoliators | | |
| 12055 | 12 | 055 | oak leaftier | Croesia semipurpurana | Defoliators | | |
| 12056 | 12 | 056 | dusky birch sawfly | Croesus latitarsus | Defoliators | | |
| 12057 | 12 | 057 | walnut caterpillar | Datana integerrima | Defoliators | | |
| 12058 | 12 | 058 | yellownecked caterpillar | Datana ministra | Defoliators | | |
| 12059 | 12 | 059 | walkingstick | Diapheromera femorata | Defoliators | | |
| 12060 | 12 | 060 | spruce coneworm | Dioryctria reniculelloides | Defoliators | | |
| 12061 | 12 | 061 | introduced pine sawfly | Diprion similis | Defoliators | | |
| 12062 | 12 | 062 | greenstriped mapleworm | Dryocampa rubicunda | Defoliators | | |
| 12063 | 12 | 063 | spruce needleminer (east) | Endothenia albolineana | Defoliators | | |
| 12064 | 12 | 064 | elm spanworm | Ennomos subsignaris | Defoliators | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **NRS** |
| 12065 | 12 | 065 | maple trumpet skeletonizer | Epinotia aceriella | Defoliators | | |
| 12066 | 12 | 066 | white fir needleminer | Epinotia meritana | Defoliators | | |
| 12067 | 12 | 067 | linden looper | Erannis tiliaria | Defoliators | | |
| 12068 | 12 | 068 | browntail moth | Euproctis chrysorrhoea | Defoliators | Any occurrence | **NRS** |
| 12069 | 12 | 069 | pine needleminer | Exoteleia pinifoliella | Defoliators | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 12070 | 12 | 070 | birch leafminer | Fenusa pusilla | Defoliators | | |
| 12071 | 12 | 071 | elm leafminer | Fenusa ulmi | Defoliators | | |
| 12072 | 12 | 072 | geometrid moth | Geometridae | Defoliators | | |
| 12073 | 12 | 073 | leafblotch miner | Gracillariidae | Defoliators | | |
| 12074 | 12 | 074 | spotted tussock moth | Halisidota maculata | Defoliators | | |
| 12075 | 12 | 075 | pale tussock moth | Halysidota tessellaris | Defoliators | | |
| 12076 | 12 | 076 | hesperiid moth | Hasora choromus | Defoliators | | |
| 12077 | 12 | 077 | brown day moth | Hemileuca eglanterina | Defoliators | | |
| 12078 | 12 | 078 | buck moth | Hemileuca maia | Defoliators | | |
| 12079 | 12 | 079 | saddled prominent | Heterocampa guttivitta | Defoliators | | |
| 12080 | 12 | 080 | variable oakleaf caterpillar | Heterocampa manteo | Defoliators | | |
| 12081 | 12 | 081 | cherry scallop shell moth | Hydria prunivorata | Defoliators | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **NRS** |
| 12082 | 12 | 082 | fall webworm | Hyphantria cunea | Defoliators | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **SRS** |
| 12083 | 12 | 083 | hemlock looper | Lambdina fiscellaria | Defoliators | | |
| 12084 | 12 | 084 | oak looper | Lambdina punctat | Defoliators | | |
| 12085 | 12 | 085 | tent caterpillar moth | Lasiocampidae | Defoliators | | |
| 12086 | 12 | 086 | satin moth | Leucoma salicis | Defoliators | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **NRS** |
| 12087 | 12 | 087 | willow leafblotch miner | Lithocolletis spp. | Defoliators | | |
| 12088 | 12 | 088 | aspen blotchminer | Lithocolletis tremuloidiella | Defoliators | | |
| 12089 | 12 | 089 | gypsy moth | Lymantria dispar | Defoliators | Any occurrence | **NRS; SRS** |
| 12090 | 12 | 090 | cottonwood leafminers | Lyonetia spp. | Defoliators | | |
| 12091 | 12 | 091 | dogwood sawfly | Macremphytus tarsatus | Defoliators | | |
| 12092 | 12 | 092 | rose chafer | Macrodactylus subspinosus | Defoliators | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 12093 | 12 | 093 | eastern tent caterpillar | Malacosoma americanum | Defoliators | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **NRS; SRS** |
| 12094 | 12 | 094 | western tent caterpillar | Malacosoma californicum | Defoliators | | |
| 12095 | 12 | 095 | Pacific tent caterpillar | Malacosoma constrictum | Defoliators | | |
| 12096 | 12 | 096 | forest tent caterpillar | Malacosoma disstria | Defoliators | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected. | **NRS** |
| 12097 | 12 | 097 | southwestern tent caterpillar | Malacosoma incurvum | Defoliators | | |
| 12098 | 12 | 098 | leafcutting bees | Megachilidae | Defoliators | | |
| 12099 | 12 | 099 | blister beetle | Meloidae | Defoliators | | |
| 12100 | 12 | 100 | early birch leaf edgeminer | Messa nana | Defoliators | | |
| 12101 | 12 | 101 | juniper sawfly | Monoctenus fulvus | Defoliators | | |
| 12102 | 12 | 102 | common sawflies | Nematus spp. | Defoliators | | |
| 12103 | 12 | 103 | balsam fir sawfly | Neodiprion abietis | Defoliators | | |
| 12104 | 12 | 104 | lodgepole sawfly | Neodiprion burkei | Defoliators | | |
| 12105 | 12 | 105 | blackheaded pine sawfly | Neodiprion excitans | Defoliators | | |
| 12106 | 12 | 106 | pine infesting sawflies | Neodiprion fulviceps | Defoliators | | |
| 12107 | 12 | 107 | redheaded pine sawfly | Neodiprion lecontei | Defoliators | | |
| 12109 | 12 | 109 | ponderosa pine sawfly | Neodiprion mundus | Defoliators | | |
| 12110 | 12 | 110 | white pine sawfly | Neodiprion pinetum | Defoliators | | |
| 12111 | 12 | 111 | jack pine sawfly | Neodiprion pratti banksianae | Defoliators | | |
| 12112 | 12 | 112 | Virginia pine sawfly | Neodiprion pratti pratti | Defoliators | | |
| 12113 | 12 | 113 | European pine sawfly | Neodiprion sertifer | Defoliators | | |
| 12114 | 12 | 114 | loblolly pine sawfly | Neodiprion taedae linearis | Defoliators | | |
| 12115 | 12 | 115 | hemlock sawfly | Neodiprion tsugae | Defoliators | | |
| 12116 | 12 | 116 | pine butterfly | Neophasia menapia | Defoliators | | |
| 12117 | 12 | 117 | false hemlock looper | Nepytia canosaria | Defoliators | | |
| 12118 | 12 | 118 | California tortoiseshell | Nymphalis californica | Defoliators | | |
| 12119 | 12 | 119 | locust leafminer | Odontota dorsalis | Defoliators | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 12120 | 12 | 120 | Bruce spanworm | Operophtera bruceata | Defoliators | | |
| 12121 | 12 | 121 | rusty tussock moth | Orgyia antiqua | Defoliators | | |
| 12122 | 12 | 122 | whitemarked tussock moth | Orgyia leucostigma | Defoliators | | |
| 12123 | 12 | 123 | Douglas-fir tussock moth | Orgyia pseudotsugata | Defoliators | | |
| 12124 | 12 | 124 | western tussock moth | Orgyia vetusta | Defoliators | | |
| 12125 | 12 | 125 | spring cankerworm | Paleacrita vernata | Defoliators | | |
| 12126 | 12 | 126 | black citrus swallowtail butterfly | Papilio polytes | Defoliators | | |
| 12127 | 12 | 127 | maple leafcutter | Paraclemensia acerifoliella | Defoliators | | |
| 12128 | 12 | 128 | pine tussock moth | Parorgyia grisefacta | Defoliators | | |
| 12129 | 12 | 129 | poinciana looper | Pericyma cruegeri | Defoliators | | |
| 12130 | 12 | 130 | half-wing geometer | Phigalia titea | Defoliators | | |
| 12131 | 12 | 131 | Phoberia moth | Phoberia atomaris | Defoliators | | |
| 12132 | 12 | 132 | California oakworm | Phryganidia californica | Defoliators | | |
| 12133 | 12 | 133 | European snout beetle | Phyllobius oblongus | Defoliators | | |
| 12134 | 12 | 134 | citrus leafminer | Phyllocnistis citrella | Defoliators | | |
| 12135 | 12 | 135 | aspen leafminer | Phyllocnistis populiella | Defoliators | | |
| 12136 | 12 | 136 | yellowheaded spruce sawfly | Pikonema alaskensis | Defoliators | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **NRS** |
| 12137 | 12 | 137 | tenlined June beetle | Polyphylla decemlineata | Defoliators | | |
| 12138 | 12 | 138 | Japanese beetle | Popillia japonica | Defoliators | | |
| 12139 | 12 | 139 | larch sawfly | Pristiphora erichsonii | Defoliators | | |
| 12140 | 12 | 140 | mountain-ash sawfly | Pristiphora geniculata | Defoliators | | |
| 12141 | 12 | 141 | elm leaf beetle | Pyrrhalta luteola | Defoliators | | |
| 12142 | 12 | 142 | spearmarked black moth | Rheumaptera hastata | Defoliators | | |
| 12143 | 12 | 143 | giant silkworm moth | Saturniidae | Defoliators | | |
| 12144 | 12 | 144 | redhumped caterpillar | Schizura concinna | Defoliators | | |
| 12145 | 12 | 145 | redbanded thrips | Selenothrips rubrocinctus | Defoliators | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 12146 | 12 | 146 | green larch looper | Semiothisa sexmaculata | Defoliators | | |
| 12147 | 12 | 147 | maple leafroller | Sparganothis acerivorana | Defoliators | | |
| 12148 | 12 | 148 | redhumped oakworm | Symmerista canicosta | Defoliators | | |
| 12149 | 12 | 149 | orangehumped mapleworm | Symmerista leucitys | Defoliators | | |
| 12150 | 12 | 150 | spruce needleminer (west) | Taniva albolineana | Defoliators | | |
| 12151 | 12 | 151 | maple webworm | Tetralopha asperatella | Defoliators | | |
| 12152 | 12 | 152 | pine webworm | Tetralopha robustella | Defoliators | | |
| 12153 | 12 | 153 | introduced basswood thrips | Thrips calcaratus | Defoliators | | |
| 12154 | 12 | 154 | bagworm | Thyridopteryx ephemeraeformis | Defoliators | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **SRS** |
| 12155 | 12 | 155 | leafroller/seed moth | Tortricidae | Defoliators | | |
| 12156 | 12 | 156 | willow defoliation | Tortricidae | Defoliators | | |
| 12157 | 12 | 157 | euonymus caterpillar | Yponomeuta spp. | Defoliators | | |
| 12158 | 12 | 158 | spruce bud moth | Zeiraphera canadensis | Defoliators | | |
| 12159 | 12 | 159 | larch bud moth | Zeiraphera improbana | Defoliators | | |
| 12160 | 12 | 160 | pine needle sheathminer | Zelleria haimbachi | Defoliators | | |
| 12161 | 12 | 161 | cypress looper | Anacamptodes pergracilis | Defoliators | | |
| 12162 | 12 | 162 | Chrysomela leaf beetle | Chrysomela spp. | Defoliators | | |
| 12163 | 12 | 163 | pine colaspis | Colaspis pini | Defoliators | | |
| 12164 | 12 | 164 | saddleback looper | Ectropis crepuscularia | Defoliators | | |
| 12165 | 12 | 165 | birch leaf roller | Epinotia solandriana | Defoliators | | |
| 12166 | 12 | 166 | New Mexico fir looper | Galenara consimilis | Defoliators | | |
| 12167 | 12 | 167 | striped alder sawfly | Hemichroa crocea | Defoliators | | |
| 12168 | 12 | 168 | greenstriped looper | Melanoplophia imitata | Defoliators | | |
| 12169 | 12 | 169 | willow leaf blotchminer | Micrurapteryx salicifoliella | Defoliators | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 12170 | 12 | 170 | pine sawfly | Neodiprion autmnalis | Defoliators | | |
| 12171 | 12 | 171 | pinon sawfly | Neodiprion edulicolus | Defoliators | | |
| 12172 | 12 | 172 | Neodiprion gilletti | Neodiprion gilletti | Defoliators | | |
| 12173 | 12 | 173 | Neodiprion ventralis | Neodiprion ventralis | Defoliators | | |
| 12174 | 12 | 174 | pine looper | Phaeoura mexicanaria | Defoliators | | |
| 12175 | 12 | 175 | Zadiprion rohweri | Zadiprion rohweri | Defoliators | | |
| 12176 | 12 | 176 | bull pine sawfly | Zadiprion townsendi | Defoliators | | |
| 12177 | 12 | 177 | Douglas-fir budmoth | Zeiraphera hesperiana | Defoliators | | |
| 12178 | 12 | 178 | western oak looper | Lambdina fiscellaria somniaria | Defoliators | | |
| 12179 | 12 | 179 | phantom hemlock looper | Nepytia phantasmaria | Defoliators | | |
| 12180 | 12 | 180 | tent caterpillar | Malacosoma spp. | Defoliators | | |
| 12181 | 12 | 181 | Abbot's sawfly | Neodiprion abbotii | Defoliators | | |
| 12182 | 12 | 182 | slash pine sawfly | Neodiprion merkeli | Defoliators | | |
| 12183 | 12 | 183 | sand pine sawfly | Neodiprion pratti | Defoliators | | |
| 12184 | 12 | 184 | melalueca leaf weevil | Oxyops vitiosa | Defoliators | | |
| 12185 | 12 | 185 | cypress leaf beetle | Systena marginalis | Defoliators | | |
| 12186 | 12 | 186 | Nepytia janetae | Nepytia janetae | Defoliators | | |
| 12187 | 12 | 187 | agromyzid fly | Agromyza viridula | Defoliators | | |
| 12188 | 12 | 188 | elm sawfly | Cimbex americana | Defoliators | | |
| 12189 | 12 | 189 | june beetle | Phyllophaga spp. | Defoliators | | |
| 12190 | 12 | 190 | hickory tussock moth | Halisidota caryae | Defoliators | | |
| 12191 | 12 | 191 | pin oak sawfly | Caliroa lineata | Defoliators | | |
| 12192 | 12 | 192 | palmerworm | Dichomeris ligulella | Defoliators | | |
| 12193 | 12 | 193 | pitch pine looper | Lambdina athasaria pellucidaria | Defoliators | | |
| 12194 | 12 | 194 | red pine sawfly | Neodiprion nanulus nanulus | Defoliators | | |
| 12195 | 12 | 195 | pine tube moth | Argyrotaenia pinatubana | Defoliators | | |
| 12196 | 12 | 196 | baldcypress leafroller | Archips goyerana | Defoliators | | |
| 12197 | 12 | 197 | winter moth | Operophtera brumata | Defoliators | Any occurrence | **NRS** |
| 12198 | 12 | 198 | basswood thrips | Neohydatothrips tiliae | Defoliators | | |
| 12199 | 12 | 199 | noctuid moth | Xylomyges simplex (Walker) | Defoliators | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 12200 | 12 | 200 | pyralid moth | Palpita magniferalis | Defoliators | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **NRS** |
| 12201 | 12 | 201 | pacific silver fir budmoth | Zeiraphera spp. | Defoliators | | |
| 12202 | 12 | 202 | red pine needle midge | Thecodiplosis piniresinosae | Defoliators | | |
| 12203 | 12 | 203 | western hemlock looper | Lambdina fiscellaria lugubrosa | Defoliators | | |
| 12204 | 12 | 204 | lodgepole pine sawfly | Neodiprion nanulus contortae | Defoliators | | |
| 12205 | 12 | 205 | silverspotted tiger moth | Lophocampa argentata | Defoliators | | |
| 12206 | 12 | 206 | green alder sawfly | Monsoma pulveratum | Defoliators | | |
| 12207 | 12 | 207 | conifer sawflies | conifer sawflies | Defoliators | | |
| 12208 | 12 | 208 | ambermarked birch leafminer | Profenusa thomsoni | Defoliators | | |
| 12209 | 12 | 209 | cycad blue butterfly | Chilades pandava | Defoliators | | |
| 12300 | 12 | 300 | budworm | budworms | Defoliators | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **PNW** |
| 12800 | 12 | 800 | other defloiater (known) | other defloiater (known) | Defoliators | | |
| 12900 | 12 | 900 | unknown defoliator | unknown defoliator | Defoliators | | |
| **13000** | **13** | **000** | **Chewing Insects** | | | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **SRS, IW** |
| 13001 | 13 | 001 | grasshopper | | Chewing Insects | | |
| 13002 | 13 | 002 | shorthorn grasshoppers | Acrididae | Chewing Insects | | |
| 13003 | 13 | 003 | black cutworm | Agrotis ipsilon | Chewing Insects | | |
| 13004 | 13 | 004 | Palau coconut beetle | Brontispa palauenis | Chewing Insects | | |
| 13005 | 13 | 005 | clearwinged grasshopper | Camnula pellucida | Chewing Insects | | |
| 13006 | 13 | 006 | cicadas | Cicadidae | Chewing Insects | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **SRS** |
| 13007 | 13 | 007 | eurytomids | Eurytoma spp. | Chewing Insects | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 13008 | 13 | 008 | cutworms | Euxoa excellens | Chewing Insects | | |
| 13009 | 13 | 009 | whitefringed beetles | Graphognathus spp. | Chewing Insects | | |
| 13010 | 13 | 010 | pales weevil | Hylobius pales | Chewing Insects | | |
| 13011 | 13 | 011 | vegetable weevil | Listroderes difficilis | Chewing Insects | | |
| 13012 | 13 | 012 | periodical cicada | Magicicada septendecim | Chewing Insects | | |
| 13013 | 13 | 013 | migratory grasshopper | Melanoplus sanguinipes | Chewing Insects | | |
| 13014 | 13 | 014 | valley grasshopper | Oedaleonotus enigma | Chewing Insects | | |
| 13015 | 13 | 015 | strawberry root weevil | Otiorhyhchus ovatus | Chewing Insects | | |
| 13016 | 13 | 016 | black vine weevil | Otiorhynchus sulcatus | Chewing Insects | | |
| 13017 | 13 | 017 | pandanus beetle | Oxycephala pandani | Chewing Insects | | |
| 13018 | 13 | 018 | spaeth pandanus | Oxycephala spaethi | Chewing Insects | | |
| 13019 | 13 | 019 | agamemnon butterfly | Papilio agememnon | Chewing Insects | | |
| 13020 | 13 | 020 | northern pitch twig moth | Petrova albicapitana | Chewing Insects | | |
| 13021 | 13 | 021 | ponderosa pine tip moth | Rhyacionia zozana | Chewing Insects | | |
| 13022 | 13 | 022 | pine needle weevil | Scythropus spp. | Chewing Insects | | |
| 13023 | 13 | 023 | coconut longhorned grasshopper | Segestes unicolor | Chewing Insects | | |
| 13024 | 13 | 024 | clover root curculio | Sitona hispidulus | Chewing Insects | | |
| 13025 | 13 | 025 | Madron thrips | Thrips madronii | Chewing Insects | | |
| 13026 | 13 | 026 | ash plant bug | Tropidosteptes amoenus | Chewing Insects | | |
| 13027 | 13 | 027 | shorthorned grasshopper | Valanga nigricornis | Chewing Insects | | |
| 13028 | 13 | 028 | pitch-eating weevil | Pachylobius picivorus | Chewing Insects | | |
| 13029 | 13 | 029 | eastern pine weevil | Pissodes nemorensis | Chewing Insects | | |
| 13030 | 13 | 030 | adana tip moth | Rhyacionia adana | Chewing Insects | | |
| 13800 | 13 | 800 | other chewing insect (known) | other chewing insect (known) | Chewing Insects | | |
| 13900 | 13 | 900 | unknown chewing insect | unknown chewing insect | Chewing Insects | | |
| **14000** | **14** | **000** | **Sucking Insects** | | | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **ALL** |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 14001 | 14 | 001 | scale insects | | Sucking Insects | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **NRS** |
| 14002 | 14 | 002 | western larch woolly aphid | Adelges oregonensis | Sucking Insects | | |
| 14003 | 14 | 003 | balsam woolly adelgid | Adelges piceae | Sucking Insects | Any occurrence | **ALL** |
| 14004 | 14 | 004 | hemlock woolly adelgid | Adelges tsugae | Sucking Insects | Any occurrence | **NRS; SRS; IW** |
| 14005 | 14 | 005 | spiraling whitefly | Aleurodicus dispersus | Sucking Insects | | |
| 14006 | 14 | 006 | aphid | Aphididae | Sucking Insects | | |
| 14007 | 14 | 007 | pine spittlebug | Aphrophora parallela | Sucking Insects | | |
| 14008 | 14 | 008 | western pine spittlebug | Aphrophora permutata | Sucking Insects | | |
| 14009 | 14 | 009 | Saratoga spittlebug | Aphrophora saratogensis | Sucking Insects | | |
| 14010 | 14 | 010 | spittlebug | Cercopidae | Sucking Insects | | |
| 14011 | 14 | 011 | wax scale | Ceroplastes spp. | Sucking Insects | | |
| 14012 | 14 | 012 | pine needle scale | Chionaspis pinifoliae | Sucking Insects | | |
| 14014 | 14 | 014 | giant conifer aphids | Cinara spp. | Sucking Insects | | |
| 14015 | 14 | 015 | white pine aphid | Cinara strobi | Sucking Insects | | |
| 14016 | 14 | 016 | beech scale | Cryptococcus fagisuga | Sucking Insects | Any occurrence | **NRS** |
| 14017 | 14 | 017 | spruce aphid | Elatobium abietinum | Sucking Insects | | |
| 14018 | 14 | 018 | woolly apple aphid | Eriosoma lanigerum | Sucking Insects | | |
| 14019 | 14 | 019 | striped mealybug | Ferrisia vergata | Sucking Insects | | |
| 14020 | 14 | 020 | elongate hemlock scale | Fiorinia externa | Sucking Insects | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **NRS** |
| 14021 | 14 | 021 | coconut red scale | Furcaspis oceanica | Sucking Insects | | |
| 14022 | 14 | 022 | pine thrips | Gnophothrips spp. | Sucking Insects | | |
| 14023 | 14 | 023 | leucaena psyllid | Heteropsylla cubana | Sucking Insects | | |
| 14024 | 14 | 024 | honeysuckle aphids | Hyadaphis tataricae | Sucking Insects | | |
| 14025 | 14 | 025 | Egyptian fluted scale | Icerya aegyptiaca | Sucking Insects | | |
| 14026 | 14 | 026 | Lecanium scale | Lecanium spp. | Sucking Insects | | |
| 14027 | 14 | 027 | common falsepit scale | Lecanodiaspis prosopidis | Sucking Insects | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 14028 | 14 | 028 | oystershell scale | Lepidosaphes ulmi | Sucking Insects | | |
| 14029 | 14 | 029 | pinyon needle scale | Matsucoccus acalyptus | Sucking Insects | | |
| 14030 | 14 | 030 | ponderosa pine twig scale | Matsucoccus bisetosus | Sucking Insects | | |
| 14031 | 14 | 031 | pine twig scale | Matsucoccus californicus | Sucking Insects | | |
| 14032 | 14 | 032 | ponderosa pine scale | Matsucoccus degeneratus | Sucking Insects | | |
| 14033 | 14 | 033 | red pine scale | Matsucoccus resinosae | Sucking Insects | Any occurrence | **NRS** |
| 14034 | 14 | 034 | Prescott scale | Matsucoccus vexillorum | Sucking Insects | | |
| 14035 | 14 | 035 | treehoopers | Membracidae | Sucking Insects | | |
| 14036 | 14 | 036 | hibiscus psyllid | Mesohomotoma hibisci | Sucking Insects | | |
| 14037 | 14 | 037 | balsam twig aphid | Mindarus abietinus | Sucking Insects | | |
| 14038 | 14 | 038 | hibiscus mealybug | Nipaecoccus vastator | Sucking Insects | | |
| 14039 | 14 | 039 | black pineleaf scale | Nuculaspis californica | Sucking Insects | | |
| 14040 | 14 | 040 | spruce spider mite | Oligonychus ununquis | Sucking Insects | | |
| 14041 | 14 | 041 | twig girdler | Oncideres cingulata | Sucking Insects | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **SRS** |
| 14042 | 14 | 042 | woolly alder aphid | Paraprociphilus tessellatus | Sucking Insects | | |
| 14043 | 14 | 043 | maple aphids | Periphyllus spp. | Sucking Insects | | |
| 14044 | 14 | 044 | spruce bud scale | Physokermes piceae | Sucking Insects | | |
| 14045 | 14 | 045 | red pine adelgid | Pineus borneri | Sucking Insects | | |
| 14046 | 14 | 046 | pine leaf adelgid | Pineus pinifoliae | Sucking Insects | | |
| 14047 | 14 | 047 | white pine adelgid | Pineus spp. | Sucking Insects | | |
| 14048 | 14 | 048 | pine bark adelgid | Pineus strobi | Sucking Insects | | |
| 14049 | 14 | 049 | root aphid | Prociphilus americanus | Sucking Insects | | |
| 14050 | 14 | 050 | mealybug | Pseudococcidae | Sucking Insects | | |
| 14051 | 14 | 051 | cottony maple scale | Pulvinaria innumerabilis | Sucking Insects | | |
| 14052 | 14 | 052 | fir mealybug | Puto cupressi | Sucking Insects | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 14053 | 14 | 053 | Douglas-fir mealybug | Puto profusus | Sucking Insects | | |
| 14054 | 14 | 054 | spruce mealybug | Puto sandini | Sucking Insects | | |
| 14055 | 14 | 055 | hemispherical scale | Saissetia coffeae | Sucking Insects | | |
| 14056 | 14 | 056 | woolly pine needle aphid | Schizolachnus piniradiatae | Sucking Insects | | |
| 14057 | 14 | 057 | steatococcus scale | Steatococcus samaraius | Sucking Insects | | |
| 14058 | 14 | 058 | pear thrips | Taeniothrips inconsequens | Sucking Insects | | |
| 14059 | 14 | 059 | mulberry whitefly | Tetraleurodes mori | Sucking Insects | | |
| 14060 | 14 | 060 | tuliptree scale | Toumeyella liriodendri | Sucking Insects | | |
| 14061 | 14 | 061 | pine tortoise scale | Toumeyella parvicornis | Sucking Insects | | |
| 14062 | 14 | 062 | citrus snow scale | Unaspis citri | Sucking Insects | | |
| 14063 | 14 | 063 | birch aphid | Euceraphis betulae | Sucking Insects | | |
| 14064 | 14 | 064 | Kermes scale | Allokermes spp. | Sucking Insects | | |
| 14065 | 14 | 065 | Casuarina spittlebug | Clastoptera undulata | Sucking Insects | | |
| 14066 | 14 | 066 | giant bark aphid | Longistigma caryae | Sucking Insects | | |
| 14067 | 14 | 067 | woolly pine scale | Pseudophilippia quaintancii | Sucking Insects | | |
| 14068 | 14 | 068 | european elm scale | Gossyparia spuria | Sucking Insects | | |
| 14069 | 14 | 069 | elm scurfy scale | Chionaspis americana | Sucking Insects | | |
| 14070 | 14 | 070 | magnolia scale | Neolecanium cornuparvum | Sucking Insects | | |
| 14071 | 14 | 071 | beech blight aphid | Grylloprociphilus imbricator | Sucking Insects | | |
| 14072 | 14 | 072 | beech woolly aphid | Phyllaphis fagi | Sucking Insects | | |
| 14073 | 14 | 073 | Asian cycad scale | Aulacaspis yasumatsui | Sucking Insects | | |
| 14074 | 14 | 074 | European fruit lecanium scale | Parthenolecanium corni | Sucking Insects | | |
| 14075 | 14 | 075 | lobate lac scale | Paratachardina lobata | Sucking Insects | | |
| 14800 | 14 | 800 | other sucking insect (known) | other sucking insect (known) | Sucking Insects | | |
| 14900 | 14 | 900 | unknown sucking insect | unknown sucking insect | Sucking Insects | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| **15000** | **15** | **000** | **Boring Insects** | | | Any damage to the terminal leader; damage ≥20% of the roots, stems, or branches | **ALL** |
| 15001 | 15 | 001 | shoot borer | | Boring Insects | Any damage to the terminal leader; damage ≥20% of the roots, stems, or branches | **NRS** |
| 15002 | 15 | 002 | termite | | Boring Insects | | |
| 15003 | 15 | 003 | ponderosa pine bark borer | Acanthocinus princeps | Boring Insects | | |
| 15004 | 15 | 004 | bronze birch borer | Agrilus anxius | Boring Insects | Any damage to the terminal leader; damage ≥20% of the roots, stems, or branches | **NRS** |
| 15005 | 15 | 005 | twolined chestnut borers | Agrilus bilineatus | Boring Insects | | |
| 15006 | 15 | 006 | bronze poplar borer | Agrilus liragus | Boring Insects | | |
| 15007 | 15 | 007 | carpenter bees | Apidae | Boring Insects | | |
| 15008 | 15 | 008 | flatheaded borer | Buprestidae | Boring Insects | | |
| 15009 | 15 | 009 | golden buprestid | Buprestis aurulenta | Boring Insects | | |
| 15010 | 15 | 010 | carpenter ants | Camponotus spp. | Boring Insects | | |
| 15011 | 15 | 011 | gouty pitch midge | Cecidomyia piniinopis | Boring Insects | | |
| 15012 | 15 | 012 | shootboring sawflies | Cephidae | Boring Insects | | |
| 15013 | 15 | 013 | roundheaded borer | Cerambycidae | Boring Insects | | |
| 15014 | 15 | 014 | flatheaded apple tree borer | Chrysobothris femorata | Boring Insects | | |
| 15015 | 15 | 015 | cranberry girdler | Chrysoteuchia topiaria | Boring Insects | | |
| 15016 | 15 | 016 | Columbian timber beetle | Corthylus columbianus | Boring Insects | | |
| 15017 | 15 | 017 | pitted ambrosia beetle | Corthylus punctatissimus | Boring Insects | | |
| 15018 | 15 | 018 | carpenterworm moths | Cossidae | Boring Insects | | |
| 15019 | 15 | 019 | poplar and willow borer | Cryptorphynchus lapathi | Boring Insects | | |
| 15020 | 15 | 020 | pine reproduction weevil | Cylindrocopturus eatoni | Boring Insects | | |
| 15021 | 15 | 021 | Douglas-fir twig weevil | Cylindrocopturus furnissi | Boring Insects | | |
| 15022 | 15 | 022 | Zimmerman pine moth | Dioryctria zimmermani | Boring Insects | | |
| 15023 | 15 | 023 | oak twig borers | Elaphidionoides spp. | Boring Insects | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 15024 | 15 | 024 | twig pruner | Elaphidionoides villosus | Boring Insects | | |
| 15025 | 15 | 025 | lesser cornstalk borer | Elasmopalpus lignosellus | Boring Insects | | |
| 15026 | 15 | 026 | red oak borer | Enaphalodes rufulus | Boring Insects | Damage to ≥10% of the bole circumference. | **SRS, NRS** |
| 15027 | 15 | 027 | ponderous borer | Ergates spiculatus | Boring Insects | | |
| 15028 | 15 | 028 | eastern pine shoot borer | Eucosma gloriola | Boring Insects | | |
| 15029 | 15 | 029 | western pine shoot borer | Eucosma sonomana | Boring Insects | | |
| 15030 | 15 | 030 | Eucosma shoot borers | Eucosma spp. | Boring Insects | | |
| 15031 | 15 | 031 | sugar maple borer | Glycobius speciosus | Boring Insects | Any damage to the terminal leader; damage ≥20% of the roots, stems, or branches | **NRS** |
| 15032 | 15 | 032 | Goes borers | Goes spp. | Boring Insects | | |
| 15033 | 15 | 033 | pine root collar weevil | Hylobius radicis | Boring Insects | | |
| 15034 | 15 | 034 | Warren root collar weevil | Hylobius warreni | Boring Insects | | |
| 15035 | 15 | 035 | powderpost beetle | Lyctidae | Boring Insects | | |
| 15036 | 15 | 036 | tarnished plant bug | Lygus lineolaris | Boring Insects | | |
| 15037 | 15 | 037 | bark weevils | Magdalis spp. | Boring Insects | | |
| 15038 | 15 | 038 | white pine barkminer moth | Marmara fasciella | Boring Insects | | |
| 15039 | 15 | 039 | locust borer | Megacyllene robiniae | Boring Insects | | |
| 15040 | 15 | 040 | California flathead borer | Melanophila californica | Boring Insects | | |
| 15041 | 15 | 041 | flatheaded fir borer | Melanophila drummondi | Boring Insects | | |
| 15042 | 15 | 042 | whitespotted sawyer | Monochamus scutellatus | Boring Insects | | |
| 15043 | 15 | 043 | redheaded ash borer | Neoclytus acuminutus | Boring Insects | | |
| 15044 | 15 | 044 | western ash borer | Neoclytus conjunctus | Boring Insects | | |
| 15045 | 15 | 045 | oberea shoot borers | Oberea spp. | Boring Insects | | |
| 15046 | 15 | 046 | eucalyptus longhorned borer | Phoracantha semipunctata | Boring Insects | | |
| 15047 | 15 | 047 | northern pine weevil | Pissodes approximatus | Boring Insects | | |
| 15048 | 15 | 048 | balsam bark weevil | Pissodes dubius | Boring Insects | | |
| 15049 | 15 | 049 | Monterey pine weevil | Pissodes radiatae | Boring Insects | | |
| 15050 | 15 | 050 | Engelmann spruce weevil | Pissodes strobi | Boring Insects | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 15051 | 15 | 051 | lodgepole terminal weevil | Pissodes terminalis | Boring Insects | | |
| 15052 | 15 | 052 | ambrosia beetles | Platypus spp. | Boring Insects | Damage to ≥10% of the bole circumference. | **SRS** |
| 15053 | 15 | 053 | cottonwood borer | Plectrodera scalator | Boring Insects | | |
| 15054 | 15 | 054 | balsam shootboring sawfly | Pleroneura brunneicornis | Boring Insects | | |
| 15055 | 15 | 055 | pine gall weevil | Podapion gallicola | Boring Insects | | |
| 15056 | 15 | 056 | ash borer | Podesesia syringae fraxini | Boring Insects | | |
| 15057 | 15 | 057 | lilac borer | Podosesia syringae | Boring Insects | | |
| 15058 | 15 | 058 | carpenterworm | Prionoxystus robiniae | Boring Insects | | |
| 15059 | 15 | 059 | maple shoot borers | Proterteras spp. | Boring Insects | | |
| 15060 | 15 | 060 | western subterranean termite | Reticulitermes hesperus | Boring Insects | | |
| 15061 | 15 | 061 | coconut trunk weevil | Rhabdoscelus asperipennis | Boring Insects | | |
| 15062 | 15 | 062 | New Guinea sugarcane weevil | Rhabdoscelus obscurus | Boring Insects | | |
| 15063 | 15 | 063 | European pine shoot moth | Rhyacionia buoliana | Boring Insects | | |
| 15064 | 15 | 064 | western pine tip moth | Rhyacionia bushnelli | Boring Insects | | |
| 15065 | 15 | 065 | Nantucket pine tip moth | Rhyacionia frustrana | Boring Insects | | |
| 15066 | 15 | 066 | lodgepole pine tip moth | Rhyacionia montana | Boring Insects | | |
| 15067 | 15 | 067 | southwestern pine tip moth | Rhyacionia neomexicana | Boring Insects | | |
| 15068 | 15 | 068 | poplar borer | Saperda calcarata | Boring Insects | | |
| 15069 | 15 | 069 | roundheaded appletree borer | Saperda candida | Boring Insects | | |
| 15070 | 15 | 070 | Saperda shoot borer | Saperda spp. | Boring Insects | | |
| 15071 | 15 | 071 | clearwing moths | Sesiidae | Boring Insects | | |
| 15072 | 15 | 072 | dogwood borer | Synanthedon scitula | Boring Insects | | |
| 15073 | 15 | 073 | roundheaded fir borer | Tetropium abietis | Boring Insects | | |
| 15074 | 15 | 074 | western larch borer | Tetropium velutinum | Boring Insects | | |
| 15075 | 15 | 075 | western cedar borer | Trachykele blondeli | Boring Insects | | |
| 15076 | 15 | 076 | Douglas-fir pitch moth | Vespamima novaroensis | Boring Insects | | |
| 15077 | 15 | 077 | sequoia pitch moth | Vespamima sequoia | Boring Insects | | |
| 15078 | 15 | 078 | black twig borer | Xylosandrus compactus | Boring Insects | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 15079 | 15 | 079 | Pacific dampwood termite | Zootermopsis angusticollis | Boring Insects | | |
| 15080 | 15 | 080 | subtropical pine tip moth | Rhyacionia subtropica | Boring Insects | | |
| 15081 | 15 | 081 | Asian ambrosia beetle | Xylosandrus crassiusculus | Boring Insects | | |
| 15082 | 15 | 082 | Asian longhorned beetle | Anoplophora glabripennis | Boring Insects | Any occurrence | **SRS** |
| 15083 | 15 | 083 | cottonwood twig borer | Gypsonoma haimbachiana | Boring Insects | | |
| 15084 | 15 | 084 | southern pine sawyer | Monochamus titillator | Boring Insects | | |
| 15085 | 15 | 085 | banded ash borer | Neoclytus capraea | Boring Insects | | |
| 15086 | 15 | 086 | sitka spruce weevil | Pissodes sitchensis | Boring Insects | | |
| 15087 | 15 | 087 | emerald ash borer | Agrilus planipennis | Boring Insects | Any occurrence | **NRS; SRS** |
| 15088 | 15 | 088 | hemlock borer | Melanophila fulvoguttata | Boring Insects | Any damage to the terminal leader; damage ≥20% of the roots, stems, or branches | **NRS** |
| 15089 | 15 | 089 | Formosan subterranean termite | Coptotermes formosanus | Boring Insects | | |
| 15090 | 15 | 090 | sirex woodwasp | Sirex noctilio | Boring Insects | | |
| 15091 | 15 | 091 | Oregon fir sawyer | Monochamus scutellatus oregonensis | Boring Insects | | |
| 15092 | 15 | 092 | cypress weevil | Eudociminus mannerheimii | Boring Insects | | |
| 15093 | 15 | 093 | camphor shot borer | Xylosandrus mutilatus | Boring Insects | | |
| 15094 | 15 | 094 | goldenspotted oak borer | Agrilus coxalis | Boring Insects | | |
| 15095 | 15 | 095 | European oak borer | Agrilus sulcicollis | Boring Insects | | |
| 15096 | 15 | 096 | X. germanus ambrosia beetle | Xylosandrus germanus | Boring Insects | | |
| 15097 | 15 | 097 | *Icosium tomentosum* | Icosium tomentosum | Boring Insects | | |
| 15800 | 15 | 800 | other boring insect (known) | other boring insect (known) | Boring Insects | | |
| 15900 | 15 | 900 | unknown boring insect | unknown boring insect | Boring Insects | | |
| **16000** | **16** | **000** | **Seed/Cone/Flower/Fruit Insects** | | | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 16001 | 16 | 001 | Douglas-fir cone moth | Barbara colfaxiana | Seed/Cone/Flower/Fruit Insects | | |
| 16002 | 16 | 002 | lodgepole cone beetle | Conophthorus contortae | Seed/Cone/Flower/Fruit Insects | | |
| 16003 | 16 | 003 | limber pine cone beetle | Conophthorus flexilis | Seed/Cone/Flower/Fruit Insects | | |
| 16004 | 16 | 004 | mountain pine cone beetle | Conophthorus monticolae | Seed/Cone/Flower/Fruit Insects | | |
| 16005 | 16 | 005 | ponderosa pine cone beetle | Conophthorus ponderosae | Seed/Cone/Flower/Fruit Insects | | |
| 16006 | 16 | 006 | Monterey pine cone beetle | Conophthorus radiatae | Seed/Cone/Flower/Fruit Insects | | |
| 16007 | 16 | 007 | red pine cone beetle | Conophthorus resinosae | Seed/Cone/Flower/Fruit Insects | | |
| 16008 | 16 | 008 | white pine cone beetle | Conopthorus coniperda | Seed/Cone/Flower/Fruit Insects | | |
| 16009 | 16 | 009 | black walnut curculio | Conotrachelus retentus | Seed/Cone/Flower/Fruit Insects | | |
| 16010 | 16 | 010 | Douglas-fir cone gall midge | Contarinia oregonensis | Seed/Cone/Flower/Fruit Insects | | |
| 16011 | 16 | 011 | Douglas-fir cone scale midge | Contarinia washingtonensis | Seed/Cone/Flower/Fruit Insects | | |
| 16012 | 16 | 012 | acorn/nut weevils | Curculio spp. | Seed/Cone/Flower/Fruit Insects | | |
| 16013 | 16 | 013 | Caroline fruitfly | Dacus frauenfeldi | Seed/Cone/Flower/Fruit Insects | | |
| 16014 | 16 | 014 | spruce bud midge | Dasineura swainei | Seed/Cone/Flower/Fruit Insects | | |
| 16015 | 16 | 015 | fir coneworm | Dioryctria abietivorella | Seed/Cone/Flower/Fruit Insects | | |
| 16016 | 16 | 016 | southern pine cone worm | Dioryctria amatella | Seed/Cone/Flower/Fruit Insects | | |
| 16017 | 16 | 017 | ponderosa pine coneworm | Dioryctria auranticella | Seed/Cone/Flower/Fruit Insects | | |
| 16018 | 16 | 018 | loblolly pine cone worm | Dioryctria merkeli | Seed/Cone/Flower/Fruit Insects | | |
| 16019 | 16 | 019 | ponderosa twig moth | Dioryctria ponderosae | Seed/Cone/Flower/Fruit Insects | | |
| 16020 | 16 | 020 | Dioryctria pseudotsugella | Dioryctria pseudotsugella | Seed/Cone/Flower/Fruit Insects | | |
| 16021 | 16 | 021 | Dioryctria moths | Dioryctria spp. | Seed/Cone/Flower/Fruit Insects | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 16022 | 16 | 022 | lodgepole cone moth | Eucosma rescissoriana | Seed/Cone/Flower/Fruit Insects | | |
| 16023 | 16 | 023 | seed chalcid | Eurytomidae | Seed/Cone/Flower/Fruit Insects | | |
| 16024 | 16 | 024 | slash pine flower thrips | Gnophothrips fuscus | Seed/Cone/Flower/Fruit Insects | | |
| 16025 | 16 | 025 | spruce cone maggot | Hylemya anthracina | Seed/Cone/Flower/Fruit Insects | | |
| 16026 | 16 | 026 | longleaf pine seed worm or moth | Laspeyresia ingens | Seed/Cone/Flower/Fruit Insects | | |
| 16027 | 16 | 027 | ponderosa pine seed moth | Laspeyresia piperana | Seed/Cone/Flower/Fruit Insects | | |
| 16028 | 16 | 028 | spruce seed moth | Laspeyresia youngana | Seed/Cone/Flower/Fruit Insects | | |
| 16029 | 16 | 029 | boxelder bug | Leptocoris trivittatus | Seed/Cone/Flower/Fruit Insects | | |
| 16030 | 16 | 030 | leaffooted pine seed bug | Leptoglossus corculus | Seed/Cone/Flower/Fruit Insects | | |
| 16031 | 16 | 031 | western conifer seed bug | Leptoglossus occidentalis | Seed/Cone/Flower/Fruit Insects | | |
| 16032 | 16 | 032 | hollyhock thrips | Liothrips varicornis | Seed/Cone/Flower/Fruit Insects | | |
| 16033 | 16 | 033 | Magastigmus lasiocarpae | Magastigmus lasiocarpae | Seed/Cone/Flower/Fruit Insects | | |
| 16034 | 16 | 034 | spruce seed chalcid | Magastigmus piceae | Seed/Cone/Flower/Fruit Insects | | |
| 16035 | 16 | 035 | ponderosa pine seed chalcid | Megastigmus albifrons | Seed/Cone/Flower/Fruit Insects | | |
| 16036 | 16 | 036 | fir seed chalcid | Megastigmus pinus | Seed/Cone/Flower/Fruit Insects | | |
| 16037 | 16 | 037 | Douglas-fir seed chalcid | Megastigmus spermotrophs | Seed/Cone/Flower/Fruit Insects | | |
| 16038 | 16 | 038 | yellow poplar weevil | Odontopus calceatus | Seed/Cone/Flower/Fruit Insects | | |
| 16039 | 16 | 039 | fruitpiercing moth | Othreis fullonia | Seed/Cone/Flower/Fruit Insects | | |
| 16040 | 16 | 040 | roundheaded cone borer | Paratimia conicola | Seed/Cone/Flower/Fruit Insects | | |
| 16041 | 16 | 041 | mango shoot caterpillar | Penicillaria jocosatrix | Seed/Cone/Flower/Fruit Insects | | |
| 16042 | 16 | 042 | coneworm | Phycitidae | Seed/Cone/Flower/Fruit Insects | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 16043 | 16 | 043 | harvester ants | Pogonomyrmex spp. | Seed/Cone/Flower/Fruit Insects | | |
| 16044 | 16 | 044 | citrus flower moth | Prays citri | Seed/Cone/Flower/Fruit Insects | | |
| 16045 | 16 | 045 | fir cone maggot | Strobilomyia abietis | Seed/Cone/Flower/Fruit Insects | | |
| 16046 | 16 | 046 | spruce cone maggot | Strobilomyia anthracina | Seed/Cone/Flower/Fruit Insects | | |
| 16047 | 16 | 047 | shieldbacked pine seed bug | Tetyra bipunctata | Seed/Cone/Flower/Fruit Insects | | |
| 16048 | 16 | 048 | coneworm | Hylemia spp. | Seed/Cone/Flower/Fruit Insects | | |
| 16049 | 16 | 049 | prairie tent caterpillar | Malacosoma lutescens | Seed/Cone/Flower/Fruit Insects | | |
| 16050 | 16 | 050 | jack pine tip beetle | Conophthorus banksianae | Seed/Cone/Flower/Fruit Insects | | |
| 16051 | 16 | 051 | webbing coneworm | Dioryctria disclusa | Seed/Cone/Flower/Fruit Insects | | |
| 16052 | 16 | 052 | blister coneworm | Dioryctria clarioralis | Seed/Cone/Flower/Fruit Insects | | |
| 16053 | 16 | 053 | southern cone gall midge | Cecidomyia bisetosa | Seed/Cone/Flower/Fruit Insects | | |
| 16054 | 16 | 054 | seed bugs | Lygaeidae spp. | Seed/Cone/Flower/Fruit Insects | | |
| 16800 | 16 | 800 | other seed/cone/flower insect (known) | other seed/cone/flower insect (known) | Seed/Cone/Flower/Fruit Insects | | |
| 16900 | 16 | 900 | unknown seed/cone/ flower insects | unknown seed/cone/ flower insects | Seed/Cone/Flower/Fruit Insects | | |
| **17000** | **17** | **000** | **Gallmaker Insects** | | | | |
| 17001 | 17 | 001 | birch budgall mite | Aceria rudis | Gallmaker Insects | | |
| 17002 | 17 | 002 | eastern spruce gall adelgid | Adelges abietis | Gallmaker Insects | | |
| 17003 | 17 | 003 | Cooley spruce gall adelgid | Adelges cooleyi | Gallmaker Insects | | |
| 17004 | 17 | 004 | horned oak gall | Callirhytis cornigera | Gallmaker Insects | | |
| 17005 | 17 | 005 | oak gall wasp | Callirhytis quercuspunctata | Gallmaker Insects | | |
| 17006 | 17 | 006 | gall midge | Cecidomyiidae | Gallmaker Insects | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 17007 | 17 | 007 | Douglas-fir needle gall midge | Contarinia pseudotsugae | Gallmaker Insects | | |
| 17008 | 17 | 008 | gall mite | Eriophyidae | Gallmaker Insects | | |
| 17009 | 17 | 009 | spruce gall midge | Mayetiola piceae | Gallmaker Insects | | |
| 17010 | 17 | 010 | hackberry nipplegall maker | Pachypsylla celtidismamma | Gallmaker Insects | | |
| 17011 | 17 | 011 | balsam gall midge | Paradiplosis tumifex | Gallmaker Insects | Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **NRS** |
| 17012 | 17 | 012 | hickory gall Phylloxera | Phylloxera caryaecaulis | Gallmaker Insects | | |
| 17013 | 17 | 013 | gall aphid | Phylloxeridae | Gallmaker Insects | | |
| 17014 | 17 | 014 | alder gall mite | Phytoptus laevis | Gallmaker Insects | | |
| 17015 | 17 | 015 | psyllid | Psyllidae | Gallmaker Insects | | |
| 17016 | 17 | 016 | sugarberry psyllid | Tetragonocephela flava | Gallmaker Insects | | |
| 17017 | 17 | 017 | mountain apple psyllid | Trioza vitiensis | Gallmaker Insects | | |
| 17018 | 17 | 018 | gouty pitch midge | Cedidomyia piniinopsis | Gallmaker Insects | | |
| 17019 | 17 | 019 | spider mites | Oligonychus spp. | Gallmaker Insects | | |
| 17020 | 17 | 020 | cypress gall midges | Taxodiomyia spp. | Gallmaker Insects | | |
| 17021 | 17 | 021 | jumping oak gall wasp | Neuroterus saltatorius | Gallmaker Insects | | |
| 17022 | 17 | 022 | erythrina gall wasp | Quadrastichus erythrinae | Gallmaker Insects | | |
| 17800 | 17 | 800 | other gallmaking insect (known) | other gallmaking insect (known) | Gallmaker Insects | | |
| 17900 | 17 | 900 | unknown gallmaking insect | unknown gallmaking insect | Gallmaker Insects | | |
| **18000** | **18** | **000** | **Insect Predators** | | | | |
| 18001 | 18 | 001 | lacewing | | Insect Predators | | |
| 18002 | 18 | 002 | blackbellied clerid | Enoclerus lecontei | Insect Predators | | |
| 18003 | 18 | 003 | redbellied clerid | Enoclerus sphegeus | Insect Predators | | |
| 18004 | 18 | 004 | red wood ant | Formica rufa | Insect Predators | | |
| 18005 | 18 | 005 | western yellowjacket | Vespula pennsylvanica | Insect Predators | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| **19000** | **19** | **000** | **General Diseases** | | | Any damage to the terminal leader; damage ≥ 20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; > 20% of the branches affected ; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected | **ALL** |
| **20000** | **20** | **000** | **Biotic Damage** | | | | |
| 20001 | 20 | 001 | damping off | | Biotic Damage | | |
| 20002 | 20 | 002 | gray mold | Botrytis cinerea | Biotic Damage | | |
| 20003 | 20 | 003 | Cassytha | Cassytha filiformis | Biotic Damage | | |
| 20004 | 20 | 004 | hemlock fluting | | Biotic Damage | | |
| **21000** | **21** | **000** | **Root/Butt Diseases** | | | Any occurrence | **ALL** |
| 21001 | 21 | 001 | Armillaria root disease | Armillaria spp. | Root/Butt Diseases | Any occurrence | **PNW; NRS; SRS** |
| 21002 | 21 | 002 | yellow stringy rot | Corticium galactimum | Root/Butt Diseases | | |
| 21003 | 21 | 003 | Cylindrocladium root disease | Cylindrocladium spp. | Root/Butt Diseases | | |
| 21004 | 21 | 004 | brown crumbly rot | Fomitopsis pinicola | Root/Butt Diseases | | |
| 21005 | 21 | 005 | black root rot of pine | Fusarium oxysporum | Root/Butt Diseases | | |
| 21006 | 21 | 006 | Fusarium root rot | Fusarium spp. | Root/Butt Diseases | | |
| 21007 | 21 | 007 | white mottled rot | Ganoderma applanatum | Root/Butt Diseases | | |
| 21008 | 21 | 008 | Ganoderma rot of hardwoods | Ganoderma lucidum | Root/Butt Diseases | | |
| 21009 | 21 | 009 | Ganoderma rot of conifers | Ganoderma tsugae | Root/Butt Diseases | | |
| 21010 | 21 | 010 | Heterobasidion root disease | Heterobasidion annosum | Root/Butt Diseases | Any occurrence | **PNW; NRS; SRS** |
| 21011 | 21 | 011 | circinatus root rot | Inonotus circinatus | Root/Butt Diseases | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 21012 | 21 | 012 | tomentosus root rot/false velvet top fungus | Inonotus tomentosus | Root/Butt Diseases | | |
| 21013 | 21 | 013 | charcoal root rot | Macrophomina phaseolina | Root/Butt Diseases | | |
| 21014 | 21 | 014 | black stain root disease | Ophiostoma wageneri | Root/Butt Diseases | Any occurrence | **PNW** |
| 21015 | 21 | 015 | Schweinitzii root and butt rot | Phaeolus schweinitzii | Root/Butt Diseases | Any occurrence | **PNW** |
| 21016 | 21 | 016 | flame tree root disease | Phellinus noxious | Root/Butt Diseases | | |
| 21017 | 21 | 017 | laminated root rot | Phellinus weirii | Root/Butt Diseases | Any occurrence | **PNW** |
| 21019 | 21 | 019 | littleleaf disease/ Phytophthora root rot | Phytophthora cinnamomi | Root/Butt Diseases | Any occurrence | **SRS** |
| 21020 | 21 | 020 | Port-Orford-Cedar root disease | Phytophthora lateralis | Root/Butt Diseases | Any occurrence | **PNW** |
| 21022 | 21 | 022 | Pythium root rot | Pythium spp. | Root/Butt Diseases | | |
| 21023 | 21 | 023 | procera root disease of conifers | Verticicladiella procera | Root/Butt Diseases | | |
| 21024 | 21 | 024 | crown gall | Agrobacterium tumefaciens | Root/Butt Diseases | | |
| 21025 | 21 | 025 | borealis conk | Climacocystis borealis | Root/Butt Diseases | | |
| 21026 | 21 | 026 | yellow pitted rot | Hericium abietis | Root/Butt Diseases | | |
| 21027 | 21 | 027 | brown cubical rot | Laetiporus sulphureus | Root/Butt Diseases | Any occurrence | **PNW** |
| 21028 | 21 | 028 | sudden oak death | Phytophthora ramorum | Root/Butt Diseases | Any occurrence | **PNW; SRS** |
| 21029 | 21 | 029 | Rhizina root disease | Rhizina undulata | Root/Butt Diseases | | |
| 21030 | 21 | 030 | yellow root rot | Perenniporia subacida | Root/Butt Diseases | | |
| 21031 | 21 | 031 | brown top rot | Fomitopsis cajanderi | Root/Butt Diseases | | |
| 21033 | 21 | 033 | pocket dry rot | Tyromyces amarus | Root/Butt Diseases | | |
| 21700 | 21 | 700 | root or butt decay (indicators present) | root or butt decay (indicators present) | Root/Butt Diseases | | |
| 21800 | 21 | 800 | other root or butt disease (known) | other root or butt disease (known) | Root/Butt Diseases | | |
| 21900 | 21 | 900 | unknown root or butt disease | unknown root or butt disease | Root/Butt Diseases | | |
| **22000** | **22** | **000** | **Cankers** | | | Any occurrence | **All** |
| 22005 | 22 | 005 | viruses | | Cankers | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 22006 | 22 | 006 | black knot of cherry | Apiosporina morbosa | Cankers | Any occurrence on the bole or on branches ≤1 foot from bole; damage to ≥50% of branches | **NRS; SRS** |
| 22007 | 22 | 007 | Atropellis canker | Atropellis piniphila | Cankers | | |
| 22008 | 22 | 008 | Siberian elm canker | Botryodiplodia hypodermia | Cankers | | |
| 22009 | 22 | 009 | Botryosphaeria canker | Botryosphaeria ribis | Cankers | | |
| 22011 | 22 | 011 | Caliciopsis canker | Caliciopsis pinea | Cankers | Any occurrence | **NRS** |
| 22012 | 22 | 012 | black canker of aspen | Ceratocystis fimbriata | Cankers | | |
| 22013 | 22 | 013 | sycamore canker stain | Ceratocystis fimbriata f.sp. plataini | Cankers | | |
| 22023 | 22 | 023 | chestnut blight | Cryphonectria parasitica | Cankers | Any occurrence | **NRS** |
| 22025 | 22 | 025 | Cryptosphaeria canker of aspen | Cryptosphaeria populina | Cankers | | |
| 22026 | 22 | 026 | Cytospora canker of fir | Cytospora abietis | Cankers | | |
| 22029 | 22 | 029 | sooty-bark canker | Encoelia pruinosa | Cankers | | |
| 22030 | 22 | 030 | Eutypella canker | Eutypella parasitica | Cankers | Any occurrence | **NRS** |
| 22032 | 22 | 032 | pitch canker of pines | Fusarium subglutinans | Cankers | Any occurrence | **PNW** |
| 22033 | 22 | 033 | Fusicoccum canker | Fusicoccum spp. | Cankers | | |
| 22034 | 22 | 034 | Scleroderris canker | Gremmeniella abietina | Cankers | | |
| 22035 | 22 | 035 | amelanchier rust | Gymnosporangium harknessianum | Cankers | | |
| 22036 | 22 | 036 | cedar apple rust | Gymnosporangium juniperi-virginianae | Cankers | | |
| 22037 | 22 | 037 | Hypoxylon canker of oak | Hypoxylon atropunctatum | Cankers | Any occurrence | **SRS** |
| 22038 | 22 | 038 | Hypoxylon canker of aspen | Hypoxylon mammatum | Cankers | Any occurrence | **NRS** |
| 22041 | 22 | 041 | European larch canker | Lachnellula willkommii | Cankers | | |
| 22042 | 22 | 042 | beech bark disease | Nectria coccinea | Cankers | Any occurrence | **NRS; SRS** |
| 22043 | 22 | 043 | Nectria canker | Nectria galligena | Cankers | Any occurrence | **NRS** |
| 22050 | 22 | 050 | Phomopsis canker | Phomopsis occulta | Cankers | | |
| 22051 | 22 | 051 | Phomopsis canker | Phomopsis spp. | Cankers | | |
| 22052 | 22 | 052 | cypress canker | Seiridium cardinale | Cankers | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 22053 | 22 | 053 | butternut canker | Sirococcus clavigignenti-jugl. | Cankers | Any occurrence | **NRS** |
| 22054 | 22 | 054 | maple canker | Steganosporium spp. | Cankers | | |
| 22055 | 22 | 055 | Thyronectria canker | Thyronectria austro-americana | Cankers | | |
| 22056 | 22 | 056 | citrus canker | Xanthomonas citri | Cankers | | |
| 22057 | 22 | 057 | Cytospora canker of aspen | Cytospora chrysosperma | Cankers | | |
| 22058 | 22 | 058 | Dothichiza canker | Dothichiza populae | Cankers | | |
| 22060 | 22 | 060 | Leucocytospora canker of spruce | Leucocytospora kunzei | Cankers | | |
| 22073 | 22 | 073 | hemlock canker | Xenomeris abietis | Cankers | | |
| 22075 | 22 | 075 | Lachnellula canker | Lachnellula flavovirens | Cankers | Any occurrence | **NRS** |
| 22076 | 22 | 076 | strumella canker | Strumella coryneoidea | Cankers | Any occurrence | **NRS** |
| 22077 | 22 | 077 | phomopsis blight | Phomopsis juniperovora | Cankers | | |
| 22078 | 22 | 078 | fusarium canker of yellow poplar | Fusarium solani | Cankers | | |
| 22079 | 22 | 079 | sterile conk of maple and beech | Inonotus glomeratus | Cankers | | |
| 22080 | 22 | 080 | canker of spruce | Aleurodiscus spp. | Cankers | | |
| 22082 | 22 | 082 | Discocainia canker | Discocainia treleasei | Cankers | | |
| 22083 | 22 | 083 | red ring rot canker | Phellinus pini var. cancriformans | Cankers | | |
| 22084 | 22 | 084 | Douglas-fir cankers | Douglas-fir cankers | Cankers | | |
| 22085 | 22 | 085 | Scleroderris canker of western firs | Grovesiella abieticola | Cankers | | |
| 22086 | 22 | 086 | Thousand cankers disease | Geosmithia morbida | Cankers | Any occurrence | **SRS** |
| 22087 | 22 | 087 | nonrust canker | unknown | Cankers | Damage ≥20% of bole circumference (in a running 3-foot section) at point of occurrence | **PNW** |
| 22300 | 22 | 300 | other canker disease (known) | other canker disease (known) | Cankers | | |
| 22400 | 22 | 400 | unknown canker disease | unknown canker disease | Cankers | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| **22500** | **22** | **500** | **Stem Decay** | | Stem Decays | Any visual evidence (conks; fruiting bodies; rotten wood) | **All** |
| 22001 | 22 | 001 | heart rot | | Stem Decays | Any visual evidence | **SRS** |
| 22002 | 22 | 002 | stem rot | | Stem Decays | | |
| 22003 | 22 | 003 | sap rot | | Stem Decays | | |
| 22004 | 22 | 004 | slime flux | | Stem Decays | | |
| 22010 | 22 | 010 | black rot fungus | Botryosphaeria stevensii | Stem Decays | | |
| 22024 | 22 | 024 | gray-brown sap rot | Cryptoporus volvatus | Stem Decays | | |
| 22027 | 22 | 027 | western red rot | Dichomitus squalens | Stem Decays | | |
| 22028 | 22 | 028 | Indian paint fungus | Echinodontium tinctorium | Stem Decays | Any occurrence | **PNW** |
| 22031 | 22 | 031 | Fusarium cortical stem rot | Fusarium avenaceum | Stem Decays | | |
| 22039 | 22 | 039 | canker rot of oak | Inonotus hispidus | Stem Decays | | |
| 22040 | 22 | 040 | sterile conk trunk rot of birch | Inonotus obliquus | Stem Decays | | |
| 22044 | 22 | 044 | ash heart rot | Pereniporia fraxinophila | Stem Decays | | |
| 22047 | 22 | 047 | red heart rot | Phellinus pini | Stem Decays | Any occurrence | **PNW** |
| 22048 | 22 | 048 | aspen trunk rot | Phellinus tremulae | Stem Decays | | |
| 22049 | 22 | 049 | stem decay of black walnut | Phellinus weirianus | Stem Decays | | |
| 22059 | 22 | 059 | red belt fungus/brown crumbly rot | Fomitopsis pinicola | Stem Decays | | |
| 22062 | 22 | 062 | quinine fungus/brown trunk rot | Fomitopsis Officinalis | Stem Decays | | |
| 22063 | 22 | 063 | brown cubical decay | Coniophora puteana | Stem Decays | | |
| 22064 | 22 | 064 | tinder fungus | Fomes fomentarius | Stem Decays | | |
| 22065 | 22 | 065 | purple conk | Hirschioporus abietinus | Stem Decays | | |
| 22066 | 22 | 066 | pinyon black stain | Leptographium wagnerii | Stem Decays | | |
| 22067 | 22 | 067 | *Phellinus hartigii* | Phellinus hartigii | Stem Decays | | |
| 22068 | 22 | 068 | false tinder fungus | Phellinus igniarius | Stem Decays | | |
| 22069 | 22 | 069 | robustus conk | Phellinus robustus | Stem Decays | | |
| 22070 | 22 | 070 | yellow cap fungus | Pholiota spp. | Stem Decays | | |
| 22071 | 22 | 071 | oyster mushroom | Pleurotus ostreatus | Stem Decays | | |
| 22072 | 22 | 072 | white ring rot | Poria albipellucida | Stem Decays | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 22074 | 22 | 074 | cedar brown pocket rot | Poria sericeomollis | Stem Decays | | |
| 22081 | 22 | 081 | birch conk | Piptoporus betulinus | Stem Decays | | |
| 22800 | 22 | 800 | other stem decay (known) | other stem decay (known) | Stem Decays | | |
| 22900 | 22 | 900 | unknown stem decay | unknown stem decay | Stem Decays | | |
| **23000** | **23** | **000** | **Parasitic/Epiphytic Plants** | | | Dwarf mistletoes with Hawksworth rating of ≥3; true mistletoes or vines covering ≥ 50% of crown | **ALL** |
| 23001 | 23 | 001 | mistletoe | mistletoe | Parasitic/Epiphytic Plants | | |
| 23002 | 23 | 002 | parasitic plants | parasitic plants | Parasitic/Epiphytic Plants | | |
| 23003 | 23 | 003 | vine damage | vine damage | Parasitic/Epiphytic Plants | Vines covering ≥50% of crown | **PNW; NRS** |
| 23005 | 23 | 005 | white fir dwarf mistletoe | Arceuthobium abietinum f. sp. concoloris | Parasitic/Epiphytic Plants | | |
| 23006 | 23 | 006 | lodgepole pine dwarf mistletoe | Arceuthobium americanum | Parasitic/Epiphytic Plants | | |
| 23007 | 23 | 007 | Apache dwarf mistletoe | Arceuthobium apachecum | Parasitic/Epiphytic Plants | | |
| 23008 | 23 | 008 | western dwarf mistletoe | Arceuthobium campylopodum | Parasitic/Epiphytic Plants | | |
| 23009 | 23 | 009 | limber pine dwarf mistletoe | Arceuthobium cyanocarpum | Parasitic/Epiphytic Plants | | |
| 23010 | 23 | 010 | pinyon dwarf mistletoe | Arceuthobium divaricatum | Parasitic/Epiphytic Plants | | |
| 23011 | 23 | 011 | Douglas-fir dwarf mistletoe | Arceuthobium douglasii | Parasitic/Epiphytic Plants | Dwarf mistletoes with Hawksworth rating of ≥3; true mistletoes or vines covering ≥ 50% of crown | **SRS** |
| 23012 | 23 | 012 | Chihuahua pine dwarf mistletoe | Arceuthobium gillii | Parasitic/Epiphytic Plants | | |
| 23013 | 23 | 013 | larch dwarf mistletoe | Arceuthobium laricis | Parasitic/Epiphytic Plants | | |
| 23014 | 23 | 014 | western spruce dwarf mistletoe | Arceuthobium microcarpum | Parasitic/Epiphytic Plants | | |
| 23015 | 23 | 015 | eastern dwarf mistletoe | Arceuthobium pusillum | Parasitic/Epiphytic Plants | Any occurrence | **NRS** |
| 23016 | 23 | 016 | hemlock dwarf mistletoe | Arceuthobium tsugense | Parasitic/Epiphytic Plants | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 23017 | 23 | 017 | southwestern dwarf mistletoe | Arceuthobium vaginatum subsp. crytopodum | Parasitic/Epiphytic Plants | Dwarf mistletoes with Hawksworth rating of ≥3; true mistletoes or vines covering ≥ 50% of crown | **SRS** |
| 23018 | 23 | 018 | dodder | Cuscuta spp. | Parasitic/Epiphytic Plants | | |
| 23019 | 23 | 019 | white fir mistletoe | Phoradendron bolleanum subsp. pauciflorum | Parasitic/Epiphytic Plants | | |
| 23020 | 23 | 020 | true mistletoe (other) | | Parasitic/Epiphytic Plants | True mistletoe covering ≥50% of crown | **IW; PNW** |
| 23021 | 23 | 021 | red fir dwarf mistletoe | Arceuthobium abietinum f. sp. magnificae | Parasitic/Epiphytic Plants | | |
| 23022 | 23 | 022 | juniper true mistletoe | Phoradendron juniperum | Parasitic/Epiphytic Plants | | |
| 23023 | 23 | 023 | dwarf mistletoe | Arceuthobium spp. | Parasitic/Epiphytic Plants | Hawksworth rating of ≥3 | **IW; PNW** |
| 23024 | 23 | 024 | Weins dwarf mistletoe | Arceuthobium abietinum f. sp magnificae | Parasitic/Epiphytic Plants | | |
| **24000** | **24** | **000** | **Decline Complexes/Dieback/Wilts** | | | Damage ≥ 20% dieback of crown area | **ALL** |
| 24001 | 24 | 001 | Alaska-yellow cedar decline | Alaska-yellow cedar decline | Decline Complexes/Dieback/Wilts | | |
| 24002 | 24 | 002 | Norfolk Island pine decline | Norfolk Island pine decline | Decline Complexes/Dieback/Wilts | | |
| 24003 | 24 | 003 | Stillwell's syndrome | Stillwell's syndrome | Decline Complexes/Dieback/Wilts | | |
| 24004 | 24 | 004 | ash decline/yellows | ash decline/yellows | Decline Complexes/Dieback/Wilts | Damage ≥ 20% dieback of crown area | **NRS** |
| 24005 | 24 | 005 | birch dieback | birch dieback | Decline Complexes/Dieback/Wilts | | |
| 24006 | 24 | 006 | coconut cadang-cadang viroid | Cocadviroid coconut cadang-cadang viroid | Decline Complexes/Dieback/Wilts | | |
| 24007 | 24 | 007 | complex | complex | Decline Complexes/Dieback/Wilts | | |
| 24008 | 24 | 008 | decline | decline | Decline Complexes/Dieback/Wilts | | |
| 24009 | 24 | 009 | fall hardwood defoliator complex | fall hardwood defoliator complex | Decline Complexes/Dieback/Wilts | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 24010 | 24 | 010 | joga decline | joga decline | Decline Complexes/Dieback/Wilts | | |
| 24011 | 24 | 011 | larch decline | larch decline | Decline Complexes/Dieback/Wilts | | |
| 24012 | 24 | 012 | looper abiotic complex | looper abiotic complex | Decline Complexes/Dieback/Wilts | | |
| 24013 | 24 | 013 | maple decline | maple decline | Decline Complexes/Dieback/Wilts | | |
| 24014 | 24 | 014 | oak decline | Hypoxylon spp. | Decline Complexes/Dieback/Wilts | Damage ≥ 20% dieback of crown area | **SRS** |
| 24015 | 24 | 015 | pingelap disease | pingelap disease | Decline Complexes/Dieback/Wilts | | |
| 24016 | 24 | 016 | sprout dieback | sprout dieback | Decline Complexes/Dieback/Wilts | | |
| 24017 | 24 | 017 | true fir pest complex | true fir pest complex | Decline Complexes/Dieback/Wilts | | |
| 24018 | 24 | 018 | western X disease | western X disease | Decline Complexes/Dieback/Wilts | | |
| 24019 | 24 | 019 | pinewood nematode | Bursaphelenchus xylophilus | Decline Complexes/Dieback/Wilts | | |
| 24020 | 24 | 020 | sapstreak disease of sugar maple | Ceratocystis coerulescens | Decline Complexes/Dieback/Wilts | | |
| 24021 | 24 | 021 | oak wilt | Ceratocystis fagacearum | Decline Complexes/Dieback/Wilts | Damage ≥ 20% dieback of crown area | **NRS** |
| 24022 | 24 | 022 | Dutch elm disease | Ceratocystis ulmi | Decline Complexes/Dieback/Wilts | Damage ≥ 20% dieback of crown area | **NRS; SRS** |
| 24023 | 24 | 023 | bacterial wetwood | Erwinia nimipressuralis | Decline Complexes/Dieback/Wilts | | |
| 24024 | 24 | 024 | mimosa wilt | Fusarium oxysporum f. sp. perniciosum | Decline Complexes/Dieback/Wilts | | |
| 24025 | 24 | 025 | Verticillium wilt | Verticilium albo-atrum | Decline Complexes/Dieback/Wilts | | |
| 24026 | 24 | 026 | bacterial leaf scorch | Xylella fastidiosa | Decline Complexes/Dieback/Wilts | | |
| 24027 | 24 | 027 | wetwood | wetwood | Decline Complexes/Dieback/Wilts | | |
| 24028 | 24 | 028 | hemlock decline | hemlock decline | Decline Complexes/Dieback/Wilts | | |
| 24029 | 24 | 029 | Pacific madrone decline | Pacific madrone decline | Decline Complexes/Dieback/Wilts | | |
| 24030 | 24 | 030 | elm phloem necrosis | Mycoplasma spp. | Decline Complexes/Dieback/Wilts | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 24031 | 24 | 031 | laurel wilt | Raffaelea spp. | Decline Complexes/Dieback/Wilts | Damage ≥ 20% dieback of crown area | **SRS** |
| 24032 | 24 | 032 | sudden aspen decline | sudden aspen decline | Decline Complexes/Dieback/Wilts | | |
| 24800 | 24 | 800 | other decline/complex/wilt (known) | other decline/complex/ wilt (known) | Decline Complexes/Dieback/Wilts | | |
| 24900 | 24 | 900 | unknown decline/complex/ wilt | unknown decline/complex/ wilt | Decline Complexes/Dieback/Wilts | | |
| **25000** | **25** | **000** | **Foliage diseases** | | | Damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **ALL** |
| 25001 | 25 | 001 | blight | blight | Foliage diseases | | |
| 25003 | 25 | 003 | juniper blights | juniper blights | Foliage diseases | | |
| 25004 | 25 | 004 | leaf spots | leaf spots | Foliage diseases | | |
| 25005 | 25 | 005 | needlecast | needlecast | Foliage diseases | | |
| 25006 | 25 | 006 | powdery mildew | powdery mildew | Foliage diseases | | |
| 25007 | 25 | 007 | tobacco mosaic virus | tobacco mosaic virus | Foliage diseases | | |
| 25008 | 25 | 008 | tobacco ringspot virus of ash | Nepovirus TRSV | Foliage diseases | | |
| 25009 | 25 | 009 | true fir needlecast | true fir needlecast | Foliage diseases | | |
| 25010 | 25 | 010 | sycamore anthracnose | Apiognomonia veneta | Foliage diseases | Damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **SRS** |
| 25011 | 25 | 011 | Cercospora blight of juniper | Cercospora sequoiae | Foliage diseases | | |
| 25013 | 25 | 013 | large-spored spruce-laborador tea rust | Chrysomyxa ledicola | Foliage diseases | | |
| 25014 | 25 | 014 | ink spot of aspen | Ciborinia whetzelii | Foliage diseases | | |
| 25015 | 25 | 015 | pine needle rust | Coleosporium spp. | Foliage diseases | Damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **SRS** |
| 25016 | 25 | 016 | anthracnose on Russian olive | Colletotrichum spp. | Foliage diseases | | |
| 25017 | 25 | 017 | Coronado limb rust | Cronartium arizonicum | Foliage diseases | | |
| 25018 | 25 | 018 | leaf shothole | Cylindrosporium spp. | Foliage diseases | | |
| 25019 | 25 | 019 | cedar leaf blight | Didymascella thujina | Foliage diseases | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 25020 | 25 | 020 | dogwood anthracnose | Discula spp. | Foliage diseases | Damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **SRS** |
| 25021 | 25 | 021 | mango scab | Elsinoe magiferae | Foliage diseases | | |
| 25022 | 25 | 022 | Elytroderma needle blight | Elytroderma deformans | Foliage diseases | Damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **PNW** |
| 25023 | 25 | 023 | fire blight | Erwinia amylovora | Foliage diseases | | |
| 25024 | 25 | 024 | walnut anthracnose | Gnomonia leptostyla | Foliage diseases | Damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **SRS** |
| 25025 | 25 | 025 | anthracnose | Gnomonia spp. | Foliage diseases | | |
| 25027 | 25 | 027 | brown felt blight | Herpotrichia juniperi | Foliage diseases | | |
| 25028 | 25 | 028 | larch needle blight | Hypodermella laricis | Foliage diseases | | |
| 25029 | 25 | 029 | hardwood anthracnose | Kabatiella apocrypta | Foliage diseases | | |
| 25030 | 25 | 030 | Lasiodiplodia cone damage | Lasiodiplodia spp. | Foliage diseases | | |
| 25031 | 25 | 031 | spruce needle cast | Lirula macrospora | Foliage diseases | | |
| 25032 | 25 | 032 | fir needle cast | Lirula spp. | Foliage diseases | | |
| 25033 | 25 | 033 | white pine needle cast | Lophodermella arcuata | Foliage diseases | | |
| 25034 | 25 | 034 | Lophodermella needle cast | Lophodermella spp. | Foliage diseases | | |
| 25036 | 25 | 036 | Marssonina blight | Marssonina populi | Foliage diseases | | |
| 25037 | 25 | 037 | Douglas-fir rust | Melampsora medusae | Foliage diseases | | |
| 25039 | 25 | 039 | larch needle cast | Meria laricis | Foliage diseases | | |
| 25040 | 25 | 040 | Dothistroma needle blight | Mycosphaerella pini | Foliage diseases | | |
| 25041 | 25 | 041 | brown felt blight of pines | Neopeckia coulteri | Foliage diseases | | |
| 25042 | 25 | 042 | snow blight | Phacidum abietis | Foliage diseases | | |
| 25043 | 25 | 043 | Swiss needle cast | Phaeocryptopus gaumannii | Foliage diseases | | |
| 25044 | 25 | 044 | Phoma blight | Phoma spp. | Foliage diseases | | |
| 25045 | 25 | 045 | Phyllosticta leaf spot | Phyllosticta spp. | Foliage diseases | | |
| 25046 | 25 | 046 | bud rot | Phytophthora palmivora | Foliage diseases | | |
| 25047 | 25 | 047 | Ploioderma needle cast | Ploioderma spp. | Foliage diseases | | |
| 25048 | 25 | 048 | ash rust | Puccinia sparganioides | Foliage diseases | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 25049 | 25 | 049 | fir and hemlock needle rusts | Pucciniastrum spp. | Foliage diseases | | |
| 25050 | 25 | 050 | Rhabdocline needle cast | Rhabdocline spp. | Foliage diseases | | |
| 25051 | 25 | 051 | Rhizoctonia needle blight | Rhizoctonia spp. | Foliage diseases | | |
| 25052 | 25 | 052 | Rhizophaeria needle cast | Rhizophaeria spp. | Foliage diseases | | |
| 25053 | 25 | 053 | Rhizopus rot | Rhizopus artocarpi | Foliage diseases | | |
| 25054 | 25 | 054 | brown spot needle blight | Scirrhia acicola | Foliage diseases | | |
| 25055 | 25 | 055 | Septoria leaf spot | Septoria alnifolia | Foliage diseases | | |
| 25056 | 25 | 056 | Septoria leaf spot and canker | Septoria musiva | Foliage diseases | | |
| 25057 | 25 | 057 | Sirococcus tip blight | Sirococcus conigenus | Foliage diseases | Damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **NRS** |
| 25058 | 25 | 058 | Diplodia canker | Sphaeropsis sapinea | Foliage diseases | | |
| 25059 | 25 | 059 | leaf blister of oak | Taphrina caerulescens | Foliage diseases | | |
| 25060 | 25 | 060 | Venturia leaf blight of maple | Venturia acerina | Foliage diseases | | |
| 25061 | 25 | 061 | shepherd's crook | Venturia tremulae | Foliage diseases | | |
| 25062 | 25 | 062 | Dothistroma needle blight | Dothistroma septospora | Foliage diseases | | |
| 25063 | 25 | 063 | yellow-cedar shoot blight | Apostrasseria spp. | Foliage diseases | | |
| 25065 | 25 | 065 | spruce needle rust | Chrysomyxa weirii | Foliage diseases | | |
| 25066 | 25 | 066 | cedar leaf blight | Gymnosporangium nootkatense | Foliage diseases | | |
| 25067 | 25 | 067 | spruce needle cast | Lophodermium picea | Foliage diseases | | |
| 25068 | 25 | 068 | hardwood leaf rusts | Melampsora spp. | Foliage diseases | | |
| 25070 | 25 | 070 | hemlock needle rust | Pucciniastrum vaccinii | Foliage diseases | | |
| 25071 | 25 | 071 | spruce needle cast | Rhizosphaera pini | Foliage diseases | | |
| 25072 | 25 | 072 | sirococcus shoot blight | Sirococcus strobilinus | Foliage diseases | Damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **NRS** |
| 25073 | 25 | 073 | shepherds crook | Venturia populina | Foliage diseases | | |
| 25074 | 25 | 074 | Delphinella shoot blight | Delphinella abietis | Foliage diseases | | |
| 25075 | 25 | 075 | tar spot | Rhytisma acerinum | Foliage diseases | | |
| 25076 | 25 | 076 | birch leaf fungus | Septoria betulae | Foliage diseases | | |
| 25077 | 25 | 077 | Septoria leaf spot of maple | Septoria aceris | Foliage diseases | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 25800 | 25 | 800 | other /shoot disease (known) | other /shoot disease (known) | Foliage diseases | | |
| 25900 | 25 | 900 | unknown foliage /shoot disease | Unknown foliage /shoot disease | Foliage diseases | | |
| **26000** | **26** | **000** | **Stem Rusts** | | | Any occurrence on the bole or stems (on multi-stemmed woodland species), or on branches ≤1 foot from boles or stems; damage to ≥ 20% of branches | **ALL** |
| 26001 | 26 | 001 | white pine blister rust | Cronartium ribicola | 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 | **PNW; SRS** |
| 26002 | 26 | 002 | western gall rust | Peridermium harknessii | 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 | **PNW** |
| 26003 | 26 | 003 | stalactiform blister rust | Cronartium coleosporioides | Stem Rusts | | |
| 26004 | 26 | 004 | comandra blister rust | Cronartium comandrae | 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 | **SRS** |
| 26005 | 26 | 005 | pinyon rust | Cronartium occidentale | Stem Rusts | | |
| 26006 | 26 | 006 | eastern gall rust | Cronartium quercuum | 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 | **SRS** |
| 26007 | 26 | 007 | gall rust of jack pine | Cronartium quercuum f. sp. banksignae | Stem Rusts | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 26008 | 26 | 008 | gall rust of shortleaf pine | Cronartium quercuum f. sp. echinatae | Stem Rusts | | |
| 26009 | 26 | 009 | fusiform rust | Cronartium quercuum f. sp. fusiforme | 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. | **SRS** |
| 26010 | 26 | 010 | gall rust of virginia pine | Cronartium quercuum f. sp. virginianae | Stem Rusts | | |
| 26011 | 26 | 011 | Bethuli rust | Peridermium bethuli | Stem Rusts | | |
| 26012 | 26 | 012 | limb rust | Peridermium filamentosum | Stem Rusts | | |
| 26013 | 26 | 013 | southern cone rust | Cronartium strobilinum | Stem Rusts | | |
| 26800 | 26 | 800 | other stem rust (known) | other stem rust (known) | Stem Rusts | | |
| 26900 | 26 | 900 | unknown stem rust | unknown stem rust | Stem Rusts | | |
| **27000** | **27** | **000** | **Broom Rusts** | | | ≥50% of crown area affected | **ALL** |
| 27001 | 27 | 001 | spruce broom rust | Chrysomyxa arctostaphyli | Broom Rusts | | |
| 27002 | 27 | 002 | Incense cedar broom rust | Gymnosporangium libocedri | Broom Rusts | | |
| 27003 | 27 | 003 | juniper broom rust | Gymnosporangium nidus-avis | Broom Rusts | | |
| 27004 | 27 | 004 | fir broom rust | Melampsorella caryophyllacearum | Broom Rusts | | |
| 27800 | 27 | 800 | other broom rust (known) | other broom rust (known) | Broom Rusts | | |
| 27900 | 27 | 900 | unknown broom rust | unknown broom rust | Broom Rusts | | |
| **30000** | **30** | **000** | **Fire** | | | Damage ≥ 20% of bole circumference; >20% of stems on multi-stemmed woodland species affected; ≥20% of crown affected. | **ALL** |
| 30001 | 30 | 001 | wild fire | | Fire | | |
| 30002 | 30 | 002 | human caused fire | | Fire | | |
| 30003 | 30 | 003 | crown fire damage | | Fire | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 30004 | 30 | 004 | ground fire damage | | Fire | | |
| **41000** | **41** | **000** | **Wild Animals** | | | Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected ; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected. | **ALL** |
| 41001 | 41 | 001 | bears | Ursus spp. | 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. | **PNW** |
| 41002 | 41 | 002 | beavers | Castor canadensis | 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 | **SRS, PNW** |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 41003 | 41 | 003 | big game | big game | 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 | **IW, PNW** |
| 41004 | 41 | 004 | mice or voles | mice or voles | 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. | **PNW** |
| 41005 | 41 | 005 | pocket gophers | Geomyidae spp. | 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 | **IW, PNW** |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 41006 | 41 | 006 | porcupines | Erethizon dorsatum | 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 | **IW, PNW** |
| 41007 | 41 | 007 | rabbits or hares | Sylvilagus spp. | 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. | **PNW** |
| 41008 | 41 | 008 | sapsuckers | Sphyrapicus spp. | 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. | **IW; SRS** |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 41009 | 41 | 009 | squirrels | Sciuridae spp. | 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. | **PNW** |
| 41010 | 41 | 010 | woodpeckers | Piciformes spp. | Wild Animals | | |
| 41011 | 41 | 011 | moose | Alces alces | Wild Animals | | |
| 41012 | 41 | 012 | elk | Cervus elaphus | Wild Animals | | |
| 41013 | 41 | 013 | deer | Odocoileus spp. | Wild Animals | | |
| 41014 | 41 | 014 | feral pigs | Sus scrofa | Wild Animals | | |
| 41015 | 41 | 015 | mountain beaver | Aplodontia rufa | 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. | **PNW** |
| 41017 | 41 | 017 | earthworms | Lumbricidae | Wild Animals | | |
| 41800 | 41 | 800 | other wild animals (known) | other wild animals (known) | Wild Animals | | |
| 41900 | 41 | 900 | unknown wild animals | unknown wild animals | Wild Animals | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| **42000** | **42** | **000** | **Domestic Animals** | | | Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; > 20% of the branches affected ; damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **ALL** |
| 42001 | 42 | 001 | cattle | Bos taurus | Domestic Animals | | |
| 42002 | 42 | 002 | goats | Capra hircus | Domestic Animals | | |
| 42003 | 42 | 003 | horses | Equus caballus | Domestic Animals | | |
| 42004 | 42 | 004 | sheep | Ovis aries | Domestic Animals | | |
| 42800 | 42 | 800 | other domestic animal (unknown) | other domestic animal (unknown) | Domestic Animals | | |
| 42900 | 42 | 900 | unknown domestic animals | unknown domestic animals | Domestic Animals | | |
| **50000** | **50** | **000** | **Abiotic Damage** | | | Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; > 20% of the branches affected ; damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **ALL** |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 50001 | 50 | 001 | air pollutants | | Abiotic Damage | Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; > 20% of the branches affected ; damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **IW** |
| 50002 | 50 | 002 | chemical | | Abiotic Damage | Any damage to the terminal leader; damage ≥20% of the roots, stems, or branches; damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **NRS** |
| 50003 | 50 | 003 | drought | | Abiotic Damage | Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected ; damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **IW; NRS** |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 50004 | 50 | 004 | flooding/high water | | Abiotic Damage | Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected ; damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **IW; NRS; SRS** |
| 50005 | 50 | 005 | frost | | Abiotic Damage | Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected ; damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **IW** |
| 50006 | 50 | 006 | hail | | Abiotic Damage | | |
| 50007 | 50 | 007 | heat | | Abiotic Damage | | |
| 50008 | 50 | 008 | lightning | | Abiotic Damage | Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected ; damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **ALL** |
| 50009 | 50 | 009 | nutrient imbalances | | Abiotic Damage | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 50010 | 50 | 010 | radiation | | Abiotic Damage | Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected ; damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **IW** |
| 50011 | 50 | 011 | snow/ice | | Abiotic Damage | Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected ; damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **ALL** |
| 50013 | 50 | 013 | wind | | Abiotic Damage | Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected ; damage ≥ 20% of the foliage with ≥50% of the leaf/needle affected | **ALL** |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 50014 | 50 | 014 | winter injury | | Abiotic Damage | Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected ; damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **IW** |
| 50015 | 50 | 015 | avalanche | | Abiotic Damage | Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected ; damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **IW** |
| 50016 | 50 | 016 | mud-land slide | | Abiotic Damage | | |
| 50017 | 50 | 017 | volcano | | Abiotic Damage | | |
| 50018 | 50 | 018 | other geologic event | | Abiotic Damage | | |
| 50019 | 50 | 019 | mechanical (non-human caused) | | Abiotic Damage | | |
| 50020 | 50 | 020 | saltwater injury - flooding/hurricane | | Abiotic Damage | | |
| 50800 | 50 | 800 | other abiotic damage (known) | other abiotic damage (known) | Abiotic Damage | | |
| 50900 | 50 | 900 | unknown abiotic damage | unknown abiotic damage | Abiotic Damage | | |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| **60000** | **60** | **000** | **Competition** | | | Overtopped shade intolerant trees that are not expected to survive for 5 years or saplings not expected to reach tree size (5.0 inches DBH/DRC) | **ALL** |
| 60001 | 60 | 001 | Suppression | | Competition Damage | Overtopped shade intolerant trees that are not expected to survive for 5 years or saplings not expected to reach tree size (5.0 inches DBH/DRC) | **IW** |
| **70000** | **70** | **000** | **Human Activities** | | | Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected ; damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **ALL** |
| 70001 | 70 | 001 | herbicides | | 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 | **SRS** |
| 70003 | 70 | 003 | imbedded objects | | Human Activities | Any occurrence on the bole. | **SRS; NRS** |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 70004 | 70 | 004 | improper planting technique | | Human Activities | | |
| 70005 | 70 | 005 | land clearing | | 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 | **SRS** |
| 70006 | 70 | 006 | land use conversion | | Human Activities | | |
| 70007 | 70 | 007 | logging damage | | Human Activities | Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected ; damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **ALL** |
| 70008 | 70 | 008 | mechanical | | Human Activities | | |
| 70009 | 70 | 009 | pesticides | | Human Activities | | |
| 70010 | 70 | 010 | roads | | Human Activities | | |
| 70011 | 70 | 011 | soil compaction | | Human Activities | | |
| 70013 | 70 | 013 | vehicle damage | | Human Activities | | |
| 70014 | 70 | 014 | road salt | | Human Activities | | |
| **71000** | **71** | **000** | **Harvest** | | | Removal of ≥10% cubic volume | **ALL** |
| 71001 | 71 | 001 | Woodland cutting | | Harvest | Removal of ≥10% cubic volume | **IW** |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| **80000** | **80** | **000** | **Multi-Damage (Insect/Disease)** | | | | |
| 80001 | 80 | 001 | aspen defoliation (caused by 12037, 12096, 25036 and 25037) | | Multi-Damage (Insect/Disease) | | |
| 80002 | 80 | 002 | subalpine fir mortality | | Multi-Damage (Insect/Disease) | | |
| 80003 | 80 | 003 | five-needle pine decline | | Multi-Damage (Insect/Disease) | | |
| 80004 | 80 | 004 | pinyon pine mortality | | Multi-Damage (Insect/Disease) | | |
| **85000** | **85** | **000** | **Invasive Plants** | | | | |
| **90000** | **90** | **000** | **Other Damages and Symptoms** | | | Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected ; damage ≥20% of the foliage with ≥50% of the leaf/needle affected | **ALL** |
| 90001 | 90 | 001 | broken top | Not recorded for multi-stemmed trees | Other Damages and symptoms | When actual length is less than total length | **ALL** |
| 90002 | 90 | 002 | dead top | | Other Damages and symptoms | Any occurrence | **IW; PNW; NRS** |
| 90003 | 90 | 003 | limby-wolf tree | Not recorded for non sawlog trees | Other Damages and symptoms | Damage when board foot defect is ≥ 10% | **IW** |
| 90004 | 90 | 004 | forked top | Not recorded for non sawlog trees | Other Damages and symptoms | Any occurrence | **PNW** |
| 90005 | 90 | 005 | forked below merch top | Not recorded for non sawlog trees | Other Damages and symptoms | Damage when board foot defect is ≥ 10% | **IW; PNW** |
| 90006 | 90 | 006 | crook or sweep | Not recorded for non sawlog trees | Other Damages and symptoms | Damage when board foot defect is ≥ 10% | **IW; PNW** |
| 90007 | 90 | 007 | checks, bole cracks | Not recorded for non sawlog trees | Other Damages and symptoms | Damage when board foot defect is ≥ 10% | **PNW** |

| CODE | Category | Agent | Common Name | Scientific Name | General Category Designation | Threshold | REGION |
|---|---|---|---|---|---|---|---|
| 90008 | 90 | 008 | foliage discoloration | | Other Damages and symptoms | Damage ≥ 20% of crown affected | **IW; NRS;PNW** |
| 90010 | 90 | 010 | dieback | | Other Damages and symptoms | Damage ≥ 20% of crown affected | **IW; PNW; NRS** |
| 90011 | 90 | 011 | open wound | | Other Damages and symptoms | Damage ≥20% of bole circumference (in a running 3-foot section) at point of occurrence | **IW; PNW** |
| 90012 | 90 | 012 | resinosis | | Other Damages and symptoms | Damage ≥20% of bole circumference (in a running 3-foot section) at point of origin; ≥20% of branches affected | **PNW** |
| 90013 | 90 | 013 | broken branches | | Other Damages and symptoms | Damage ≥20% of branches affected | **PNW** |
| **99000** | **99** | **000** | **UNKNOWN** | | | Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected ; damage ≥ 20% of the foliage with ≥50% of the leaf/needle affected | **ALL** |

## Appendix 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. |

| OWNGRP[a] | OWNCD[b] | Land designation (and example) | RESERVCD[c] | ADWDRAWCD[d] | Designated by | Comments |
|---|---|---|---|---|---|---|
| 10,20 | all | National Recreation Area (Hell's Canyon NRA, OR/ID) | 1 | | Congress | Although the legislation of some NRAs do not preclude wood production, most do and given the emphasis is likely to be minor, so default to reserved. |
| 10,20 | all | Wild and Scenic Rivers (wild, scenic or recreational classification) (Au Sable River, MI) | 1 | | Congress | Wood production is not an objective for any wild and scenic river (FSM 2354.42d). Harvest in segments classified as wild is excluded except under emergency conditions; harvest in segments classified as scenic or recreational is only allowed to further river management objectives. If a map of the area or other information is unavailable, use 1/4 mile on either side of the river on federal land (1/2 mile in Alaska). |
| 10,20 | all | Wild and Scenic Study Rivers (wild, scenic or recreational classification) (White Salmon River, WA) | 0 | 1 | Federal admin. unit or Congress, proposed | Includes "eligible" or "suitable" study rivers. Wood production is not allowed and harvest restrictions are similar to designated rivers (FSH 199.12 82.51). Study rivers have a default area of 1/4 mile from either side of the river on federal lands. |
| 10 | all | National Scenic Area (Mt. Pleasant, VA) | 1 | | Congress | Although the legislation of some NSAs do not preclude wood production, most do and given the emphasis is likely to be minor, so default to reserved. |
| 10 | all | Experimental Forest (Hubbard Brook, NH) | 0 | 0 | Congress/WO | Purpose includes research and management |
| 10 | all | Experimental Range (Santa Rita, AZ) | 0 | 0 | Congress/WO | Purpose includes research and management |
| 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 |

| OWNGRP[a] | OWNCD[b] | Land designation (and example) | RESERVCD[c] | ADWDRAWCD[d] | Designated by | Comments |
|---|---|---|---|---|---|---|
| 10 | all | Special Interest Area (Cape Perpetua, OR) | 0 | 1 | NFS unit | |
| 10 | all | Special Recreation Area (Bell Smith Springs, IL) | 0 | 1 | NFS unit | |
| 10 | all | Suitable for Timber Harvest | 0 | 1 | NFS unit | Areas designated in Forest Plans as suitable for harvest for a variety of purposes, but not in the timber base |
| 10 | all | Suitable for Timber Production | 0 | 0 | NFS unit | Areas designated in Forest Plans as in the timber base, and managed for multiple use |
| 20 | 21 | **ALL National Park Service designations on federal land** | 1 | | Executive Order/ Congress | Some NPS units/designations are on private land: Canyon de Chelly, parts of Lake Roosevelt, Ebey's Landing, and National Historic Sites; these are NOT reserved. |
| 20 | 22 | Areas of Critical Environmental Concern (High Rock Canyon, NV) | 0 | 1 | BLM unit | Authorized by Congress in FLPMA to protect significant areas, designated by management units |
| 20 | 22 | National Conservation Areas (Kings River, CA) | 0 | 0 | Congress | NCAs are focused on limited resources for protection, many have "multiple use" as a goal |
| 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 landowner to determine status. |

| OWNGRP[a] | OWNCD[b] | Land designation (and example) | RESERVCD[c] | ADWDRAWCD[d] | Designated by | Comments |
|---|---|---|---|---|---|---|
| 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.

## 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:

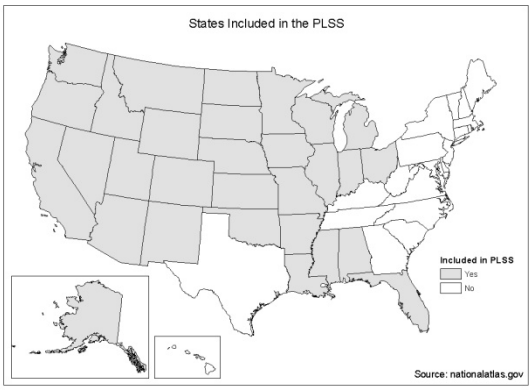
| | |
|---|---|
| 1 | Tax office |
| 2 | GIS |
| 3 | Owner |
| 4 | Other |

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 (OWNERShip REQUESTS INFORMATION = 1), then record what they want in INFORMATION REQUESTS 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 (OWNERSHIP 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

<u>Example 1 – U.S. Forest Service</u>
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:

Example 3 – Company with c/o

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:

Example 4 – Company with foreign address

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

Example 5 – Single individual

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:

Example 6 – Multiple individuals

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:

Example 7 – Estate

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 |

| Country | Code |
|---|---|
| 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 |

| Country | Code |
|---|---|
| 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 |

| Country | Code |
|---|---|
| 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 |
| 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 |

| Country | Code |
|---|---|
| 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 |
| 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 |

| Country | Code |
|---|---|
| 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 |
|---|---|
| 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 |

| 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 |

| Code | Meridian/survey | State(s) |
|---|---|---|
| 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 | |