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	margarett~~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.

FOREST INVENTORY AND ANALYSIS
NATIONAL CORE FIELD GUIDE

VOLUME I: FIELD DATA COLLECTION PROCEDURES FOR PHASE 2 PLOTS

Version 6.1

Version History:

1.1 March 1999 (first version implemented, Maine, 1999)
1.2 August 1999
1.3 September 1999 (revised from Bangor, ME Data Acquisition Band meeting, Aug. 1999)
1.4 February 2000 (revised from Charleston, SC Data Acquisition Band meeting, Dec 1999)
1.5 January 2001 (revised from Portland, OR Data Acquisition Band meeting, Sept. 2000)
1.6 March 2002 (revised from Tucson, AZ Joint Band meeting, Jan. 2002)
1.7 February 2003 (revised from Charleston, SC Joint Band Meeting, Feb. 2003)
2.0 April 2003 (revised from Atlantic City, NJ, Data Acquisition Band Meeting, Mar. 2003)
October 2003 (revised from Anchorage, AK, Data Acquisition Band Meeting, Aug. 2003)
January 2004 (revised from Data Acquisition Band conference calls with FIA Management Team Approval)
August 2004 (revised from Asheville, NC, Data Acquisition Band Meeting, Aug. 2004)
3.0 October 2005 (revised from change management process, change proposals approved by FIA Management Team, from Asheville, NC, Data Acquisition Meeting, Aug. 2004, and from Las Vegas, NV, Data Acquisition Meeting, Mar. 2005)
4.0 October 2007 (revised from change management process, change proposals approved by FIA Management Team, from Flagstaff, AZ, Data Acquisition Band Meeting, Sept. 2006, and from multiple Data Acquisition Band conference calls)
5.0 July 2009 (revised from change management process, change proposals approved by FIA Management Team, from Charleston, SC, Data Acquisition Band Meeting, Mar. 2009, and from multiple Data Acquisition Band conference calls)
October 2010 (revised from change management process and from Portland, OR, Data Acquisition Band Meeting, Feb. 2010 and subsequent conference calls)
6.0 October 2012 (revised from change management process, change proposals approved by FIA Management Team; from Portland, OR, Data Acquisition Band Meeting, Feb. 2011; and multiple Data Acquisition Band conference calls)
6.1 October 2014 (revised from change management process, change proposal approved by FIA Management Team; and from multiple Data Acquisition Band conference calls.

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.

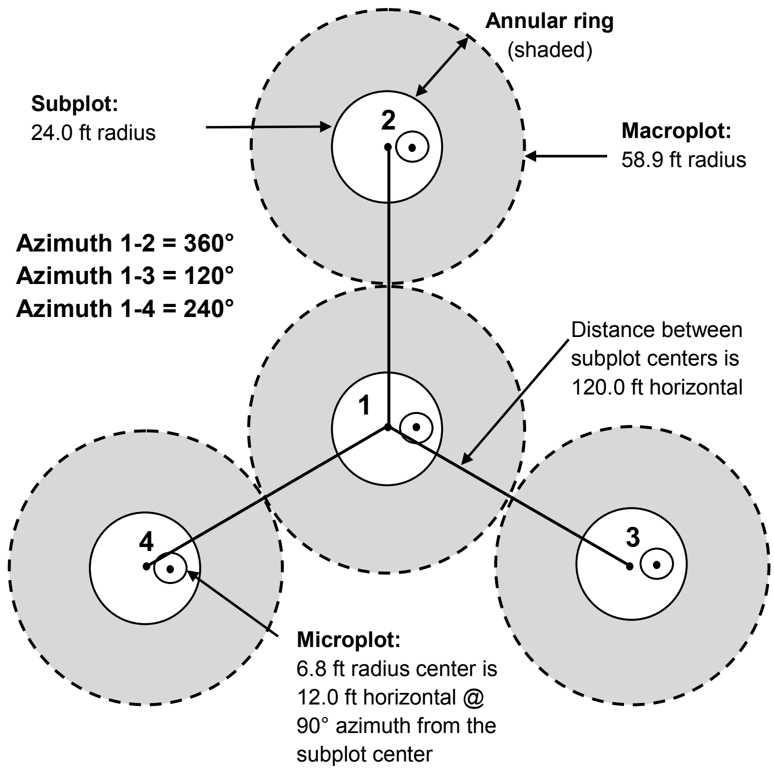


Figure 1. FIA Phase 2 plot diagram. See individual Phase 3 chapters for Phase 3 plot figures.

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 From	Numbers 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: $\geq$ 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.

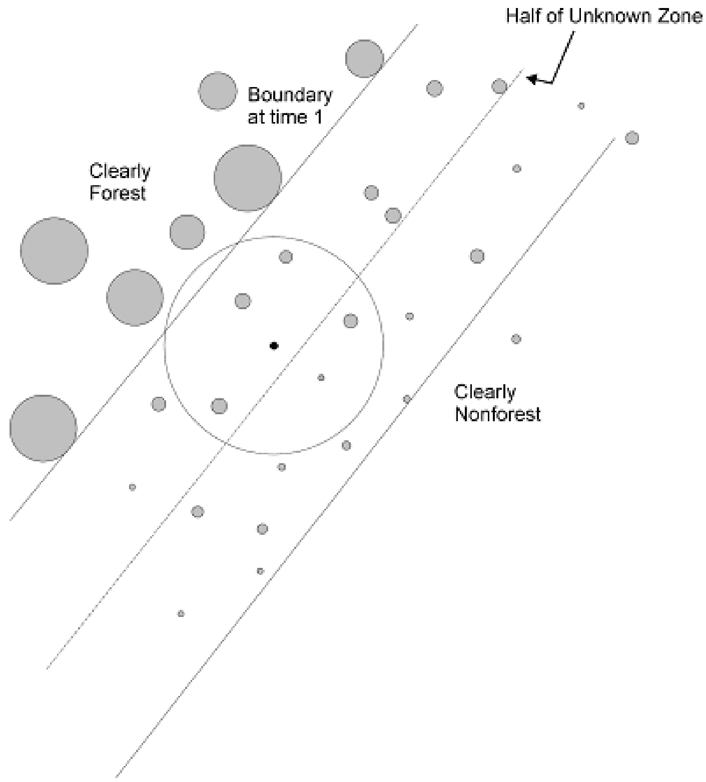


Figure 2. Example of classifying the condition class of the subplot in a transition zone with forest/nonforest encroachment.

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.

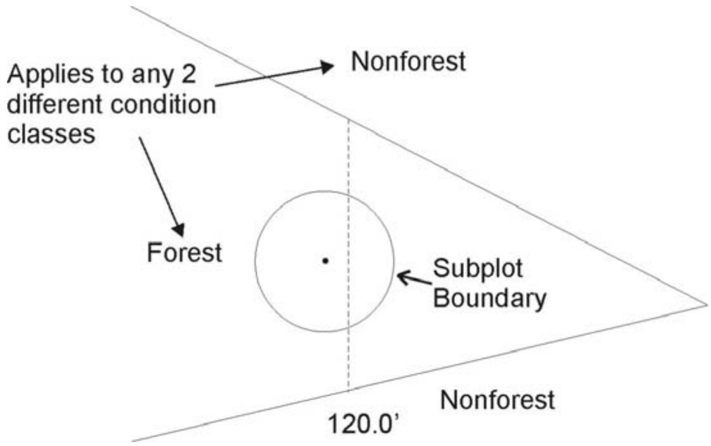


Figure 3. Forest condition narrows within a nonforest land condition. Examine the location of the subplot center in reference to the approximate line where the forest narrows to 120.0 ft wide. In this example, the entire subplot is classified as forest.

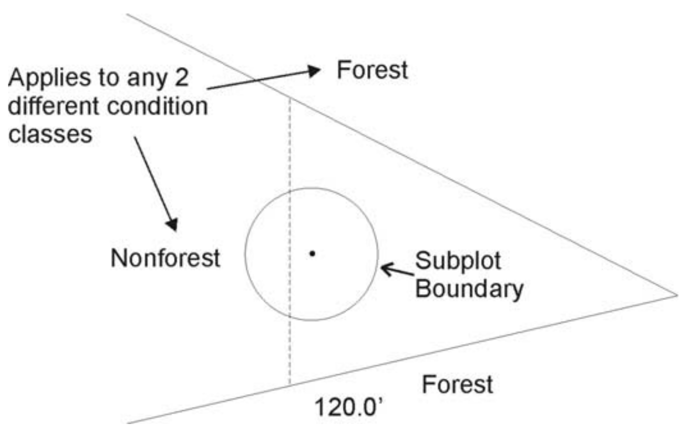


Figure 4. Nonforest land condition narrows within a forest condition. Examine the location of the subplot center in reference to the approximate line where the nonforest narrows to 120.0 ft wide. In this example, the entire subplot is classified as forest.

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 ≥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
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

Attributes where a change causes a separate condition class

2.5.8	OWNER CLASS	Ancillary - changes do not delineate a new condition 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	

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	Attributes where a change causes a separate condition class
2.5.2	OWNER GROUP	
2.5.30	PRESENT NONFOREST LAND USE	

2.5.8	OWNER CLASS	Ancillary - changes do not delineate a new condition 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	

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.

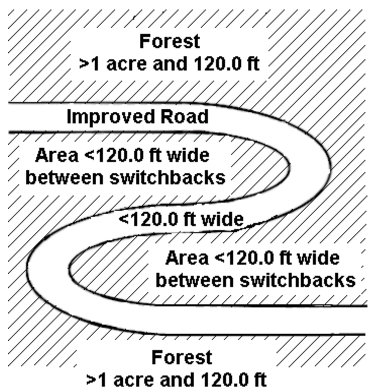


Figure 5. Example of a switchback road. All the cross-hatched area is forest and the improved road is a nonforest condition.

    (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.

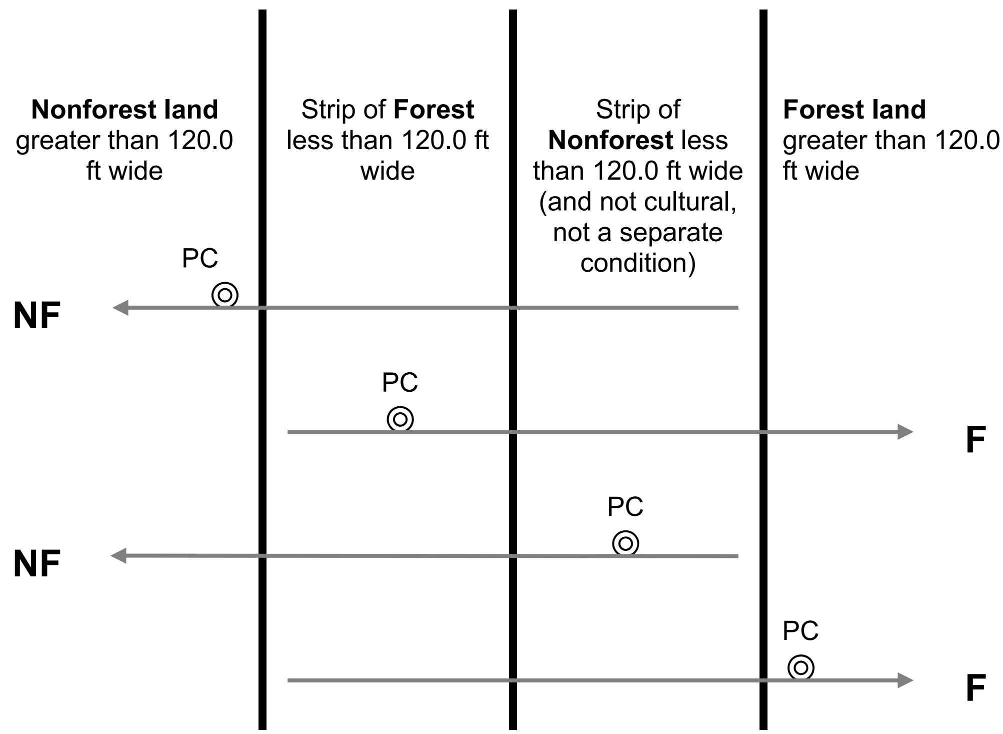


Figure 6. Example of alternating strips of forested and nonforested conditions. PC is the plot center (center of subplot 1).

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

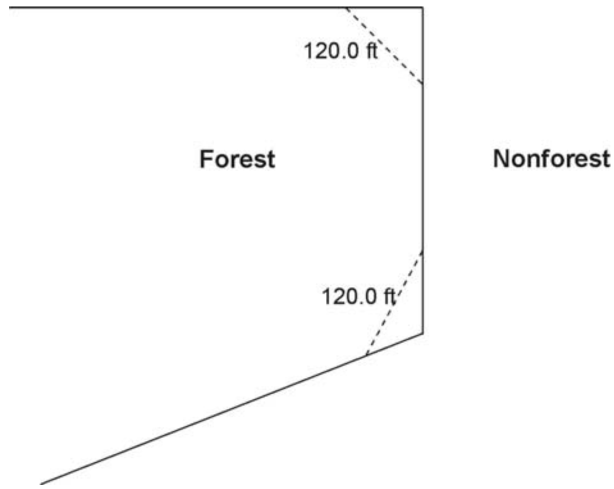


Figure 7. Illustration of the 90 degree corner rule. The dotted lines do not create nonforest land conditions.

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.

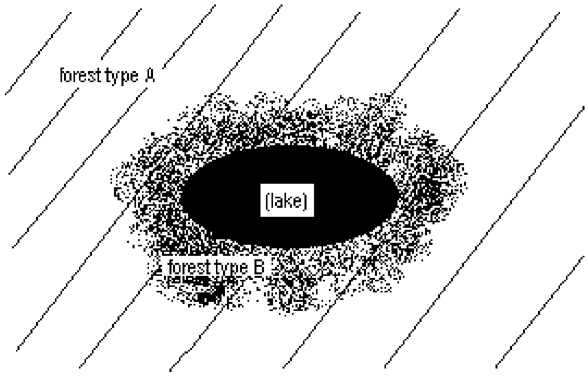


Figure 8. Forest type B is a separate condition class (riparian) if the band of it is between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.

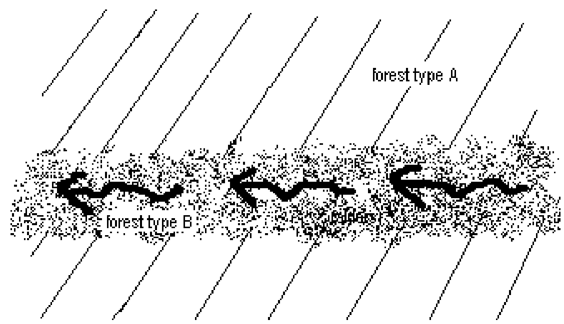


Figure 9. Forest type B is a separate condition class (riparian) if the band of it is between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.

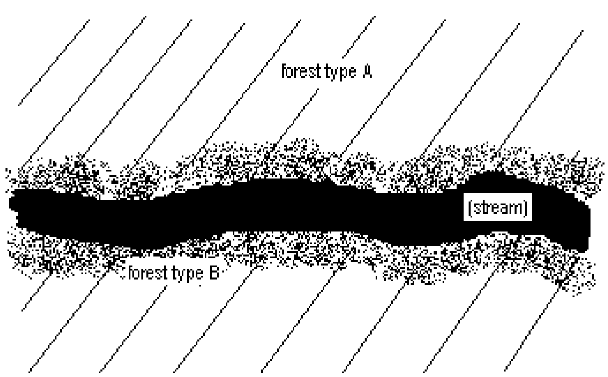


Figure 10. If the stream is < 30.0 feet wide, forest type B is a separate condition class (riparian) if the sum of the two widths of the bands, including the stream falls between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.

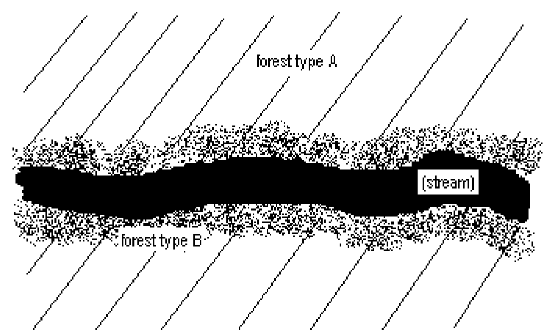


Figure 11. If the stream is > 30.0 feet wide, forest type B is a separate condition class (riparian) if either of the two widths of the bands falls between 30.0 feet and 120.0 feet wide and is ≥ 1.0 acre in size.

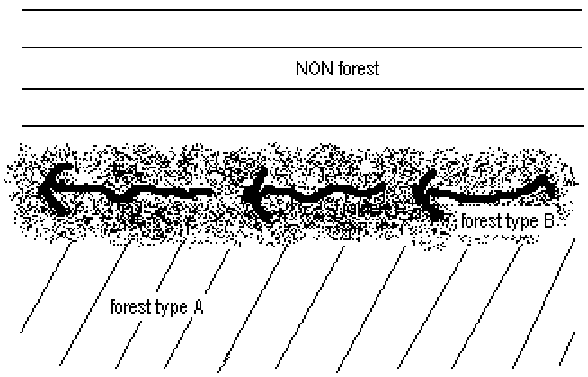


Figure 12. Forest type B is a separate condition class (riparian) if the band of it is between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.

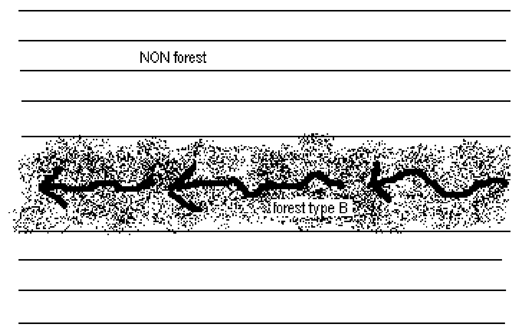


Figure 13. In a nonforested area, a band of forest type B that is < 120.0 feet wide is NOT considered a riparian area. It is not a separate condition class at all.

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:

$(34 \times 0.25) + (62 \times 0.60) + (59 \times 0.15) = 55$ 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. <u>The term treatment further implies that a silvicultural application has been prescribed.</u> 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 <u>None</u> - No observable treatment.

10 <u>Cutting</u> - The removal of one or more trees from a stand.

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

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

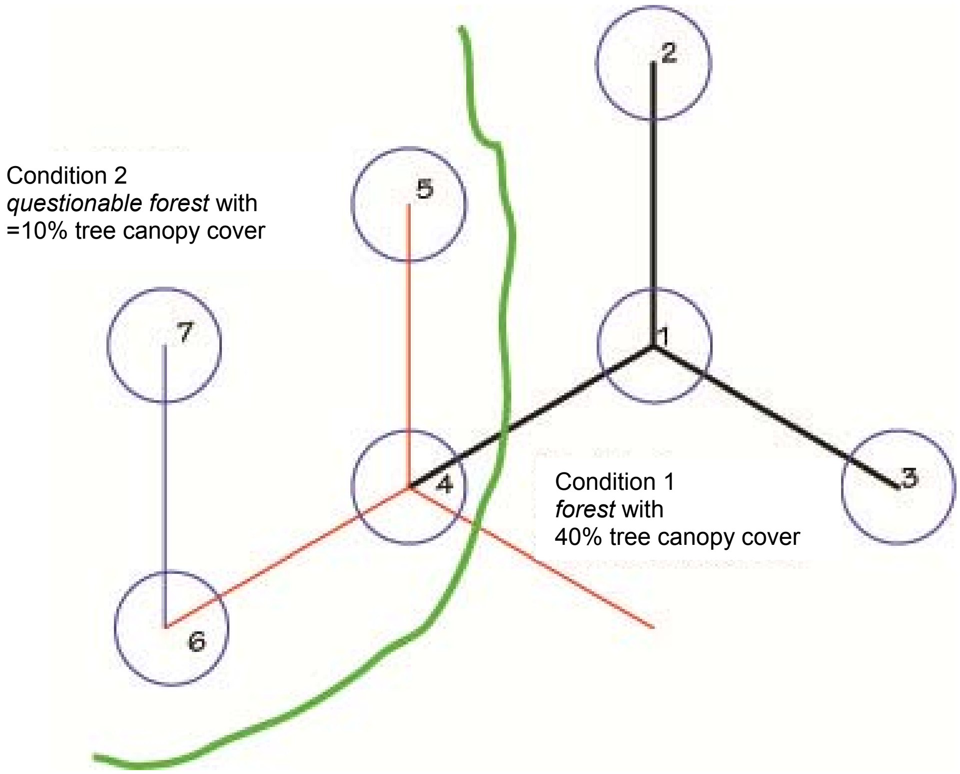


Figure 14. Example of the subplot method phantom subplots.

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).

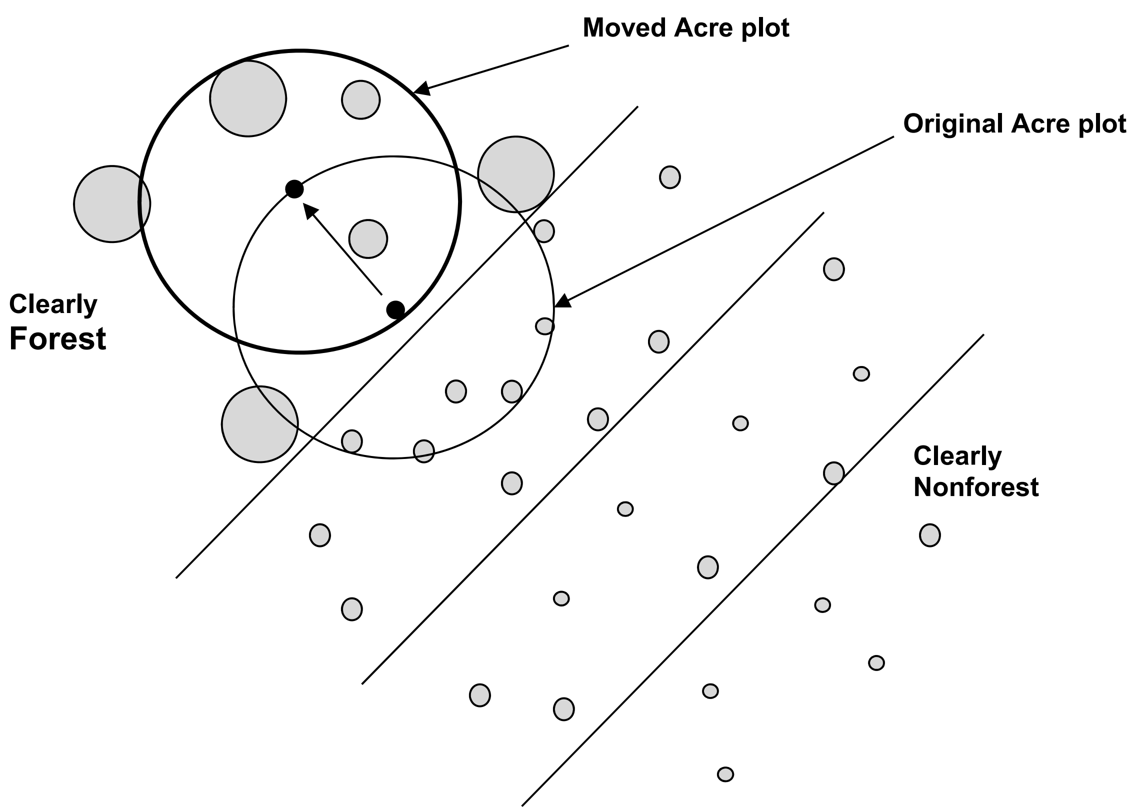


Figure 15. Example of using the Acre plot method when determining CANOPY COVER when the Acre plot is in a transition zone with forest/nonforest encroachment.

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.

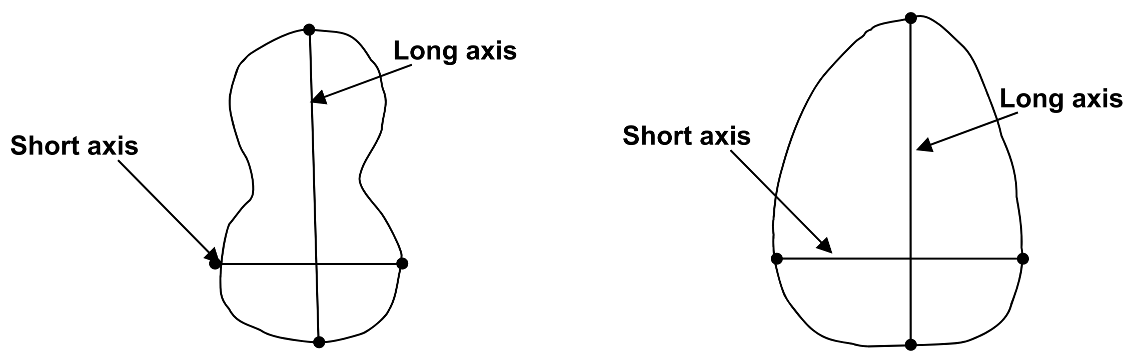


Figure 16. Examples of where to measure canopy widths.

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.

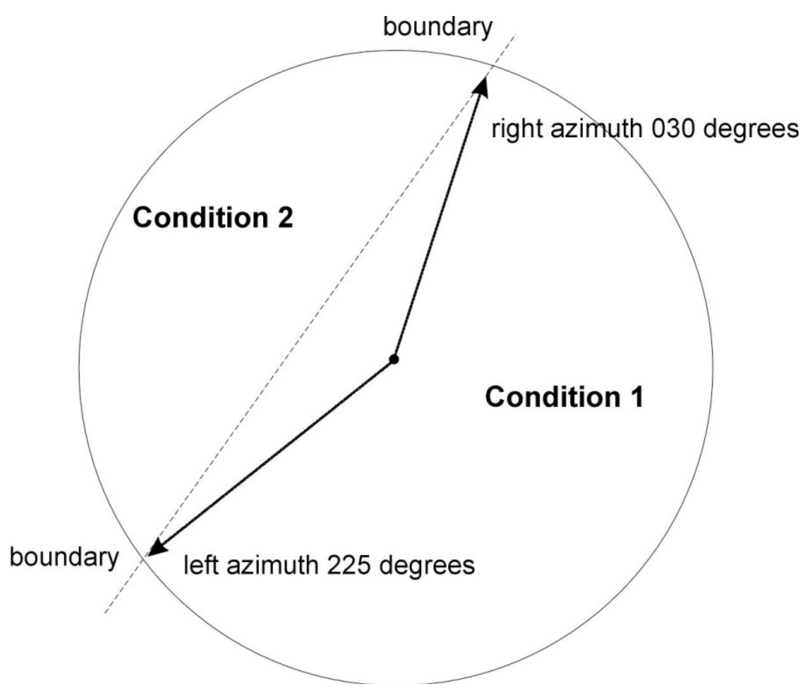


Figure 17. How to measure a straight boundary on a microplot, subplot, or macroplot.

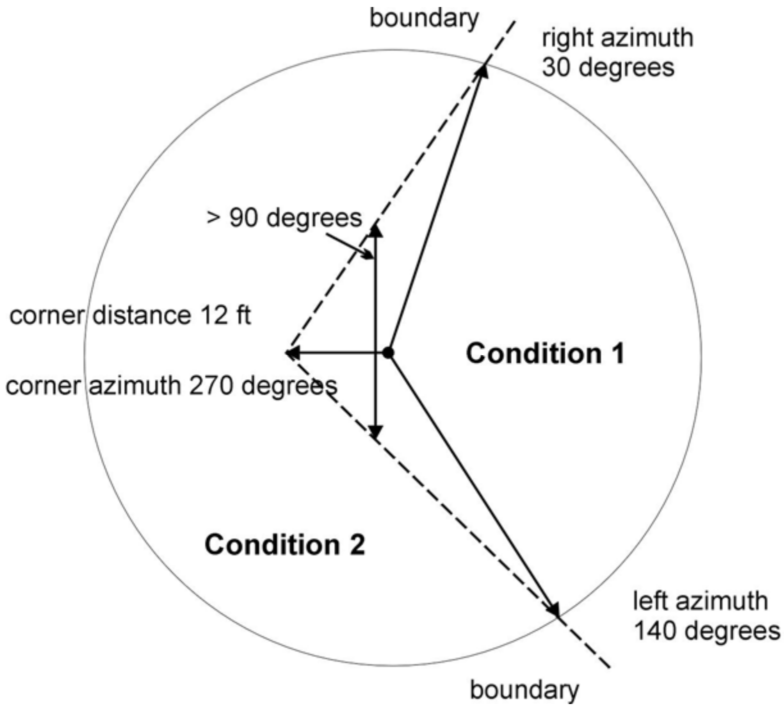


Figure 18. How to measure a boundary with a corner on a subplot or macroplot.

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

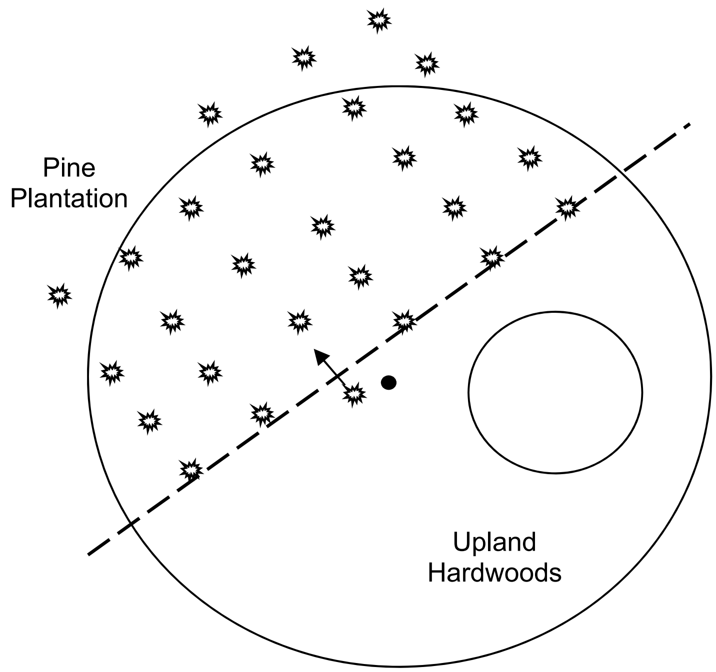


Figure 19. Ragged CONDITION CLASS boundary and tree condition class designation.

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 $\geq$ 1.0 in DBH/DRC and standing dead tally trees $\geq$ 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 ≥ 1.0 in DBH/DRC (PRESENT TREE STATUS = 1 and no PREVIOUS TREE STATUS), all new dead tally trees ≥ 5.0 in (PRESENT TREE STATUS = 2 and no PREVIOUS TREE STATUS), all no status trees (PRESENT TREE STATUS = 0)
Field width: 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.

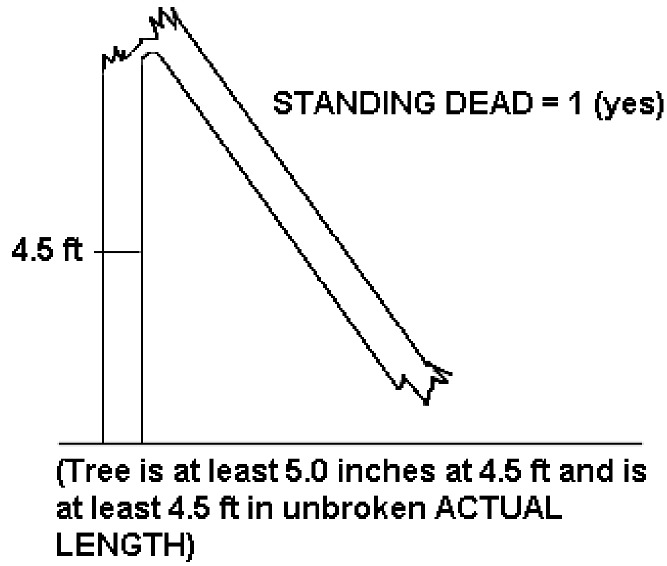


Figure 20. Example of an unbroken bole to 4.5 feet.

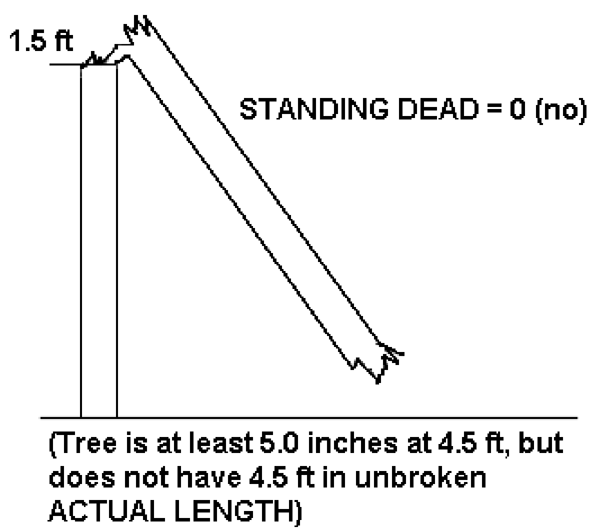


Figure 21. Example of an unbroken length of < 1.5 feet.

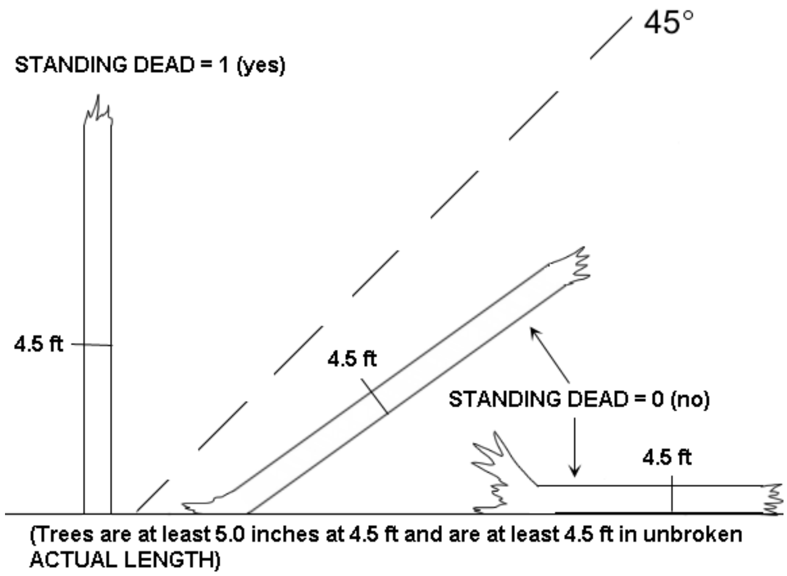


Figure 22. Other examples of dead trees.

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.

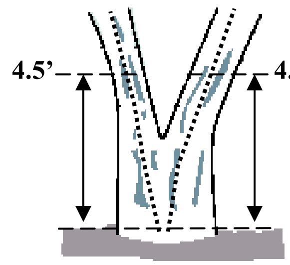


Figure 23. Forked below 1.0 ft.

    - 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).

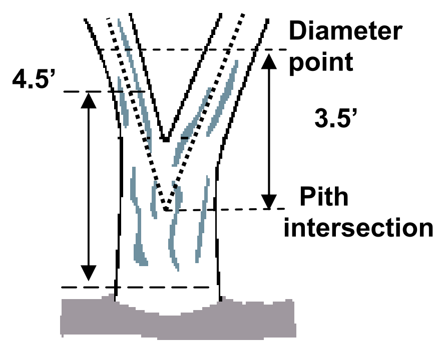


Figure 24. Forked between 1.0-4.5 ft.

- 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.

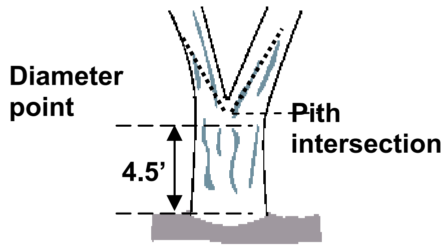


Figure 25. One tree.

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.

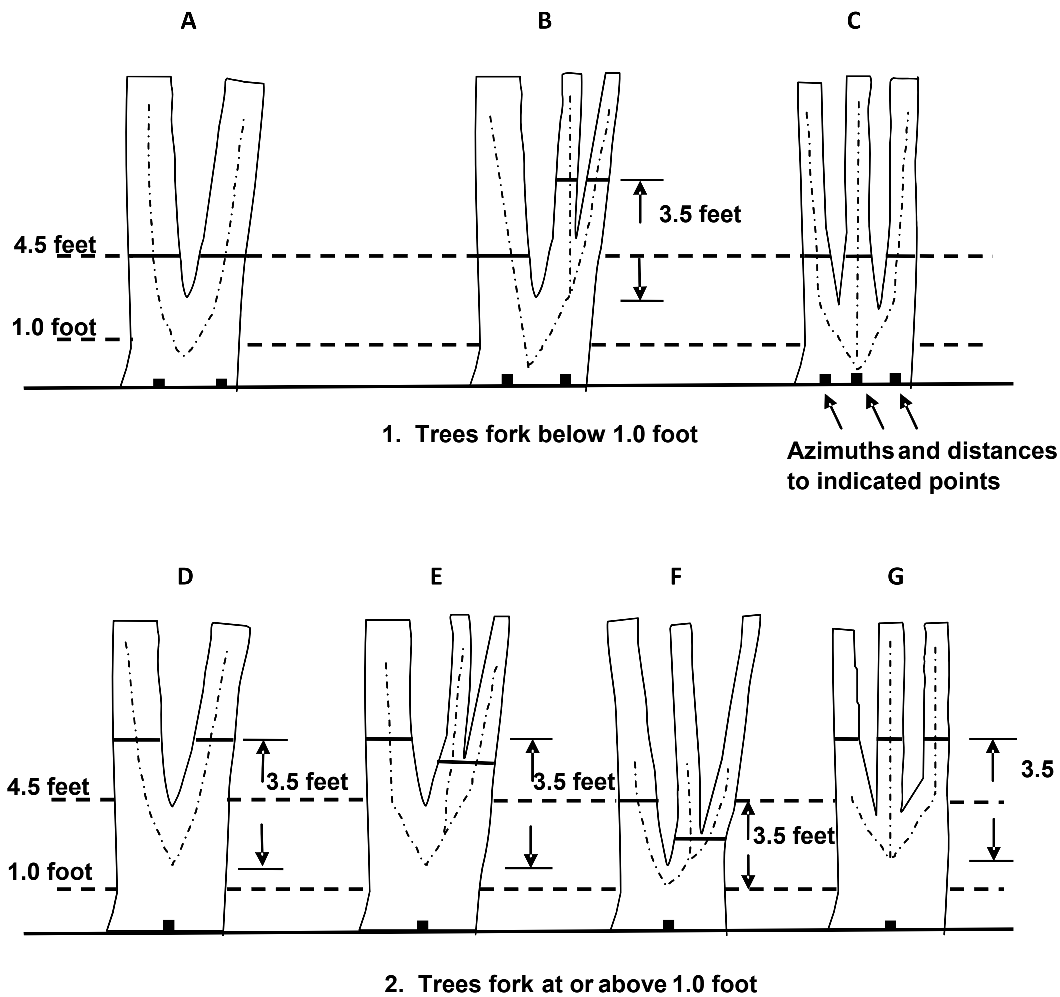


Figure 26. Summary of where to measure DBH, distance, and azimuth on forked trees.

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

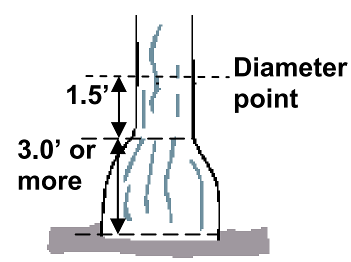


Figure 27. Bottleneck tree.

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.

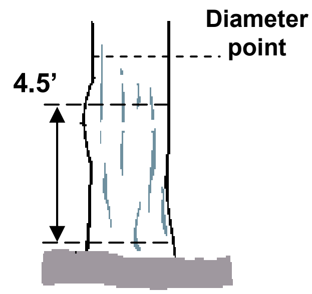


Figure 28. Tree with swelling.

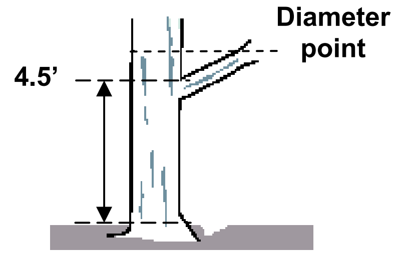


Figure 29. Tree with branch.

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).

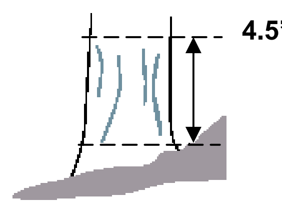


Figure 30. Tree on a slope.

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).

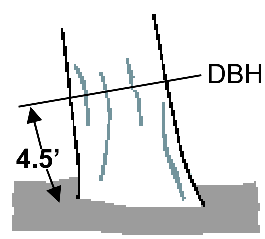


Figure 31. Leaning tree.

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).

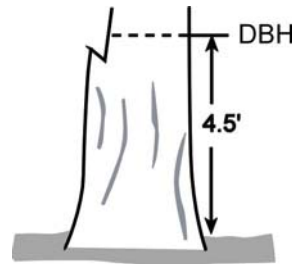


Figure 32. Tree with part of stem missing.

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

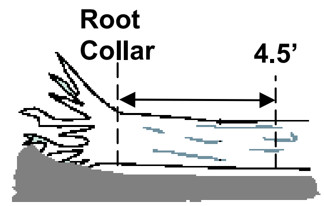


Figure 33. Tree on the ground.

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.

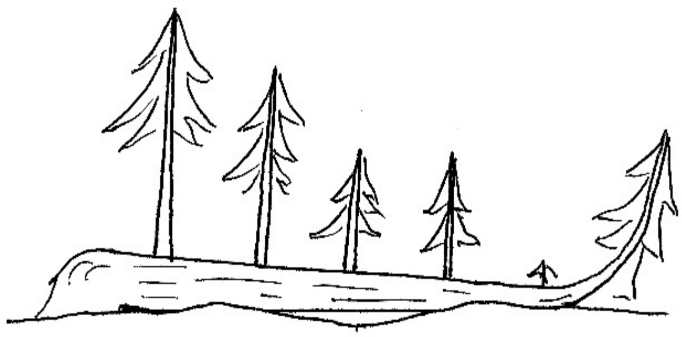


Figure 34. Down tree above duff.

- 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.

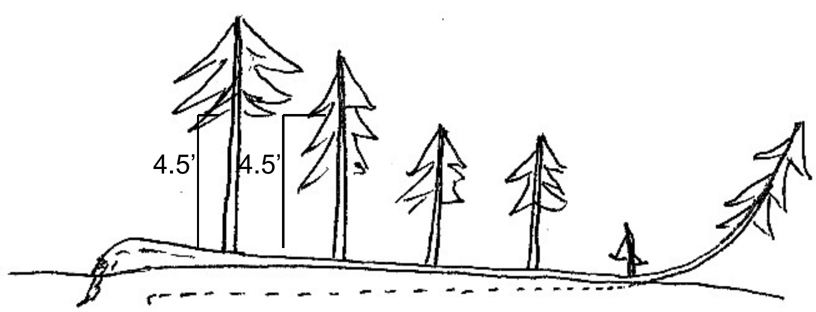


Figure 35. Down tree below duff.

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

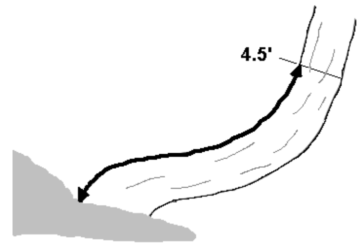


Figure 36. Tree with curved bole (pistol butt tree).

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:

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

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:

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

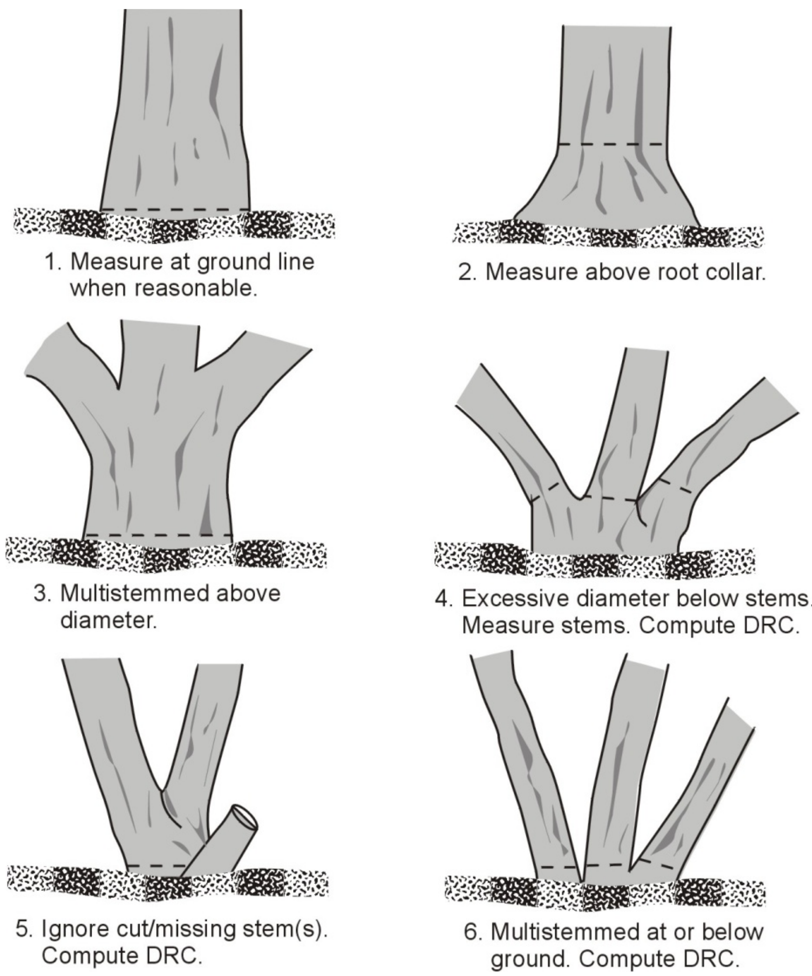


Figure 37. How to measure DRC in a variety of situations.

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 ≥ 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:

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.

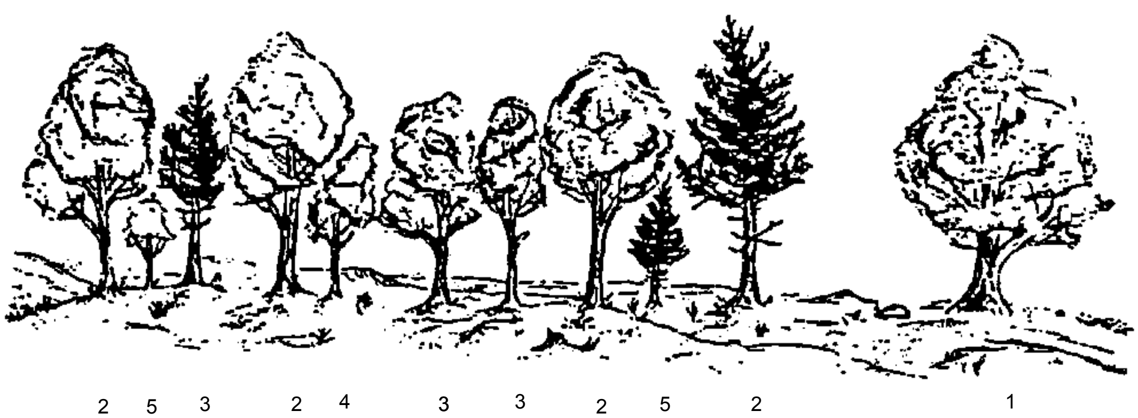


Figure 38. Examples of CROWN CLASS code definitions (numbers are the CROWN CLASS codes).

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.

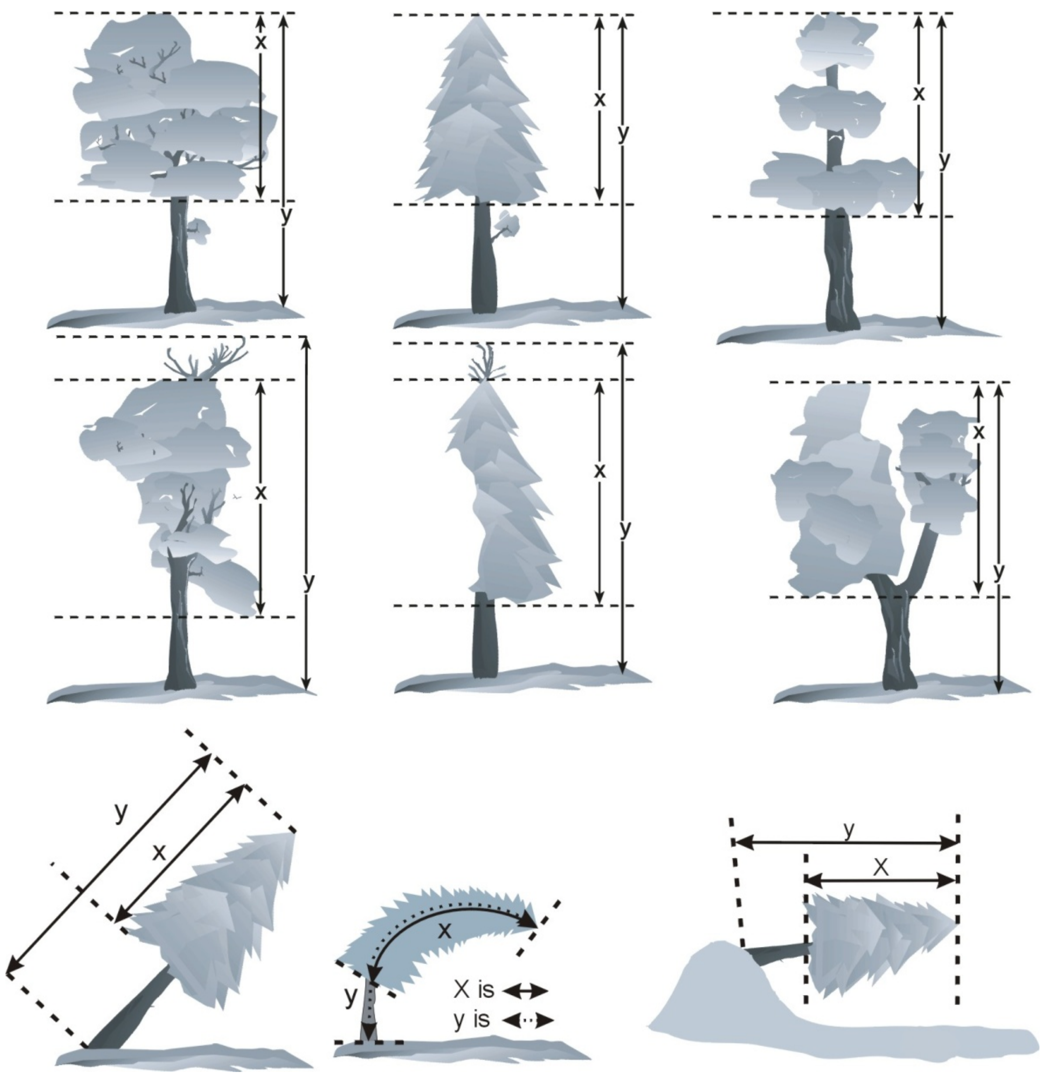


Figure 39. UNCOMPACTED LIVE CROWN RATIO examples.

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).

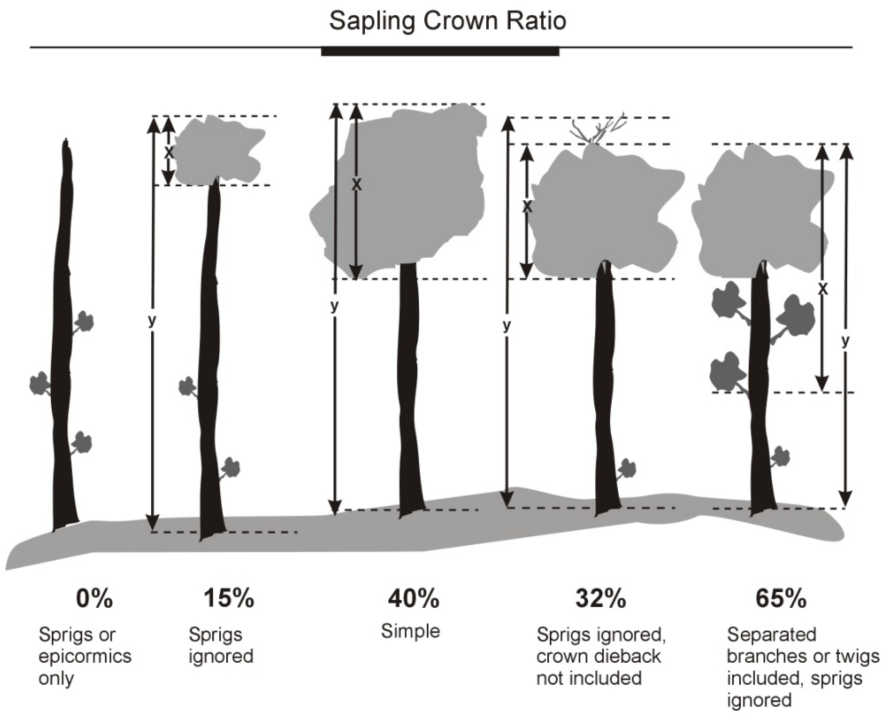


Figure 40. Sapling ratio determination examples.

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

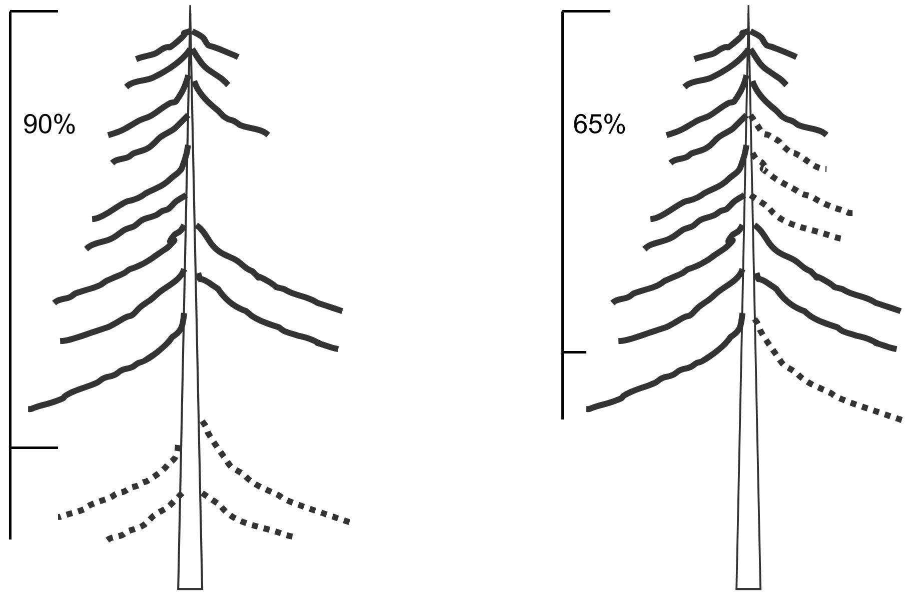
5.19 COMPACTED CROWN RATIO

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: Compacted:

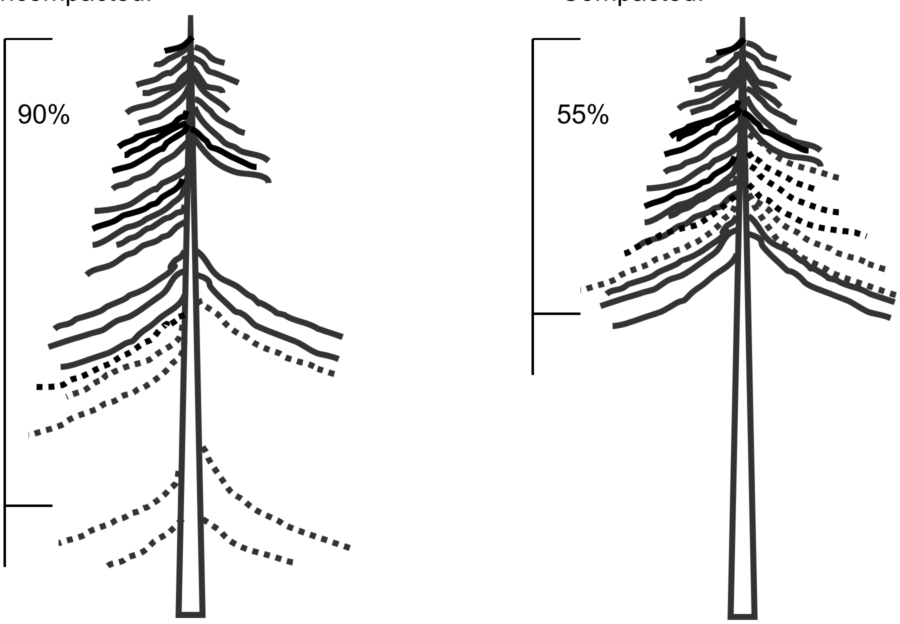


Figure 41. Examples of and comparison between COMPACTED CROWN RATIO and UNCOMPACTED LIVE CROWN RATIO of conifers.

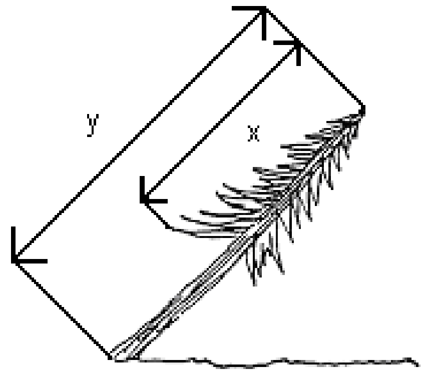


Figure 42. COMPACTED CROWN RATIO on a leaning tree. CROWN RATIO = (x/y)100.

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

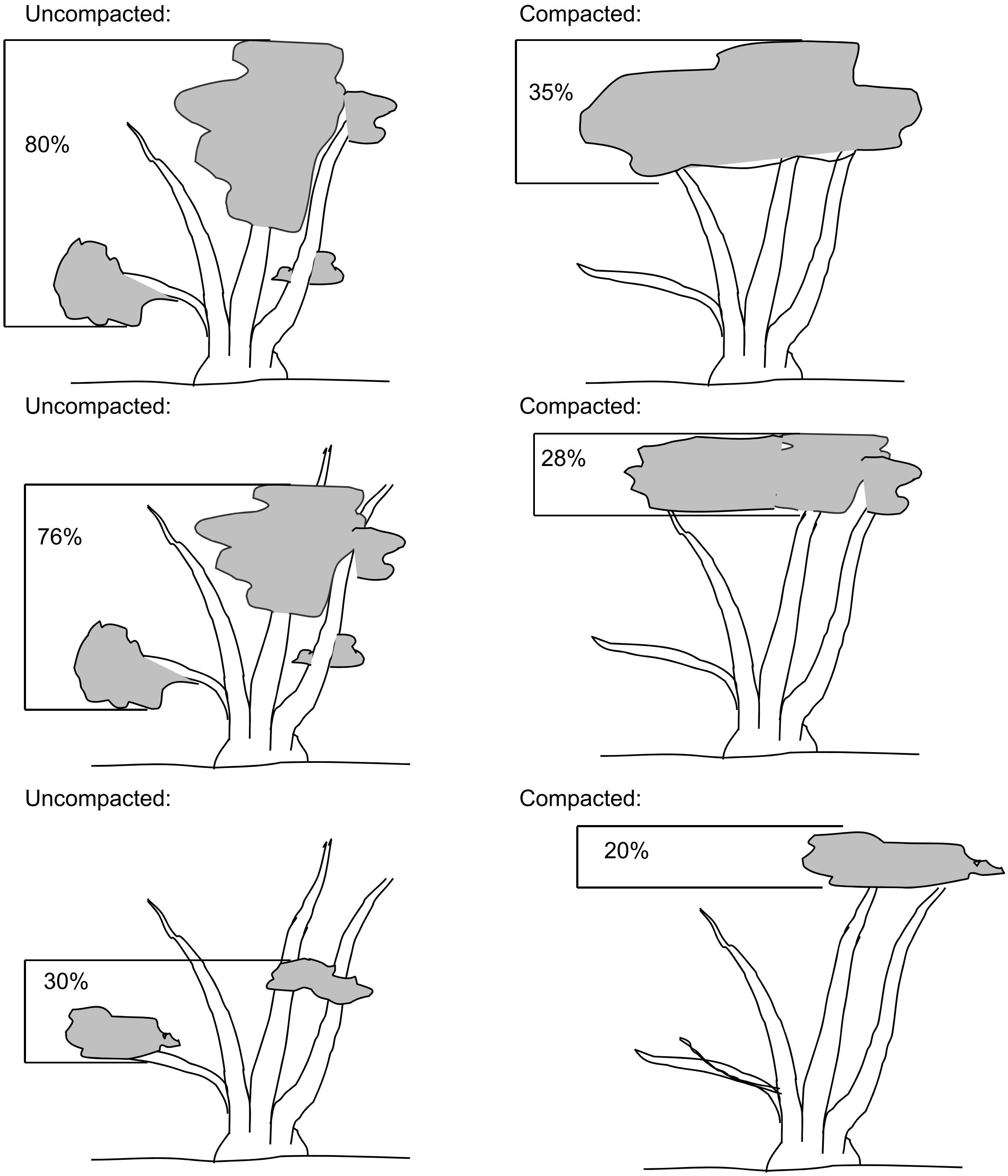


Figure 43. Examples of and comparison between COMPACTED CROWN RATIO and UNCOMPACTED LIVE CROWN RATIO of woodland species.

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. 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

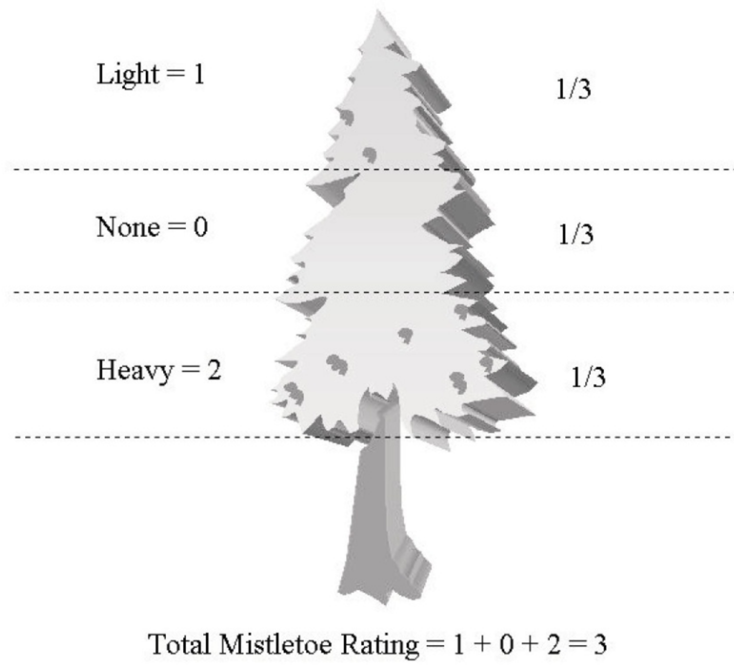


Figure 44. Example of the Hawksworth six-class rating system.

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.

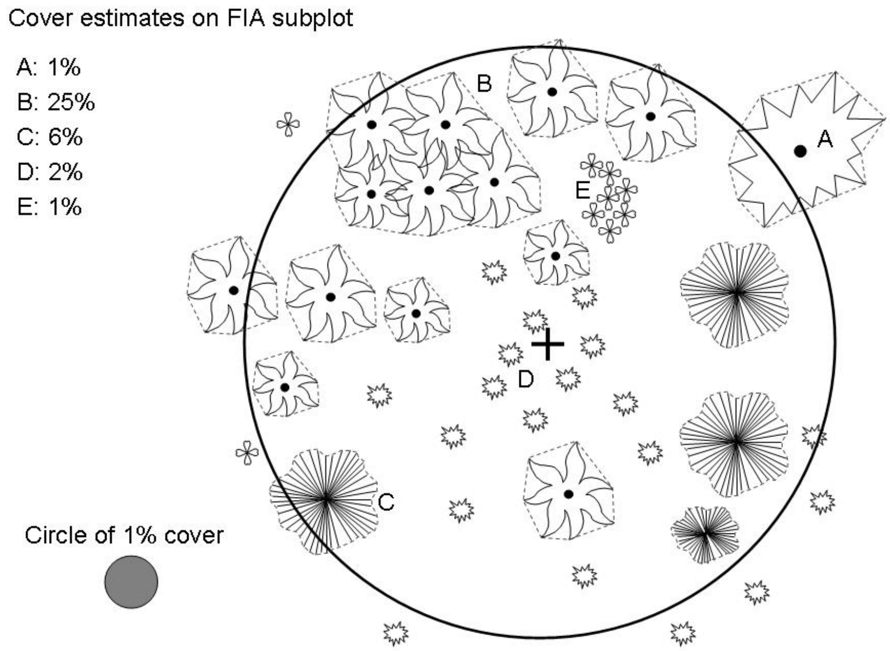


Figure 45. Assessing canopy cover.

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

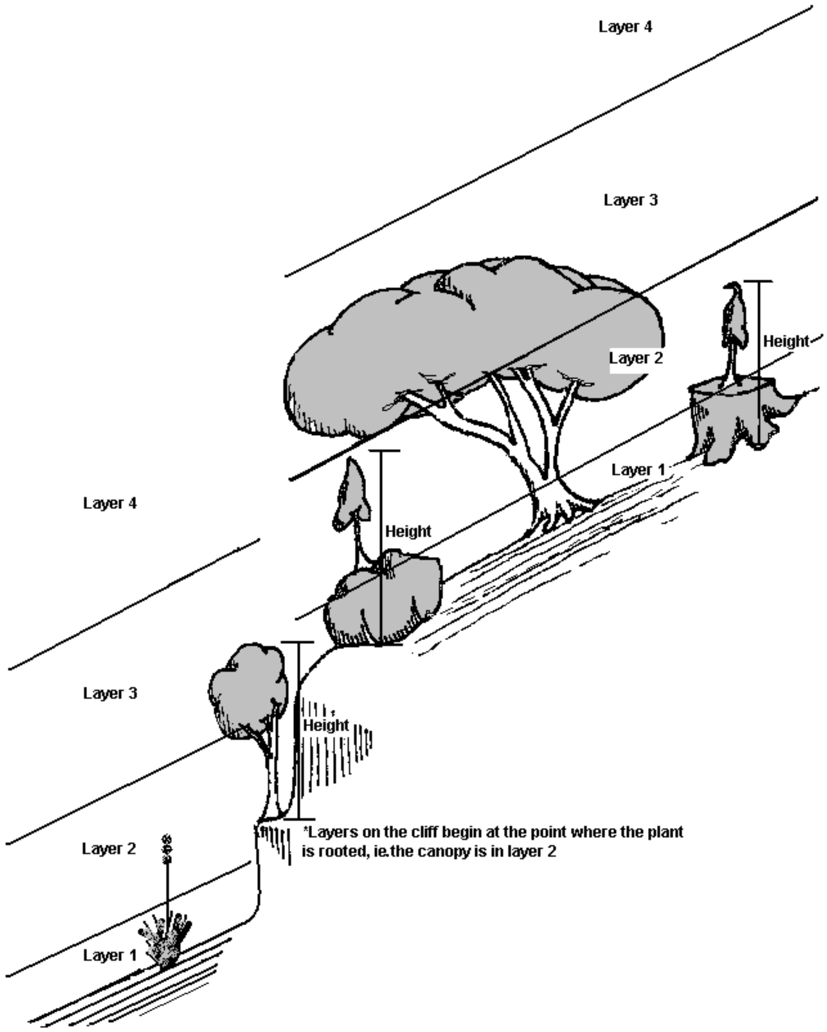


Figure 46. To determine the layer of a plant, measure the height of the layer from the ground.

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.

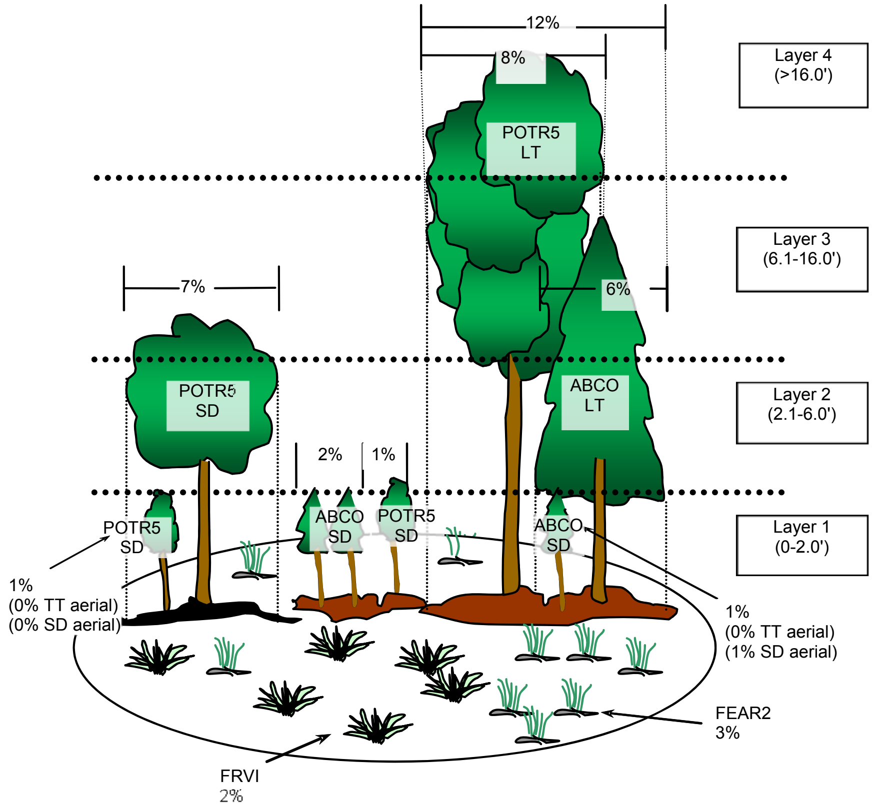


Figure 47. Example of growth habit by layer and species composition.

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.

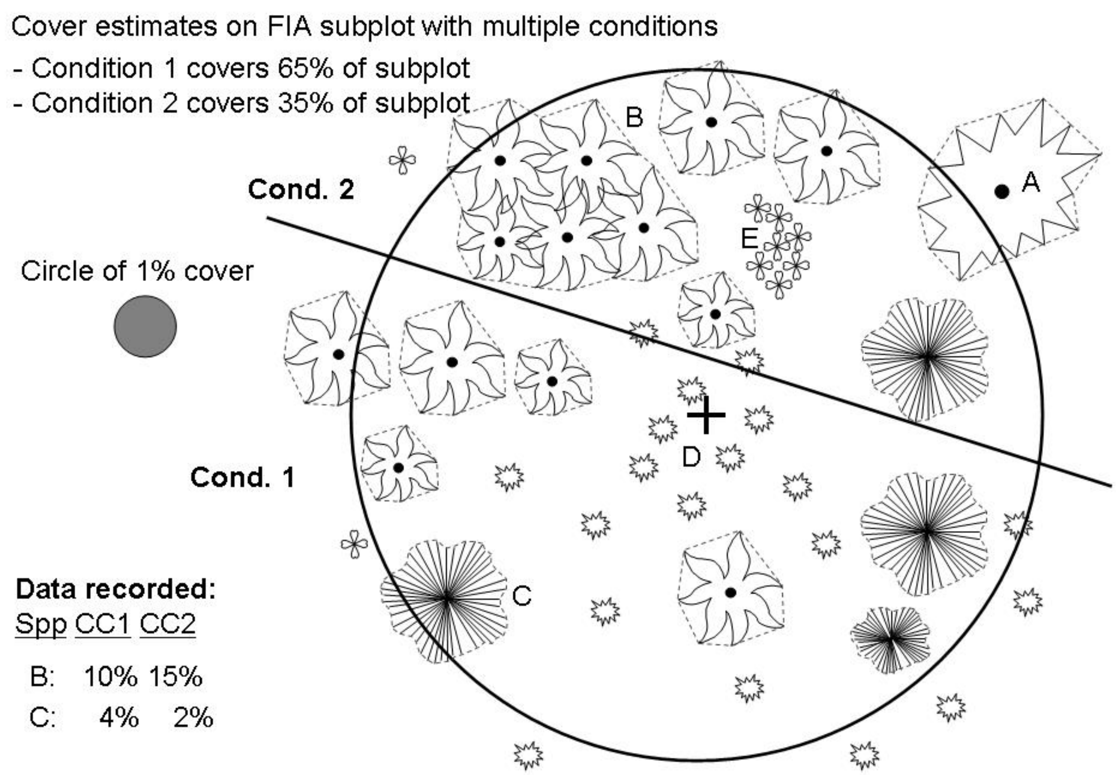


Figure 48. Example of species total aerial canopy cover estimation on a subplot with 2 accessible conditions. See figure 45 for total aerial canopy cover across the subplot. In figure 45, species A, D, and E would be included in estimates of *Vegetation Structure* by Structure Growth Habit, but not recorded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

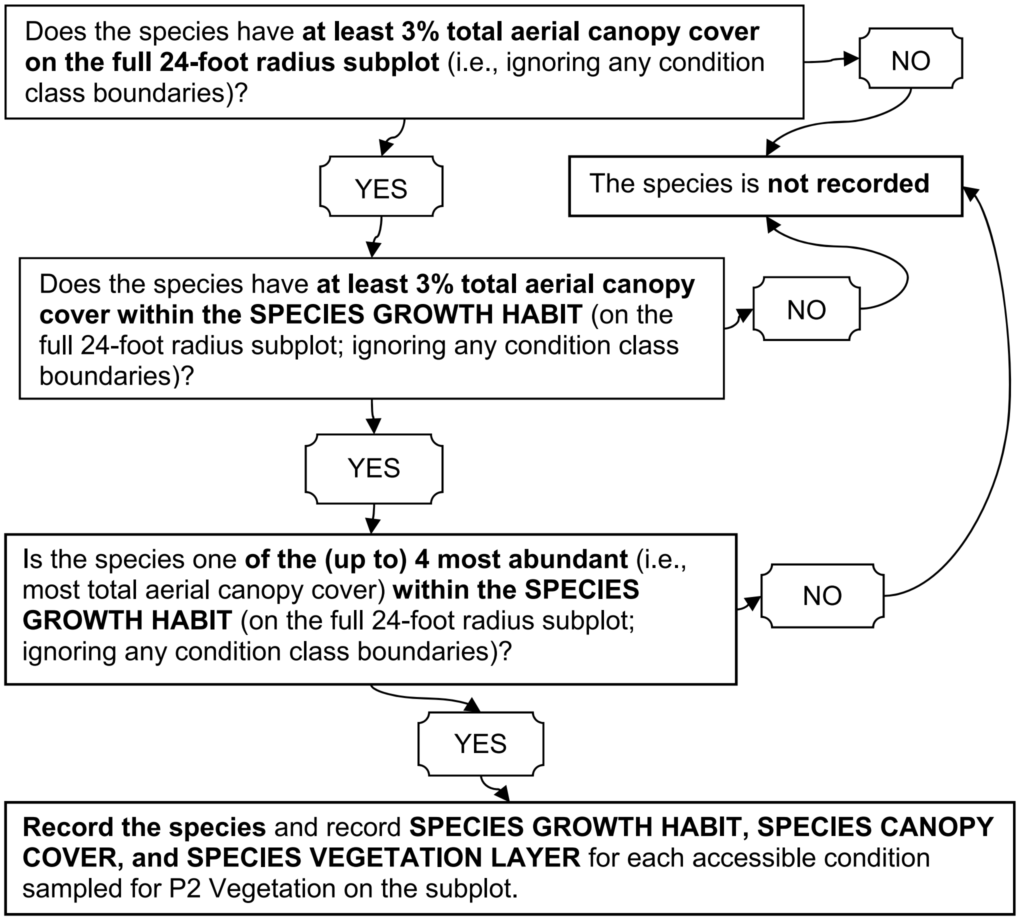


Figure 49. *Species Composition* subplot flow chart.

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).

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[2] All core tree species **and** any core optional tree species selected by a particular FIA unit.
[3] Tree species not on a particular FIA unit's tree tally list that are woody plants with a single well-defined dominant stem, not supported by other vegetation or structures (not vines), and which are, or are expected to become, greater than 13 feet in height.

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.

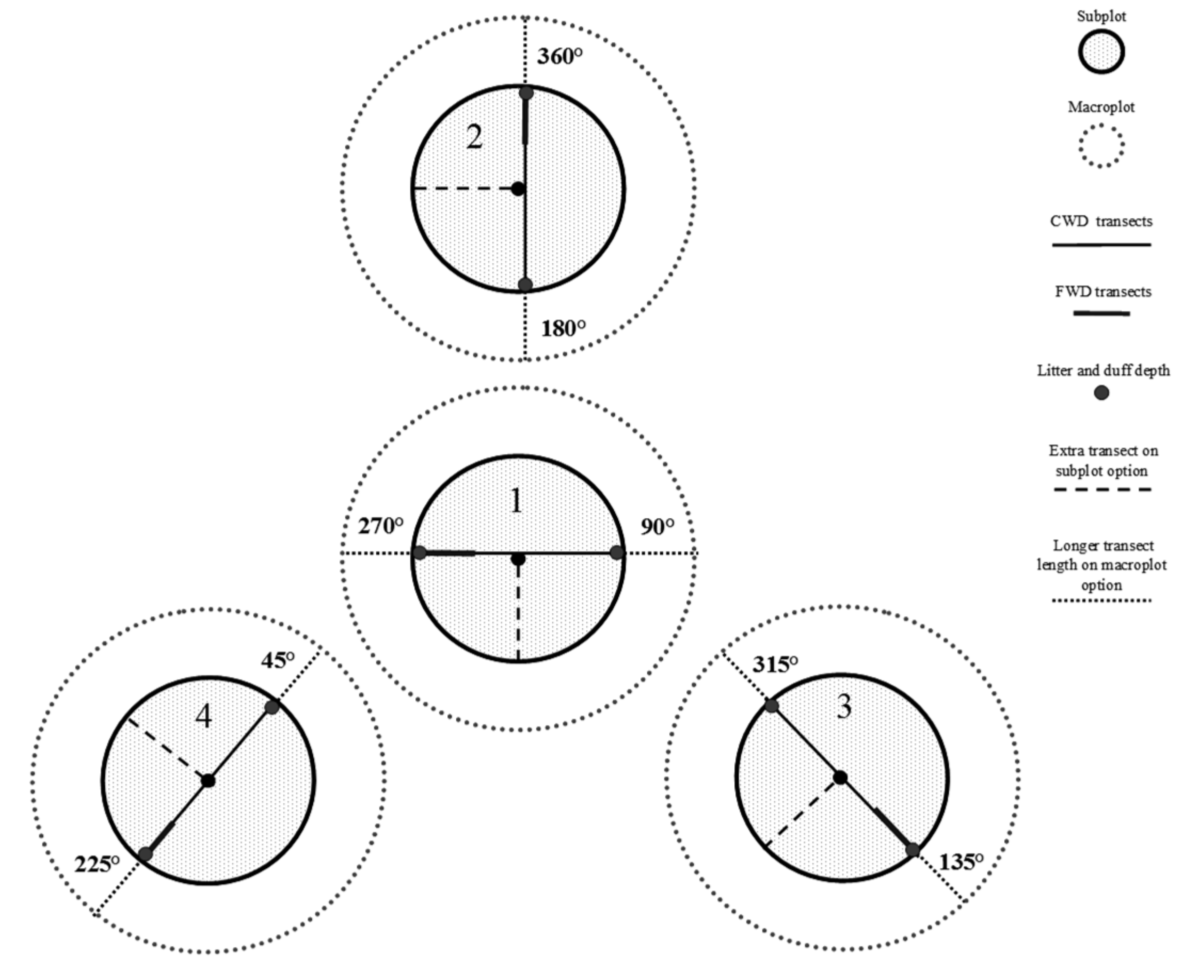

Figure 50. Plot layout for sampling CWD, FWD, and litter and duff depth. CWD transects include two 24-foot transects per subplot (starting at subplot center designated by its azimuth as labeled), optional extension onto condition mapped macroplots, and optional third transect for CWD.

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.

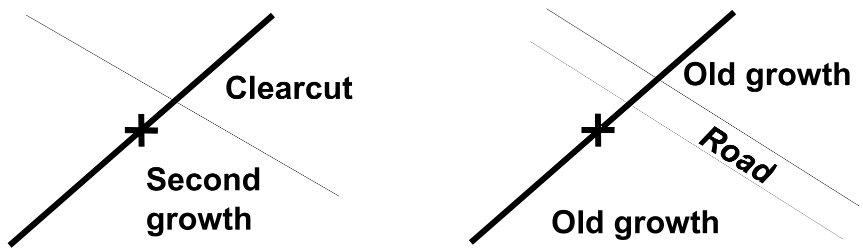

Figure 51. Transects are installed across condition class boundaries.

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.

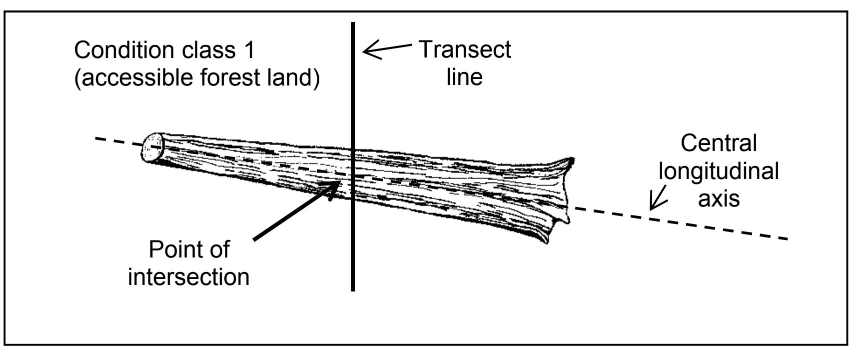

Figure 52. Tally rules for CWD.

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.

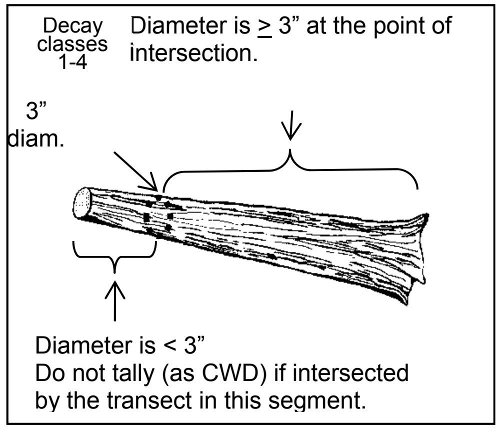

Figure 53. Tally rules for CWD decay classes 1-4.

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).

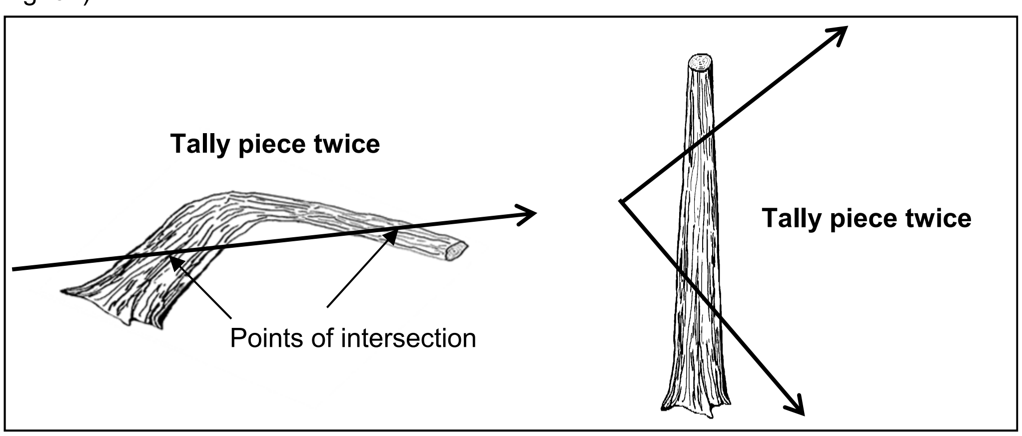

Figure 54. CWD tally rules: intersections.

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.

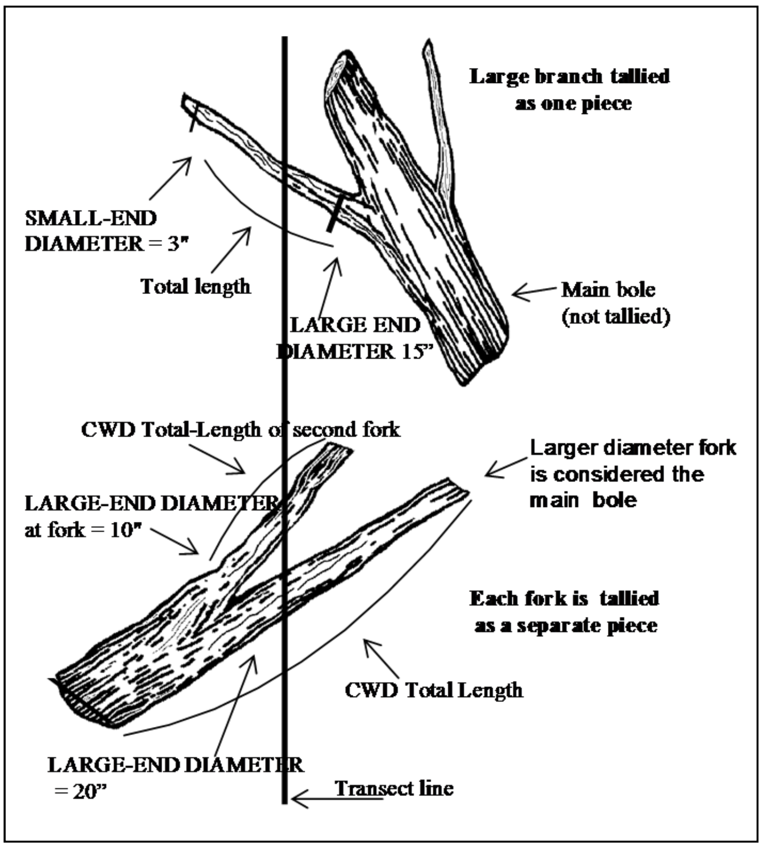

Figure 55. CWD tally rules for forked trees.

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.

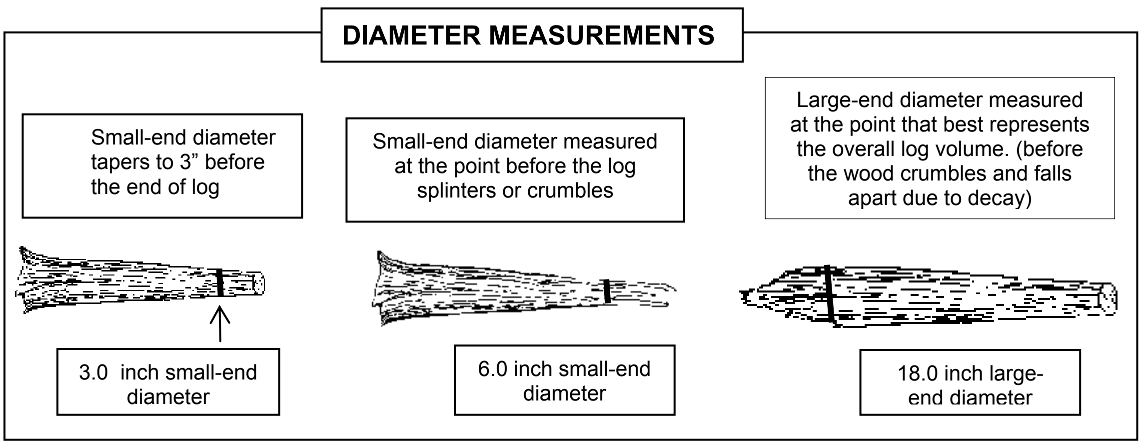

Figure 56. Diameter measurements

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.

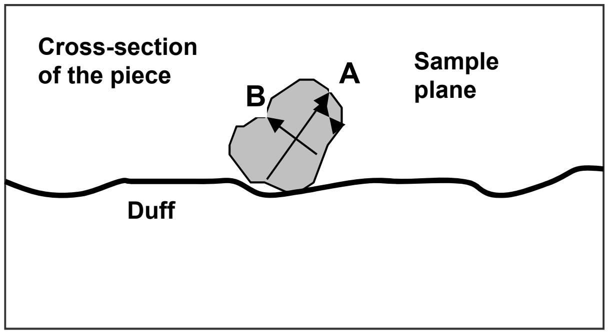

Figure 57. Estimating the diameter of pieces that are not round in cross-section.

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.

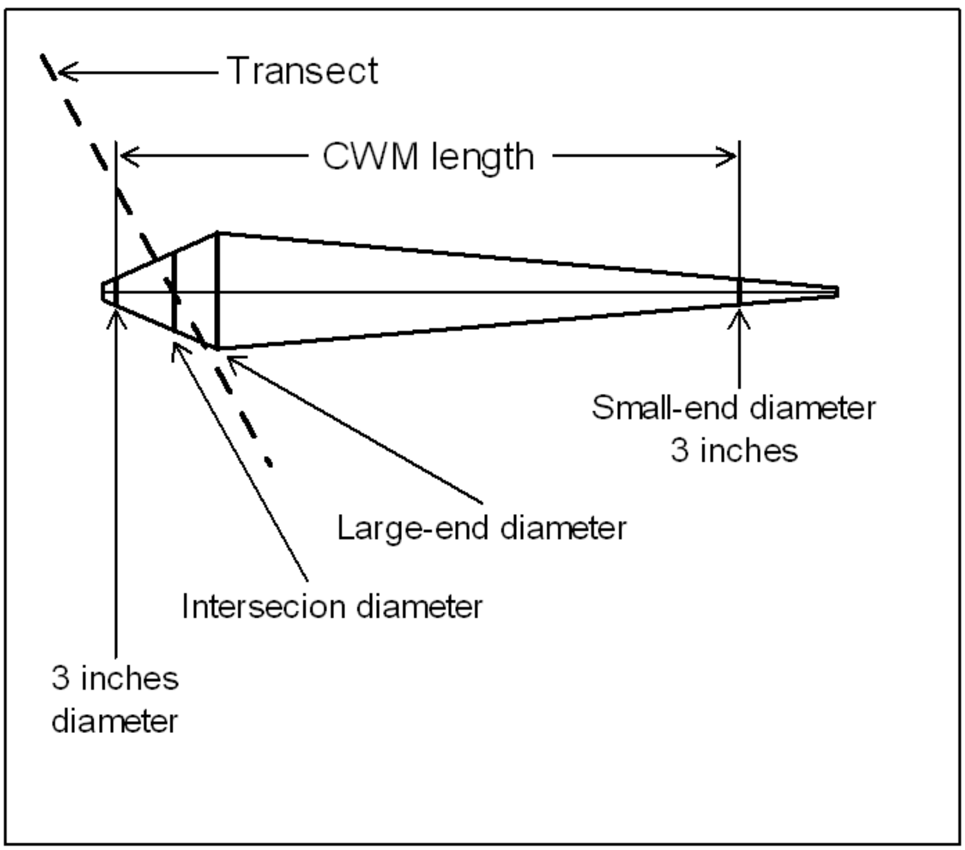

Figure 58. Example of decayed end intersecting the transect

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.

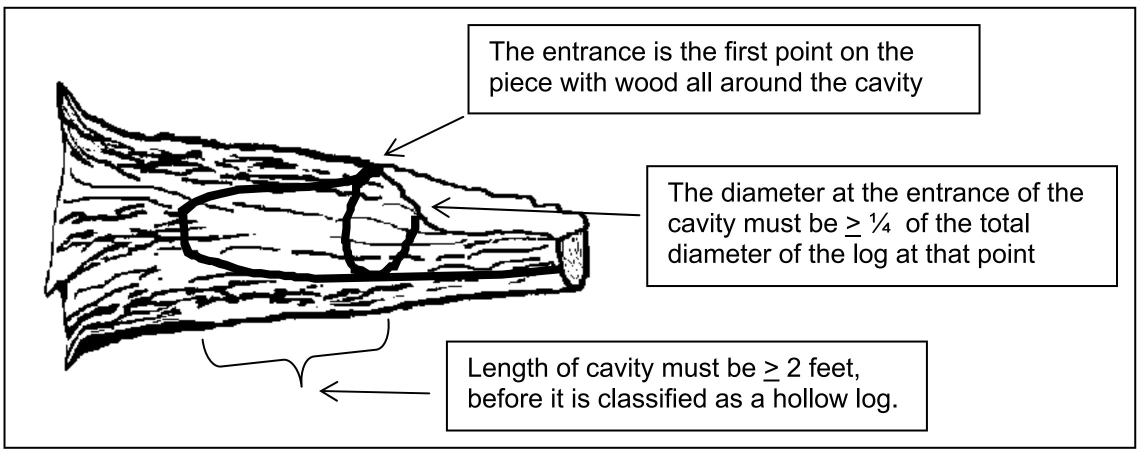

Figure 59. Determining if the piece is hollow.

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.

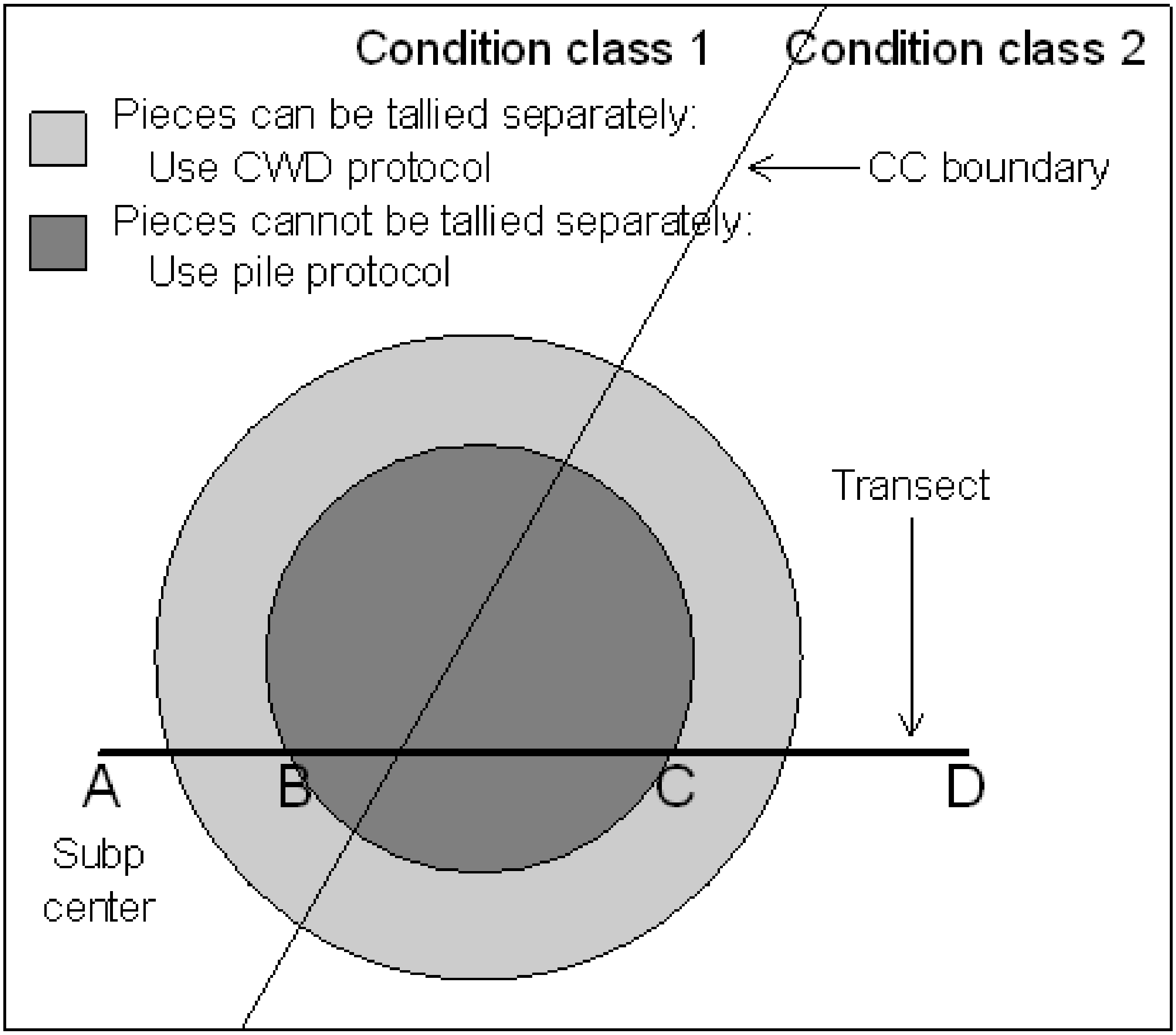

Figure 60. Example for measuring a pile. Pieces can be identified and tallied separately between points A-B and C-D, so the CWD protocols are used, even though part of the transect may be within the pile. Between points B and C, pieces cannot be tallied separately and the pile protocol is used. Enter 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.

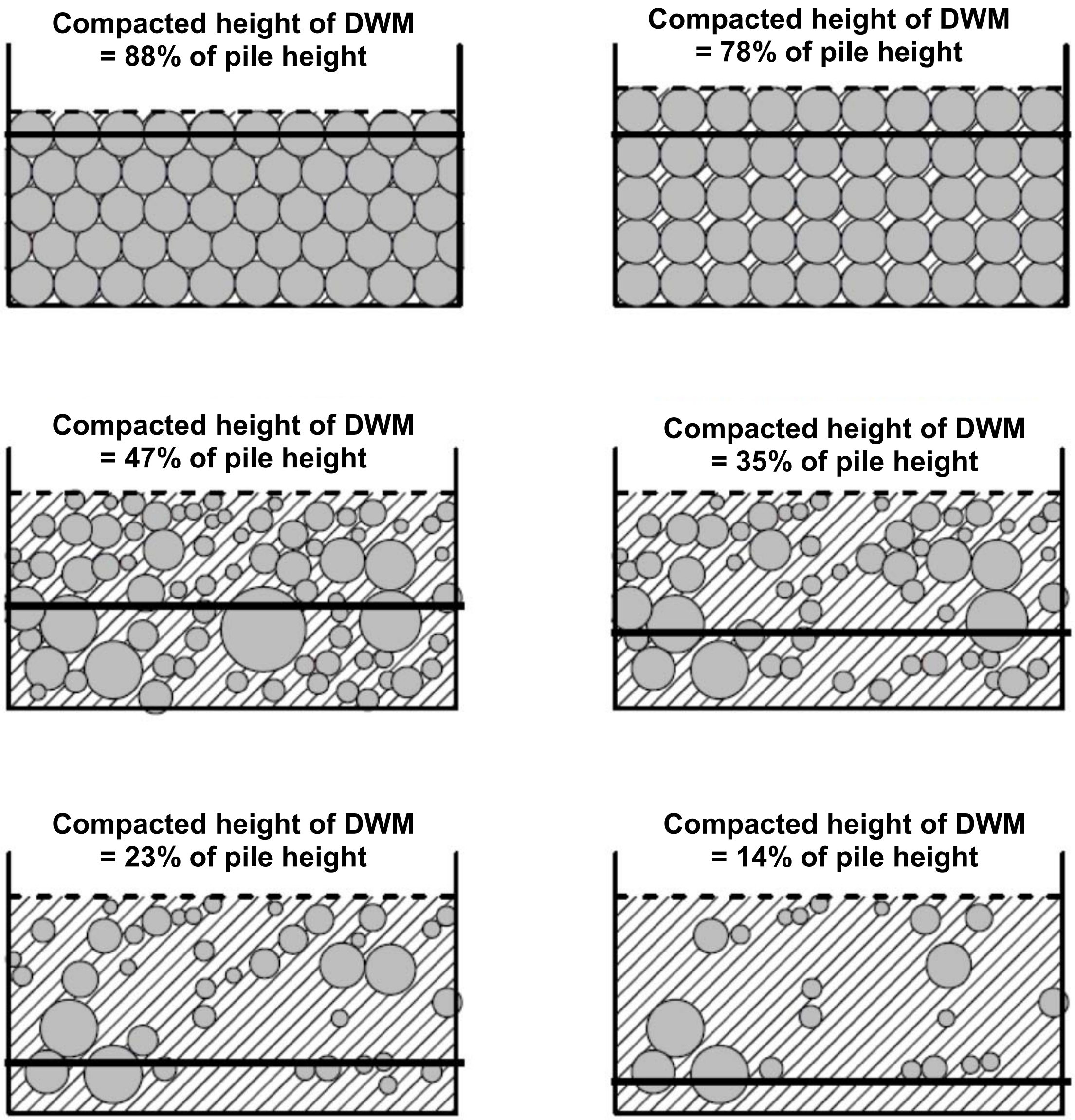

Figure 61. Calculating compacted height of CWD. The dashed line represents the height of the pile, the solid, thick line the compacted height of wood. Grey circles are cross sections of woody pieces greater than 3 inches of diameter and the fill represents debris, air and smaller pieces of wood.

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	(209)	Hays	(321)	Matagorda
(099)	Coryell	(211)	Hemphill	(323)	Maverick
(101)	Cottle	(213)	Henderson	(325)	Medina
(103)	Crane	(215)	Hidalgo	(327)	Menard
(105)	Crockett	(217)	Hill	(329)	Midland
(107)	Crosby	(219)	Hockley	(331)	Milam
(109)	Culberson	(221)	Hood	(333)	Mills
(111)	Dallam	(223)	Hopkins	(335)	Mitchell
(113)	Dallas	(225)	Houston	(337)	Montague
(115)	Dawson	(227)	Howard	(339)	Montgomery
(117)	Deaf Smith	(229)	Hudspeth	(341)	Moore
(119)	Delta	(231)	Hunt	(343)	Morris
(121)	Denton	(233)	Hutchinson	(345)	Motley
(123)	De Witt	(235)	Irion	(347)	Nacogdoches
(125)	Dickens	(237)	Jack	(349)	Navarro
(127)	Dimmit	(239)	Jackson	(351)	Newton
(129)	Donley	(241)	Jasper	(353)	Nolan
(131)	Duval	(243)	Jeff Davis	(355)	Nueces
(133)	Eastland	(245)	Jefferson	(357)	Ochiltree
(135)	Ector	(247)	Jim Hogg	(359)	Oldham
(137)	Edwards	(249)	Jim Wells	(361)	Orange
(139)	Ellis	(251)	Johnson	(363)	Palo Pinto
(141)	El Paso	(253)	Jones	(365)	Panola
(143)	Erath	(255)	Karnes	(367)	Parker
(145)	Falls	(257)	Kaufman	(369)	Parmer
(147)	Fannin	(259)	Kendall	(371)	Pecos
(149)	Fayette	(261)	Kenedy	(373)	Polk
(151)	Fisher	(263)	Kent	(375)	Potter
(153)	Floyd	(265)	Kerr	(377)	Presidio
(155)	Foard	(267)	Kimble	(379)	Rains
(157)	Fort Bend	(269)	King	(381)	Randall
(159)	Franklin	(271)	Kinney	(383)	Reagan
(161)	Freestone	(273)	Kleberg	(385)	Real
(163)	Frio	(275)	Knox	(387)	Red River
(165)	Gaines	(277)	Lamar	(389)	Reeves
(167)	Galveston	(279)	Lamb	(391)	Refugio
(169)	Garza	(281)	Lampasas	(393)	Roberts
(171)	Gillespie	(283)	La Salle	(395)	Robertson
(173)	Glasscock	(285)	Lavaca	(397)	Rockwall
(175)	Goliad	(287)	Lee	(399)	Runnels
(177)	Gonzales	(289)	Leon	(401)	Rusk
(179)	Gray	(291)	Liberty	(403)	Sabine
(181)	Grayson	(293)	Limestone	(405)	San Augustine
(183)	Gregg	(295)	Lipscomb	(407)	San Jacinto
(185)	Grimes	(297)	Live Oak	(409)	San Patricio
(187)	Guadalupe	(299)	Llano	(411)	San Saba
(189)	Hale	(301)	Loving	(413)	Schleicher
(191)	Hall	(303)	Lubbock	(415)	Scurry
(193)	Hamilton	(305)	Lynn	(417)	Shackelford
(195)	Hansford	(307)	McCulloch	(419)	Shelby
(197)	Hardeman	(309)	McLennan	(421)	Sherman
(199)	Hardin	(311)	McMullen	(423)	Smith
(201)	Harris	(313)	Madison	(425)	Somervell
(203)	Harrison	(315)	Marion	(427)	Starr
(205)	Hartley	(317)	Martin	(429)	Stephens
(207)	Haskell	(319)	Mason	(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 rickseckeri* 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	Carib bean	Wood land	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	Carib bean	Wood land	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	Carib bean	Wood land	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	Carib bean	Wood land	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

Core	East	West	Carib bean	Wood land	FIA Code	PLANTS Code	Common Name	Common name SRS	Common name RMRS	Common name PNWRS	Common name Caribbean	Genus	Species
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

Core	East	West	Carib bean	Wood land	FIA Code	PLANTS Code	Common Name	Common name SRS	Common name RMRS	Common name PNWRS	Common name Caribbean	Genus	Species
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

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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

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	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 necklacep od				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

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	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

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			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

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			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

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			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

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			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

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			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

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			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

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			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

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			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

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			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

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			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

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			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

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			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

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			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

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			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

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			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	jacquemontianu m
			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

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			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	Carib bean	Wood land	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	Carib bean	Wood land	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	madagascariensi s
			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	Carib bean	Wood land	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: 5th row, 1st column) is met. In the same condition only 5 tally trees in the 13.0-14.9-inch DBH class are needed to meet minimum stocking of 10 percent. If the tally were three 5.0-6.9-inch trees and two 13.0-14.9-inch DBH class trees (total stocking of 3 x 0.5 + 2 x 2.2 = 5.9), the combined stocking would not meet the minimum 10 percent (5.9 < 10) and the condition would be classified nonforest.

When using the *Number of Trees* table (table 5g), estimate the number of trees per acre by the diameter classes. When a condition exists on all 4 of the 24-ft radius subplots, each tally tree (DBH $\geq$ 5.0 inches) represents 6 trees per acre and each sapling (DBH $\geq$ 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	$\geq$ 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 SRS 330001-339999 RMRS 220001-229999 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 When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	0-90	degrees
LATITUDE MINUTES	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	0 – 59	minutes
LATITUDE SECONDS	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	0.00 – 59.99	seconds
LONGITUDE DEGREES	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	1 – 180	degrees
LONGITUDE MINUTES	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	0 – 59	minutes
LONGITUDE SECONDS	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	0.00 – 59.99	seconds

Variable Name	Tolerance	MQO	Values	Units
UTM ZONE	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	Number varies from 2 in Alaska to 19 on the East Coast. The letter varies from Q in Hawaii to W in Alaska	n/a
EASTING (X) UTM	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	0000000-9999999	
NORTHING (Y) UTM	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	0000000-9999999	
AZIMUTH TO PLOT CENTER	+/- 3 degrees	At least 99% of the time	000 at plot center 001 to 360 not at plot center	degrees
DISTANCE TO PLOT CENTER	+/- 6 ft	At least 99% of the time	000 at plot center 001 to 200 if a Laser range finder not used 001 to 999 if a Laser range finder is used	feet
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 999 071 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 At least 95% of the time in type 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 +/ 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 +/ 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 +/ 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 +/- 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 +/- 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 +/- 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 mesic: 21, 22, 23, 24, 25, 29 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 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 +/- 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 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; +/- 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
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* *Pieces ≥ 20.0 inches diameter (decay classes 1-4): +/- 2 inches for each 20-inch increment >20.0 inches* *Pieces ≥ 20.0 inches diameter (decay class 5): +/- 3 inches for each 20-inch increment above 20.0 inches*	*At least 90% of the time*	*003 to 200*	*inches*

Variable Name	Tolerance	MQO	Values	Units
DIAMETER OF HOLLOW AT POINT OF INTERSECTION (BASE)	*Pieces < 20.0 inches diameter: +/- 1 inch* *Pieces ≥ 20.0 inches diameter: +/- 2 inches for each 20-inch increment above 20.0 inches*	*At least 80% of the time*	*000, 001 to 200*	*inches*
DIAMETER AT THE SMALL END (WILDLIFE OPTION)	*Pieces < 20.0 inches diameter: +/- 1 inch* *Pieces > 20.0 inches diameter: +/- 2 inches for each 20-inch increment above 20.0 inches*	*At least 90% of the time*	*003 to 200*	*Inches*
DIAMETER AT THE LARGE END (WILDLIFE OPTION)	*Pieces < 20.0 inches diameter: +/- 1 inch* *Pieces > 20.0 inches diameter: +/- 2 inches for each 20-inch increment above 20.0 inches*	*At least 90% of the time*	*003 to 250*	*Inches*
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) Subplot 2: 360, 180, 270 (extra optional transect) Subplot 3: 135, 315, 225 (extra optional transect) 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 Subplot 2: 360 Subplot 3: 135 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 51 to 100 = +/- 25% of the total count for the transect 100 + = +/- 50% of the total count for the transect*	*At least 90% of the time*	*000 to 999*	*pieces*

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* *Subplot 2: 360, 180* *Subplot 3: 135, 315* *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		

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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		

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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		

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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:

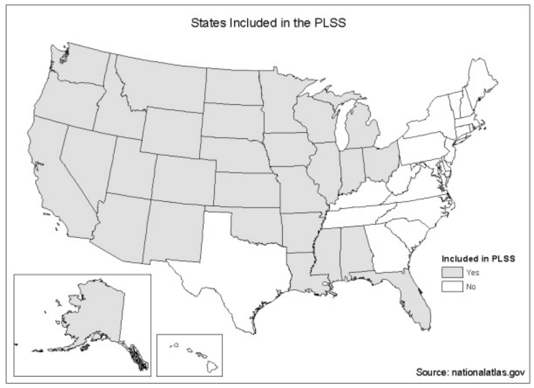
1	Tax office
2	GIS
3	Owner
4	Other

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:

<u>Example 2 – State Forestry Agency</u>

AGENCY: Pennsylvania Department of Conservation and Natural Resources
COMPANY:
MANAGEMENT UNIT: William Penn State Forest
NAME:
ATTENTION:
ADDRESS LINE 1: 845 Park Rd
ADDRESS LINE 2:
ADDRESS LINE 3:
ADDRESS CITY: Elverson
ADDRESS STATE: PA
ADDRESS PROVINCE:
ADDRESS POSTAL CODE: 19520
ADDRESS COUNTRY:

<u>Example 3 – Company with c/o</u>

AGENCY:
COMPANY: Generic Tree Company
MANAGEMENT UNIT:
NAME:
ATTENTION: c/o Jane Doe, Chief Forester
ADDRESS LINE 1: PO Box 456
ADDRESS LINE 2: 123 S Main St
ADDRESS LINE 3:
ADDRESS CITY: Somewhere
ADDRESS STATE: AL
ADDRESS PROVINCE:
ADDRESS POSTAL CODE: 12345-1234
ADDRESS COUNTRY:

<u>Example 4 – Company with foreign address</u>

AGENCY:
COMPANY: Trees R Us
MANAGEMENT UNIT:
NAME:
ATTENTION:
ADDRESS LINE 1: 1 Spruce Blvd Ste 100
ADDRESS LINE 2:
ADDRESS LINE 3:
ADDRESS CITY: Somewhere
ADDRESS STATE:
ADDRESS PROVINCE: AB
ADDRESS POSTAL CODE: A1B 2C3
ADDRESS COUNTRY: CA

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	Country	Code
Cyprus	CY	Réunion	RE
Czech Republic	CZ	Romania	RO
Denmark	DK	Russian Federation	RU
Djibouti	DJ	Rwanda	RW
Dominica	DM	Saint Helena	SH
Dominican Republic	DO	Saint Kitts and Nevis	KN
Ecuador	EC	Saint Lucia	LC
Egypt	EG	Saint Pierre and Miquelon	PM
El Salvador	SV	Saint Vincent and The Grenadines	VC
Equatorial Guinea	GQ	Samoa	WS
Eritrea	ER	San Marino	SM
Estonia	EE	Sao Tome and Principe	ST
Ethiopia	ET	Saudi Arabia	SA
Falkland Islands (Malvinas)	FK	Senegal	SN
Faroe Islands	FO	Serbia	RS
Fiji	FJ	Seychelles	SC
Finland	FI	Sierra Leone	SL
France	FR	Singapore	SG
French Guiana	GF	Slovakia	SK
French Polynesia	PF	Slovenia	SI
French Southern Territories	TF	Solomon Islands	SB
Gabon	GA	Somalia	SO
Gambia	GM	South Africa	ZA
Georgia	GE	South Georgia and The South Sandwich Islands	GS
Germany	DE	Spain	ES
Ghana	GH	Sri Lanka	LK
Gibraltar	GI	Sudan	SD
Greece	GR	Suriname	SR
Greenland	GL	Svalbard and Jan Mayen	SJ
Grenada	GD	Swaziland	SZ
Guadeloupe	GP	Sweden	SE
Guam	GU	Switzerland	CH
Guatemala	GT	Syrian Arab Republic	SY
Guernsey	GG	Taiwan, Province of China	TW
Guinea	GN	Tajikistan	TJ
Guinea-Bissau	GW	Tanzania, United Republic of	TZ
Guyana	GY	Thailand	TH
Haiti	HT	Timor-Leste	TL
Heard Island and Mcdonald Islands	HM	Togo	TG
Holy See (Vatican City State)	VA	Tokelau	TK
Honduras	HN	Tonga	TO
Hong Kong	HK	Trinidad and Tobago	TT
Hungary	HU	Tunisia	TN
Iceland	IS	Turkey	TR

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	