

**Wisconsin State Forests
Continuous Forest Inventory**

VOLUME I: FIELD DATA COLLECTION PROCEDURES FOR PHASE 2 PLOTS

Version 5.0



Wisconsin Department of Natural Resources

Division of Forestry

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Note: Wisconsin State Forests, Continuous Forest Inventory (WisCFI), Version 5.0 is adapted from the USDA Forest Service Forest Inventory and Analysis (FIA) Northern Region (NRS) Field Guide Version 9.0. NRS FIA Field Guide Version 9.0 Volume 1 (and Volume 1 Supplement) is based on the National Core FIA Field Guide Version 9.0; with the exception of Soil Measurements and Sampling, Crowns Measurements and Sampling, and Down Woody Materials data elements and procedures, which are based on the National Core Field Guide Version 5.1 and the FIA National Core Optional Down Woody Materials Lite Protocols Proposal (August, 2006). All data elements are national unless indicated as follows:

- National data elements that end in "+N" (e.g., x.x+N) have had values, codes, or text added, changed, or adjusted from the CORE program*. Any additional regional text for a national CORE data element is hi-lighted or shown as a "NRS Note."
- All regional data elements end in "N" (e.g., x.xN). The text for a regional data element is not hi-lighted and does not have a corresponding variable in CORE.
- NRS electronic file notes:
 - National and regional FIA data elements that are not applicable in NRS are formatted as light gray or light gray hidden text.
 - Hyperlink cross-references are included for various sections, figures, and tables.
- National data elements that end in "+WisCFI" (e.g., x.x+WisCFI) have had values, codes, or text added, changed, or adjusted from the CORE program*. Any additional WisCFI text for a national CORE data element is hi-lighted or shown as a "WisCFI Note."
- All WisCFI-specific data elements end in "N-WisCFI" (e.g., x.xN-WisCFI). The text for WisCFI elements is not hi-lighted.
- WisCFI field guide electronic file notes:
 - National and regional FIA data elements that are not applicable in WisCFI are formatted as light gray or light gray hidden text.
 - Hyperlink cross-references are included for various sections, figures, and tables.

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**Wisconsin State Forests
Continuous Forest Inventory**

VOLUME I: FIELD DATA COLLECTION PROCEDURES FOR PHASE 2 PLOTS

Version 5.0

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1.0N-WisCFI	October 2006 (adapted from USFS FIA Northern Region Version 3.1) October 2006 [WisCFI Volume II, Field Data Collection Procedures for Phase 3 Indicators, adapted from USFS FIA National Core Field Guide version 3.0 and FIA National Core Optional Down Woody Materials Lite Protocols Proposal (August, 2006).]
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5.0N-WisCFI	September 2021 (adapted from USFS FIA Northern Region Version 7.0.1 and 9.0.1)

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INTRODUCTION+WISCFI

This document describes the standards, codes, methods, and definitions for Wisconsin State Forests Continuous Forest Inventory (WisCFI) field data items as adapted from Forest Inventory and Analysis (FIA) Northern Region (NRS) field guide version 9.0.

The focus of Volume I is on data that are collected in the field on all Phase 2 plots. 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: soils; crown condition; and vegetation diversity and structure. Note that the down woody materials field procedures are now included only in Volume I.

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
12N-WisCFI	Forest Habitat Type Identification
.	National Appendices
.	Regional Appendices

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 and Phase 3 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 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
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+N+WISCFI GENERAL DESCRIPTION

The WisCFI field plot consists of two subplots approximately 1/24 acre in size with a radius of 24.0 feet. The center subplot is subplot 1. Subplot 2 is located 120.0 feet horizontal (+/- 7 feet) at an azimuth of 360 degrees from the center of subplot 1 (see Figure 1+N-WisCFI). Throughout this field guide, the use of the word 'plot' refers to the entire set of two subplots. 'Plot center' is defined as the center of subplot 1.

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.

NRS CORE Note: Macroplots are not installed in the North and all reference to a macroplot has been shaded out or removed for this regional guide.

Each subplot contains a microplot of approximately 1/300 acre in size with a radius of 6.8 feet. The center of the microplot is offset 90 degrees and 12.0 feet horizontal (+/- 1 foot) from each subplot center. Microplots are numbered in the same way as subplots. Microplots are used to select and collect data on saplings (DBH/DRC of 1.0 inch through 4.9 inches) and seedlings (DBH/DRC less than 1.0 inch in diameter and greater than or equal to 0.5 foot in length [conifers] or greater than or equal to 1.0 foot in length [hardwoods]).

NRS CORE Note: Annular plots are not installed in the North for P2 and all reference to an annular plot has been shaded out or removed for this regional guide.

Data are collected on field plots at the following levels:

Plot	Data that describe the entire cluster of two 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.

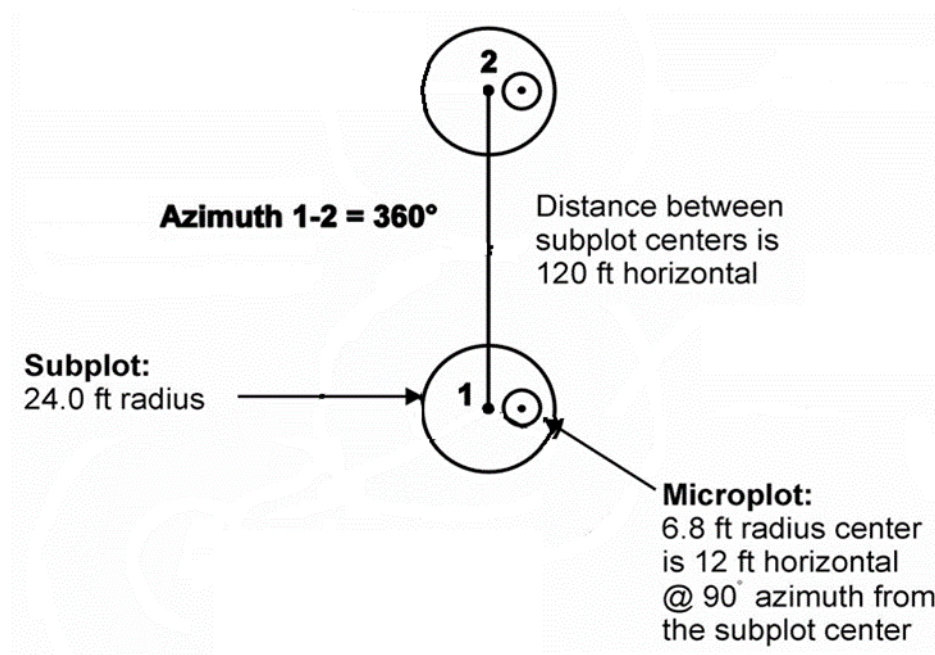


Figure 1+N-WisCFI. WisCFI Phase 2 plot diagram.

0.1+N Plot Setup

Plots will be established according to the regional guidelines of each unit (See Regional Appendix A for plot establishment and/or relocation procedures). 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.

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 PRESENT TREE STATUS = 0 and RECONCILE = 7 to all downloaded trees (i.e., incorrectly tallied at the previous survey).
- Assign PRESENT TREE STATUS = 1 or 2 and RECONCILE codes 7 (cruiser error) to all trees on the new subplot.
- Assign the next TREE RECORD NUMBER for all new trees.

0.2 Plot Integrity

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. **Not applicable in the North.**
- 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).
- Boring trees for age on subplots to determine tree age, site index, stand age, or for other reasons.
- 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. **NRS Note: The use of alternative tools is not applicable.**
- **Toppling of dead trees or saplings.**

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

0.3+N Plot Monumentation

Record a Starting Point (SP) record on all initial installment plots, PIQA plots, and PIQA Special plots. The initial installment plots will include some SK=1 plots that are new and have never been sent to the field or SK=2 plots that were identified as Nonforest in the office and never sent to the field for measurement.

Historical Starting Point Coordinates will not be included in the current Historical data files. It has been determined that we no longer need to carry SP information from previous Cycles into the current Cycle. There will be no requirement to keypunch coordinates or the Starting Point Description if it has been collected during a previous visit. The historical scanned plotsheets will be maintained in Midas to allow for reference if navigation info is required to locate an established plot.

Continue to collect Witness Objects and Reference Trees when the situation warrants. If a Subplot or Microplot location will benefit from having a Witness Object established to assist future crews then be sure to establish a valuable object. See Section A.5.3 to determine if Plot Monumentation is required for a Subplot.

0.3.1N MONUMENT TYPE [MOTY]

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

When collected: Record a Starting Point (SP) for all initial installment, PIQA, and PIQA Special plots. Record a Witness Object or Reference Trees when a situation warrants.

Field width: 1 digit

Tolerance: No tolerance

MQO: At least 99% of the time

Values:

- 1 Starting Point (SP) / Reference Point (RP)
- 2 Witness Object
- 3 No Witness Object available

0.3.2N MONUMENT NUMBER [MO#]

Record the MONUMENT NUMBER for the monument being described. Each plot may have up to eleven monuments, including a Starting Point (SP) / Reference Point (RP).

When collected: MONUMENT TYPE 1, 2

Field width: 2 digits

Tolerance: No tolerance

MQO: At least 99% of the time

Values: 1-11

0.3.3N+WisCFI SUBPLOT NUMBER [S/M#]

Record the code to indicate which SUBPLOT or Phantom Subplot is being monumented.

When collected: Record for each MONUMENT TYPE 1 or 2

Field width: 2 digits

Tolerance: No tolerance

MQO: At least 99% of the time

Values:

- 1 Subplot 1 (PC)
- 2 Subplot 2
- 3 Subplot 3 Not Collected in WisCFI
- 4 Subplot 4 Not Collected in WisCFI
- 5 Phantom Subplot 1
- 6 Phantom Subplot 2
- 7 Phantom Subplot 3
- 8 Phantom Subplot 4
- 9 Phantom Subplot 5
- 10 Phantom Subplot 6
- 11 Phantom Subplot 7

12 Phantom Subplot 8

0.3.4U SUBPLOT / MICROPLOT OFFSET POINT [OFFPT] Not Collected in NRS CORE

0.3.5N WITNESS OBJECT / SP / RP TYPE [WTYPE]

Indicate the type of reference used to monument the SUBPLOT. Choose a Witness Object that is most likely to still be present when the plot is remeasured in the future.

When collected: Record for each MONUMENT TYPE 1 or 2

Field width: 2 digits

Tolerance: No tolerance

MQO: At least 99% of the time

Values:

- | | |
|-----------|---------------------------------------------------------------------------------------------------------------------------|
| 1 | Tree or Sapling |
| 2 | Corner of House /Building (the front side of a home is preferable to the rear, as additions are often added to the rear.) |
| 3 | Electric Meter |
| 4 | Fire Hydrant |
| 5 | Gas Meter |
| 6 | Mailbox |
| 7 | Fence Post |
| 8 | Street Sign |
| 9 | Utility Pole |
| 10 | Sewer / Storm Cover |
| 11 | Sewer / Storm Drain |
| 12 | Street Lamp |
| 13 | Sprinkler Box |
| 14 | Utility Box |
| 99 | Other Object |

0.3.6N WITNESS OBJECT / SP / RP SPECIES [WSPP]

Indicate the species used as a monument.

When collected: Record for WITNESS OBJECT / SP / RP TYPE=1

Field width: 4 digits

Tolerance: No tolerance

MQO: At least 99% of the time

Values: See Appendix 3+N

0.3.7N OBJECT DESCRIPTION [DESC]

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

When collected: Record for WITNESS OBJECT / SP / RP TYPE 2-12 (optional for TYPE 1)

Field width: 240 characters

Tolerance: No tolerance

MQO: At least 99% of the time

Values: Letters, numbers, and special characters

0.3.8N MONUMENT AZIMUTH [AZM]

MONUMENT TYPE = 1 record the MONUMENT AZIMUTH from the Starting Point (SP) / Reference Point (RP) to the center of the subplot.

MONUMENT TYPE = 2 Record the MONUMENT AZIMUTH from subplot center to the center of the WITNESS OBJECT.

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

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

0.3.9N MONUMENT HORIZONTAL DISTANCE [HDIS]

Record the measured HORIZONTAL DISTANCE, to the nearest 0.1 foot, from the center (or corner if monumenting a building) of the MONUMENT TYPE to the corresponding subplot center.

When collected: Record for MONUMENT TYPE 1 or 2
Field width: 5 digits (xxxx.y)
Tolerance: Monument Type 1: +/- 33.0 ft
Monument Type 2: 0000.1 ft. to 0139.9 ft.: +/- 1.0 ft.
0140.0 ft. to 0500.0 ft.: +/- 2.0 ft.
0500.1 ft. to 0999.9 ft.: +/- 3.0 ft.
MQO: Monument Type 1: 99% of the time
Monument Type 2: At least 90% of the time
Values: Monument Type 1: 0000.1 ft. to 9999.9 ft.
Monument Type 2: 0000.1 ft to 0999.9 ft.

0.3.10N MONUMENT DBH / DRC [DBH]

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

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

0.4N GPS Starting Point Variables

Record the latitude and longitude of the SP / RP on the plot sheet and data recorder using the same procedures for collecting SUBPLOT center coordinates. See Regional Appendix G – GPS User's Guide.

When collected: MONUMENT TYPE = 1

GPS Unit Settings, Datum, and COORDINATE SYSTEM

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

0.4.1N SP/RP GPS UNIT [UNIT]

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

NRS Note: If an SP is not required or the GPS coordinates cannot be collected for any reason, enter code 0 for GPS UNIT. The remaining GPS variables for PC are not recorded.

When collected: MONUMENT TYPE = 1

Field width: 1 digit

Tolerance: No errors

MQO: At least 99% of the time

Values:

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

0.4.2N SP/RP GPS ENTRY METHOD [METH]

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

0.4.3N SP/RP GPS DATUM [DATM]

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 (ccnnc)

Tolerance: No errors

MQO: At least 99% of the time

Values:

- NAD83 North American Datum of 1983

0.4.4N SP/RP COORDINATE SYSTEM [COORS]

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

0.4.5N SP/RP LATITUDE DEGREES [NDEG]

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

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

0.4.6N SP/RP LATITUDE MINUTES [NMIN]

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

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

0.4.7N SP/RP LATITUDE SECONDS [NSEC]

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

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

0.4.8N SP/RP LONGITUDE DEGREES [WDEG]

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

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

0.4.9N SP/RP LONGITUDE MINUTES [WMIN]

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

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

0.4.10N SP/RP LONGITUDE SECONDS [WSEC]

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

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

0.5N Plot Data Security Not Collected in WisCFI

0.6N Wilderness (Reserved) Areas Not Collected in WisCFI

0.7N Border States Not Collected in WisCFI

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.

1.0.1N+WisCFI CYCLE [CYCL]

This variable represents the number of times a WisCFI P2/P3 plot has been inventoried.

When collected: All plots

Field width: 2 digits

Tolerance: N/A

MQO: N/A

Values: Downloaded value and preprinted on plot location sheet

1.0.2N SUB-CYCLE [SUBC]

This variable identifies the sub-panels that are being inventoried.

When collected: All plots

Field width: 1 digit

Tolerance: N/A

MQO: N/A

Values: Downloaded value and preprinted on plot location sheet

1.1+N+WisCFI STATE [ST]

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: 55 (Downloaded value and preprinted on plot location sheet)

1.1.1N UNIT [UNIT]

Record the unique code identifying the inventory unit where the plot center is located.

When collected: All plots
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values: See Appendix 1 (Downloaded value and preprinted on plot location sheet)

1.1.2N-WisCFI STATE FOREST PROPERTY CODE [STFORPROP]

Record the unique code identifying the State Forest property where the plot center is located.

When collected: All plots
Field width: 4 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: See Appendix 1 (Downloaded value and preprinted on plot location sheet)

1.2+N COUNTY [CNTY]

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

When collected: All plots
Field width: 3 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: See Appendix 1 (Downloaded value and preprinted on plot location sheet)

1.3+N PLOT NUMBER [PLT#]

Record the identification number, unique within a county, parish, or borough (survey unit in AK), for each plot.

When collected: All plots
Field width: 5 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: 00001 to 99999 (Downloaded value and preprinted on plot location sheet)

1.4+N PLOT STATUS [STAT]

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.

NRS CORE Note: PLOT STATUS code 3 is used when any portion of a plot is considered Nonsampled – possibility of forestland and when PLOT STATUS does not qualify as code 1.

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+N 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 (Downloaded "hidden" value)
- 1 Nonforest plots / conditions are inventoried

NRS Note: Nonforest inventories are not conducted in our region, i.e. NONFOREST SAMPLING STATUS = 1.

1.6 NONFOREST PLOT STATUS Not Collected in NRS

1.7+WisCFI PLOT NONSAMPLED REASON [REAS]

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 WDNR boundary – Entire plot is outside of the WDNR 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. Not Collected in WisCFI
- 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. Not Collected in NRS
- 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. Not Collected in NRS

- 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. **NRS Office Only Value - Contact St. Paul for guidance on when a plot can be recorded as Skipped Visit**
- 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. **Not Collected in NRS**
- 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. **Not Collected in WisCFI**

1.8 NONFOREST PLOT NONSAMPLED REASON **Not Collected in NRS**

1.9+N+WisCFI SUBPLOTS EXAMINED [EXAM]

Record the number of subplots examined. By default, PLOT STATUS = 1 plots have all 2 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 – Utilized during Photo Interpretation in office from photos, maps, etc.
- 2 All two subplots fully described (no assumptions/inferences) – on site field verification. Subplot center does not need to be occupied.

1.10+N+WisCFI SAMPLE KIND [SK]

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: (Downloaded value and preprinted on plot location sheet)

- 1 Initial plot establishment - the initial establishment and sampling of a plot. 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 (PLOT STATUS = 3 and PLOT NONSAMPLED REASON = 02 or 03 from the previous inventory cycle)
- 2 Remeasurement – remeasurement of a national design plot that was sampled at the previous inventory cycle.

- 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. **Contact the Madison office for a new plot number.**

1.10.1NPHASE

This variable indicates the type of plot that is being completed. Phase 2 (P2) represents all plots from the base grid. Phase 3 (P3) plots area a subset of Phase 2.

When collected: All plots

Field width: 1 digit

Tolerance: N/A

MQO: N/A

Values: 2 or 3 (downloaded "hidden" value and preprinted on plot location sheet only)

1.11 PREVIOUS PLOT NUMBER [PRV#]

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+N+WisCFI FIELD GUIDE VERSION

Record the version number of the WisCFI 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: 5.0

1.13+N Current and Previous Date

Record the year, month, and day that the current plot visit was completed as described in 1.13.1 – 1.13.6N. **Previous plot year and month for all remeasurement plots are downloaded/hidden variables used for logic checks in Condition and Tree data.**

1.13.1 YEAR [YEAR]

Record the year that the plot was completed.

When collected: All plots

Field width: 4 digits

Tolerance: No errors

MQO: At least 99% of the time

Values: ≥ 2003

1.13.2 MONTH [MONT]

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 [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

1.13.4 PREVIOUS YEAR [PYEAR]

The year that the plot was previously completed is used as a logic check for recorded condition and tree data.

When collected: All plots
Field width: 4 digits
Tolerance: N/A
MQO: N/A
Values: Downloaded "hidden" value and preprinted on plot location sheet

1.13.5 PREVIOUS MONTH [PMON]

The month that the plot was previously completed is used as a logic check for recorded condition and tree data.

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

1.13.6 PREVIOUS DAY [PDAY] Not Collected in NRS CORE

1.14 DECLINATION (CORE OPTIONAL) Not Collected in NRS

1.15+H HORIZONTAL DISTANCE TO IMPROVED ROAD [RDIS]

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

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– 1.5 chains or less
- 2 101 to 300 ft– 1.5 chains to 4.55 chains
- 3 301 to 500 ft– 4.55 chains to 7.58 chains
- 4 501 to 1000 ft– 7.58 chains to 15.2 chains
- 5 1001 ft to 1/2 mile– 15.2 chains to 40 chains
- 6 1/2 to 1 mile– 40 chains to 80 chains
- 7 1 to 3 miles– 80 chains to 240 chains
- 8 3 to 5 miles– 240 chains to 400 chains
- 9 Greater than 5 miles– greater than 400 chains

1.16+N+WisCFI WATER ON PLOT [WTYP]

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

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 forested swamps, bogs or marshes classified as accessible forest land with standing trees
- 3 Ditch/canal – human-made channels used as a means of moving water, such as irrigation or drainage which are too small to qualify as noncensus water
- 4 Temporary streams
- 5 Flood zones – evidence of flooding when bodies of water exceed their natural banks
- 9 Other temporary water – specify in plot notes (includes Springs)

1.17 QA STATUS [QAST]

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 Certification /practice plot (off grid)
- 5 Botched plot file (disregard during data processing)
- 6 Blind check
- 7 Hot check (production plot)

1.18+WisCFI CREW NUMBER [CRW1, CRW2, CRW3, CRW4, CRW5]

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 (WisCFI -- 15xxxx, 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:

WisCFI 150001 -- 159999

1.18.1NQA SCORE [QASC]

Record the QA score to the nearest tenth of a percent when PLOT STATUS is 1 (Sampled -- at least one accessible forest land condition), 2 (Sampled -- no accessible forest land but at least one nonforest condition), or 3 (Sampled - no accessible forest or nonforest condition) present on plot and QA STATUS is 2 (cold check) or 6 (blind Check). (See Regional Appendix C for additional information about PI and Special plot designation.)

When collected: Plots with PLOT STATUS = 1 or 2 and QA STATUS = 2 or 6.
Field width: 4 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: 000.0 to 100.0

1.18.1.1N QA SCORE CREW NUMBER [PROD1, PROD2, PROD3, PROD4, PROD5]

Record up to 5 crew numbers as assigned to the production field crews associated with the QA SCORE, 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: Plots with PLOT STATUS = 1 or 2 and QA STATUS = 2 or 6.
Field Width: 6 digits
Tolerance: No errors
MQO: At least 99% of the time
Values:

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

1.18.2 NONE OR TWO PERSON PLOT [CRSZ]

Enter a code which indicates that the plot could be completed with either a one person crew or with a two person crew. As a guideline, consider what can be completed safely by an average crewmember or crew.

When collected: All plots where Plot Status (STAT) = 1 or 2

Field width: 1 digit

Tolerance: N/A

MQO: N/A

Values:

- 1 Could be completed by a one person crew
- 2 Should be completed by a two person crew

1.18.3 PLOT SEASON [SEAS]

Enter the code reflecting the best time of year to access and complete this plot. If there are no hindrances (e.g., water, vegetation, remoteness) for completing this plot at any time of year, enter code 3. Do not base your assessment on whether or not the plot is chosen for P2+, P3, PA Regeneration.

When collected: All plots where Plot Status (STAT) = 1 or 2

Field width: 1 digit

Tolerance: N/A

MQO: N/A

Values:

- 1 Winter
- 2 Summer
- 3 Anytime

1.18.4 TRAINING PLOT [TRAN]

Indicate whether the plot is completed by a crew with a new crew member. Plots coded as 1 "training plot" will typically take more time to complete due to explaining, defining, and demonstrating how to collect plot data. Supervisory approval is required in order to code 1 "training plot" outside the normal window allowed for training a new crew member.

When collected: All plots

Field width: 1 digit

Tolerance: N/A

MQO: N/A

Values:

- 0 Standard production plot
- 1 Training plot

1.18.5 DENIED ACCESS REASON [DARE] Not Collected in WisCFI

1.19+N 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.

NRS Note: Every attempt should be made to collect GPS data at plot center. If it is not possible to collect GPS data at plot center, attempt to compute an offset location to PC (see Offset instructions in Appendix G). If this too is not possible, and GPS data is not collected, do not enter either the previous coordinates or the PI coordinates from the plotsheet into the data recorder.

The procedures to enter data into the data recorder when GPS coordinates are not taken are as follows (much of the GPS screen should be left blank.):

- Enter 'GPS Unit' as '0' (GPS coordinates not collected)
- Delete the downloaded value for 'GPS Datum' (DATM)
- Delete the downloaded value for 'Coordinate System' (CSYS)
- Leave all other data item blank

For the standard field plots, if coordinates were not collected, a PLOT NOTE must be entered in the MIDAS PDR Application and on the plotsheet. If it is a QAQC-PI plot, a note is not necessary.

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 unit will use the NAD83 Datum to collect coordinates.

1.19.2+N Collecting Readings

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

NRS Note: Most NRS-FIA Allegros are loaded with LANDMARK CE software and are accompanied with an EMTAC/RIGHTWAY/QSTARZ GPS receiver. When using a combination of the two, the LANDMARK CE software will allow a coordinates file to be created on the Allegro that can auto-populate the MIDAS Starting Point or Plot Center GPS screens. Once the LANDMARK CE software has completed its averaging process, navigate to either the MIDAS Plot Monument or Plot Center GPS screen and Click on Ctrl+K. This will auto-populate the point data into their respective fields.

Soon after arriving at plot center, use the GPS unit to attempt to collect coordinates. If suitable positions cannot be obtained, try again before leaving the plot center.

If it is still not possible to get suitable coordinates from plot center, attempt to obtain them from a location within 200 feet of plot center. Obtain the azimuth and horizontal distance from the "offset" location to plot center. If LANDMARK CE software is used, use the offset function to compute the coordinates of the plot center. If another type of GPS unit is used, 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. Again, if LANDMARK CE software is used, use the offset function to compute the coordinates of the plot center. If another type of GPS unit is used, record the azimuth and horizontal distance as described in Sections 1.19.14 and 1.19.15.

NRS Note: Latitude and Longitude are collected for all new starting points (SP) where a course to plot is being established for the first time. This SP data are recorded in the data recorder. See Section 0.3 and Regional Appendix A for required PDR SP variables.

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

1.19.3+N GPS UNIT [UNIT]

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

NRS Note: If GPS coordinates cannot be collected for any reason, enter code 0 for GPS UNIT. The remaining GPS variables for PC are not recorded. The regional SP coordinates will not be required either but should be transferred from previous plotsheet if present and valid. (See Regional Appendix A for required PDR SP variables.)

When collected: All field visited plots

Field width: 1 digit

Tolerance: No errors

MQO: At least 99% of the time

Values:

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

1.19.4 GPS SERIAL NUMBER [GPS#]

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+N GPS ENTRY METHOD [METH]

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.

NRS Note: GPS ENTRY METHOD is auto-populated in the PDR MIDAS Application as read-only. If the data is transferred electronically it will populate a '1' in this field. If any auto-populated GPS data is keypunched, even after being transferred, a '0' will be populated for GPS ENTRY METHOD.

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 [DATM]

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 (ccnnc)
Tolerance: No errors
MQO: At least 99% of the time
Values: NAD83 North American Datum of 1983

1.19.7+N COORDINATE SYSTEM [COORS]

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

NRS Note: The geographic coordinate system value 1 will be displayed on GPS screen as a Download Value.

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

NRS Note: The former procedure of collecting latitude and longitude as degrees and decimal minutes is no longer applicable. Coordinates will now be collected as degrees, minutes and seconds for latitude and longitude at both SP and PC.

Example: 41° 38.1306 degrees and decimal minutes is converted to degrees minutes and decimal seconds as:

41°

.1306 X 60 = 7.836 or 07.84"

41° 38' 07.84"

1.19.8+N Latitude

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

NRS Note: On a remeasurement plot (SK 2), latitude at PC is remeasured even if the previous value is satisfactory for plot relocation.

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 [NDEG]

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 [NMIN]

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 [NSEC]

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+N Longitude

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

NRS Note: On a remeasurement annual plot (SK 2), longitude at PC is remeasured even if the previous value is satisfactory for plot relocation.

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 [WDEG]

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 [WMIN]

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 [WSEC]

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 Not Collected in NRS

1.19.11 EASTING (X) UTM Not Collected in NRS

1.19.12 NORTHING (Y) UTM Not Collected in NRS

1.19.13+N Correction for "Offset" Location

NRS Note: The following variables, pertaining to the correction for "offset", are used only if the recorded latitude and longitude coordinates do not relate to the plot center and require post correction at the regional office. In the North, most GPS units have program software utilities to calculate plot center coordinates if azimuth and distance are known to plot center.

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 (including LANDMARK CE software) 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 [AZM]

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

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

1.19.15 DISTANCE TO PLOT CENTER [DIST]

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

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

When collected: When GPS UNIT = 2, 3 or 4

Field width: 3 digits

Tolerance: +/- 6 ft

MQO: At least 99% of the time

Values:

000 when coordinates are collected at plot center
001 to 200 when a Laser range finder is not used to determine distance
001 to 999 when a Laser range finder is used to determine distance

1.19.15.1N COORDINATE DIFFERENCE [CDIF]

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

When collected: When GPS UNIT = 2, 3 or 4

Field width: 6 digits

Tolerance:

MQO:

Values: 0-999999

1.19.16+N GPS ELEVATION [ELEV]

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

NRS Note: If GPS coordinates are collected at different location other than PC, no data will be entered into GPS ELEVATION.

When collected: When GPS UNIT = 2 or 4

Field width: 6 digits (1st digit is + or -, last 5 digits are numeric)

Tolerance: No errors

MQO: At least 99% of the time

Values: -00100 to +20000

State	Highest Point	Elevation	Lowest Point	Elevation
Wisconsin	Timms Hill	1,951	Lake Michigan	579

1.19.17 GPS ERROR [ERRS]

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

When collected: When GPS UNIT = 2

Field width: 3 digits

Tolerance: No errors

MQO: At least 99% of the time

Values: 000 - 999

1.19.17.1N GPS PDOP [PDOP]

Record the Position Dilution of Precision (PDOP) value as shown on the LANDMARK CE software to the nearest tenth. When averaging, the software requires a minimum amount of precision to determine whether or not to ignore a positional measurement. The recorded PDOP measures the overall accuracy of measurements.

Note: If the GPS UNIT does not display this value, enter 0.0.

When collected: When GPS UNIT = 2
Field width: 2 digits (x.y)
Tolerance: No errors
MQO: At least 99% of the time
Values: 0.0, 0.1 to 8.0

1.19.18 NUMBER OF READINGS [READ]

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

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

1.19.19 GPS FILE NAME (CORE OPTIONAL) Not Collected in NRS

1.20 MACROPLOT BREAKPOINT DIAMETER (CORE OPTIONAL) Not Collected in NRS

1.21+N 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. Others may find this information helpful when checking or processing the plot data, or even when re-establishing the plot during the next inventory cycle. The value of good notes cannot be overemphasized.

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

1.21.1N SAFETY [SAFE]

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

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

When collected: All plots. If CONDITION NONSAMPLED REASON = 3 then SAFETY = 1 is required

Field width: One digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

- 0 No safety concern
- 1 Safety Concern(s) Present (Ctrl-E to note the specific concern)

Potential safety concerns include but are not limited to:

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

1.21.1.1N SAFETY DESCRIPTION [SDESC]

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

When collected: SAFETY = 1

Field width: 2000 characters

Tolerance: No errors

MQO: At least 99% of the time

Values: English words or phrases that describe safety concerns on the plot.

2.0+WISCFI CONDITION CLASS

The WisCFI plot is a cluster of two 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+N+WisCFI 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 WisCFI purposes. This is the area where most of the data collection is conducted. Additionally, nonforest land is sampled in some areas of special interest.

NRS CORE Note: Whenever Accessible Forestland exists on a subplot, delineation is required between all other CONDITION CLASS STATUSes. If the plot consists only of CONDITION CLASS STATUSes 2, 3 or 4, and for remeasure plots also consisting only of CONDITION CLASS STATUSes 2, 3, or 4 during the previous inventory, then no delineation is required and the CONDITION CLASS STATUS at plot center will be recorded for the entire plot. If the plot consists only of CONDITION CLASS STATUSes 2, 3, or 4, delineation is required on any accessible Nonforest subplot where Accessible Forestland existed during the previous inventory. However, if no Accessible Forestland exists, but there is a Nonsampled condition, CONDITION CLASS STATUS 5 will be recorded for the entire plot. **WisCFI Note:** WisCFI will recognize all condition class statuses on all subplots including multiple Status 2 conditions based on PRESENT NONFOREST LAND USE.

PLOT STATUS code 3 is used when any portion of a plot is considered Nonsampled – possibility of forestland and when PLOT STATUS does not qualify as code 1.

Use the pre-printed plot diagram to illustrate the other Nonforest land uses not recorded. The plot diagram is useful for plot relocation during the next cycle.

In some cases it may be necessary to visit plots that have been partially denied access in order to verify that no accessible forestland exists on the accessible portions of the plot. If the accessible portion of the plot does contain accessible forest, the plot will receive a PLOT STATUS = 1. If no accessible forestland is present on the plot and the denied access portion has the possibility of forestland, the plot will receive a PLOT STATUS = 3.

NRS CORE Note: If the previous crew's data can be justified and is correct then we would like to keep condition data consistent over time. Record the previous crew's condition data for RESERVED STATUS, FOREST TYPE, REGENERATION STATUS, and PHYSIOGRAPHIC CLASS. Adjust STAND AGE and STAND SIZE CLASS to reflect growth changes. The previous crew's calls are printed on the plot sheet.

2.1.1.0N-WisCFI Using Status 5 (Out of State Forest) Land to Make Minimum Width and Size of a Condition.

When a non-qualifying (< 120' wide, but at least 120' long) strip of State Forest is bordered by Status 2 State Land and Status 5 (Figure 2N-WisCFI), the Status 5 land can be used to make the minimum 120' and 1 acre.

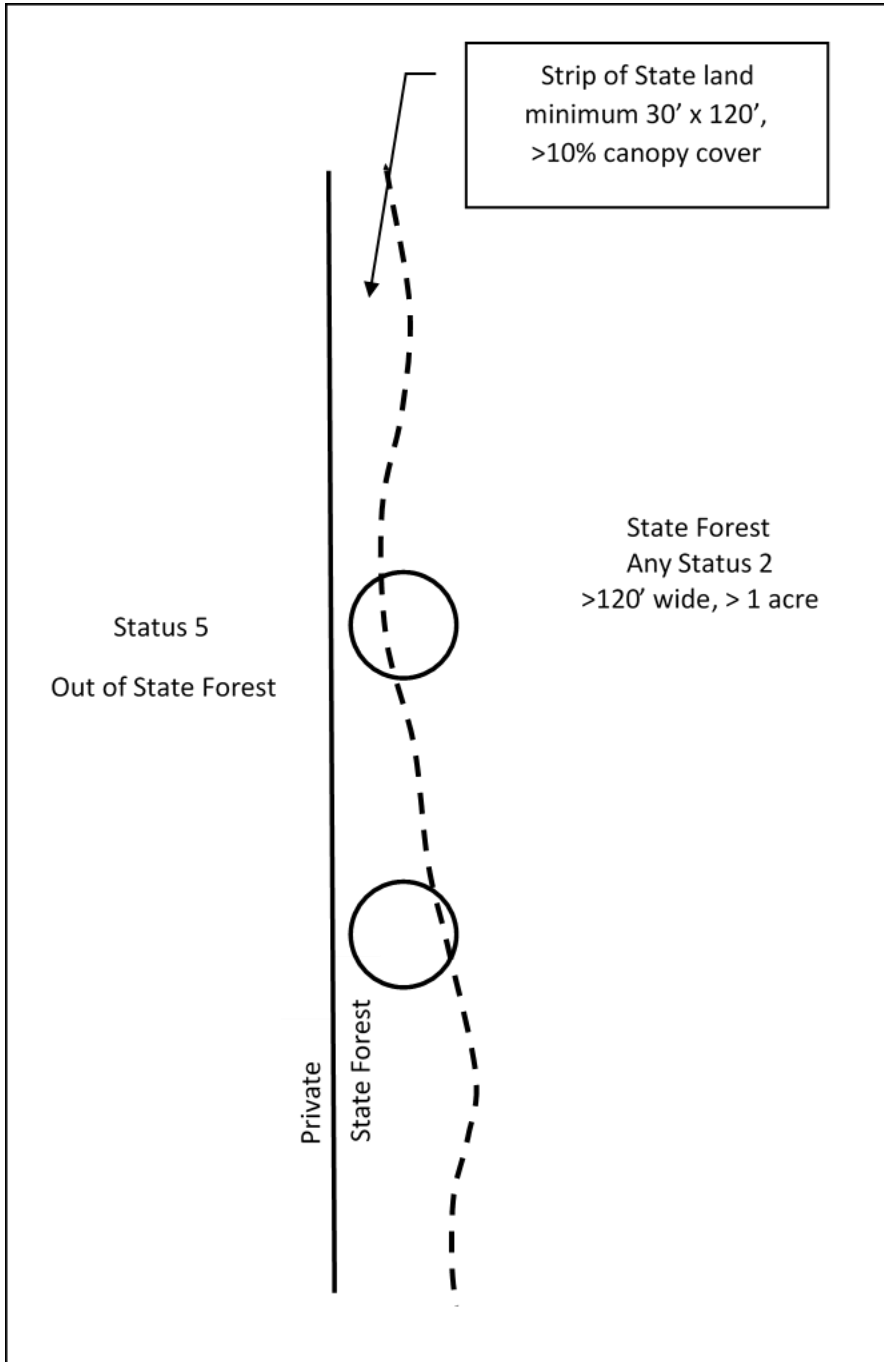


Figure 2N-WisCFI.

For example, in Figure 3N-WisCFI, there is a strip of State Forest Aspen Saplings between qualifying Status 2 Marsh (State Forest) and Status 5 Private lands. In this instance the Status 5 forestland can be used to make a minimum 120' and 1 acre in size for the strip of Aspen saplings to qualify as its own condition.

Using the Status 5 to make the minimum requirements of the Aspen, this plot would have 2 conditions:

1. COND 1, Status 1, FTYP = 901, STSZ = 1
2. COND 2, Status 2, NFLU = 42 (wetland)

And 1 boundary: a boundary along the dashed line on points 1 and 2 delineating the Status 2 marsh.

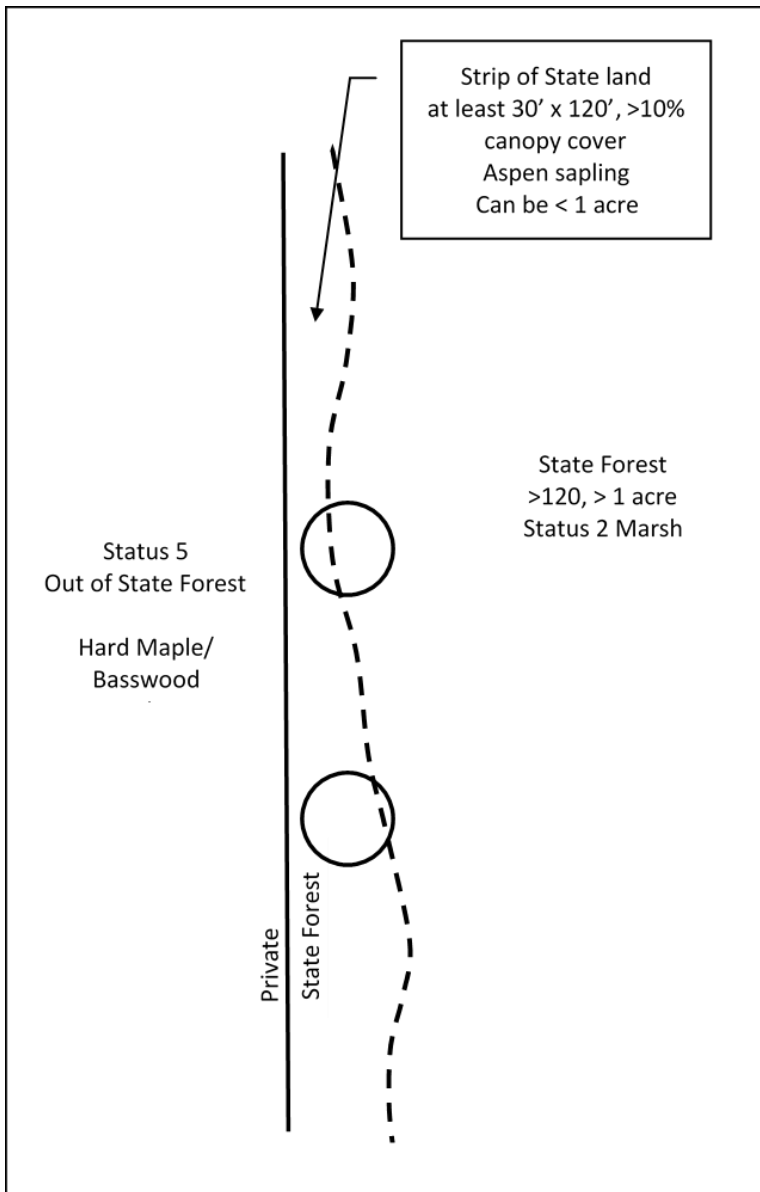


Figure 3N-WisCFI.

Figure 4N-WisCFI shows the same situation as Figure 3N-WisCFI, but the subplots also have a boundary with the Status 5 area.

Using the Status 5 again to make the minimum requirements of the Aspen, this plot would have 3 conditions:

1. COND 1, Status 1, FTYP = 901, STSZ = 1
2. COND 2, Status 5,
3. COND 3, Status 2, NFLU = 42 (wetland)

And 2 boundaries:

1. A boundary along the solid line on points 1 and 2 delimiting the Status 5 area.
2. A boundary along the dashed line on Point 2 delineating the State Forest Status 2 lands.

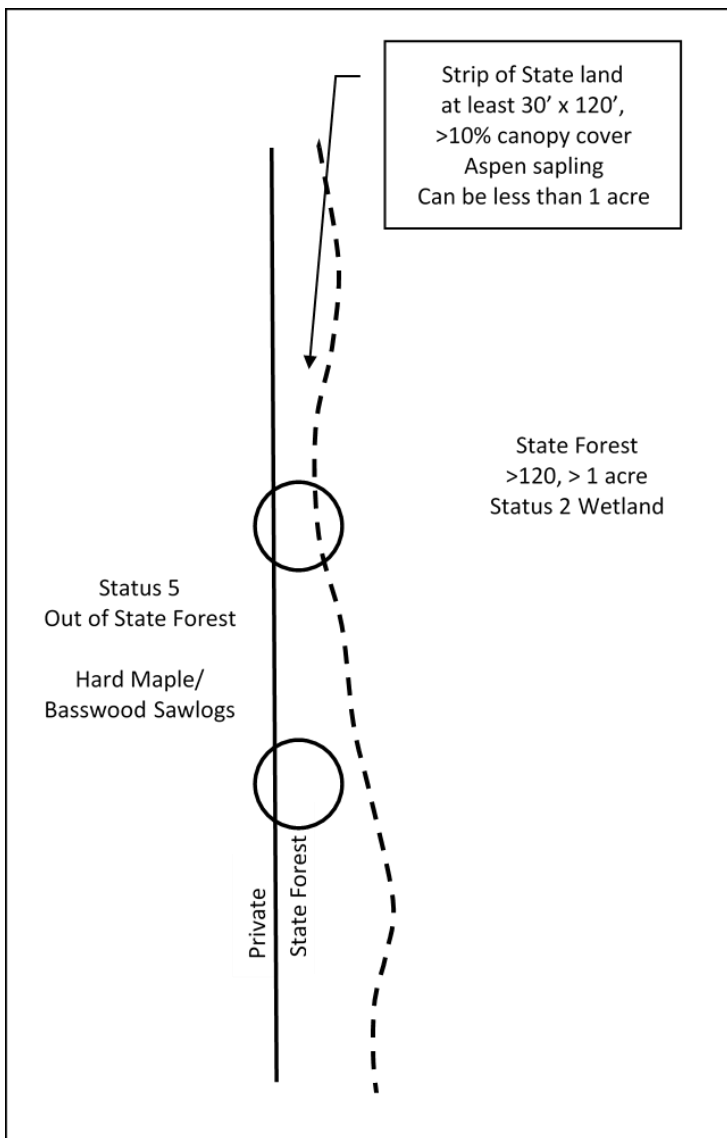


Figure 4N-WisCFI.

2.1.2+WisCFI 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 Not Collected in WisCFI
2. OWNER GROUP Not Collected in WisCFI
3. FOREST TYPE
4. STAND SIZE CLASS
5. REGENERATION STATUS
6. TREE DENSITY

NRS CORE Note: In order to track area of accessible forest land, all subplots with accessible forest land -- in either the current or previous cycle -- will be occupied and all CONDITION CLASS STATUS and all PRESENT NONFOREST LAND USE will be defined and mapped.

WisCFI Note: Recognizing multiple non-forest land use conditions IS REQUIRED on all subplots regardless of the presence or absence of any Status 1 conditions.

On subplots with no accessible forest land the use of imagery, past cluster maps, crew notes and/or adjacent ground observation is permissible to determine Condition Class Status(es) and/or Present Non-forest Land Use(s). Boundaries between multiple Condition Class Statuses and/or Present Non-forest Land Uses may also be estimated using the above methods.

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 Not Collected in NRS CORE

2.2 Condition Class Status Definitions

2.2.1+N 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 specifically intended to prevent normal tree regeneration and succession, such as regular mowing, intensive grazing, or recreation activities.

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

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

NRS Note: When evaluating a condition for the 10 % canopy cover threshold required for forest land:

- Evaluate the condition based on observations on the day the plot is visited without taking into account how the land may be used in the future.
- Exclude from consideration any missing canopy cover (LIVE PLUS MISSING CANOPY COVER) that resulted from the most recent land use conversion.
 - Example pond: A beaver dams up a creek killing a stand of timber and creating a STATUS 3 pond. When the dam falls apart, the pond drains and the area starts to revert back to forest - do not count the trees that died as a result of the conversion to the pond.
- The Primary land use must be forest.
 - Example yard: The primary land use of a maintained backyard with canopy cover of 90% would be STATUS 2 nonforest / developed. All canopy cover originating from this area would not count towards the forest land threshold.
- When dual land uses are present in the condition only consider live canopy cover. Such areas exist where regeneration or the overall lifespan of the potential forested condition is limited by the fact that there are two competing land uses present.
 - Example grazing: A potential forested condition that is heavily grazed by domestic animals. In such a case the presence of the animals may increase tree mortality or prevent successful natural regeneration after tree mortality or harvest.
 - Example water levels: The mean high water mark associated with some bodies of water may fluctuate from year to year or even decade to decade depending on rain fall or various activities such as dams. In such cases during periods of low water a forest might get established one year only to be flooded out a few years later,
 - Example wildlife management: An area is managed for grouse habitat through the use of various forms of timber stand improvement (TSI) or prescribed fire.

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.

NRS Note: See Section 2.4 for more guidance dealing with strips less than 120 feet wide.

When a forest land condition encroaches into a nonforest land condition, the border between forest and nonforest is often a gradual change in tree cover with no clear and abrupt boundary. In addition, it may be difficult to determine exactly where the forested area meets the minimum cover criteria and where it does not. For these situations, determine where the land clearly meets the 10 percent minimum canopy cover, and where it clearly is less than required cover; divide the

zone between these points in half, and determine the side of the zone on which the subplot center is located. Classify the condition class of the subplot based on this line (Figure 5), using the class criteria above.

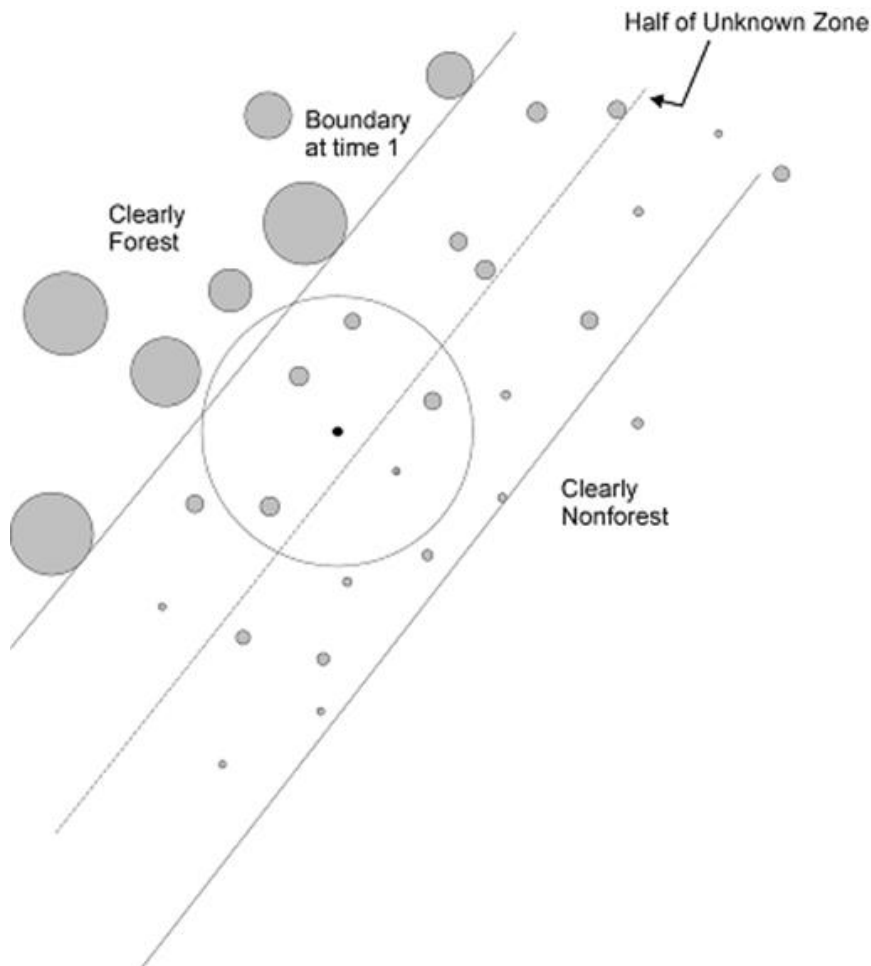


Figure 5. Example of classifying the condition class of the subplot in a transition zone with forest/nonforest encroachment.

For example, at measurement time 1, a clear and distinct boundary existed between the forest and nonforest land condition classes. At time 2, however, there now exists a zone of regeneration or small-diameter trees between the previous forest condition and where the nonforest clearly remains. If the zone of encroachment is clearly forest where it meets the nonforest, classify the entire zone as forest. If the zone is clearly nonforest up to the original stand, call it all nonforest. If the encroachment or transition zone is not clearly stocked where it meets the nonforest, determine where it is clearly forest and where it is clearly nonforest; divide this zone in half, and classify the entire subplot based on which side of the line the subplot center falls.

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

Indistinct boundary due to the condition minimum-width definition – Do not subdivide subplots where a condition class may change due only to the forest vs. nonforest minimum width (120.0 feet) definition. Although the point where the definition changes from forest to nonforest creates an invisible “line” between conditions, this definitional boundary is not distinct and obvious. See Figure 6 and Figure 7. 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.

NRS Note: The definitional boundary concepts described in Figure 6 and Figure 7 are not limited to Forest / Nonforest boundaries; they apply to any two conditions.

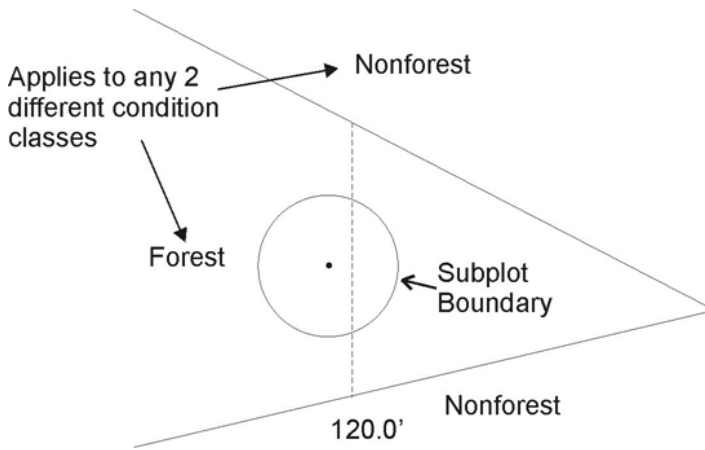


Figure 6. Forest condition narrows within a nonforest land condition. Examine the location of the subplot center in reference to the approximate line where the forest narrows to 120.0 ft wide. In this example, the entire subplot is classified as forest.

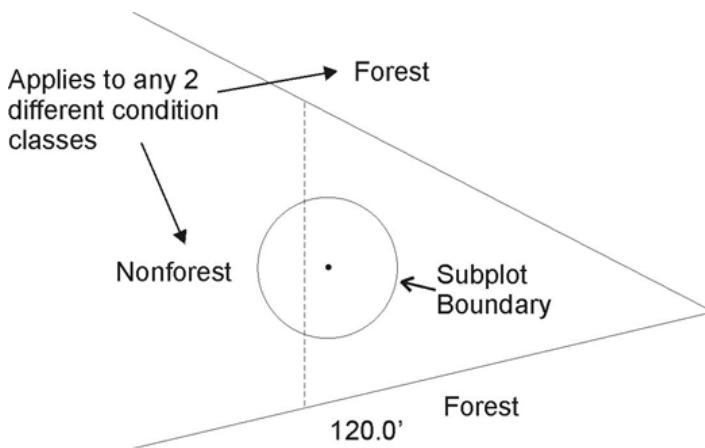


Figure 7. Nonforest land condition narrows within a forest condition. Examine the location of the subplot center in reference to the approximate line where the nonforest narrows to 120.0 ft wide. In this example, the entire subplot is classified as forest.

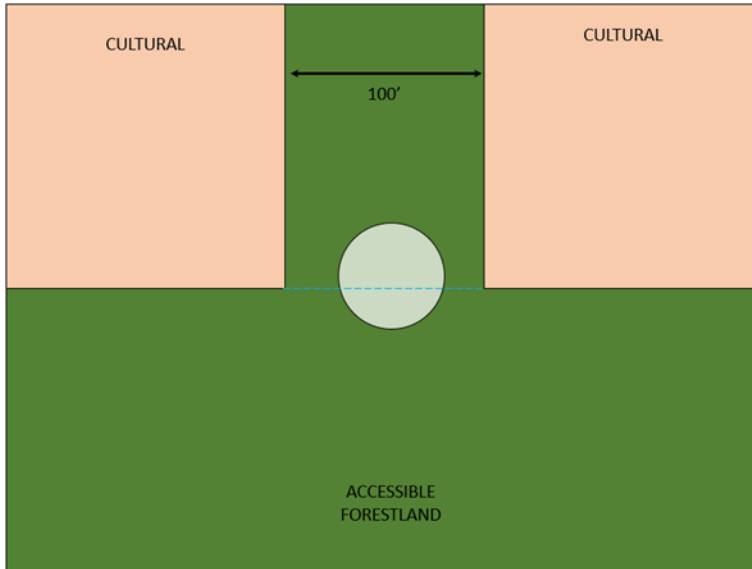


Figure 7.aN. In the event of a finger of trees that extends out from Accessible Forestland and measures less than 120 feet wide, if a distinct and obvious boundary can be identified, record a Boundary on the Subplot. For P2 plots, trees would only be measured on the forested side of the boundary. For Urban plots, all trees would be measured and reflect their respective Condition depending on what side of the boundary they reside.

In order to determine if there is a distinct and obvious boundary, identify if a projected straight line can be extended from an obvious boundary that is present on the ground (even if the present boundary isn't being mapped). If there is not a distinct and obvious boundary, refer back to Figure 6 and Figure 7 to determine the SUBPLOT STATUS.

For the Figure above, a distinct and obvious boundary is present to the east and to the west of the finger so a boundary can be established on this subplot.

2.2.2+N 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.

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

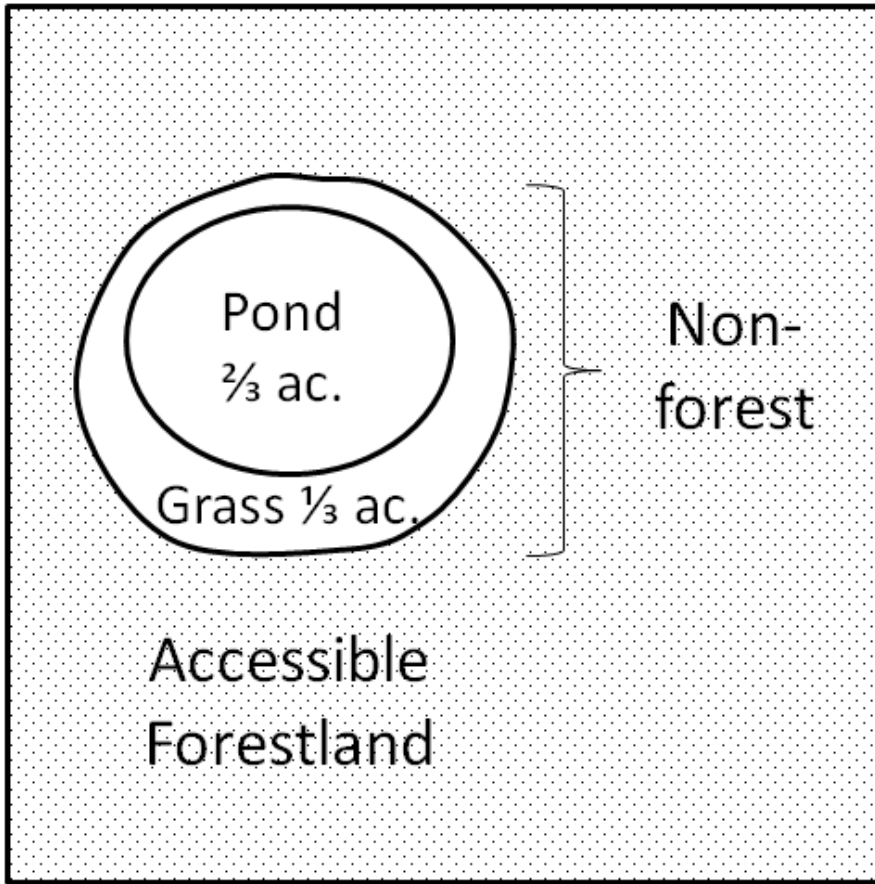


Figure 7.bN. Neither the pond nor the grass can independently qualify as a Status 1, 3, or 4 but combined together they are an acre in size. Since Nonforest Land is defined as any land (at least 120' and an acre in size) within the sample that does not meet the definitions of Accessible Forest Land, Noncensus Water, or Census water, the white area is defined as Status 2 (Nonforest Land).

If the combined area of the pond and grass were < 1 acre in size, the white area would be considered an inclusion within the forestland and be classified as Status 1 (Accessible Forest Land).

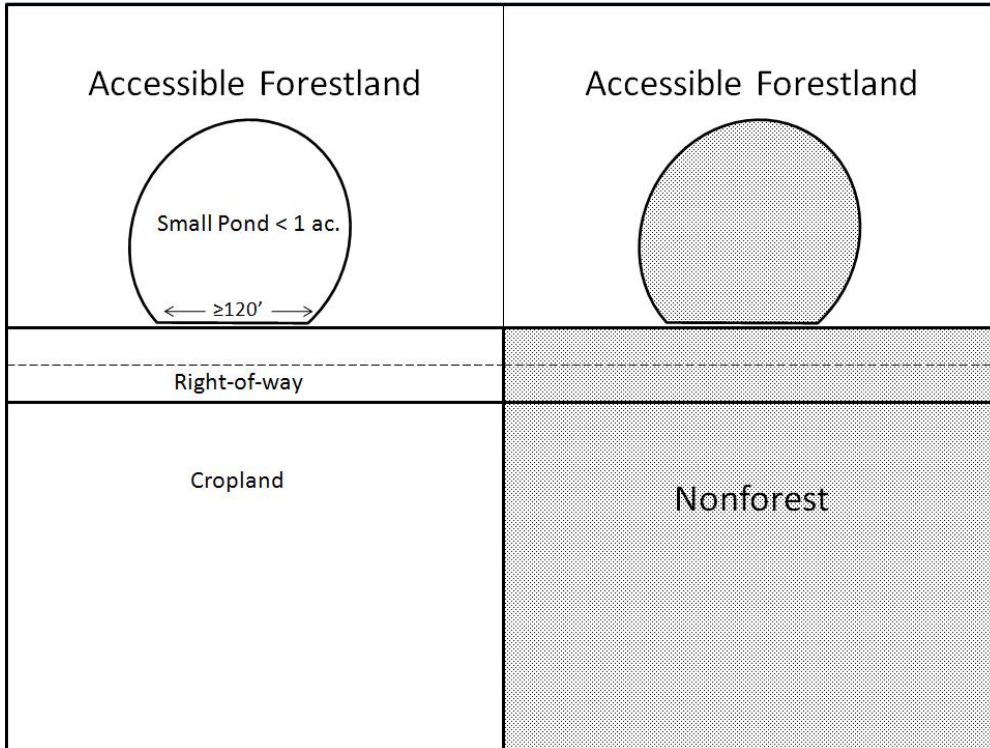


Figure 7.cN. The above figure displays the delineation of the plot area on the left and the assigned Condition Class of the same plot area on the right. The small pond does not qualify as a Status 1, 3, or 4 but shares a 120' boundary with the road and cropland. This shared 120' boundary allows the area of the pond to be combined with the road and cropland. In which case, the pond, the road, and the cropland are classified as Status 2 (Nonforest Land).

If the small pond did not share this 120' shared boundary with the road and cropland the small pond would be considered an inclusion within forestland and be classified as Status 1 (Accessible Forest Land).

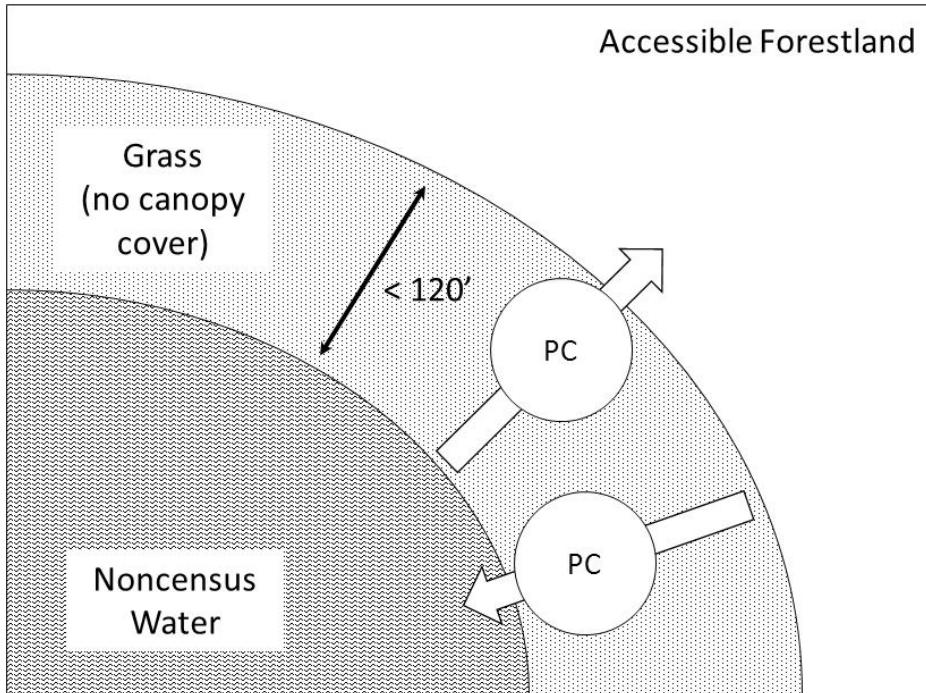


Figure 7.dN. A questionable area, in this case nonstocked grass, falls between two defined conditions. The entire questionable area is defined at PC by whichever existing status is closest. Once it is defined at PC all subplots that fall within the questionable area are assigned the same condition.

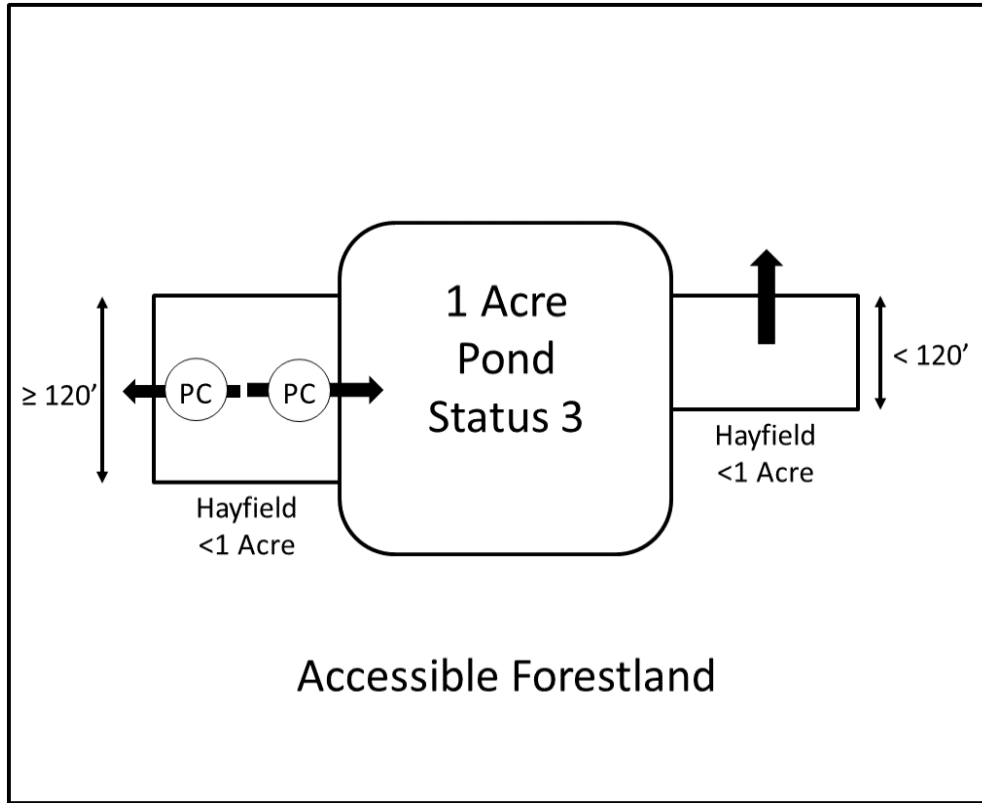


Figure 7.eN. Where the hayfield is too small to stand alone as its own condition, that area would be defined by the condition status nearest PC, provided the hayfield shares at least a 120 ft. boundary with that condition. If the hayfield does not share a 120 ft. boundary the adjacent condition, it will be considered an inclusion within the surrounding condition.

2.2.3+N 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.

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

2.2.4+N 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).

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

2.2.5+N 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.

NRS CORE Note: Reference Section 2.1.1, NRS Note, when determining if a separate condition is defined under these guidelines.

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+N+WisCFI Forest Land

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

Attributes where a change causes a separate condition class

2.5.1	RESERVED STATUS Not Collected in WisCFI
2.5.2	OWNER GROUP Not Collected in WisCFI
2.5.3	FOREST TYPE
2.5.4	STAND SIZE CLASS
2.5.5	REGENERATION STATUS
2.5.6	TREE DENSITY

Ancillary – changes do not delineate a new condition class

2.4.3	FOREST LAND CONDITION STATUS CHANGE
2.5.7	OWNER CLASS Not Collected in WisCFI
2.5.12	RESERVED AREA NAME Not Collected in WisCFI
2.5.13	ARTIFICIAL REGENERATION SPECIES
2.5.14	STAND AGE
2.5.15	DISTURBANCE (up to 3 coded)
2.5.16	DISTURBANCE YEAR (1 per disturbance)
2.5.21	TREATMENT (up to 3 coded)
2.5.22	TREATMENT YEAR (1 per treatment)
2.5.27	PHYSIOGRAPHIC CLASS
2.5.27.1N	PRODUCTIVITY STATUS
2.5.28	COVER CLASS
2.5.29+N	PRESENT NONFOREST LAND USE (for the first CONDITION CLASS STATUS 2 encountered as well as any additional IF the area was converted from accessible forest land condition class to nonforest land since last inventory).
2.5.37N	PRIVATE OWNER INDUSTRIAL STATUS Not Collected in WisCFI
2.5.30	CANOPY COVER SAMPLE METHOD
2.5.31	LIVE CANOPY COVER
2.5.32	LIVE PLUS MISSING CANOPY COVER
2.5.33	CURRENT AFFORESTATION CODE
2.5.34	PREVIOUS AFFORESTATION CODE
2.5.35	TOTAL STEMS
2.5.36	CHAINING CODE

NRS CORE Note: PRESENT NONFOREST LAND USE is recorded on all plots that are either entirely nonforest or contain both a forested and a nonforested condition.

2.3.2 Nonforest Land **Not Collected in NRS CORE**

2.4+N+WisCFI Delineating Condition Classes Differing In Condition Class Status:

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

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

Within a nonforest land condition class, forested areas or linear strips of trees less than 1.0 acre in size and less than 120.0 feet in width are considered part of the nonforest land condition class **and are considered inclusions**.

Five exceptions to these size and width requirements apply:

2.4.0.1 Developed nonforest land condition:

human-caused nonforest land condition classes such as homes or cabins that are less than 1.0 acre in size and 120.0 feet in width and are surrounded by forest land. There are three kinds of developed nonforest land conditions that do not have to meet area or width requirements (Figure 8).

2.4.0.1.1a Improved roads:

paved roads, gravel roads, or improved dirt roads regularly maintained for long-term continuing use. Unimproved traces and roads created for skidding logs are not considered improved road

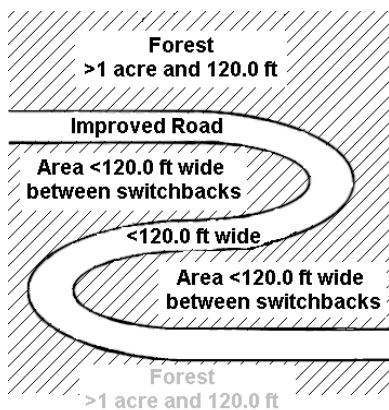


Figure 8. Example of a switchback road. All the cross-hatched area is forest and the improved road is a nonforest condition.

NRS Note: Improved roads may contain restricted access such as gates or berms. Indications that roads are NOT regularly maintained may include long-term evidence of unrepaired gullies, washouts, deep ruts, blowdowns, or the establishment of vegetation on the road bed that would restrict normal vehicle traffic.

2.4.0.1.2b 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.

NRS Note: Rights-of-way that do not exclude other existing nonforest land uses such as cropland or pasture shall not be classified as rights-of-way. A power line that crosses a pasture at least 1 acre in size and 120 feet in width would be classified as pasture because there is no maintenance under the power line to preclude the existence of the pasture. Similarly, if a power line passes through accessible forestland, but is not maintained, the power line would not be recognized as a nonforest Condition Status because it does not preclude the existence of the accessible forestland.

Trees that are growing into live power lines create an unsafe work environment and must be considered as part of a hazardous condition.

2.4.0.1.3c 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.

NRS Note: Intense human activity such as developed campgrounds would be considered nonforest. However, recreation trails used for snowmobiling, skiing, biking, or hiking would be considered an inclusion in the surrounding condition unless the trail is considered highly developed as evidenced by permanent surfacing with concrete, asphalt, or structural wood throughout. Shooting lanes and other areas cleared in association with hunting are also considered an inclusion in the surrounding condition.

NRS Note: Improved roads, R.O.W., and noncensus water that are less than 120.0 feet in width do not necessarily break up a forest condition that are between "switchbacks" as shown in Figure 8. Other regional variations of the "switchback" rule can be found in Regional Appendix C. In other situations as shown in Figure 9.b+N, where there is an improved R.O.W, development or noncensus water, a strip of forest land may have minimum width of 30.0 feet and minimum length of 120.0 feet as long as there is "qualifying" accessible forest land that lies across from the nonforest strip. Since the forest strip cannot be delineated as its own condition, the condition variables are determined from the "qualifying" accessible forest land.

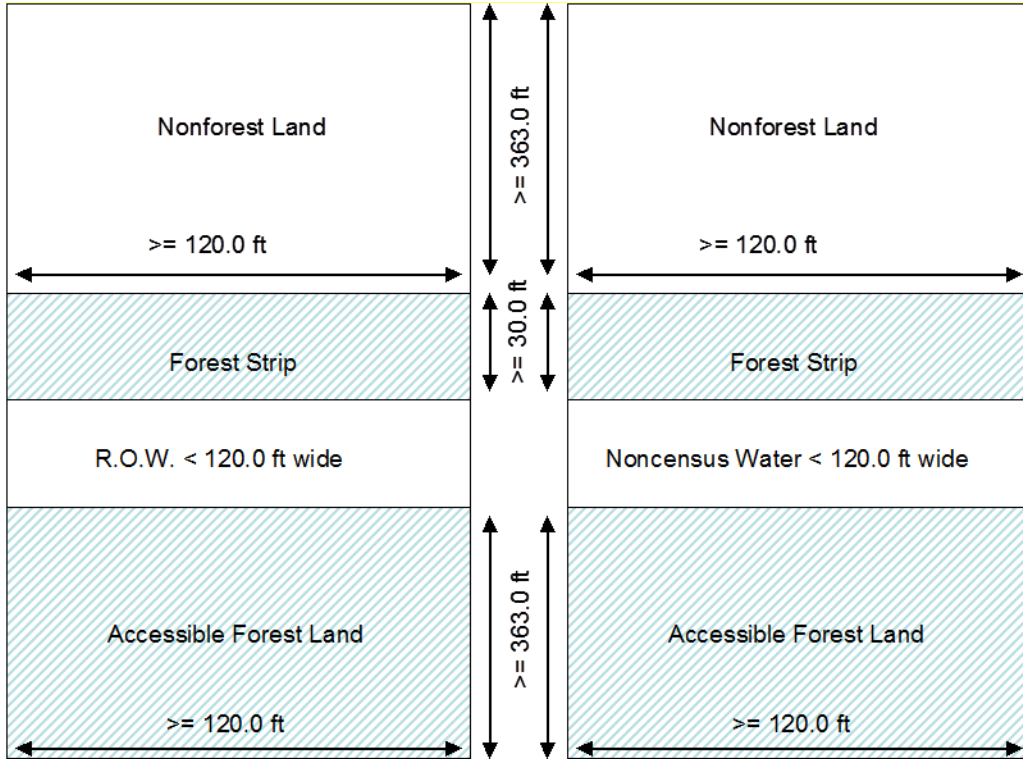


Figure 8.aN. Example of nonforest and forest strips when the nonforest strip is developed (e.g., R.O.W or areas with structures), or noncensus water. Otherwise, see Figure 9.b+N.

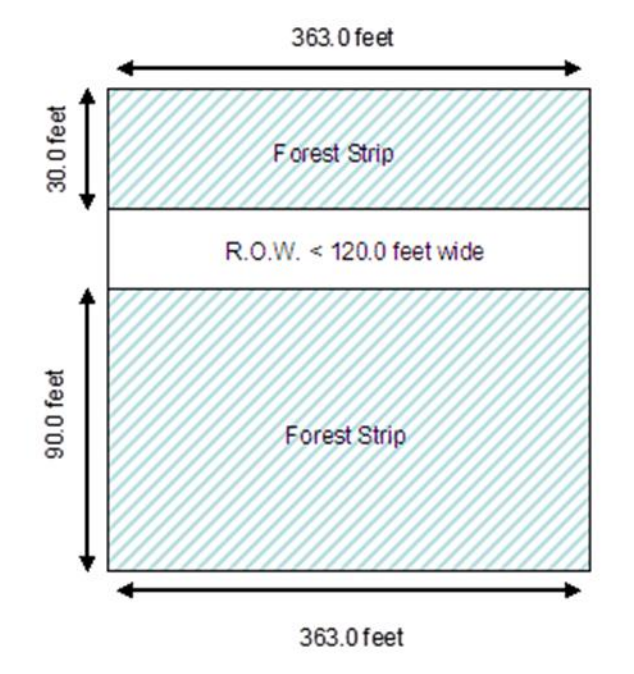


Figure 8.bN. Two forest strips exist on either side of a R.O.W. The R.O.W is its own condition, however, a developed condition can be jumped if less than 120.0 ft in width. The width of the R.O.W cannot be used to measure the overall width of the forest. If the

combined forest strips measure to be at least 120 ft in width and 363 ft in length, then the combined strips can be defined as accessible forest land.

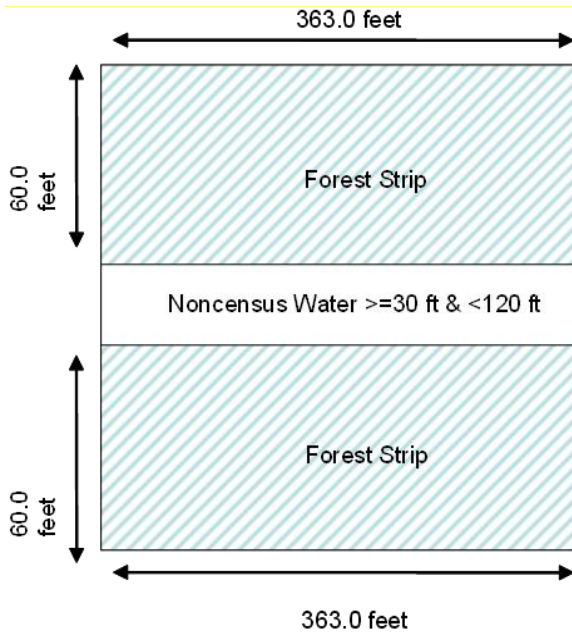


Figure 8.cN. Two forest strips exist on either side of noncensus water. The noncensus water is its own condition, however, noncensus water can be jumped if less than 120.0 ft in width. The width of the noncensus water cannot be used to measure the overall width of the forest. If the combined forest strips measure to be at least 120 ft in width and 363 ft in length, then the combined strips can be defined as accessible forest land.

NRS Note: The preceding two illustrations show a procedure to combine two forest strips in order to achieve the minimum width and acreage for accessible forestland. This is in contrast to Figure 8.aN which shows accessible forest land (i.e., 1 acre and 120.0 ft) adjacent to the nonforest “developed” strip or noncensus water. In both figures, the width of the nonforest condition is not used to measure overall width since these represent a separate CONDITION CLASS STATUS. As in Figure 8.aN, a forest strip must be at least 30.0 feet in width. Strips of trees less than 30.0 feet in width are treated as inclusions of the adjacent nonforest condition when the adjacent condition is nonforest. Strips of trees less than 30.0 feet in width are treated as inclusions in the adjacent forested condition when the adjacent condition is accessible forestland. This also holds true if the adjacent forest land is of a different forest type than the strip.

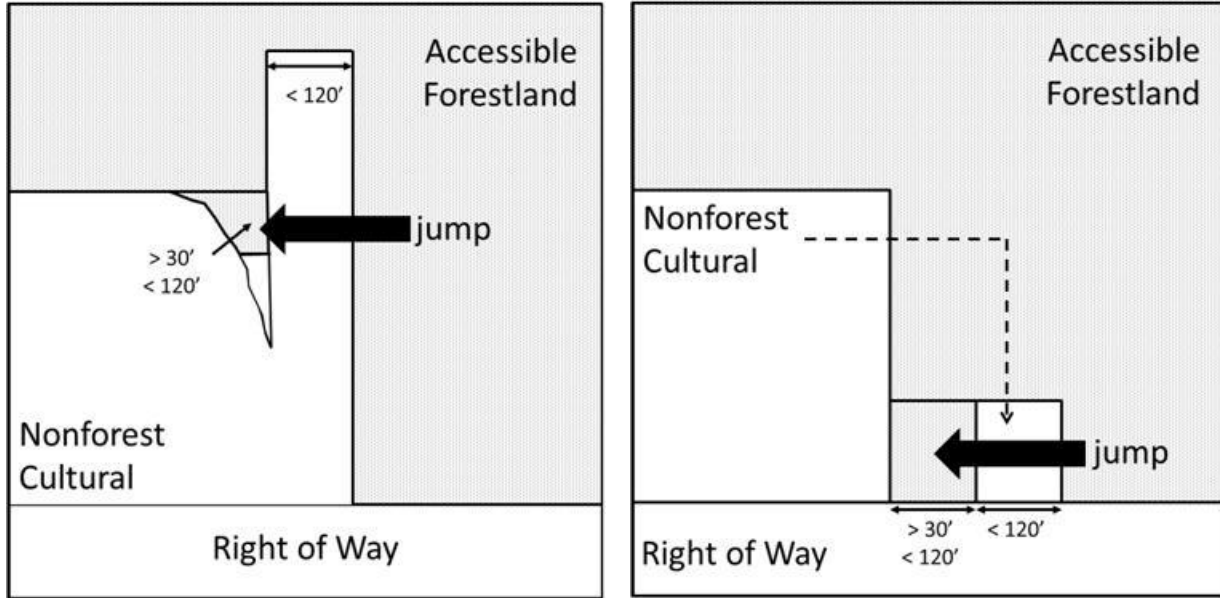


Figure 8.dN.

Figure 8.eN.

NRS Note: In Figure 8.dN and Figure 8.eN the target area for the jumping rule does not need to be distinct from any other area that qualifies as accessible forestland without the use of the jumping rule. As long as the target area is at least 30 ft. by 120 ft., the jumping rule may be applied even if portions of this area are incorporated into adjacent defined accessible forestland.

2.4.0.2 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.

2.4.0.2.1a 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.

See Figure 9.aN.

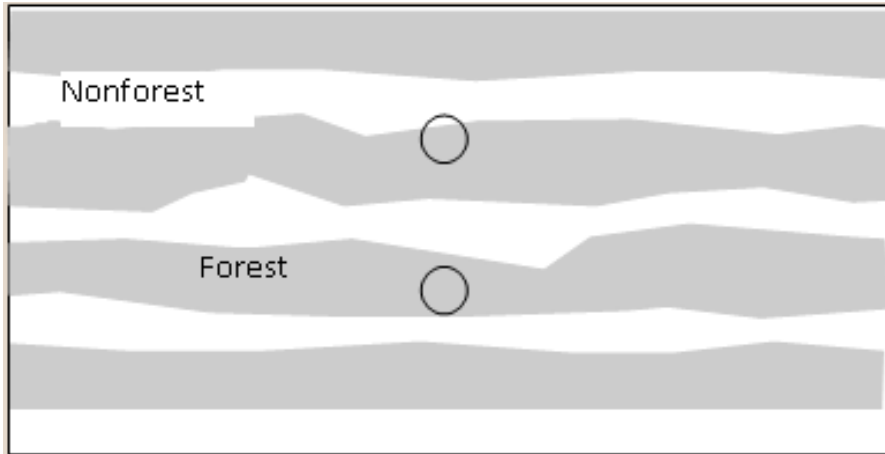


Figure 9.aN-WisCFI. Entire plot area consists of strips of forest and nonforest land. None of the strips meets the 120 ft minimum width to qualify as a separate land use and the nonforest strips are not developed nonforest conditions. In this example, the entire area is classified as forest since the sum of the areas occupied by the forest land use exceeds the sum of the nonforested area in this example.

2.4.0.2.2b Two alternating strips:

For two alternating strips of forest and nonforest between two qualifying areas of nonforest land and forest land, see Figure 9.b+N. Figure 9.b+N 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. If either strip of land is less than 30.0 feet wide, then the strip is treated as inclusion of the surrounding or adjacent condition. Note: The nonforest strip in Figure 9.b+N is not “developed” as described in Exception 1 and shown in Figure 8aN. See Regional Appendix C for more regional Figure 9.b+N illustrations.

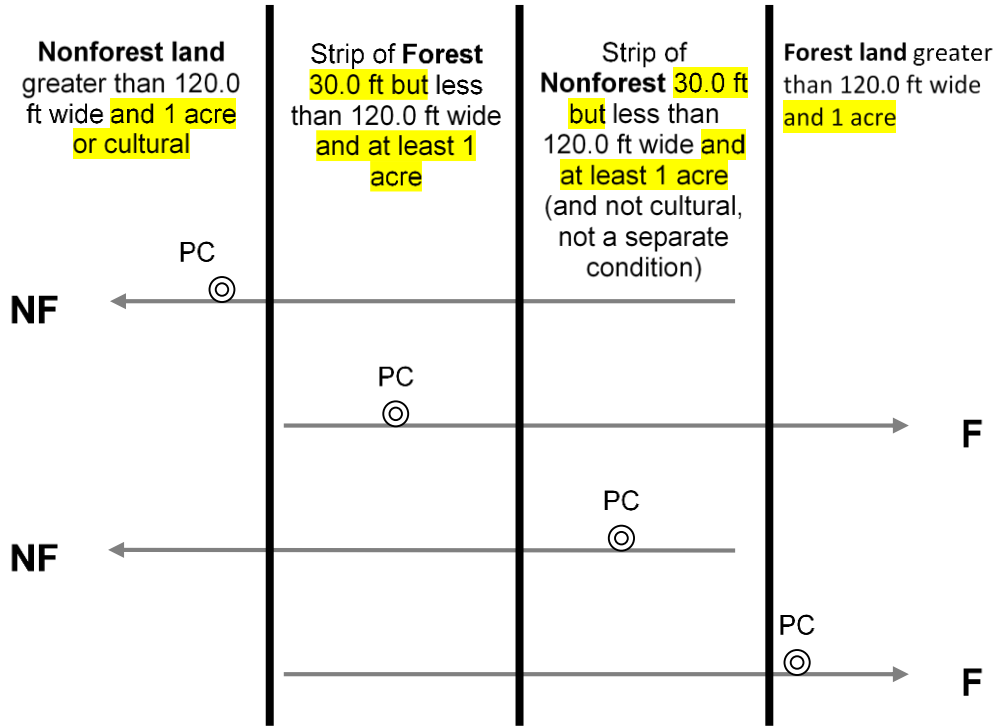


Figure 9.b+N. Example of alternating strips of forested and nonforested conditions (that is neither a developed feature as indicated in “Exception 1” nor linear noncensus). PC is the plot center (center of subplot 1) and the strips are treated as either F or NF based on this location.

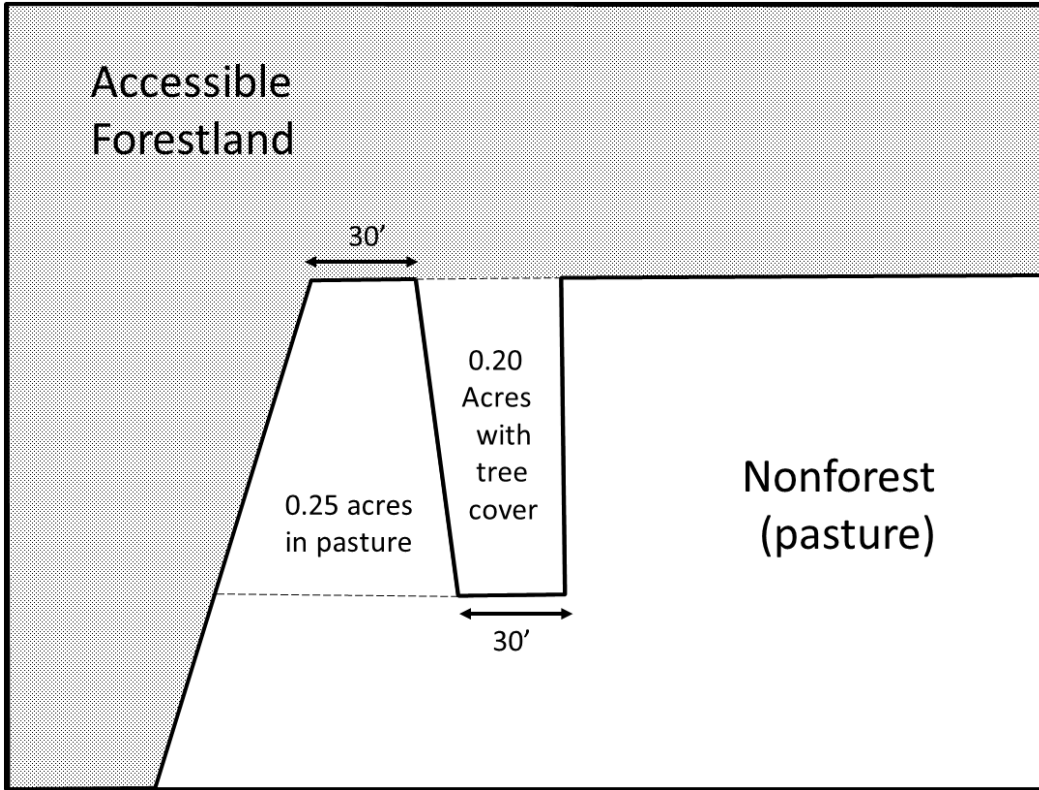


Figure 9.cN. When determining the acreage of a strip in order to qualify for Figure 9.b+N do not include associated areas that are not part of the strip. Neither of the strips meet the size requirements for Figure 9.b+N. In such cases the area of the largest strip will dictate what both strips are classified as; in this case they are treated as NF.

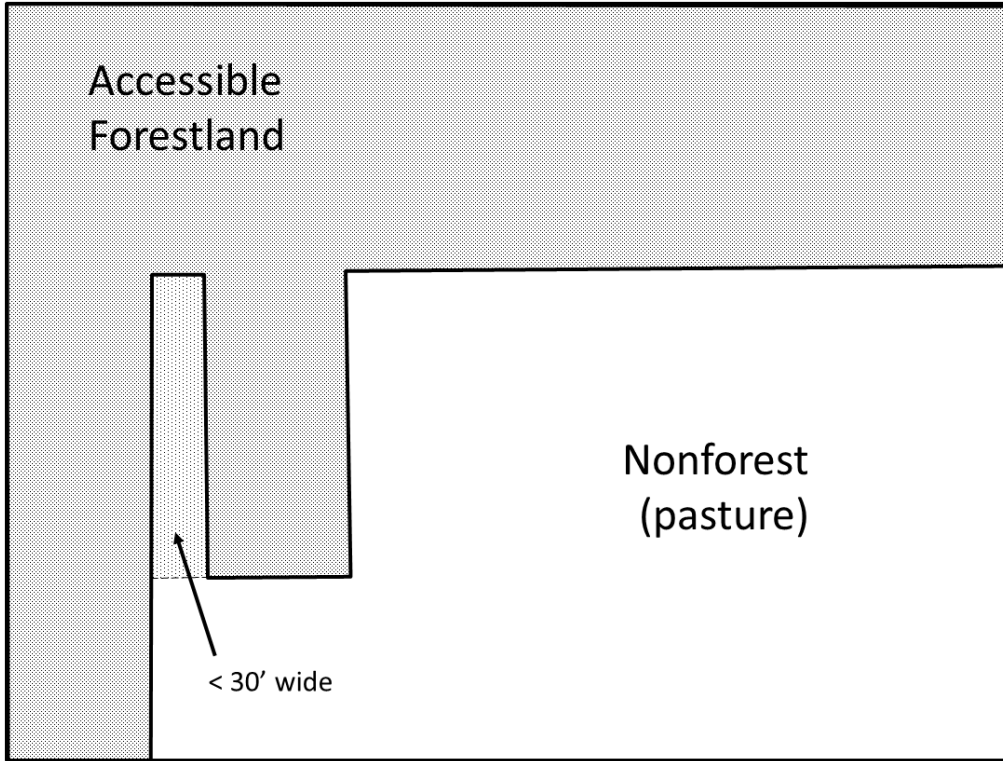


Figure 9.dN. In cases where there are two strips, only one of which meets the size requirements under Figure 9.b+N, the smaller strip will be considered an inclusion within the surrounding condition. Therefore Figure 9.b+N does not apply. In this case the 25 ft. strip is considered forest.

Dealing with strips			
Fig. 6a N	Fig. 6b + N	Figs. 6c N, 6d N	Figs. 5, 5a-e N
Use for more than two alternating strips <120' wide.	Use for two non-cultural alternating strips 30-120' wide and at least 1 acre in size.	Use for alternating non-cultural strips not meeting 6b + N size requirements.	Use only for cultural areas and linear non-census water.

Figure 9.eN. The preceding is a summary describing when to use which rules when dealing with strips of various dimensions.

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

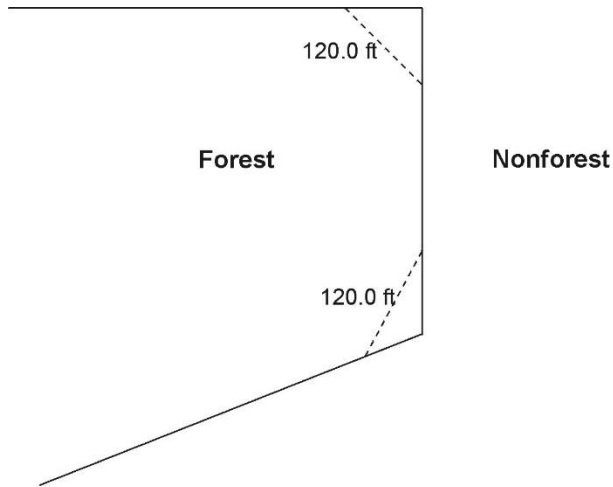


Figure 10. Illustration of the 90 degree corner rule. The dotted lines do not create nonforest land conditions.

2.4.0.4 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.

NRS Note: Linear water features must also cover 1 acre while maintaining the 30.0 foot width requirement.

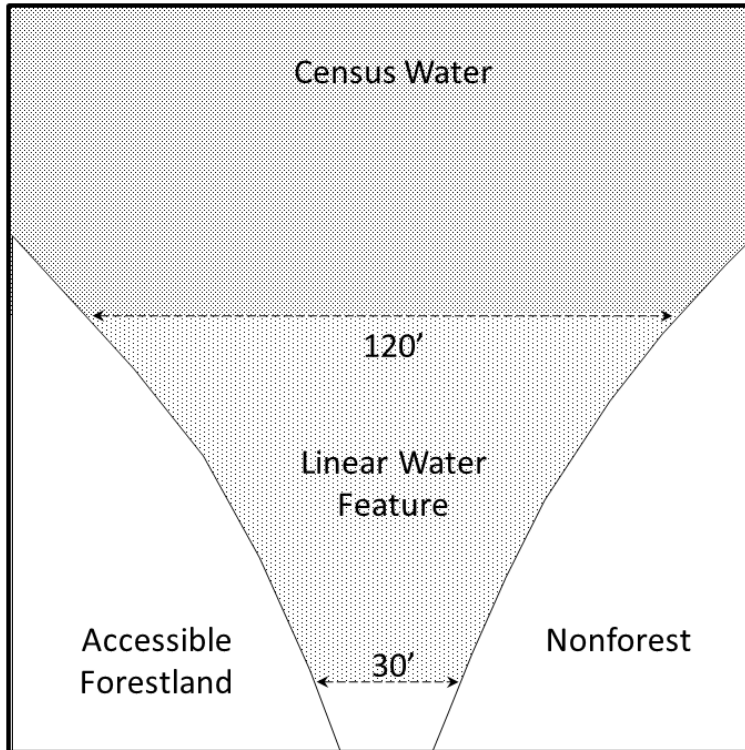


Figure 10.aN. Although dimensional requirements for bodies of water and linear features are distinct, there may be instances where a linear Noncensus Water feature (or narrow finger of a body of water) feeds into a body of Census or Noncensus Water. In these cases, the linear feature will be mapped only if it meets the 1 acre size requirement, excluding any acreage that otherwise would qualify as Census or Noncensus water for the body. Specifically, only the acreage between the 30' minimum width for linear features and the 120' minimum width for bodies of water would be considered. If the minimum acreage is not met, the linear feature (or narrow finger of a body of water) is considered part of the adjacent Nonforest condition. In a similar context, if Accessible Forestland borders both sides of the linear feature that does not meet the minimum acreage; the linear feature is considered part of the surrounding Forestland.

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

2.4.1 **+N+WisCFI** CONDITION CLASS NUMBER [CON#]

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 on a subplot following the standard numeric progression through the two points and proceed clockwise on individual subplots.

NRS Note: On remeasurement plots, conditions are renumbered to reflect current conditions (i.e., CONDITION CLASS = 1 always represents subplot 1's plot center).

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+N CONDITION CLASS STATUS [CDST]

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.

NRS CORE Note: Reference Section 2.1.1, NRS Note, when determining if a separate condition is defined under these guidelines.

NRS Note: When defining conditions on subplots that include a nonsampled condition, see Split Subplot procedures in Regional Appendix C.

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+WisCFI FOREST LAND CONDITION STATUS CHANGE [FLCCh] – New Forest Condition or Loss of Previous Forest Condition

Field protocol change, physical change on the ground, and crew error can all have an effect on or influence new forested conditions moving onto a plot or previously forested conditions being reclassified to a condition status other than forest land between visits. The purpose of this variable is to identify what caused:

1. A new forested condition to be recognized on the plot,

And / Or

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

Wisconsin is interested in tracking forest land changes due to disturbances or treatments that result in a situation that severely limits and/or makes highly improbable the retention of enough seedlings, saplings and trees to maintain the required 10% live canopy cover on status 1 lands. Do not confuse these situations with, for example, a harvested Red pine plantation that has been treated with herbicide and will be re-planted, or an Aspen cut that will sprout back sometime in the next year.

The Wisconsin DNR is being pro-active in tracking (specifically) the affects of Emerald Ash Borer (EAB) on state forest lands. Although EAB is the main disturbance of concern at this time, other disturbances resulting in forest land changing to non-forest statuses or non-forest to forest should also be coded here.

Forest land cannot be classified as non-stocked indefinitely, however the condition must remain below 10% Live Canopy Cover for THREE consecutive measurements using the subplot method to estimate Live Canopy Cover. On the third remeasurement of less than 10% LCC (using the subplot method) the condition is changed from non-stocked forestland to the appropriate non-forest status.

Exception

If the field crew's professional judgement at the third remeasurement (based on historical data and actual on-site evidence in the form of regeneration, tree growth, etc.) indicates that canopy cover is recovering (increasing) and that although currently still <10% LCC but will likely exceed 10% on or before the next (fourth) measurement the condition should be left as Status 1, non-stocked.

Examples

A forested condition is intentionally converted to agricultural uses. The resulting agricultural land would be coded as FLCCH=1.

Severe and repeated overharvesting of a northern hardwood stand results in a sparse (<10% LCC) cover of scattered overmature individuals with little to no regeneration for three consecutive measurements: FLCCH = 4, NOTE: Severe overharvesting.

Emerald Ash borer caused mortality drops the LCC to <10% for three consecutive measurements which results in a raised water table inhibiting regeneration of ash and/or other species: FLCCH = 5 (EAB).

Marauding beaver dam a small stream flooding the entire plot area with a pond about 5 acres in size: FLCCH = 4, NOTE: beaver activity.

A previous status 2 condition now meets the forest land definition due to the presence of additional canopy cover provided by a new species that has been added to the tree list between visits: FLCCH = 3

WisCFI Special Note for Maintained Prairies

Conditions in maintained prairies within the borders of Wisconsin State Forests will be coded as non-forest Status 2 regardless of LCC, so long as the State Forest confirms they are maintaining the area as a prairie.

If a field crew determines an LCC of >10% for a condition located within what was previously determined to be or now appears to be a maintained prairie, the State Forest office should be contacted to verify if the location is or is not being maintained as a prairie.

If the previous crew coded a condition that was within a maintained prairie as Status 1 based on a temporary increase in LCC, and now the plot is coded as status 2 because the LCC <10% due to maintenance (burning, brush hogging, etc), then FLCCH = 1: Physical Changes.

If a condition that was previously in a maintained prairie and was status 2 is now Status 1 because LCC > 10% AND the State Forest determined it will no longer maintain the plot area as a prairie, then FLCCH = 1: Physical Changes.

If a condition that was previously in a maintained prairie and was status 1 is now Status 1 because LCC > 10% AND the State Forest determined it is no longer maintaining the area as a prairie, then FLCCH = 0: No Change.

When collected: CONDITION CLASS STATUS = 1, 2, 3, or 4 on remeasured plots with a newly recognized forested condition OR a new Condition Class Status = 2, 3 or 4 that is the direct result of a former forested condition no longer qualifying as such

Field width: 1 digit

Tolerance: No errors

MQO: At least 99% of the time

Values:

- 0 No change – the condition is not a new forested condition nor is it a new condition that is the result of a previously forested condition no longer qualifying as such.
- 1 Physical changes - condition status changed due to INTENTIONAL actual on-the-ground physical change.
- 2 Crew error - condition status changed due to a previous crew's error.
- 3 Procedural changes – condition status changed due to a change in variable definition or procedures.
- 4 Unintentional Physical Changes - condition status changed due to actual on-the-ground human or natural caused factors the intent of which was not to change condition status. Examples would be overharvesting w/ lack of regeneration, beaver activity, etc. CONDITION LEVEL NOTE REQUIRED.
- 5 EAB – change in status is a result of Ash mortality due to Emerald Ash Borer.

2.4.4+N+WisCFI CONDITION NONSAMPLED REASON [REAS]

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 WDNR boundary – Assign this code to condition classes beyond the WDNR 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. Not Collected in WisCFI

NRS CORE Note: If a denied access or hazardous plot can be ground-truthed as nonforest from adjacent accessible property, code the plot nonforest.

NRS CORE Note: If a denied access or hazardous subplot can be ground-truthed as nonforest from an adjacent accessible property, code the subplot as nonforest, provided accessible forestland exists on one of the subplots.

- 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.

NRS CORE Note: Reference note above.

- 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. **Not Collected in NRS**
- 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. **Not Collected in NRS**
- 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. **Not Collected in NRS**
- 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. **Not Collected in NRS**
- 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. **Not Collected in WisCFI**
NRS CORE Note: When a potentially forested portion of a subplot cannot be measured because the subplot center falls under a building, the entire subplot should be classified as a CONDITION CLASS STATUS = 5 with a CONDITION NONSAMPLED REASON code = 10.
- 11 Ocean – Condition falls in ocean water below mean high tide line. **Not Collected in WisCFI**

2.4.5 NONFOREST CONDITION CLASS STATUS **Not Collected in NRS**

2.4.6 NONFOREST CONDITION NONSAMPLED REASON **Not Collected in NRS**

2.5+N+WisCFI 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.

NRS Note: Throughout Field Guide 9.0 the word stocking is used to describe the stands relative basal area and tree distribution. DO NOT confuse this with previous field guide’s “stocking guidelines.”

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 2.5.37N).

General instructions for delineating condition classes within accessible forest lands:

2.5.0.1 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.

2.5.0.2+WisCFI 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 two subplots all sample only accessible forest land. Subplot 1 samples 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.

2.5.0.3+WisCFI 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 subplot, 1, falls 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 subplot.

2.5.0.4 Riparian forest area Not Collected in WisCFI

2.5.0.5N-WisCFI Riparian Percent Area Subplot 1 [RIPA1]

[RIPA1] refers to the percent of the condition on subplot 1 that lies within an RMZ.

Record the percent of all Status 1 Conditions that fall within a defined Riparian Management Zone (RMZ). The water source for the RMZ is NOT included as part of the RMZ.

This is NOT a delineating variable: new conditions are not defined based on riparian management zones.

Riparian zones as defined in this section include intermittent and perennial streams, both navigable and non-navigable, and all lakes as defined below.

Beaver ponds will be treated as part of the stream in which they are located: if the stream is a permanent stream, the RMZ around the beaver pond will be 100', if in a temporary stream the RMZ around the pond will be 35'.

Other temporary still water bodies not meeting the definition of a lake (i.e. ephemeral ponds) are not considered lakes and will have no RMZ associated with them.

Some streams have no obvious high-water mark (i.e. a mucky streams running through marsh grasses). In this case the edge of the vegetation running along the obvious stream channel will be used as the surrogate high-water mark.

Emergent vegetation along lake shores, including floating cattail marshes, will be considered part of the lake, and the RMZ begins at the high ground where the vegetation associated with the lake ends.

Alder swamps and tamarack/spruce bogs along lakes are not considered part of the lake. The RMZ begins in these cases where open water ends and the vegetation begins.

Backwaters along larger river systems should be considered part of the river, as should oxbows that are still connected to the river. Oxbows completely cut off from the main river system would not be considered part of the river and although they may be included within a RMZ, would not have an RMZ directly associated with them.

Guidance for RMZs comes from the Wisconsin Dept. of Natural Resources publication "Best Management Practices for Water Quality".

Definitions

Lake – A still water body that:

- has an ordinary high water mark
- has a bed that indicates "reasonably permanent" surface water.

Stream – A watercourse that:

- has an ordinary high water mark.
- has bed and banks.
- flows at least periodically.
- has an easily identifiable beginning and end.
- does not lose its character as a watercourse even though it may break up and disappear temporarily and reappear down stream.

The ordinary high-water mark is the point on the bank or shore up to which the presence and action of the water is so continuous as to leave a distinct mark either by erosion, destruction of terrestrial vegetation, or other easily recognized characteristic.

There are two kinds of streams:

- Perennial streams flow throughout most of the year (i.e. > 50%) of the year.
- Intermittent streams usually flow only after rainstorms or snowmelt and are, therefore, dry most of the year. Intermittent streams must be protected because they channel runoff into perennial streams and lakes and may become part of the aquatic ecosystem when water flows in them.

WisCFI Note: Navigability will not be considered when evaluating water sources. If a stream is perennial the RMZ is 100' on either side, and if not perennial the RMZ is 35' on each side. All lakes have an RMZ of 100'.

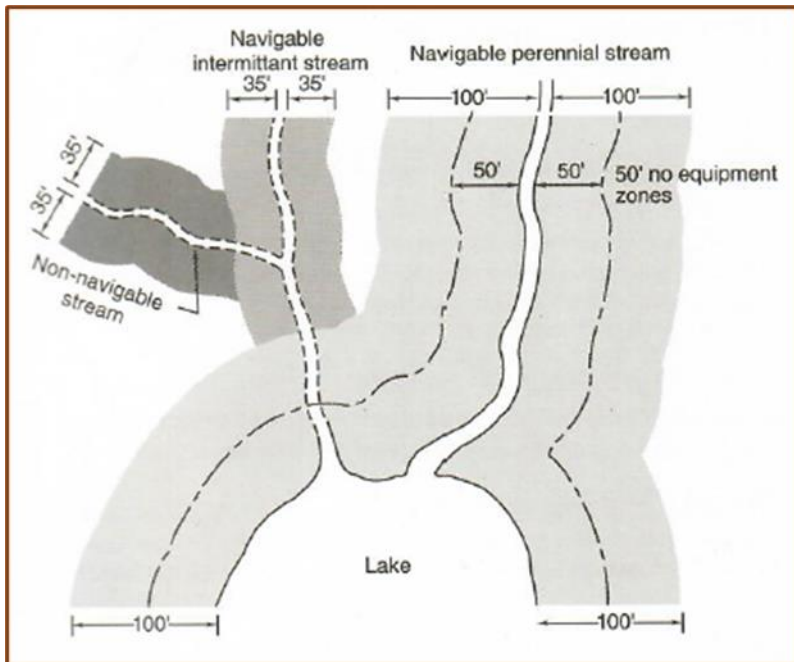


Figure 11N-WisCFI. The three riparian management zones.

Examples

NOTE: When evaluating percent area RIPA, only look at the area of the respective conditions within the subplot. EXCLUDE the area of the water source for the RMZ on the subplot from all estimates, even if the water is an inclusion in the Status 1 condition (see Figure 15N-WisCFI).

WisCFI Special Situation

Riparian Management Zones are always directly associated with streams, rivers and lakes as defined above: this is different from FIA protocols. For example, a marsh or swamp, forested or not, is NOT a defined water source and therefore cannot have an RMZ associated with it.

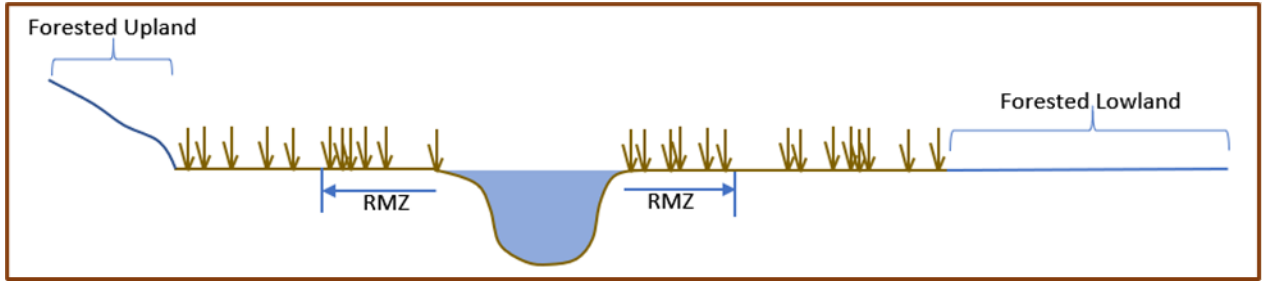


Figure 12N-WisCFI.

For the purposes of WisCFI riparian management zones, only conditions or parts of conditions that fall within a defined RMZ will be recognized. In Figure 12N-WisCFI only status 1 conditions falling within the indicated RMZ would have a non-zero entry for RIPA, regardless of if the stream and/or associated RMZ is its own condition or not.

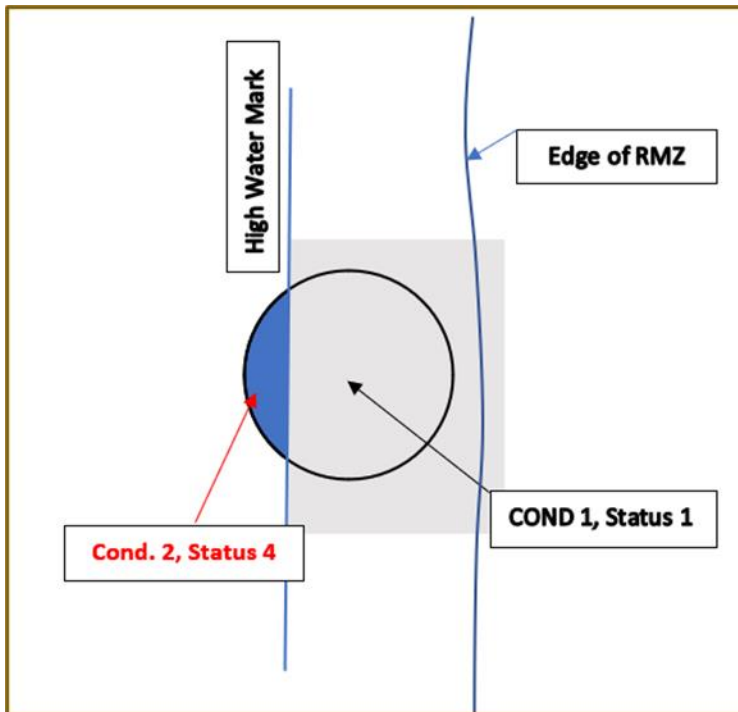


Figure 13N-WisCFI.

In Figure 13N-WisCFI Cond. 1 falls in the riparian management zone and Cond. 2 is the associated water body. In this case [RIPA] is:

- COND 1 = 100
- COND 2 = NOT COLLECTED

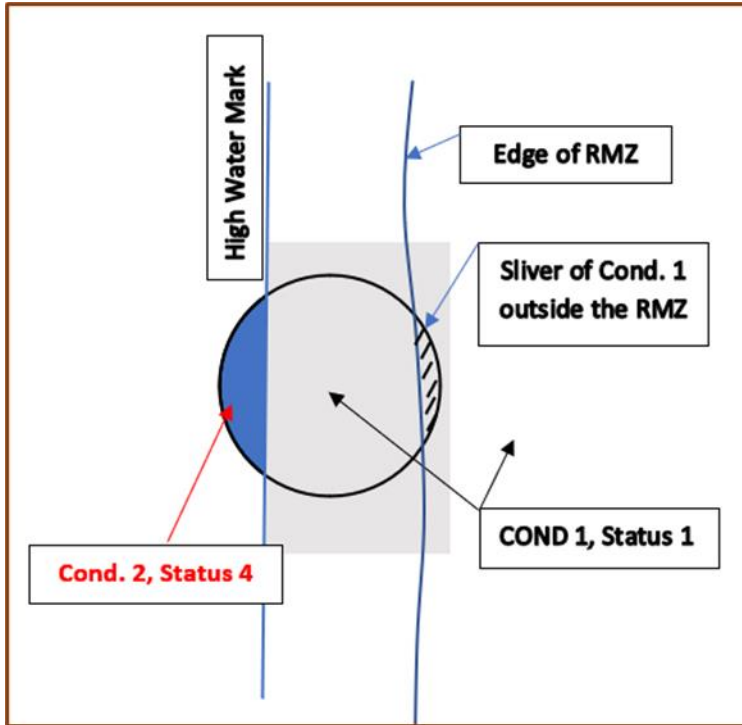


Figure 14N-WisCFI.

In Figure 14N-WisCFI, A small sliver of Cond. 1 is outside the RMZ. If we estimate the sliver outside the RMZ to be 6% of Cond. 1, then [RIPA] is:

- COND 1 = 94
- COND 2 = NOT COLLECTED

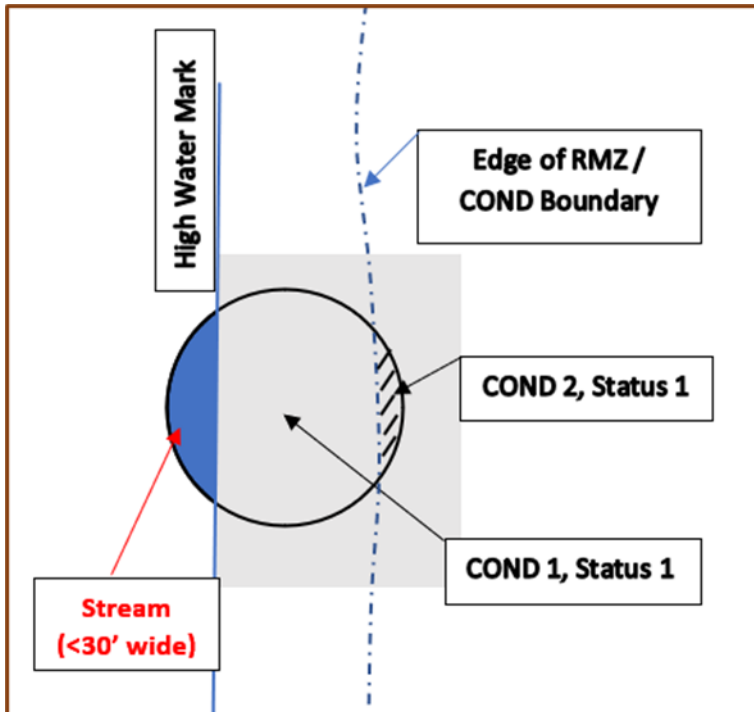


Figure 15N-WisCFI.

In Figure 15N-WisCFI only condition 1 is within the RMZ. Condition 2 lies outside the RMZ, and the actual water source, the stream, is not included in the RMZ. If we estimate the stream to be about 13% of Condition 1, then [RIPA] is:

- COND 1 RIPA = 87
- COND 2 RIPA = 0

Percent area of mapped (contrasting) condition for a traditional, straight boundary. DIST is perpendicular line from plot center to the boundary.

DIST to Boundary	Percent Area	DIST to Boundary	Percent Area
1	47.3	13	17.3
2	44.7	14	15.1
3	42.1	15	13.0
4	39.4	16	11.0
5	36.8	17	9.0
6	34.2	18	7.2
7	31.7	19	5.5
8	29.2	20	4.0
9	26.7	21	2.6
10	24.3	22	1.4
11	21.9	23	0.5
12	19.5	24	0.0

Figure 16N-WisCFI. Straight Line Boundary Percentages on subplot.

How to code

[RIPA1] refers to the percent of the condition on subplot 1 that lies within an RMZ.

[RIPA2] refers to the percent of the condition on subplot 2 that lies within an RMZ.

When Collected: When Condition Class Status = 1
Field Width: 3 digits
Tolerance: ± 10%
MQO: at least 99% of the time
Values: 0 to 100

2.5.0.6N-WisCFI Riparian Percent Area Subplot 2 [RIPA2]

[RIPA2] refers to the percent of the condition on subplot 2 that lies within an RMZ.

When Collected: When Condition Class Status = 1
Field Width: 3 digits
Tolerance: ± 10%
MQO: at least 99% of the time
Values: 0 to 100

2.5.1 RESERVED STATUS [RESV] Not Collected in WisCFI

2.5.2 OWNER GROUP [OWNG] Not Collected in WisCFI

2.5.3+N FOREST TYPE [FTYP]

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

NRS Note: When determining FOREST TYPE, first try to match the plurality of the stocking present with the “named” type. If the “named” type does not match the plurality of the stocking in

the stand, match the plurality of the stocking in the stand with the trees listed as associates under each type even if the “named” type species are not represented in the plurality of the stocking present.

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

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

When collected: All accessible forest land condition classes (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+NSTAND SIZE CLASS [STSZ]

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

NRS Note: Stand size class is calculated with an algorithm post data collection, but in the field use canopy cover as surrogate for stocking to determine stand size class.

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:
NRS Note: Reference last paragraph in this section in order to determine if Nonstocked is the correct STAND SIZE CLASS.
 - (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/or woodland trees 9.0 – 19.9 inches DRC.
- 4 20.0 – 39.9 inches
At least 10 percent stocking (or 10 percent canopy cover if stocking standards are not available) in trees, seedlings, and saplings; and at least 1/3 of the canopy cover is in trees greater than 5.0 inches DBH/DRC and the plurality of the canopy cover is in trees between 20.0 – 39.9 inches DBH.
- 5 40.0 + inches
At least 10 percent stocking (or 10 percent canopy cover if stocking standards are not available) in trees, seedlings, and saplings; and at least 1/3 of the canopy cover is in trees greater than 5.0 inches DBH/DRC and the plurality of the canopy cover is in trees ≥ 40.0 inches DBH.

The instructions in Sections 2.1 and 2.4 apply when delineating, on accessible forest land, contrasting conditions based on differences in STAND SIZE CLASS.

Within the sampled area on microplot, 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+N REGENERATION STATUS [REGN]

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

NRS Note: Artificial regeneration must be at least 1 acre and at least 120.0 feet in width.

NRS Note: Underplanting is considered artificial regeneration.

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 [DENS]

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

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

Codes 2 and higher are used ONLY when all other attributes used to delineate separate condition classes are homogenous, i.e., when a change in density is the ONLY difference within what would otherwise be treated as only one forest condition. Otherwise, code 1 for all condition classes. Codes 2 and higher are usually, but not always, used to demarcate areas that differ from an adjacent area due to forest disturbance, e.g., a partial harvest or heavy, but not total tree mortality due to a ground fire. Delineation by density should only be done when the less-dense condition is 50 percent or less as dense as the more dense condition.

Do not distinguish between low-stocked stands or stands of sparse and patchy forest.

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+N OWNER CLASS [OWNC] Not Collected in WisCFI

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

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

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

2.5.11 ADMINISTRATIVELY WITHDRAWN NOTES (CORE OPTIONAL) Not Collected in NRS

2.5.12 RESERVED AREA NAME [RNAM] Not Collected in WisCFI

2.5.13 ARTIFICIAL REGENERATION SPECIES [SOSP]

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+N

2.5.14+N STAND AGE [SAGE]

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 certification 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:

$$(34 \times 0.25) + (62 \times 0.60) + (59 \times 0.15) = 55 \text{ years.}$$

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.

NRS Note: Boring or drilling on plots located in Wilderness areas on National Forests will be done on representative non-tally trees and only when absolutely necessary to estimate site, age, or growth. (This will generally be the case during initial establishment of permanent plots.) [SERVICEWIDE AGREEMENT 09-SA-FIA01]

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 (999 is not applicable in our region)

2.5.15+N DISTURBANCE 1 [DIS1]

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.

NRS Note: For remeasured plots, although only Disturbances that have occurred since the previous inventory are considered, Disturbances that are ongoing will still be recorded if they originated before the time of the previous inventory so long as the Disturbance continues to meet the specified "significant threshold".

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 such as a catastrophic event like a hurricane or other major rain event. Periodic flooding that occurs as part of the natural forest ecosystem should not be coded.)
 - 54 drought
- 60 Vegetation (suppression, competition, vines) NRS Note: Stand maturity, along with the characteristics of the tree species present, are considered while evaluating any impact that suppression or competition may have on understory vegetation. Suppression and or competition may be caused by both native and nonnative vegetation. See Regional Appendix C for examples of Understory Vegetation as a Disturbance.
- 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

2.5.16 DISTURBANCE YEAR 1 [DYZ1]

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

When collected: When DISTURBANCE 1 > 00

Field width: 4 digits

Tolerance: +/- 1 year for measurement cycles of 5 years

+/- 2 years for measurement cycles of > 5 years

MQO: At least 99% of the time

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

2.5.17 DISTURBANCE 2 [DIS2]

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

2.5.18 DISTURBANCE YEAR 2 [DYZ2]

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

2.5.19 DISTURBANCE 3 [DIS3]

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

2.5.20 DISTURBANCE YEAR 3 [DYZ3]

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

2.5.21+N TREATMENT 1 [TRE1]

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

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

When collected: All accessible forest land condition classes (CONDITION CLASS STATUS = 1)

Field width: 2 digits

Tolerance: No errors

MQO: At least 99% of the time

Values:

- 00 None - No observable treatment.
- 10 Cutting - The removal of one or more trees from a stand due to a silvicultural operation that affects 1 acre or more. Cutting does not include occasional stumps of unknown origin or sparse removals for firewood, Christmas trees, or other miscellaneous purposes. If Cutting is coded, ensure that consideration is given to Artificial or Natural regeneration if it has occurred within the past 5 years

- 20 Site preparation - Clearing, slash burning, chopping, disking, bedding, or other practices clearly intended to prepare a site for either natural or artificial regeneration.
- 30 Artificial regeneration - Following a disturbance or treatment (usually cutting), a new stand where at least 50% of the live trees present resulted from planting or direct seeding.
- 40 Natural regeneration - Following a disturbance or treatment (usually cutting), a new stand where at least 50% of the live trees present (of any size) were established through the growth of existing trees and/or natural seeding or sprouting.
- 50 Other silvicultural treatment - The use of fertilizers, herbicides, girdling, pruning, **noncommercial thinning**, 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.

2.5.22 TREATMENT YEAR 1 [TYR1]

Record the year in which TREATMENT 1 occurred.

When collected: When TREATMENT 1 > 00

Field width: 4 digits

Tolerance: +/- 1 year for measurement cycles of 5 years

+/- 2 years for measurement cycles of > 5 years

MQO: At least 99% of the time

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

2.5.23 TREATMENT 2 [TRE2]

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

2.5.24 TREATMENT YEAR 2 [TYR2]

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

2.5.25 TREATMENT 3 [TRE3]

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

2.5.26 TREATMENT YEAR 3 [TYR3]

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

2.5.26.1N-ME STAND STRUCTURE [MEST] Not Collected in WisCFI

2.5.27+N PHYSIOGRAPHIC CLASS [PHYS]

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

NRS Note: Record the previous PHYSIOGRAPHIC CLASS as current if the previous crew's call can be justified. The previous crew's call is printed on the plot location sheet. If the previous crew's call is changed then a PLOT NOTE is required.

NRS Note: When determining PHYSIOGRAPHIC CLASS, choose the class that best represents the condition. If the condition has multiple PHYSIOGRAPHIC CLASSES, code the

PHYSIOGRAPHIC CLASS that best describes the condition within the plot area. In cases where multiple PHYSIOGRAPHIC CLASSES within a condition are located within the plot area, code the PHYSIOGRAPHIC CLASS that represents the majority of land within plot area. If the PHYSIOGRAPHIC CLASS is an inclusion less than 1 acre in size and 120' wide it should not be considered when coding the PHYSIOGRAPHIC CLASS for the condition.

When collected: When CONDITION CLASS STATUS = 1 or NONFOREST SAMPLING STATUS = 1 and 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. (See Appendix 6 for definitions of bays and pocosins.)
- 34 Beaver ponds
- 35 Cypress ponds
- 39 Other hydric - All other hydric physiographic sites.

2.5.27.1N PRODUCTIVITY STATUS [PROD]

Record the code that indicates the productivity of the forest condition.

Productivity is determined by the Site Index of the best tree in the condition, even if the best tree does not match the FOREST TYPE. Ignore trees that are growing on unique micro sites within the condition that do not represent the condition as a whole, such as a small island of upland terrain surround by lowland. For example, it would be acceptable to use a productive paper birch for a site tree in a stand of unproductive black spruce as long as the birch was not growing on a small drier hump not representative of the overall condition which is wet sphagnum mosses.

A forest land productivity table with limited species can be found in Regional Appendix E. as an aid for determining productivity. In addition site index can be used as an indicator of productivity in the WEST by using provided western site index curves. (Note: These site index curves are available as regional supplement to this field guide.) If the site index meets the minimum value indicated below for that species, the forest is considered productive.

Species	Name	Minimum SI Value
0066	Rocky Mountain juniper	25
0068	eastern redcedar	25
0071	tamarack	20
0095	black spruce	20
0122	Ponderosa pine	21
0241	northern white cedar	15
	Other SI species available	35

When collected: CONDITION CLASS STATUS = 1

Field width: 1 digit

Tolerance: No errors

MQO: At least 99% of the time

Values:

- 0 Unproductive – Forest land incapable of producing 20 cubic feet per acre per year because of adverse site conditions. Adverse conditions include sterile soils, dry climate, poor drainage, high elevation, steepness, and rockiness. Vegetation, if present, is widely spaced and scrubby, or tree growth cannot be established. These conditions can be due to forces of nature or human-caused disturbances.
- 1 Productive – Forest land capable of producing in excess of 20 cubic feet per acre per year. Productive forest land may be nonstocked provided that neither any natural condition, nor any activity by humans, prevents or inhibits the establishment of tree seedlings.

2.5.28+N COVER CLASS [LCOV]

Record this variable for all mapped conditions. As with 2.4.2 CONDITION CLASS STATUS, COVER CLASSES must meet the minimum area and width requirements (except those cases where the condition has been defined due to one of the exceptions to the size and width requirements. If the condition is less than 1 acre, then apply the key to the condition. In order to assign a single cover class to a mapped condition that contains more than one candidate cover class, proceed as follows: if no prospective cover classes meet the minimum width and area requirements, apply the key to the acre area that is within the condition being evaluated and closest to the lowest numbered subplot center associated with the condition. If multiple cover classes (i.e., those which meet minimum area and width requirements) exist in the condition, assign the first cover class that is encountered to the condition. As with other condition attributes, inclusions (of less than 1 acre) within the condition should be ignored when assigning the COVER CLASS. Therefore, areas of the inclusion within the acre area are ignored when making the relative cover assessments. Apply the key as a guide and/or to verify the COVER CLASS selection.

NRS Note: For the purpose of assigning Cover Class, developed nonforest land uses are treated as a separate condition even within greater defined nonforest areas.

Assignment of COVER CLASS code is hierarchical in nature, and should be performed using the following **Cover Classification** hierarchical key. Following the guidance of the key, codes should be examined in succession, and the first definition that describes the area of the condition should be chosen. For example, if an area has 15% tree cover that is taller than the 50% shrub cover, it is classified as class 01 (Tree Cover). Note: Tree Cover is not equivalent to Forestland (e.g., a recent clearcut could be Forestland, but would not be Tree Cover). Vegetative cover, as used below, includes the area of ground covered by the vertical projection of the live plant canopy [or other vegetation components like flowers, basal structures (vegetation at the base of the plant, emerging from the ground) or vines] on the area defined by the condition. If foliage is absent due to senescence (leaves turning brown and falling off) or dormancy, the cover should be estimated based on the position of plant remains or other evidence of the foliar distribution during the growing season. If vegetation rooted outside of a condition is hanging over the condition being evaluated, it is considered in the cover calculations. If burned, then classify based on the remaining live vegetation, including the canopy cover of remaining live trees and shrubs. When the surface of a condition is covered by deep non-permanent snow, ice, or water, and/or a condition is defined as CONDITION CLASS STATUS 5 (denied access or hazardous), field crews should use aerial imagery, local knowledge, and field observations to best determine COVER CLASS.

NRS Note: When the entire plot is defined as CONDITION CLASS STATUS 5, separate individual condition classes are not mapped. Only one COVER CLASS is assigned per plot, base this class on the condition represented by plot center. If the class at plot center does not meet minimum area and width requirements to establish a condition, then use the class that occupies the majority of the visual acre surrounding plot center to describe the COVER CLASS for the plot.

Full 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% live vegetation cover.
- Sparsely Vegetated: Does not contain at least 10% live vegetation cover.

Cover Classification Key

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

1. $\geq 10\%$ live vegetative Cover (when considering aquatic vegetation, only emergent vegetation is considered) = Vegetated, else 2.
 - a. Areas on which live trees provide 10% or greater canopy cover and are part of the dominant (uppermost) vegetation layer, including areas that have been planted to produce woody crops = 01 Tree Cover
 - b. Areas on which live shrubs provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer = 02 Shrub Cover
 - c. Areas on which live herbaceous vegetation (including seasonally senescent cover) provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer = 03 Herbaceous Cover
 - d. Areas on which non-vascular vegetation provide 10% or greater cover and are part of the dominant vegetation layer = 04 Non-vascular Vegetation Cover
 - e. Areas with 10% or greater live vegetative cover but no one life form has 10% or more cover = 05 Mixed Vegetation Cover
2. $< 10\%$ live vegetative cover = Sparsely Vegetated
 - a. Areas persistently and predominantly covered by water (census and noncensus water, permanent snow and ice) and with less than 10% cover of emergent vegetation. = 10 Water
 - b. Areas predominantly covered with constructed materials with limited plant life = 09 Impervious
 - c. Areas predominantly covered by bare rock, gravel, sand, silt, clay, or other earthen material, which contains $< 10\%$ vegetation cover regardless of its inherent ability to support life = 08 Barren

When collected: All condition classes

Field width: 2 digits

Tolerance: No errors

MQO: At least 95% of the time

Values:

Codes are $\geq 10\%$ vegetative cover:

- 01 Tree Cover: Areas on which live trees provide 10% or greater canopy cover and are part of the dominant (uppermost) vegetation layer, including areas that have been planted to produce woody crops, Christmas trees, orchards, etc. Only include tree species that are listed in Appendix 3 after taking into account the three exclusion zones (see variable 5.8 SPECIES). Varieties and subspecies are tallied at the species level and hybrids are based on the dominant external characteristics. Species not included in Appendix 3 are considered shrub cover. Example areas include forests, forest plantations, reverting fields with $\geq 10\%$ tree canopy cover, clearcuts with $\geq 10\%$ tree canopy cover. This category includes cypress swamps and mangroves (not to be confused with aquatic vegetation).

- 02 Shrub Cover: Areas on which live shrubs or subshrubs provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer, provided these areas do not qualify as Tree Cover. Shrub/Subshrub — a woody plant that generally has several erect, spreading, or prostrate stems which give it a bushy appearance. This includes dwarf shrubs, and low or short woody vines (NVCS 2008) and excludes any species on FIA's tree list. Examples include cranberry bogs, berry crops, and other shrub-dominated wetlands, chaparral, and sagebrush.
- 03 Herbaceous Cover: Areas on which live herbaceous vegetation (including seasonally senescent cover) provides 10% or greater cover and are part of the dominant (uppermost) vegetation layer, provided these areas do not qualify as Tree Cover or Shrub Cover. This includes herbs, forbs, and graminoid species. Examples include meadows, prairies, croplands (while crops are present), and improved pasture. This category also includes emergent wetland vegetation like seasonally flooded grasslands, cattail marshes, etc.
- 04 Non-vascular Vegetation Cover: Areas on which non-vascular vegetation provide 10% or greater cover and are part of the dominant vegetation layer, provided these areas do not qualify as Tree Cover, Shrub Cover, or Herbaceous Cover. Examples include mosses, sphagnum moss bogs, liverworts, hornworts, lichens, and algae.
- 05 Mixed Vegetation Cover: Areas with 10% or greater live vegetative cover but no one life form has 10% or more cover. That is, these areas do not qualify as Tree Cover, Shrub Cover, Herbaceous Cover, or Non-vascular Vegetation Cover, and thus are a mixture of plant life forms. Examples can include early stages of reverting fields and high deserts.

Codes are < 10% live vegetative cover

- 08 Barren: Areas predominately covered by bare rock, gravel, sand, silt, clay, or other earthen material, which contains <10% vegetation cover regardless of its inherent ability to support life. Examples include naturally barren areas such as lava fields, gravel bars, sand dunes, salt flats, deserts, playas, and rock outcroppings, as well as areas of bare soil exposed by land clearing (including plowed, harvested, or planted but not yet emerged cropland, or harvested unplanted cropland), wildfire and other forms of disturbance. Also includes minerals and other geologic materials exposed by surface mining and roads made of dirt and gravel.
- 09 Impervious: Areas predominantly covered with constructed materials that contain < 10% vegetation cover. Examples include paved roads, parking lots, driveways, sidewalks, rooftops and other man-made structures.
- 10 Water: Areas persistently covered and predominated by water and have <10% emergent vegetative cover. Examples include census and noncensus water and permanent snow and ice. For example, only the open water portion of a bog is to be included.

2.5.29+N+WisCFI PRESENT NONFOREST LAND USE [NFLU]

Record this attribute for every nonforest condition class sampled. Recognizing multiple nonforest conditions on a plot is not required unless 1) conducting a nonforest inventory (NONFOREST SAMPLING STATUS = 1); 2) or when areas that were sampled and classified at last inventory as accessible forest land and are now nonforest or partially nonforest land 3) or subplot is comprised of accessible forest land -- in either the current or previous cycle -- which will require that it be occupied and all CONDITION CLASS STATUSes and all PRESENT NONFOREST LAND USEs will be defined and mapped (See NRS Core Note in Section 2.1.2). 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.

WisCFI Note: Recognizing multiple non-forest land use conditions IS REQUIRED on all subplots regardless of the presence or absence of any Status 1 conditions.

On subplots with no accessible forest land the use of imagery, past cluster maps, crew notes and/or adjacent ground observation is permissible to determine CONDITION CLASS STATUS(es) and/or Present Non-forest Land Use(s). Boundaries between multiple non-forest Condition Class Statuses and/or Present Non-forest Land Uses may also be estimated using the above methods.

NRS CORE Note: Reference NRS text within Section 2.1.1 and 2.1.2 for more detailed delineation guidelines.

NRS CORE Note: Guidelines on how to combine areas that are too small to stand alone into combined Nonforest conditions:

- In cases where the first encountered nonforest area is less than an acre and or less than 120 feet in width but is bounded by a single qualifying adjacent nonforest area, the nonforest area is considered an inclusion and the surrounding Land Use will be used to represent the condition.
- Nonforest conditions may consist of multiple nonforest land uses that are less than an acre or less than 120 feet in width. In such cases, the first nonforest land use encountered will be used to represent the condition, assuming the combined areas are 120 feet and an acre.
- In cases where the area encountered is not identifiable as a distinct and specific Nonforest Land Use (an inclusion), the adjacent qualifying Land Use will be used to represent the condition.
- In cases where a wooded strip is too small to be its own condition and it is bordered on each side by two different qualifying distinct and specific Nonforest Land Uses, assign the wooded strip to the condition that PC is closest to.
- In cases where a wooded strip is too small to be its own condition and it is bordered on each side by two different non-qualifying Nonforest Land Uses, assuming the combined areas are 120 feet and an acre, assign the strip of trees a Nonforest Land Use of 40 (Other).

NRS CORE Note: When measuring a plot that has multiple CONDITION STATUS 2 conditions defined:

- Subplots without accessible forest land will be classified by CONDITION CLASS STATUS and by the PRESENT NONFOREST LAND USE at subplot center.

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.) NRS CORE Note: A windbreak or shelterbelt can be less than 120.0 feet wide and less than 1 acre. If a windbreak or shelterbelt qualifies and meets the definition of accessible forest land, then it is not considered nonforest. At times a 2 condition may be made up of multiple nonforest land uses, some of which may not be an acre in size. In this case record the first nonforest land use that you encounter, regardless of size. Use the 10 code only for cases not better described by one of the following:
 - 11 Cropland
 - 12 Pasture (improved through cultural practices) Exclude occasional large trees with the obvious function of providing shade for livestock, and small single trees or clusters of trees when determining canopy cover (unless they are somewhat homogenous throughout the condition).
 - 13 Idle farmland
 - 14 Orchard / Nursery
 - 15 Christmas tree plantation
 - 16 Maintained wildlife opening
 - 17 Windbreak / Shelterbelt NRS Note: This code is a subdivision of the Agriculture land use (10) and should only be coded when located within or directly adjacent to agricultural land. It should not be used to define similar features located within urban / developed areas that are not directly adjacent to agricultural lands. Such lands should be considered a part of the green space associated with the developed land use. A widely spaced row of trees located in a maintained area within a developed land use is NOT considered a Windbreak / Shelterbelt even if it is adjacent to agricultural lands due to both the spacing and the maintenance observed between the trees. NRS Note: When the width of the windbreak / shelterbelt measured bole-to-bole is at least 120 feet and 1 acre in size, the windbreak / shelterbelt is considered Accessible Forestland.
- 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, powerlines, maintained canal. A canal that qualifies as census or noncensus water is coded as CONDITION CLASS STATUS 3 or 4.
 - 33 Recreation: parks, Skiing, golf courses,
 - 34 Mining and wasteland
NRS Note: Code 34 must be at least 1 acre in size and 120.0 feet in width.

- 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

NRS CORE Note: The following are regional definitions developed for both national and regional sub-codes. Use these codes in conjunction with CONDITION CLASS STATUS 2.

11 – CROPLAND

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

12 – IMPROVED / MAINTAINED PASTURE

Land maintained and used and for grazing with canopy cover less than 10 percent in live trees (established seedlings, saplings or larger trees), except that occasional large trees with the obvious function of providing shade for livestock, and small single trees or clusters should be ignored when determining canopy cover (unless they are somewhat homogenous throughout the condition). Evidence of maintenance, besides the degree of grazing, includes condition of fencing, presence of stock ponds or water tanks. Land also may be periodically brush hogged indicated by seedlings 3 to 4 feet in height and basal scars present on trees.

13 – IDLE FARMLAND

Former cropland or pasture that has not been tended within the last 2 years and that has less than 10 percent canopy cover with live trees, (established seedlings or larger trees) regardless of species. A field that is between crop rotations should NOT be called Idle Farmland.

14 – ORCHARD/NURSERY

Land utilized for orchards and nursery stock.

15 – CHRISTMAS TREE PLANTATION

Active Christmas tree plantation must show signs of annual shearing. Record tree species used in the plantation in the PLOT NOTES. If an inclusion of maintained Christmas trees are located within forest land treat them as crops and do not tally them.

16 – MAINTAINED WILDLIFE OPENING

Land maintained as a permanent opening of primarily herbaceous vegetation within woodland areas to provide food and cover benefits for early successional wildlife species. [Source: USDA NRCS] These may be located on public or private land.

17 – WINDBREAK / SHELTERBELT

Windbreaks or shelterbelts are plantings of single or multiple rows of trees or shrubs that are established for environmental purposes. Windbreaks or shelterbelts are generally established to protect or shelter nearby leeward areas from troublesome winds. Such plantings are used to reduce wind erosion, protect growing plants (crops and forage), manage snow, and improve irrigation efficiency. Windbreaks also protect structures and livestock, provide wildlife habitat, improve aesthetics, and provide tree or shrub products. Also, when used as a living screen, windbreaks control views and lessen noise. [Source: USDA NRCS, Windbreak / Shelterbelt Conservation Practice Job Sheet 380, April 1997]

31 – CULTURAL

Cultural includes multiple family housing – More than one family household per structure, for example, condominiums, townhouses, row houses and apartment buildings. Single family housing – One family or person per structure. Industrial/commercial – Supply yards, parking lots, shopping centers, factories, etc.

32 – RIGHTS-OF-WAY

Highways, improved roads, railroads, airports, pipelines, gas/oil wells, maintained levees, or power lines.

A canal that qualifies as census or noncensus water is coded as 3 or 4.

An improved road that specifically serves a Developed area such as a residence, parking lot, campground, or a cemetery is considered a part of that greater Developed NFLU, and is not delineated as a Right-of-Way so long as it remains within that Developed land use. Once that road departs from the specific Developed land use, it may be considered a Right-of-Way. Improved roads that are adjacent to Developed Nonforest areas, but do not uniquely serve those areas are considered rights-of-way and are not incorporated into the greater Developed condition.

A rail trail that is part of the "rail banking" program is classified as a R.O.W. The rail banking program, created by a congressional amendment in 1983 [to the 1968 National Trails System Act], allows the temporary, though often long-term, use of a disused rail corridor as a public trail while maintaining the option of reactivating the corridor for rail use. If a rail trail can be documented as being part of this program, then a rail trail is a R.O.W. Highly developed trails permanently surfaced with concrete, asphalt, or structural wood may be considered Rights-of-Way.

33 – RECREATION

Parks, campgrounds, playing fields, athletic, sports tracks, etc. Highly developed trails permanently surfaced with concrete, asphalt, or structural wood may be considered a Recreation Nonforest Land Use.

34 – MINING AND WASTELAND

Surface mining, gravel pits, dumps, landfills or reclaimed mining areas that are at least 1 acre and 120.0 feet in width. Note: Reclaimed mining areas are not always nonforest. Some trees such as black locust readily adapt to reclaimed areas. If the 10 %canopy cover requirement is met, the land is considered forest land. The field crew will make the decision of whether the land is productive or unproductive. Reclaimed mine areas should remain in this land use until either the 10% canopy cover threshold is met for accessible forest land or another nonforest land use applies.

42 – WETLAND

Areas subjected to periodic tidal flooding or other areas where water is present for extended periods during the growing season and for longer periods during the non-growing season. Water usually comes from rainfall, snowmelt, a rising water table, groundwater seepage, or incoming tides. Water may be present on the surface of wetlands for varying periods, as in flooded or ponded wetlands, or it may simply keep the underlying soils saturated near the surface with no surface water present. Wetlands include bogs, marshes, salt marshes, swamps, meadows and fens. [Source: Tiner]

Bogs are not always nonforest. Some tree species such as black spruce can adapt to bog conditions. If the 10% canopy cover requirement is met, the land is considered forest land.

Swamps are not always nonforest. Some tree species readily adapt to the swamp conditions. If the 10% canopy cover requirement is met, the land is considered forest land. Drained beaver ponds that are not stocked are included in this category.

43 – BEACH

Sandy or pebbly shore associated with an ocean or lake.

2.5.30N+WisCFI Canopy Cover Variables Overview:

NRS Note: Canopy cover variables are condition level variables that are collected on all CONDITION CLASS STATUS 1, 2, and 5 conditions. These variables have replaced the old NRS stocking check procedures. A condition now requires a minimum LIVE PLUS MISSING CANOPY COVER of 10% to be classified as forest land.

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

Homogenous areas: If the stocking density in the potential condition is at least somewhat homogenous with individual or groups of trees, or when you can't be positive that it is not homogenous, use the Subplot METHOD to determine if the area qualifies as forestland based on canopy cover measured on 2 subplots.

Isolated islands or groups of trees: In some cases, stocking density may not be homogenous, but will consist of multiple random groups or islands of trees, none of which meet the minimum forestland size requirement individually. Examples of such areas may include reverting fields, rangeland, pastures, areas of exposed bedrock, sand dunes / beaches, bogs, marshes, or clones of trees in an otherwise alpine environment. In these cases, the individual area associated with each group or island of trees and the intermingled undefined NF areas between them may be combined for purposes of meeting forestland size requirements. To calculate the area, draw a polygon around the stems of the combined groups and their intermingled undefined NF areas. If the resulting polygon meets forestland size requirements and the groups of trees obviously contain > 10% canopy cover, apply the same logic as is applied to the alternating strips of F and NF rule in Figure 9.aN to determine if the area qualifies as forestland. A polygon containing more F than NF will be called a forested condition. If the resulting area does not meet minimum size requirements or contains more NF than potential F, it will be considered NF and its' groups or islands of trees will be considered inclusions in the surrounding NF condition.

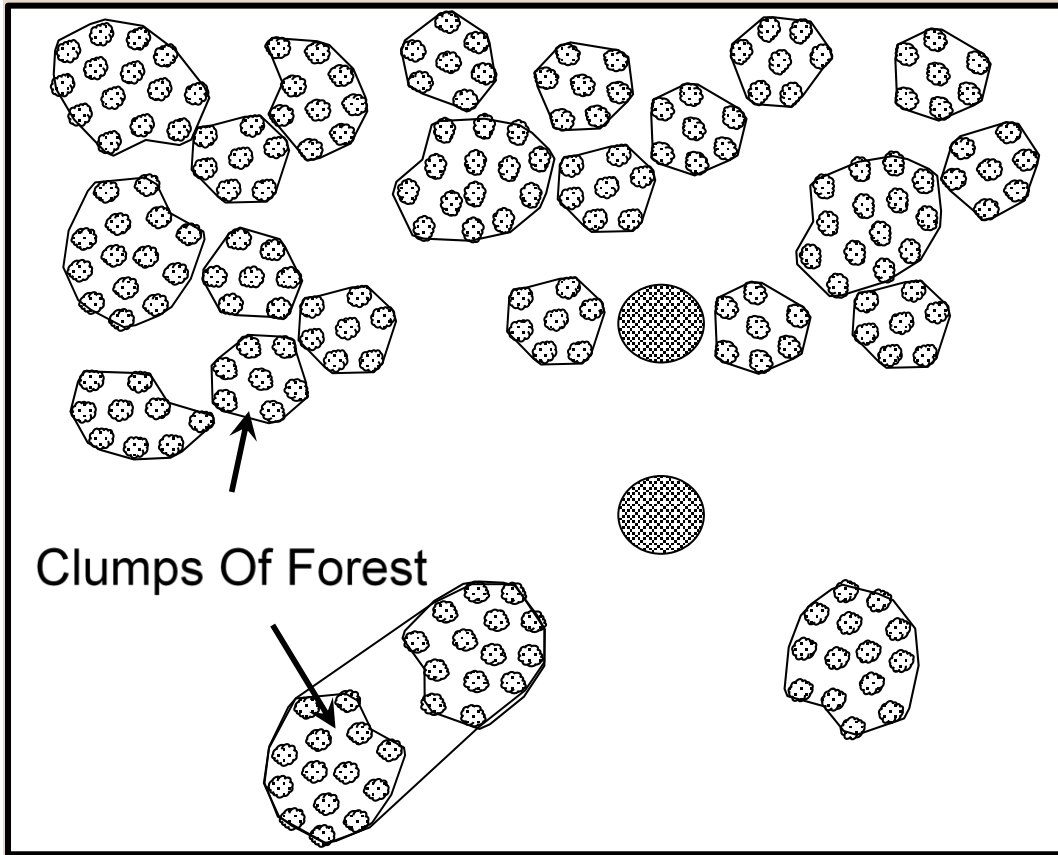


Figure 16.cN-WisCFI. Clumps of forest within an otherwise NF area.

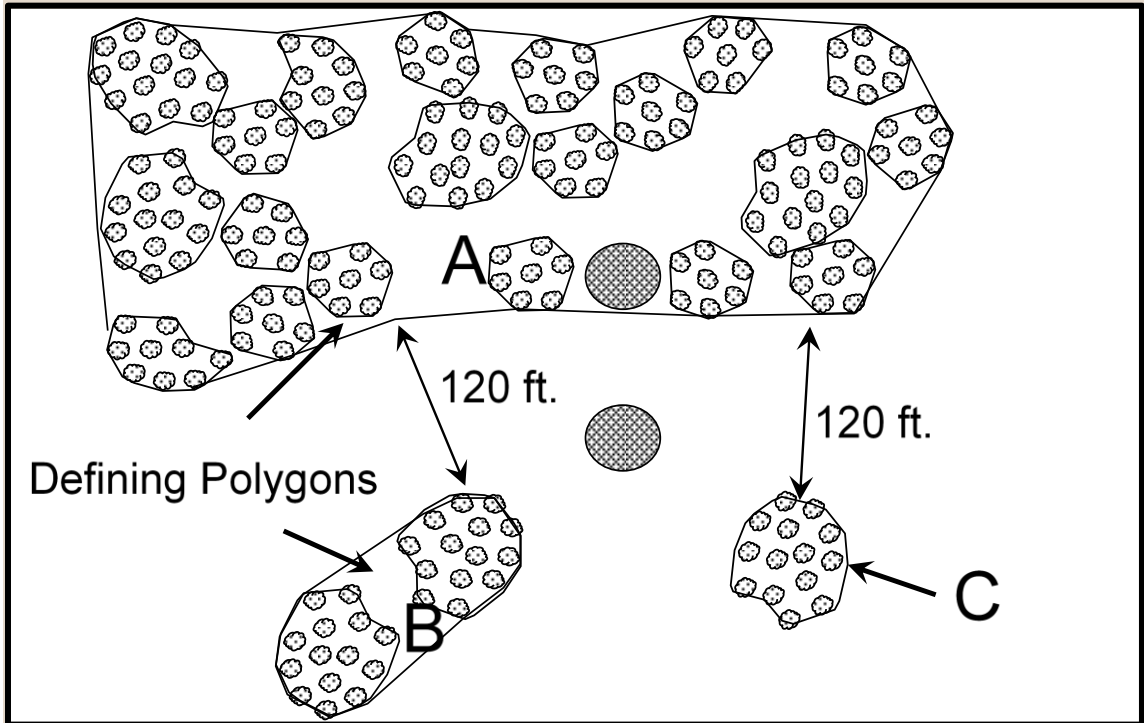


Figure 16.dN-WisCFI. The entire plot area consists of scattered clumps of forest. Neither the clumps nor the undeveloped treeless areas in between meet the width and/or acreage requirements to qualify as separate conditions. Clumps of forest that are within 120 ft. of each other are then combined into a defining polygon. Clumps that are beyond 120 ft. and surrounded by a defined NF condition are excluded. In this example, polygon A meets the size requirement for a separate condition, and is predominantly forested. Polygon A is therefore defined as a forested condition. Although polygon B and C are also predominantly forested, they do not meet the minimum size requirements for a condition. The entire area, outside of polygon A is therefore classified as Nonforest.

Condition 1 LIVE CANOPY COVER = approximately 10%, determined by the Ocular Method for the visual acre around subplot 1.

Condition 2 = Forested regardless of the percentage of canopy cover present on subplot 2. There is no reason to install 3 additional phantom points when dealing with such situations. Condition 2 LIVE CANOPY COVER = approximately 60%, determined by the Ocular Method within polygon A.

Inclusions: In order for a condition to be considered forest it must contain 10% canopy cover. When conducting a “canopy cover check” to determine if this threshold has been met do NOT include any canopy cover derived from inclusions.

Canopy cover from inclusions IS included when populating the canopy cover condition variable on the SUBPLOT/MACROPLOT CONDITION LIST for CONDITION CLASS STATUS 1, 2, and 5.

Canopy Cover Sample Methods: The Subplot Method should be used whenever it is not obvious that the condition meets the LIVE PLUS MISSING CANOPY COVER forest land canopy requirements.

Suggested methods to calculate LIVE CANOPY COVER AND LIVE PLUS MISSING CANOPY COVER:

- Ocular Method - If LIVE PLUS MISSING CANOPY COVER is <6% OR >14% OR any time the condition is developed for a nonforest land.
- Subplot Method - If LIVE PLUS MISSING CANOPY COVER is >6% and <14%
- SubAcre Method - If LIVE PLUS MISSING CANOPY COVER is >6% and <14% and the size or shape of the condition prevents the use of the Subplot method

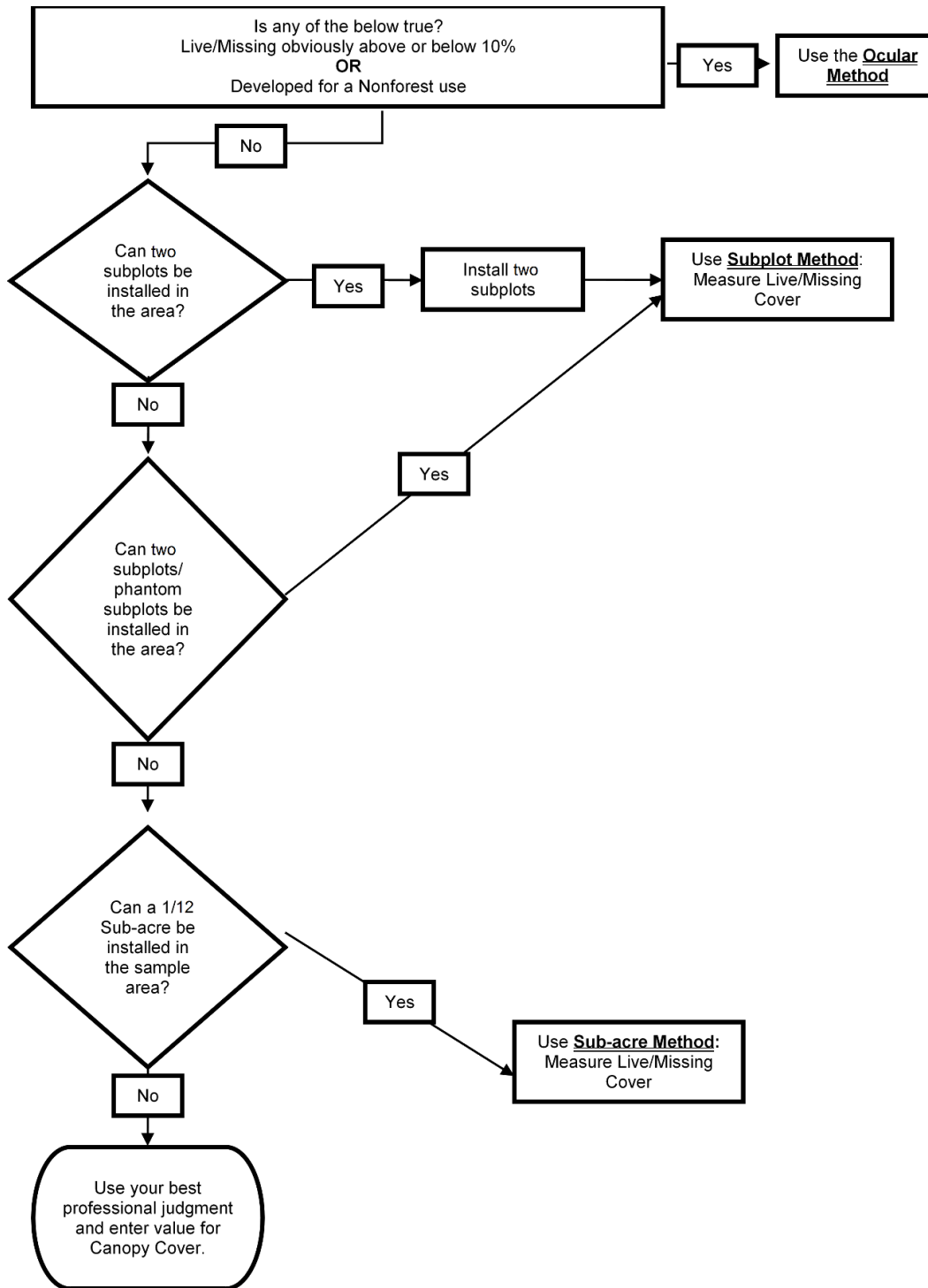


Figure 16.eN-WisCFI. CANOPY COVER SAMPLE METHOD flowchart.

2.5.30+N+WisCFI CANOPY COVER SAMPLE METHOD [CCSM]

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 CLASS STATUS 2 plots where access to the nonforest land cover area may be limited or the nonforest condition is a developed nonforest land use. Note that when the Ocular method is used, it is likely to be easier for the observer to ignore subplot boundaries and assess the percentage of tree canopy cover over the visual acre of the condition in question, without regard to the locations of the stems supporting the canopy over the plot.

NRS CORE Note: National defined "phantom subplots" are the equivalent to NRS defined "temporary subplots".

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 two 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 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.

NRS CORE Note: Seedlings and Saplings are counted in COVER calculations across the whole subplot, not just the microplot.

NRS CORE Note: TOTAL STEMS are calculated based on actual stem tally on points 1 - 2 in the PDR, no additional input by the crews is needed.

2. Install phantom subplots as necessary to yield two 1/24-acre sample areas that fall entirely within the questionable condition. Record the location of these phantom or temporary subplots on your two point plot sketch and monument with pins/dowels and flagging. Include reference trees (> 3 " DBH when they are available or otherwise trees < 3 " DBH may be used) along with their distance and azimuth from 'X' subplot. Establish phantom subplots using the following protocol:
 - a. Begin by locating the phantom subplots using the "highest" numbered regular subplot that falls in the questionable condition (e.g., 2 is the highest numbered regular subplot, then 1). The phantom subplots are located in the following fashion (1) 120.0 feet at 360 degrees, (2) 120.0 feet at 120 degrees.
 - b. If this fails to yield 2 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 2 subplots have been located in the questionable condition.

NRS CORE Note: Install pins and reference trees at all phantom subplots, when proper reference trees are not present use what you can find.

NRS CORE Note: When using the Ocular method to estimate LIVE CANOPY COVER and LIVE PLUS MISSING CANOPY COVER for conditions that do not contain two full subplots, use the visual acre surrounding the estimated location of your phantom subplots.

NRS CORE Note: If a portion of a plot falls in a Condition that is clearly Status 2 and the remaining portion falls in a reverting field of marginal canopy cover, 2 subplots/phantom subplots will need to be installed in the reverting field to check for 10% canopy cover to qualify for forest land. If the results turn out to be less than 10% canopy cover, the plot as a whole is defined as one Status 2 Condition. With only one Condition, the phantom subplots will be ignored and the Canopy estimates for the plot as a whole will be based on the original two subplots.

3. The Subplot method uses a 1/12 acre sample, so it would require a total of 363 ft² of LIVE PLUS MISSING CANOPY COVER to reach 10% threshold and be sampled as accessible forestland.

Acre method - **Not Collected in NRS**

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
1/12	34.0	3630	363

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

2.5.31+N+WisCFI LIVE CANOPY COVER [LCC]

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

Canopy widths are measured using the ellipse formula for calculation of canopy area. This requires two measurements. The first measurement is the long axis diameter. The second measurement is made at 90 degrees to the first measurement at the widest point of the crown (Figure 17). Canopy area = $\pi * ((\text{long axis diameter}/2) * (90 \text{ degrees axis diameter}/2))$.

NRS Note: LCC and can be calculated on the PDR. If calculating by hand use $\pi = 3.14$ in the above formula. Round all axis diameters to the nearest foot. Enter all seedlings whose crowns are less than 1' by 1' as 1' by 1'. Ctrl. C on the Allegro brings up the canopy calculator, enter length x width, number of occurrences, and live or missing – the system will keep a running total for the plot and the data will not be saved.

- Do not include the crown portion of trees, saplings, or seedlings that are vertically overtopped by other trees, saplings or seedlings whose stem originates within the PLOT.
- Hardwood seedlings must have a length of at least 1 foot and softwoods a length of at least 6" to be included in canopy cover.
- Ignore crowns from trees, saplings, and seedlings whose stems originate outside of the SUBPLOT area. These invading crowns can NOT overtop crowns originating within the SUBPLOT area.
- Grasses, herbs, shrubs, and non tally tree species are not considered when determining whether a crown is overtopped.
- Only include tree canopy measurements from trees with stems that originate within the sample area, although canopy measurements can extend outside the sample area. NRS Note: When a clump of trees are encountered within a subplot their combined crown can be measured as one unified crown. When stems from a clump of trees falls outside the subplot area, ignore the canopy cover associated with these stems.
- Trees, saplings, and seedlings originating within the entire SUBPLOT area are counted in this process.
- Do not compact canopy axis measurements (with exception of abnormal branches) even if trees are sparsely leafed. Canopy axis measurements are not compacted and are measured to the end of the branches regardless of how sparsely leafed the branches are.
- 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. For leaning/fallen trees whose current canopy position is part of the Canopy Cover, take its axis measurements as it would be if it were standing up. Do not count any canopy cover of any seedlings/saplings that are being overtopped by the fallen tree in its current position. However, if the leaning/fallen tree is overtopped by other trees/saplings, the over topped part of the fallen tree's canopy would not be added to the Canopy Cover estimate.
- NRS CORE Note: Approximately 462 seedlings with a canopy width of 1'x1' or less must be counted across all two subplots in order to reach 10% Cover (363 ft² of Cover).

- **NRS CORE Note:** A tree with a canopy width of approximately 22'x21' is approximately 10% Cover (363 ft² of Cover).

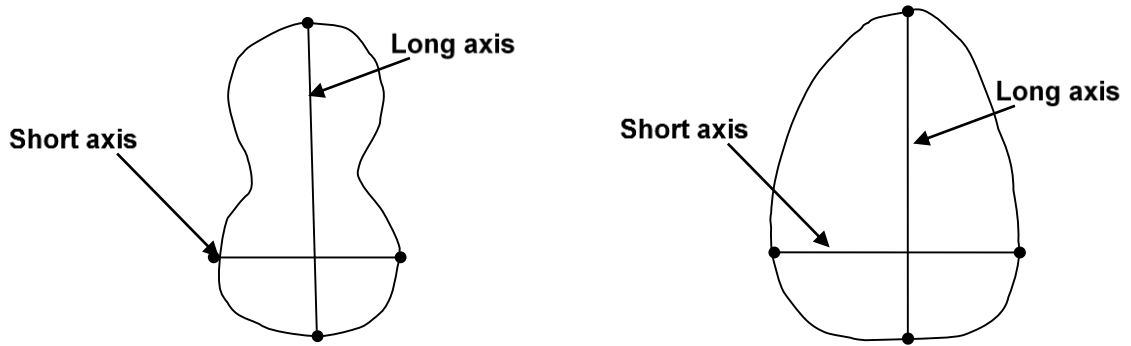


Figure 17. Examples of where to measure canopy widths.

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%)

NRS Note: When the CONDITION CLASS STATUS = 5 use the imagery provided with the plot packet to estimate both LIVE CANOPY COVER & LIVE PLUS MISSING CANOPY COVER for the acre surrounding plot center.

2.5.32+N LIVE PLUS MISSING CANOPY COVER [LMCC]

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

NRS Note: MISSING CANOPY COVER is any loss of canopy due to a DISTURBANCE or TREATMENT such as fire, windthrow, harvest, or other causes, at any time in the past, which is not associated with a land use conversion. The estimate of MISSING CANOPY COVER must be based on some evidence of the past canopy cover, as indicated by stumps and snags, or trees on adjacent undisturbed sites. DISTURBANCE is defined in Section 2.5.15 and TREATMENT is defined in Section 2.5.21.

- **Dead portions of live trees are not considered as missing unless it is part of the condition DISTURBANCE.**

- Stumps and dead trees are not considered unless they originate within the sample area and are a direct result of a defined DISTURBANCE OR TREATMENT.
- Do not double count canopy layers; any live canopy supersedes any presence of missing canopy; ignore portions of missing canopy that have live trees, saplings, and seedlings below them.
- Use your best professional judgment when estimating missing crowns from stumps. Take into consideration the spacing of the stumps and the size of any possible remaining live crowns in the area. Also ensure that your estimated missing crown is not overtopping any live crown cover when estimating missing cover.

NRS Note: If a DISTURBANCE prevents the establishment and survival of trees, such as in cases where forest land is converted to a marsh (STATUS 2) or a small pond (STATUS 3) by a beaver dam, only LIVE CROWN CANOPY will be counted towards LIVE PLUS MISSING CANOPY COVER.

NRS Note: LCC and LMCC receive the same values when CONDITION CLASS STATUS = 2.

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%)

2.5.33+N CURRENT AFFORESTATION CODE [CRAF]

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.

NRS CORE Note: For a more detailed description of deliberate afforestation, see Section 2.2, item 1. Accessible Forest Land.

NRS Note: Do not code Current Afforestation Code = 1 if Current or Previous were recorded for the same afforestation attempt in the defined Condition during last measurement. Reference the Condition Records section on the plotsheet to determine if Current or Previous were recorded as 1 last time.

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

2.5.34+N PREVIOUS AFFORESTATION CODE [PRAF]

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.

NRS CORE Note: For a more detailed description of deliberate afforestation, see Section 2.2, item 1. Accessible Forest Land.

NRS Note: In order to qualify for a Previous Afforestation Code = 1, the plot must be SK 1 or have been an office plot during the previous cycle. In addition, do not record Previous Afforestation Code = 1 for any afforestation that has occurred prior to the last two measurements, both field and office.

If the plot was visited during the previous cycle, the previous crew should have recognized any afforestation that had occurred and coded the condition as forested. If the crew failed to identify afforestation, code Previous and Current as 0 and assign a Reconcile code of 7 (Cruiser Error) for any saplings that are now present on plot. Reference the Condition Records section on the plotsheet to determine if Current or Previous were recorded as 1 last time.

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

2.5.35+N TOTAL STEMS [STEM]

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

NRS Note: For both Condition Status 1 and 2, TOTAL STEMS will be determined by the STEMS calculator in the PDR based on the actual stem count tallied. The STEMS calculator will provide an option to override this calculation and enter an estimated STEM count based on field observations, but NRS policy is to only accept the STEM value produced by the calculator.

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

2.5.36 CHAINING CODE [CHAN]

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

2.5.37NPRIVATE OWNER INDUSTRIAL STATUS [INDU] Not Collected in WisCFI

2.5.38N-WisCFI FOREST HABITAT TYPE

See section 12.0N-WisCFI WisCFI FOREST HABITAT TYPE IDENTIFICATION

2.5.38.1N-WisCFI HABITAT TYPE [HTCD]

When collected: CONDITION CLASS STATUS = 1

Field width: 3 digits

Tolerance:

MQO:

Values: 1 -- 100

2.5.38.2N-WisCFI HABITAT TYPE ID METHOD [HTMD]

When collected: CONDITION CLASS STATUS = 1

Field width: 1 digit

Tolerance:

MQO:

Values:

- 1 on site
- 2 extrapolated
- 3 undefined

3.0+N+WISCFI 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.

NRS CORE Note: Subplot 2 is located 120.0 feet horizontal (+/- 7 feet tolerance for initial establishment) at azimuths of 360 degrees, from the center of subplot 1. The center of the microplot is offset 90 degrees and 12.0 feet horizontal (+/- 1 foot tolerance for initial establishment) from each subplot center. If a subplot or microplot was installed incorrectly at the previous cycle, remeasure the subplot or microplot in its present location, make a notation in the plot record, and contact a field supervisor. [Preceding paragraph paraphrased from Section 0.1 Plot Setup.]

NRS CORE Note: A subplot with forest land may be difficult to occupy for accurate tree data measurements due to inaccessibility of the subplot center (e.g., seasonal high water, busy road way, etc.). In the case of water, some inaccessibility can be minimized by accessing a plot during low tide, the dry season, or after winter freezing. Crews should do their best to safely occupy the subplot center. If necessary, a crew should return to a plot with additional gear so a subplot can be safely occupied. If the condition limiting access is temporary, crews should return to plot when site can be accessed safely. However, if a subplot cannot be done safely, the entire subplot should be classified as **CONDITION CLASS STATUS = 5** and **SUBPLOT NONSAMPLED REASON = 03**. Crews should also be aware that each state has a sample of plots that are completed during the summer window. This sample includes P3 plots. For these plots, do your best to occupy the plot and collect the data. Anytime a subplot cannot be occupied, a **PLOT NOTE** is required explaining conditions that prevented occupancy.

NRS CORE Note: When a potentially forested portion of a subplot cannot be measured because the subplot center falls under a building, the entire subplot should be classified as a **CONDITION CLASS STATUS = 5** with a **CONDITION NONSAMPLED REASON** code = 10.

NRS CORE Note: Subplots and microplots are monumented by either a metal pin or wooden dowel. Only a single marker is required at the subplot or microplot centers. The current crew should replace a marker if it has deteriorated. The replaced marker should be removed from the plot site. If the old marker is not found, write a **PLOT NOTE** indicating that a new marker has been set by triangulating from existing tally trees or reference trees. Crews should be careful that edge trees (subplot or microplot) that were correctly determined to be "out or in" by the previous crew are not now "in or out" when replacing a marker.

3.1+N+WisCFI SUBPLOT NUMBER

Record the code corresponding to the number of the subplot.

NRS PDR Note: This variable is determined by the subplot selection in the MIDAS PDR Application.

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 Not Collected in WisCFI
- 4 Southwest subplot Not Collected in WisCFI

3.2+N SUBPLOT/MACROPLOT STATUS [STAT]

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.

NRS CORE Note: Reference Section 2.1.1, NRS Note, when determining if a separate condition is defined under these guidelines.

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+WisCFI SUBPLOT NONSAMPLED REASON [REAS]

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 **WDNR** boundary – Assign this code to condition classes beyond the **WDNR** 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. **Not Collected in WisCFI**
- 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) **and it is impossible for the crew to return to complete the data collection**. 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. **Not Collected in NRS**
- 06 Lost plot – Entire plot cannot be found. Used for the **two** 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. **Not Collected in NRS**
- 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. **Not Collected in NRS**
- 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. **Not Collected in NRS**
- 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. **Not Collected in WisCFI**

3.4 NONFOREST SUBPLOT/MACRO PLOT STATUS **Not Collected in NRS**

3.5 NONFOREST SUBPLOT/MACRO PLOT NONSAMPLED REASON **Not Collected in NRS**

3.6 SUBPLOT CENTER CONDITION **[SCEN]**

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

3.6.1N SUBPLOT PIN FOUND

Record the code to indicate if a previously placed pin was found on the subplot.

When collected: SUBPLOT STATUS = 1, 2, or 4

Field Width: 1 digit

Tolerance: No errors

MQO: At least 99% of the time

Values:

- 0 No
- 1 Yes

3.7 MICRO PLOT CENTER CONDITION **[MCEN]**

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

3.7.0.1N MICROPLOT PIN FOUND

Record the code to indicate if a previously placed pin was found on the microplot.

When collected: SUBPLOT STATUS = 1, 2, or 4
Field Width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

0	No
1	Yes

3.8+N SUBPLOT SLOPE [SLOP]

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 center 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.

NRS Note: If subplot is partially forested, the slope is determined across the entire subplot—record slope even if <5%. Use previous crew SUBPLOT SLOPE and ASPECT measurements if within tolerance of your measurement. If worried about QA, record your actual measurement in the note section.

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+N SUBPLOT ASPECT [ASP]

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

- If aspect changes gradually across the subplot, record an average aspect.
- If aspect changes across the subplot but the aspect is predominately of one direction, code the predominate direction rather than the average.
- If the subplot center falls directly 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.

NRS Note: If SUBPLOT SLOPE is less than 5 percent, Subplot Aspect = 000. If subplot is partially forested, the aspect is determined across the entire subplot. Use previous crew SUBPLOT SLOPE and SUBPLOT ASPECT measurements if within tolerance of your measurement. If worried about QA, record your actual measurement in the note section.

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+N SNOW/WATER DEPTH [SWD]

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.

NRS Note: If snow amounts are excessive on the microplot, the seedling tally as described in Section 6.0 Seedling Data is restricted to seedlings visible above the snow. Do not excavate snow from the microplot to achieve a better measurement. This practice may compromise the integrity of the microplot by exposing seedlings and other vegetation to animal browsing; and by exposing seedlings to extreme temperatures that may lead to mortality.

NRS Note: Disregard permanent bodies of water such as streams.

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 [CLST]

This is a listing of all condition classes located within the 24.0 - foot radius around the subplot 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 zeroes. 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

3.18 UNLISTED TREE PRESENT

The FIA species list is the result of consultations among arborists, foresters, and forest specialists around the Nation. Although it is a comprehensive list that will account for the majority of tree form species that crews may encounter in the field, it is still possible for crews to encounter a species that was unintentionally OR intentionally excluded from the list due to growth form that, due to local environmental conditions, is now presenting in a tree growth form. The purpose of this variable is to provide information on such species in an attempt to further refine the species list in future inventories.

An UNLISTED TREE is defined as a live tree that is at least 5.0 inches DBH / DRC located within a subplot that is not on the Master Species List OR is on the list but is found within an exclusion zone where it is not a legal tally tree. Record the presence of any UNLISTED TREES found on the subplots.

When collected: All subplots with CONDITION CLASS STATUS = 1; CONDITION CLASS STATUS = 2, 3, 4 when completing nonforest inventories

Field width: 1 digit

Tolerance: No errors

MQO: At least 90% of the time

Values:

0 No unlisted trees present.

1 Unlisted tree present.

3.19 UNLISTED TREE GENUS

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

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

- 3.20 UNLISTED TREE SPECIES
Record the species of each UNLISTED TREE GENUS recorded.

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

- 3.21 UNLISTED TREE SPECIES COUNT
Record the number of instances each UNLISTED TREE SPECIES is encountered on the plot.
Estimate counts over 10 individuals.

When collected: For each UNLISTED SPECIES encountered
Field width: 2 digits
Tolerance: +/- 10%
MQO: At least 70% of the time
Values: 1 to 99

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

When collected: All UNLISTED TREE SPECIES records. Collected in NRS, RMRS
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

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

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

When collected: When UNLISTED TREE SPECIMEN COLLECTED = 1. Collected in NRS, RMRS.

Field width: 5 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: 1 to 99999, as pre-assigned by unit

- 3.24 UNLISTED TREE NOTES
Notes are required for each UNLISTED TREE SPECIES record. Enter text that describes the species or that explains why it was not collected if collection was required but not done. This text may be used on the specimen label and any spreadsheet used to track specimens. Use the notes section to provide any information about sources used to identify the species of the UNLISTED TREE.

PDR Note: Record this note while in the UNLISTED TREE SPECIES record. Press the “Ctrl”+“N”.

Listed are some examples of why a specimen may not be collected:

- • Species has less than 1% canopy cover on the subplot and no mature foliage or reproductive parts are present.
- Hazardous situation.
- Time limitation.
- Other (explain in notes).

When collected: Required for each UNLISTED TREE SPECIES record

Field width: Unlimited alphanumeric character field

Tolerance: N/A

MQO: N/A

Values: English language words, phrases, and numbers

4.0+N 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.

NRS CORE Note: Reference Section 2.1.1, NRS Note, when determining if boundaries are required between CONDITION CLASS STATUSes.

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+N 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.

NRS Note: Not all boundaries are straight lines. The straight lines determined by the boundary referencing procedure should not be used to assign a tree's condition number.

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 (Figure 18 and Figure 19). 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.

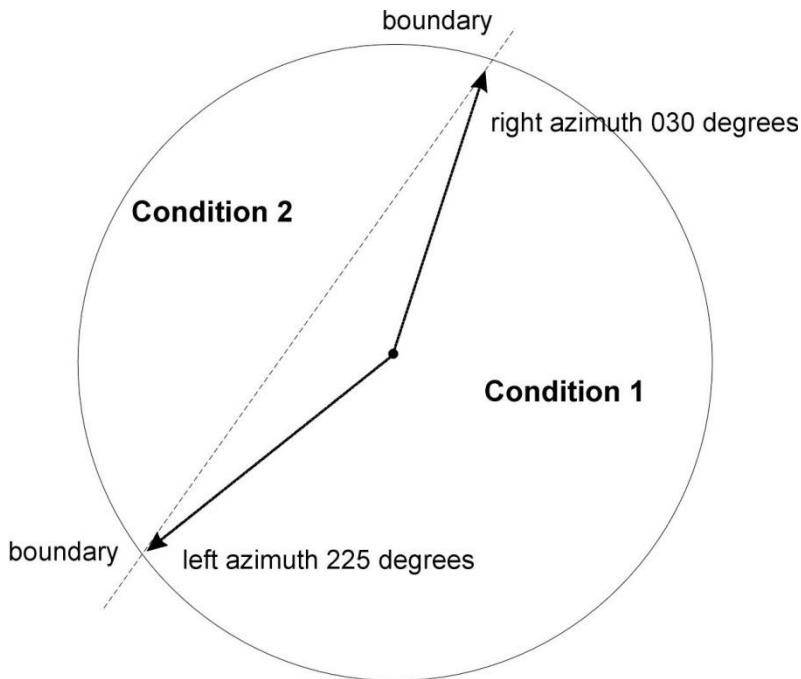


Figure 18. How to measure a straight boundary on a microplot, subplot, or macroplot.

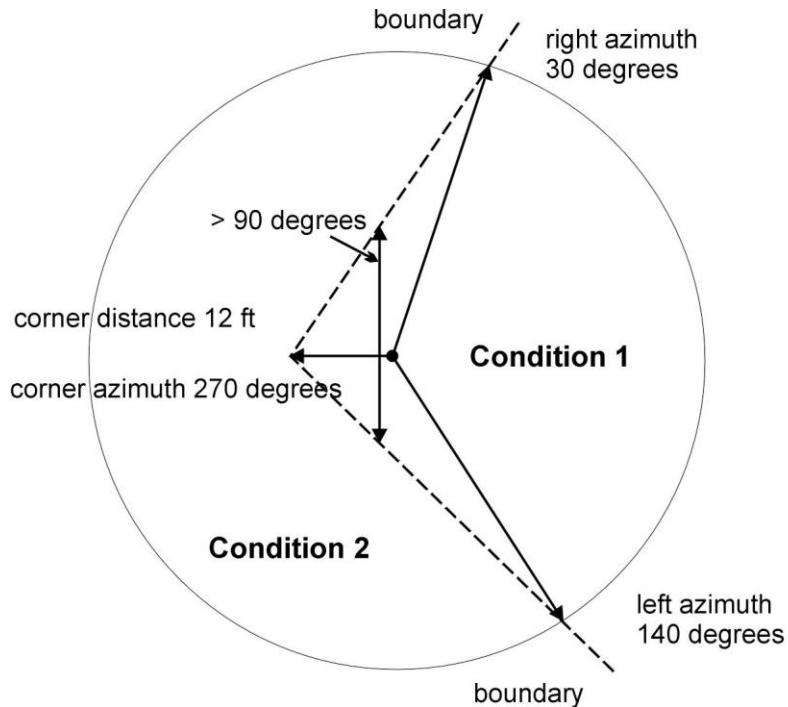


Figure 19. How to measure a boundary with a corner on a subplot or macroplot.

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 Section 2.1 and Section 2.4 for general condition class delineation guidelines. The following additional rules apply when referencing a boundary within a subplot 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 **current** 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. (See NRS Note in the **BOUNDARY CHANGE** section.)

4.2 Boundary Data

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

4.2.1+N SUBPLOT NUMBER

Record the code corresponding to the number of the subplot.

NRS PDR Note: This variable is determined by the subplot selection in the MIDAS PDR Application.

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 Not Collected in WisCFI
- 4 Southwest subplot Not Collected in WisCFI

4.2.2 PLOT TYPE [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+N BOUNDARY CHANGE [CHNG]

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

NRS Note: On remeasurement plots, if the current azimuths are within 10 degrees of the previous azimuths and no physical change has taken place, record the previous crew's boundary data. **BOUNDARY CHANGE = 0.**

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 [CCON]

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 [LAZM]

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 [CAZM]

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 [CDIS]

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 [RAZM]

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

4.2.9N PERCENT AREA [%ARE]

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

When collected: All boundaries

Field width: 3 digits

Tolerance: N/A

MQO: N/A

Values: 001 to 100

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

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

NRS CORE Note: DRC procedures are applied only on Rocky Mountain Juniper (*Juniperus scopulorum*) – species code 0066 – in the states of KS, NE, ND and SD. This species is generally found in the western half of these states.

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. If the stem is broken and still attached below DBH, the stem is tallied as a live tree. The severity of the break (i.e., more or less than 50% attached) on a live stem is not considered. Therefore as long as the stem is attached and the tree is live at DBH, it is tallied. See Figure 20.aN.

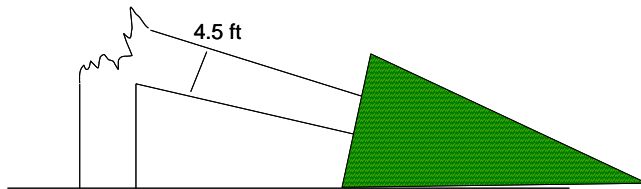


Figure 20.aN. Example of a live tree with a broken stem below 4.5 feet.

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.

NRS Note: Dead trees where the bole is separated greater than 50 percent at 4.5 feet (or previous DBH height) but maintains a DBH of 5.0 inches or greater will be measured as a

Standing Dead tree. ACTUAL LENGTH will be coded the same as LENGTH TO DIAMETER MEASUREMENT POINT rounded to the nearest foot in this situation.

For woodland species (Appendix 3+N) with multiple stems, a tree is considered down if more than 2/3 of the volume is no longer attached or upright; do not consider cut and removed volume. For woodland species with single stems to qualify as a standing dead tally tree, dead trees must be at least 1.0 inch in diameter, be at least 1.0 foot in unbroken ACTUAL LENGTH, and lean less than 45 degrees from vertical.

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

Trees that have been cut above DBH qualify as tally trees, provided they meet the size requirement.

NRS Note: Trees that have been cut above DBH no longer qualify as STANDING DEAD. This includes trees with high stumps and trees that have been cut with wood remaining at DBH (i.e., barber-chair). High stumps are usually a result of winter harvesting due to excessive snow total amounts. In addition, high stumps on trees with natural butt-swell (where it is normal to cut above 4.5 ft.) do not qualify as standing dead trees.

The following apply at remeasurement:

- If at the previous visit a forked tree was recorded as two separate trees but should have been recorded as one tree, reconcile one tree and correct the diameter for the remaining tree. Give one of the tree data lines a PRESENT TREE STATUS = 0, RECONCILE = 7, and a TREE NOTE in the PDR. The remaining tree data line receives PRESENT TREE STATUS = 1 or 2 with DIAMETER CHECK = 2, and a TREE NOTE in the PDR.
- 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 in the PDR. The second stem would get PRESENT TREE STATUS = 1 or 2, RECONCILE 7 or 8, and a TREE NOTE in the PDR.

NRS Note: If a subplot was installed incorrectly at the previous visit, the current crew should remeasure the subplot in its present location. In cases where individual forested subplots are lost (cannot be relocated and is not a land use change), apply the following procedures:

- Assign PRESENT TREE STATUS = 0 and RECONCILE = 7 to all downloaded trees (i.e., incorrectly tallied at the previous survey)
- Assign PRESENT TREE STATUS = 1 or 2 AND RECONCILE code 7 (i.e. Cruiser Error) to all trees on the new installed subplot with the next new TREE RECORD NUMBER for that subplot.

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+N+WisCFI SUBPLOT NUMBER

Record the subplot number where the tree occurs.

NRS PDR Note: This variable is determined by the subplot selection in the MIDAS PDR Application.

When collected: All tree records

Field width: 1 digit

Tolerance: No errors

MQO: At least 99% of the time

Values:

- 1 Center subplot
- 2 North subplot
- 3 Southeast subplot Not Collected in WisCFI
- 4 Southwest subplot Not Collected in WisCFI

5.2+N TREE RECORD NUMBER [TR#]

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.

NRS PDR Note: A new TREE RECORD NUMBER is assigned in the field. The next available tree number is on the printed plot sheets and is also an option on the MIDAS PDR Application. Click “Ctrl+C” on the PDR for the Next Tree Number. If a Remeasurement Tree is missing from the electronic data file, enter the data using the assigned tree number from the previous cycle’s printed tree data and enter all associated previous history data.

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 tree records

Field width: 3 digits

Tolerance: No errors

MQO: At least 99% of the time

Values: 000 or 001 to 999

5.3+N CONDITION CLASS NUMBER [CON#]

Record the CONDITION CLASS NUMBER in which each tree is located. Often, a referenced boundary is approximate and may or may not represent the actual “on the ground” boundary, and trees selected for tally are assigned to the actual condition in which they lie regardless of the recorded approximate boundary (Figure 20).

NRS CORE Note: Trees and saplings are tallied only on accessible forest land. Trees and saplings that were previously measured on forest land and now fall in a nonforest condition require minimal tree data collection. See 5.34N FOREST TO NONFOREST VARIABLES for a listing of these variables.

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

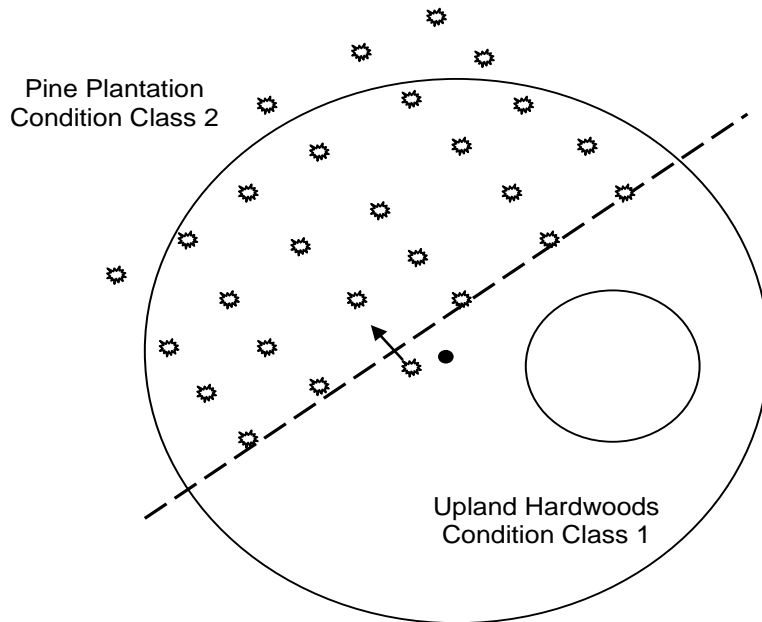


Figure 20. Ragged CONDITION CLASS boundary and tree condition class designation.

5.4+WisCFI AZIMUTH [AZM]

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+N). The geographic center is a point of equal distance between all tallied stems for a given woodland tree. Record AZIMUTH to the nearest degree. Use 360 for north.

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

5.5+N+WisCFI HORIZONTAL DISTANCE [DIST]

Record the measured HORIZONTAL DISTANCE, to the nearest 0.1 foot, from the subplot center (for trees greater than or equal to 5.0 inches DBH/DRC) or microplot center (for trees greater than or equal to 1.0 inch and less than 5.0 inches DBH/DRC) to the pith of the tree at the base. For all multi-stemmed woodland trees (woodland species indicated in Appendix 3+N), 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.

The following are additional regional instructions to determine HORIZONTAL DISTANCE for trees that lean, are windthrown, or on steep terrain.

- A leaning tree is determined to be "in" or "out" of a plot radius by measuring the horizontal distance from plot center to the center of the tree at the base. The direction that the tree leans is of no consequence.
- For a LIVE down and windthrown tree, measure the horizontal distance to the spot where the center of the tree would have been if the tree was still standing (i.e., measure the distance to the center of the stump, or ground cavity). This guideline applies to New plots as well as Remeasurement plots. See Figure 20bN below.

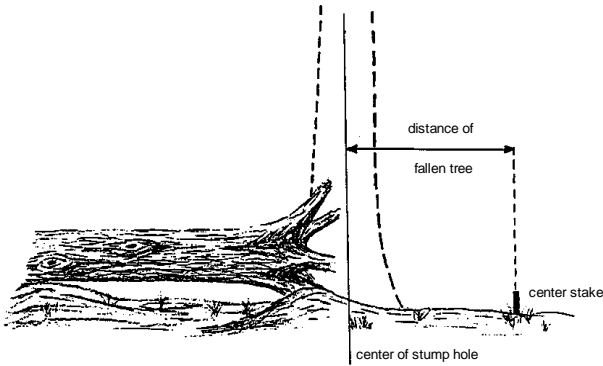


Figure 20.bN. Down and Windthrown Tree.

NRS Note: If the main bole is below the duff line (The general pith line of the main bole is below the duff layer.) reference 5.9.2 Figure 45 for more instructions.

- When direct horizontal distance cannot be accurately measured due to steep terrain, slope distance and percent slope (both measured with a clinometer parallel to the ground) should be used to calculate the horizontal distance. See below formula and Figure 20.cN.

$$\frac{\text{measure slope distance to tree}}{100 \text{ ft slope distance}} = \frac{\text{horizontal distance to tree}}{100 \text{ ft horizontal distance}}$$

For example, a tree has a slope distance of 25.9 ft and the slope is 48 %. Using the Slope Correction table in the Regional Appendix E, you find that the correction for 100 ft with 48 % slope is 10.9 ft.

All that's left is to solve the equation:

$$\frac{25.9 \text{ ft}}{110.9 \text{ ft}} = \frac{\text{horizontal distance to tree}}{100 \text{ ft}}$$

Solve for the horizontal distance, HD = 23.4 ft.

NRS PDR Note: If the MIDAS PDR Application is available, there is a function utility that allows you to determine horizontal distance. For this utility enter the measured slope distance and the percent slope and the utility calculates a horizontal distance.

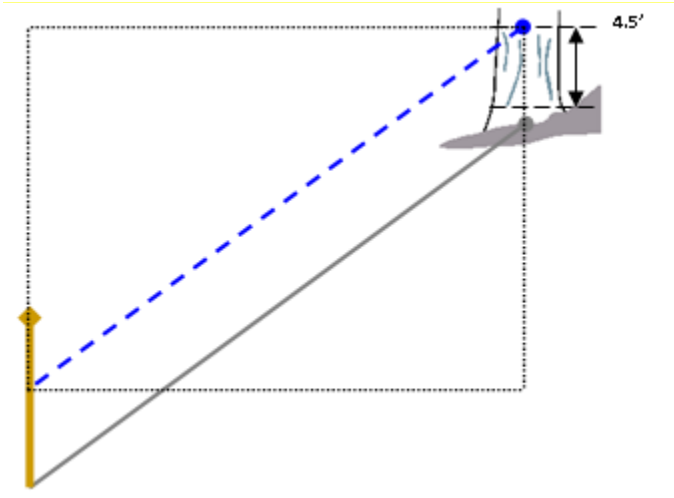


Figure 20.cN. A slope distance (dashed line) is measured parallel to the ground from the subplot center to the center of the tree and percent slope is measured along this dashed line (slope distance).

There is an alternative method to measure the slope distance and percent slope as shown in Figure 20.dN. Either measurement method will yield a horizontal distance when applied to the formula on the previous page or entered into the horizontal distance utility in the MIDAS PDR Application.

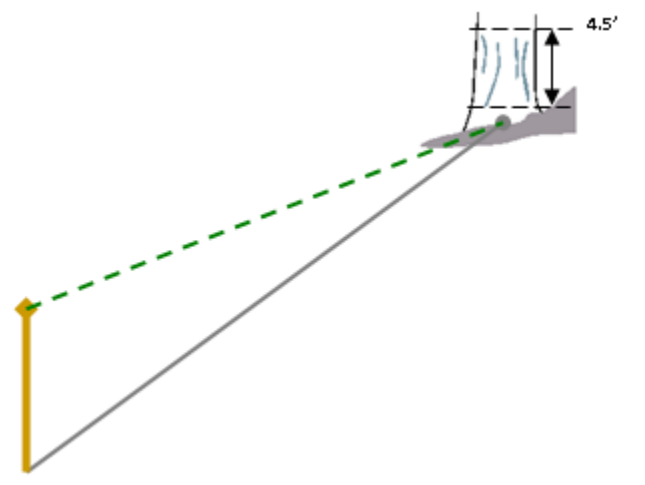


Figure 20.dN. A slope distance (dashed line) is measured from the subplot center to the center of the tree and percent slope is measured along the dashed line (slope distance).

NRS Note: If a previous tree is located on the "outer" edge of a subplot (i.e., 23.8 to 24.2 ft to the pith of the tree at the base), then apply the following rules. If the current crew determines a previously tallied tree is now at ≤ 24.2 ft, the tree will remain IN. Similarly if the current crew determines that a previously non-tallied tree is ≥ 23.8 ft, the tree will remain OUT unless it is considered ingrowth. This also applies to saplings on the microplot's "outer" ring (i.e., 6.6 to 7.0 ft to the pith of the tree at the base). On the microplot, a previously tallied sapling is now at ≤ 7.0 ft, the sapling will remain IN. If a previously non-tallied sapling is at ≥ 6.6 ft, the sapling will remain OUT unless it is considered ingrowth. This allowance is due to the difficulty of determining pith location and other factors like slope and subplot and/or microplot center relocation.

When the old pin or dowel is not found, the current crew should make sure that all “edge” trees or saplings that were in or out on the previous occasion, are still in or out unless ingrowth.

Borderline trees that either fall just outside the 24.0 ft or 6.8 ft circle or are just under 5.0 inches or 1.0 inch require some type of indication that they should not be considered missed. To ensure these trees are handled properly by a QA crew or the next field crew, either make a mark on the tree or place a Note on the plotsheet indicating the tree is out or too small. The mark could include but is not limited to a scribe mark on thick bark trees or a line from a permanent marker.

NRS PDR Note: Change the previous recorded distance if it does not meet the indicated regional tolerance for trees. Example, if the previous distance was recorded as 15.2 and the current distance is now 16.0, the previous value is satisfactory. There is no need to change this value unless the previous distance causes current on the ground confusion like trees located in a clump. In these situations it makes sense to change this distance even if the previous distance is within tolerance.

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 inch DBH and standing dead tally trees ≥ 5.0 inches DBH
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 ft. to 06.8 ft.

Subplot: 00.1 ft. to 24.0 ft.

Annular plot: 24.1 to 58.9

5.6 PREVIOUS TREE STATUS [PAST]

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

When collected: On remeasurement plots (SAMPLE KIND = 2), all previously tallied trees ≥ 1.0 inch DBH

Field width: 1 digit

Tolerance: No errors

MQO: At least 95% of the time

Values:

1 Live Tree – alive at the previous inventory

2 Dead tree – standing dead tree at the previous inventory

5.7+N+WisCFI PRESENT TREE STATUS [TRST]

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 to the proper component of change.

NRS CORE Note: A remeasured tree that is now in a “nonforest” condition is assigned the appropriate PRESENT TREE STATUS. For example, a tree that was previously live in accessible forest land and is still present and live in a residential area is coded as 1. If the tree has died (includes trees that have been removed and not utilized), it is coded as 2. If the tree has been removed and utilized, it is coded as 3. If the PRESENT TREE STATUS cannot be determined for a tree now in a “nonforest” condition (i.e., crew is unable to occupy the subplot), apply code 2 or 3. When applying code 2 or 3, apply known local utilization practices or best professional judgment for a tree that is now located in a nonforest condition.

NRS Note: When occupying accessible forest land, a remeasured tree that has a temporary hazardous situation (e.g., hornet’s nest, seasonal high water, etc.) isolating the tree on the subplot or microplot, should not be given a PRESENT TREE STATUS = 0. These trees should be given PRESENT TREE STATUS = 1 or 2 and the crew is allowed to estimate the measured variables. When estimating measured variables, view similar trees on plot and be conservative. For a new tree, these same rules apply. A tree that occupies a permanent hazardous situation requires that the subplot area be delineated as nonsampled (CONDITION CLASS STATUS 5).

NRS Note: If the current CONDITION of previous tally trees converts from forest to nonforest between cycles, reference “Condition Change from Forest to Nonforest” in Regional Appendix C to determine required Tree and Sapling variables.

When collected: All new live tally trees ≥ 1.0 inch DBH and all new standing dead tally trees ≥ 5.0 inches

On remeasurement plots, all previously tallied trees

Field width: 1 digit

Tolerance: No errors

MQO: At least 95% of the time

Values:

- 0 No status – tree is not presently in the sample (remeasurement plots only). Tree was incorrectly tallied at the previous inventory, currently is not tallied due to definition or procedural change, or is not tallied because it is located on a Nonsampled Condition (i.e., hazardous or denied), or is not tallied because it is located on a Nonsampled Condition (i.e., hazardous or denied). Requires RECONCILE code = 5-9.
- 1 Live tree – any live tree (new, remeasured or ingrowth)
- 2 Dead tree – any dead tree (new, remeasured, or ingrowth), regardless of cause of death. Includes all previously standing dead trees that no longer qualify as standing dead, trees killed by silvicultural or land clearing activity and assumed not to have been utilized, as well as dead trees that may have been present at the time of plot establishment but only tallied now due to procedural change.
- 3 Removed – A tree that has been cut and removed by direct human activity related to harvesting, silviculture or land clearing (remeasurement plots only). The tree is assumed to have been utilized.

Note: On remeasured plots, crews must collect new AZIMUTH and HORIZONTAL DISTANCE information from the subplot center for microplot saplings that grow to become subplot trees. For live 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+N+WisCFI RECONCILE [RECO]

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

When collected: On SAMPLE KIND = 2; All new live tally trees ≥ 1.0 inch DBH and all new standing dead tally trees ≥ 5.0 inches (PRESENT TREE STATUS = 1 or 2 and no PREVIOUS TREE STATUS) and all no status previously tallied trees (when PRESENT TREE STATUS = 0)

Field width: 1 digit

Tolerance: No errors

MQO: At least 95% of the time

Values:

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

- 1 Ingrowth – either (a) a new tally tree not qualifying as through growth or (b) a new tree on land that was formerly nonforest and now qualifies as forest land unrelated to cruiser error or procedural / definition change.
- 2 Through growth – new tally tree 5.0 inches DBH/DRC and larger, within the microplot, which was not missed at the previous inventory (i.e., grew from seedling to at least 5.0 inches DBH between plot inventory cycles – such trees were never tallied on a microplot). Code is valid on SK 2. Extremely rare for NRS.

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

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

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

- 6 Physical movement – tree was either (a) correctly tallied in previous inventory, but has now moved beyond the radius of the plot due to natural causes (e.g., small earth movement, hurricane), or (b) outside the radius of the plot previously, but has now moved within the plot due to natural causes. Tree must be either live before and still alive now or dead before and dead now. If tree was live before and now dead, this is a mortality tree and should have PRESENT TREE STATUS = 2 (not 0).

- 7 Cruiser error – tree was either (a) erroneously tallied (added tree), or (b) erroneously not tallied (missed tree) at the previous inventory.
- 8 Procedural change – tree either (a) was tallied at the previous inventory, but is no longer tallied due to a definition or procedural change, or (b) was not tallied at the previous inventory, but is now tallied due to a definition or procedural change.
- 9 Nonsampled area - tree either (a) was located in a sampled condition at the previous inventory, but now is in a nonsampled condition, or (b) the area where the tree is located was previously not sampled, but now is sampled. All trees located in a nonsampled area (either now or previously) have 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+N+WisCFI STANDING DEAD [DEAD]

Record the code that describes whether or not a tree qualifies as standing dead. To qualify as a standing dead tally tree, dead trees must be at least 5.0 inches in diameter, have a bole that has an unbroken ACTUAL LENGTH of at least 4.5 feet, and lean less than 45 degrees from vertical as measured from the base of the tree to 4.5 feet. For standing dead trees that are curved or bent, apply the same rules (i.e., from the base of the tree to 4.5 feet). See Figure 21-Figure 23.bN for examples. “Unbroken” is defined as at least 50 percent attached to the original source of growth.

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.

NRS Note: Dead trees where the bole is separated greater than 50 percent at 4.5 feet but maintains a DBH of 5.0 inches or greater will be measured as a Standing Dead tree. ACTUAL LENGTH will be coded as 5 feet in this situation.

For woodland species (Appendix 3) with multiple stems, a tree is considered down if more than 2/3 of the volume is no longer attached or upright; do not consider cut and removed volume. For woodland species with single stems to qualify as a standing dead tally tree, dead trees must be at least 1.0 inch in diameter, be at least 1.0 foot in unbroken ACTUAL LENGTH, and lean less than 45 degrees from vertical.

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

NRS Note: Dead standing Remeasurement Trees that have dropped below 5.0 inches on the subplot due to loss of bark will be given a PRESENT TREE STATUS code of ‘2’ and a STANDING DEAD code of ‘0’. These trees no longer qualify as a STANDING DEAD but they still need to be accounted for in the sample. They would not receive a PRESENT TREE STATUS code of ‘0’.

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 (includes a previously tallied tree that is still standing but with a current diameter < 5.0 inches DBH)
- 1 Yes – tree does qualify as standing dead.

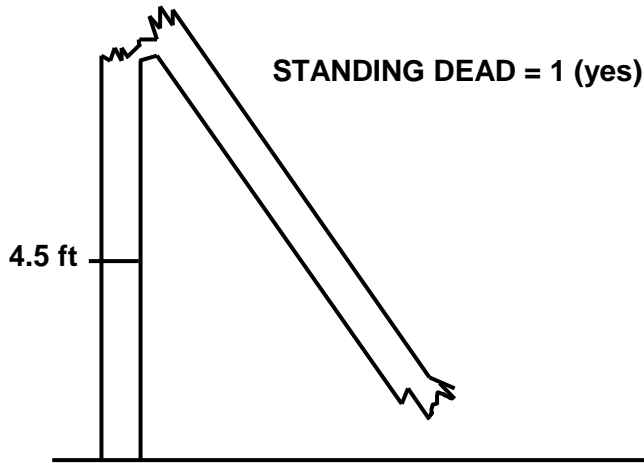


Figure 21-WisCFI. Example of an unbroken bole to 4.5 feet.

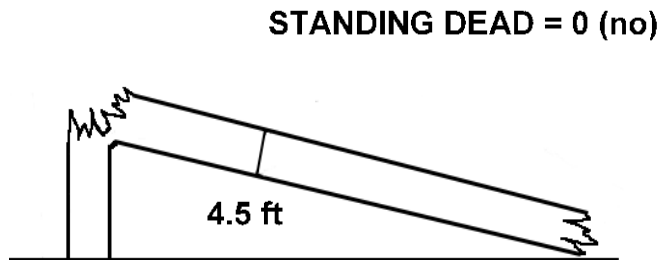


Figure 22+N-WisCFI. Example of an unbroken length of < 4.5 feet. NRS Note: The break at 1.5 ft is at least 50% attached. The lean angle is determined at 4.5 ft.

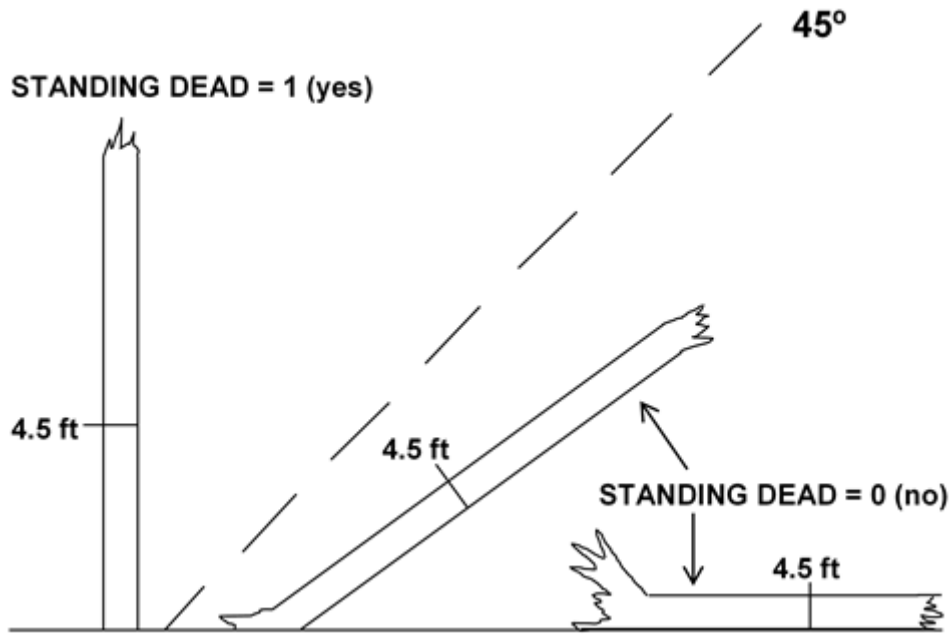


Figure 23-WisCFI. Other examples of dead trees

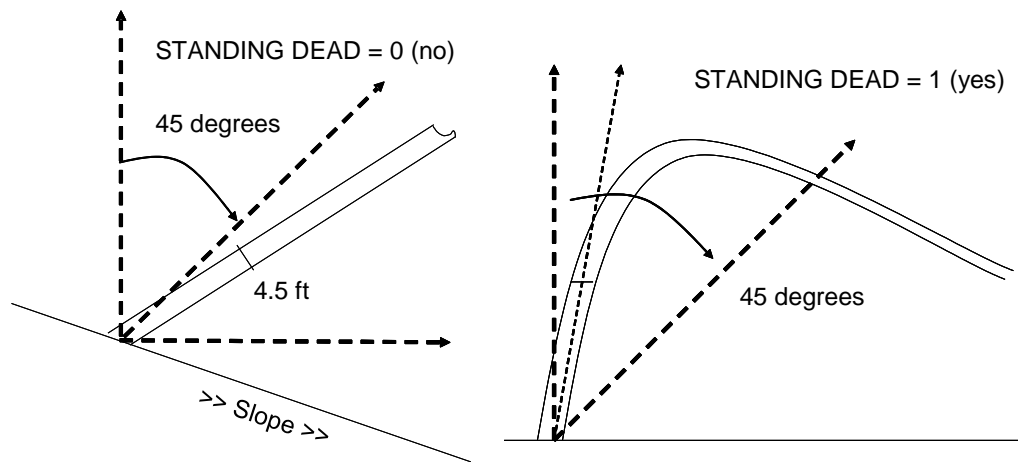


Figure 23.aN-WisCFI. Example of dead tree on slope. Figure 23.bN-WisCFI. Example of dead bent or curved tree.

5.7.3-RI and R2 MORTALITY (CORE OPTIONAL) Not Collected in WisCFI

5.8+N SPECIES [SPP]

Record the appropriate SPECIES code from the Master Species List (Appendix 3+N. If the species cannot be determined in the field, tally the tree, but bring branch samples, foliage, cones, flowers, bark, etc. to the office for further researching. If possible, collect samples outside the subplots from similar specimens and make a note in the PDR to correct the SPECIES code later. Use code 0999 only as a place holder (outside the Pacific and Caribbean Islands) in the PDR for an unknown live tree while its actual species is being investigated. Use code 0299 for unknown dead conifer, 0998 for unknown dead hardwood when the genus or species codes cannot be determined. This is often the case with standing dead trees on newly established plots. The

generic (genus) code should only be used when you are sure the species is on the Master Species List, but you cannot differentiate among acceptable species. (Only valid on Urban plots) Use of the genus code should be a last resort and is limited to valid genus codes within the geographic area that describes the trees location while accounting for the 3 exclusion areas. If a hybrid species is found, naturally or planted, and is on the Master Species List, use the hybrid code; otherwise code the parent species with the most dominant characteristic from the list. If neither the hybrid nor either of the parent species are listed, then do not tally the species and follow the UNLISTED TREE protocol (variables 3.18 – 3.24). If a variety or subspecies is found, naturally or planted, and is listed on the Master Species List, use the corresponding variety / subspecies code. If the variety is not listed, but the species is listed, code the specimen using the species code. Species marked as woodland (W) designate species where DRC is measured instead of DBH.

The Master Species List includes all tree species tallied in the Continental U.S., as well as both the Pacific and Caribbean Islands, including Hawaii. These species are valid in all areas except for the following three geographic exceptions:

NRS Note: All larch (*Larix* spp.), serviceberry (*Amelanchier* spp.), hawthorn (*Crataegus* spp.), apple (*Malus* spp.) are tallied. These species can be coded using the generic genus code (0070, 0356, 0500, 0660), if the species cannot be determined.

When collected: All tree records

Field width: 4 digits

Tolerance: No errors

MQO: At least 99% of the time for genus, at least 95% of the time for species

Values: See Appendix 3+N

5.9+N+WisCFI 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+N. Trees with diameters between 1.0- and 4.9-inches are measured on the 6.8-foot radius microplots. Those with diameters of 5.0-inches and larger are measured on the 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) or thin barked trees. Do not penetrate the cambium when using a bark scribe. A scribe that penetrates the cambium has been found to cause damage and swelling that affects not only the health of tree but compromises growth calculations. Any tree that has been scribed in the past, do not scribe again. Apply paint to the mark created by the scribe.

The diameter mark is located within one inch below where the diameter is taken and it faces the subplot center or microplot center. If using a bark scribe or paint marker, the mark should be approximately two inches long or as appropriate for a sapling. Check for irregularities before making diameter marks (see Section 5.9.2, "Special DBH situations," rule #4).

Remeasurement Trees:

When remeasuring the diameter of a tree tallied at a previous survey, always take the measurement at the location monumented by the previous crew unless it is not physically

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

For remeasurement of a group of multiple forks (≥ 3) that originate from approximately the same point on the main stem at Time 1 that are now recorded as a single tree using the Measure Low Approach (see Appendix 6) at Time 2 select one of the group to represent the resulting single tree (choose the “most representative” of the group in relation to the resulting tree) to measure at Time 2 and record a current diameter based on the Measure Low Approach guidelines and assign with:

- DIAMETER CHECK = 2
- LENGTH TO DIAMETER MEASUREMENT POINT

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

- PRESENT TREE STATUS = 0
- RECONCILE = 8

NRS Note: If a Remeasurement Tree with a DBH measured above 4.5 feet is severed below the previously established DBH, the tree is no longer a ‘Tally tree’ regardless whether the tree maintains 5.0/1.0 inches at or above 4.5 feet.

The following are additional regional instructions on how to establish the initial DBH location and when to move a remeasurement location. Remember we are looking for ‘Growth Over Time’, so we want DBH initially placed in the best possible location and moved only if a gross deformity has formed or if it is no longer physically possible to collect DBH in the same location as the previous crew.

- For new measurement single stem trees, initially attempt to measure DBH at 4.5 ft. If there is a gross deformity at that location, begin to move up the bole for a suitable location that will remain normal over time and to which an average-height crewmember can access. If there isn’t a suitable location above, then move below 4.5 for a suitable location. If that fails as well, last resort is to estimate DBH at a location that will best represent the tree volume.
- For remeasurement single stem trees, initially attempt to measure DBH at the same location the previous crew measured. If a gross deformity is present at that location, once again start at 4.5 ft and move up and then down. If a new suitable location cannot be located, estimate the DBH at a location that will best represent the tree volume.
- For new measurement forked trees where two trees are recorded, attempt to measure each DBH at an accessible location following the forking rules where the stem becomes normal and will remain normal over time. If that fails, last resort is to estimate each DBH at a location that will best represent each tree's volume.
- For remeasurement forked trees where two trees are recorded, attempt to measure each DBH at the same location the previous crew measured. If a gross deformity is present at one or two DBH locations or the crotch has fused, attempt to move the DBH/s up to an accessible location. Attempt to ensure new location/s will be accessible in future cycles. If the location/s must be moved and it is predicted that the crotch will fuse within the next cycle, estimate the DBH/s at a location that will best represent the tree volume.

NRS Note: Record a TREE NOTE in the PDR if the previous DBH location is:

1. poor but was left "as is" for consistency purposes.
2. moved because previous location was egregiously off.

NRS Note: Borderline trees that either fall just outside the 24.0 ft or 6.8 ft circle or are just under 5.0 inches or 1.0 inch require some type of indication that they should not be considered missed. To ensure these trees are handled properly by a QA crew or the next field crew, either make a mark on the tree or place a Note on the plotsheet indicating the tree is out or too small. The mark could include but is not limited to a scribe mark on thick bark trees or a line from a permanent marker.

When collected: All live tally trees ≥ 1.0 in DBH and standing dead tally trees ≥ 5.0 in DBH

Field width: 4 digits (xxx.y)

Tolerance: +/- 0.1 inch per 20.0-inch increment of measured diameter on all live trees and standing dead trees with DECAY CLASS = 1, 2

+/- 1.0 inch per 20.0-inch increment of measured diameter on standing dead trees with DECAY CLASS = 3, 4, 5

For woodland species: +/- 0.2 inch per stem

MQO: At least 95% of the time. For example: a tree with a diameter of 41.0 inches would have a tolerance of plus or minus 0.3 inch. (Note: the MQO for point of measurement is +/- 0.2 inch when the tree is first measured and within 1 foot of the location established by the previous crew when the tree is remeasured.)

Values: 001.0 to 999.9

5.9.1 PREVIOUS DIAMETER AT BREAST HEIGHT [DBHO]

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+N DIAMETER AT BREAST HEIGHT (DBH) [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.

NRS Note: Record diameter height for all trees not measured at 4.5 feet, even if diameter was previously monumented.

NRS Note: If it can be determined that there is a gross error for the PREVIOUS DIAMETER AT BREAST HEIGHT, enter a corrected value for DBHO. A 'gross error' doesn't have a set range. The range needs to reflect an obvious mistake and not just an acceptable level of growth. If a mistake is evident then estimate what the DBH would have been.

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 at the point of attachment, measured just above the branch collar, and must branch out from the main stem at an angle of 45 degrees or less (Figure 24 to Figure 27) AND must be judged to have, or have the potential to assume, an obvious "tree like" form and function as opposed to an obvious "branch like" form and function. If there is any doubt as to the form and function of a potential fork call it a fork instead of a branch. Figure 29 provides examples where the form and function are considerations. Forks originate at the point on the bole where the piths intersect. Forked trees are handled differently depending on whether the fork originates below 1.0 foot, between 1.0 and 4.5 feet, or above 4.5 feet. Seedling-sized stems, (i.e., stems that are less than 1 inch in diameter at the point of attachment or at the prescribed diameter location, 3.5 feet above pith separation), are not considered forks.

NRS Note: The regional guideline regarding the consideration of missing forks for Tree Class determination applies only to the regional merchantability variables. Do not consider missing forks when locating the diameter measurement. For trees not tallied in the past, a fork is considered missing if it is broken below the location where DBH should be located using the standard forking rules. For a Remeasurement Tree, a fork is considered missing if the stem is broken and gone below the previous DBH measurement (TRST=2 and DEAD=0).

NRS Note: A dead stem that is ≥ 1.0 inch DBH/DRC is treated the same as a live stem on forked trees.

NRS Note: Disregard any primary fork, live or dead, that is < 1.0 inch DBH/DRC.

NRS Note: Remeasured Forked Trees – If a previously measured fork no longer meets the 1/3 diameter requirement in order to qualify as a fork, record PRESENT TREE STATUS = 0 (No Status), RECONCILE = 7 (Cruiser Error), along with a TREE NOTE describing the situation.

NRS Note: Remeasured Forked Trees – Do not relocate previous valid diameter locations if a cut or broken fork(s), which occurred between visits, currently allows for a single stem measurement or the normal forking rules to be applied.

NRS Note: Remeasured Forked Trees – If a stem on a forked tree did not meet the 1/3 diameter rule during the previous measurement, follow the current forking rules to determine if it qualifies during this measurement. In the process of evaluating the potential new stem/s, ignore any fork/s that were cut or broken off between visits.

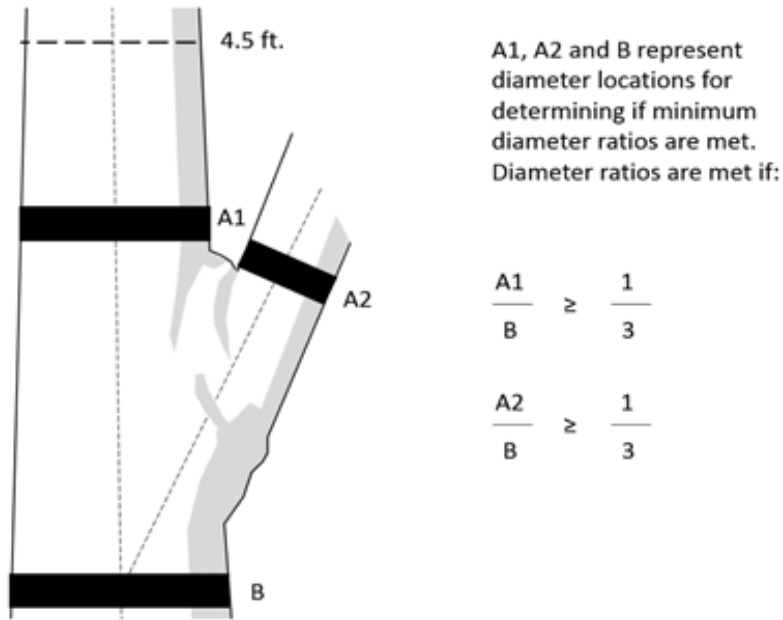


Figure 24. Determining diameter ratio of forks. When determining if a fork meets the 1/3 diameter requirement for qualifying as a fork, the diameter of the potential fork taken at locations A1 and A2 must be 1/3 of the diameter at location B.

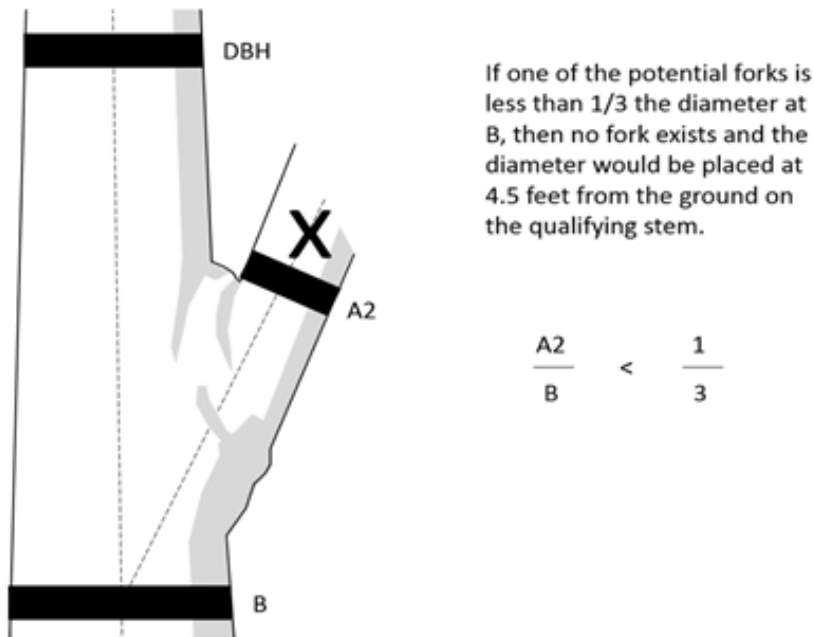


Figure 25. A single non-qualifying fork. If one of the forks does not meet the minimum ratio, then no fork exists and the diameter is placed at the normal location on the dominant stem.

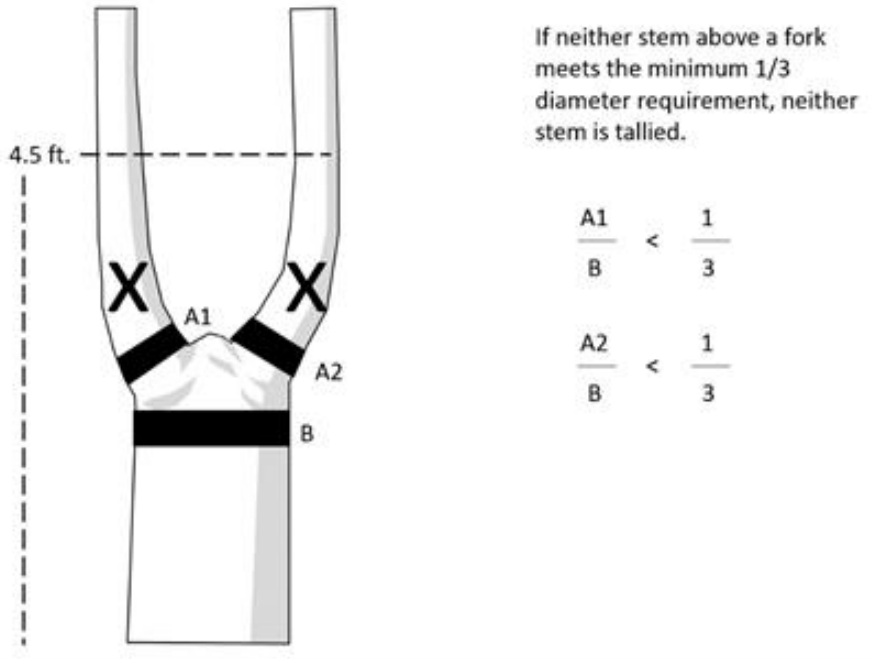


Figure 26. Two non-qualifying stems. If neither stem meets the 1/3 diameter requirement, neither is tallied. This is often associated with broken tops and is consistent with the point at which a stem is considered recovered from a break.

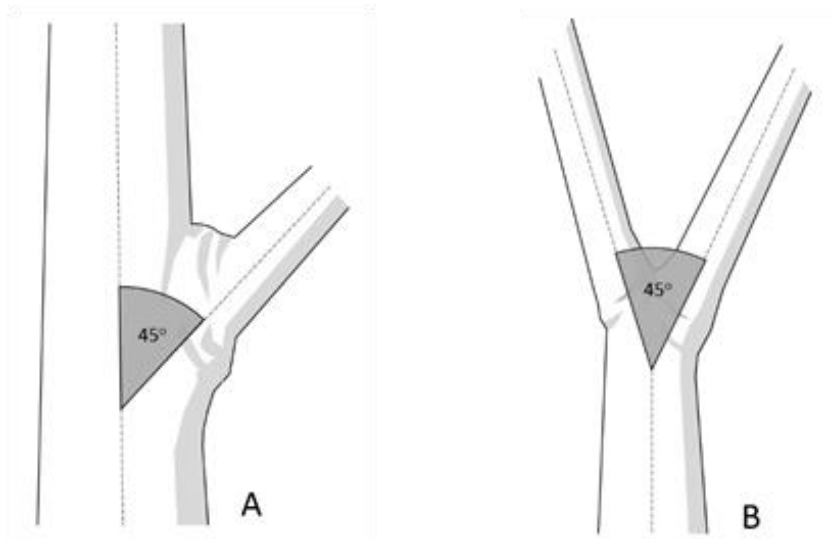


Figure 27. Forking angle. In order to qualify as a fork, the piths must diverge at an angle not exceeding 45 degrees from the main stem (A). In cases where there is no obvious main stem (B), consider the angle of pith separation between the two stems.

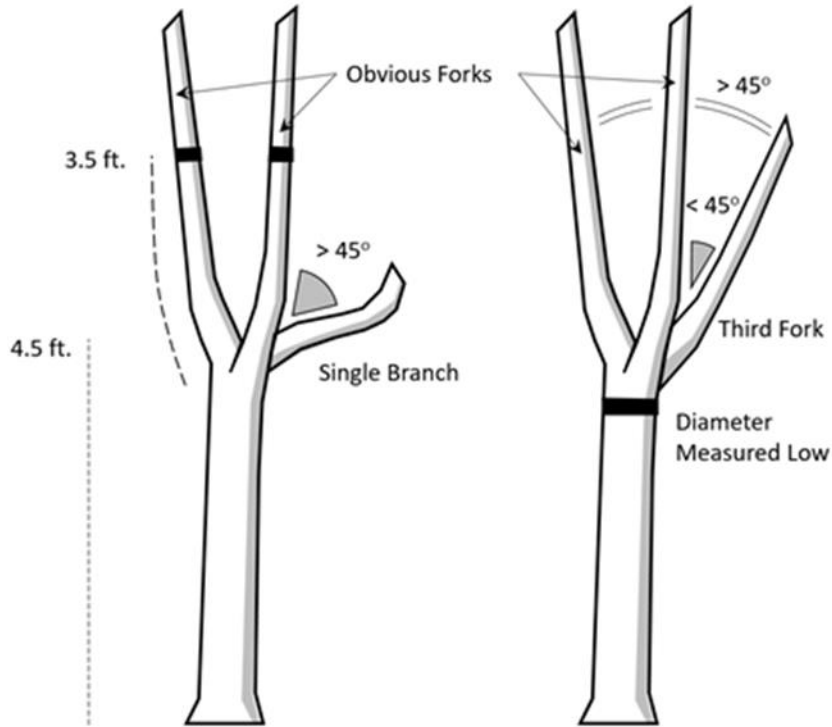


Figure 28. The tree on the left has two stems that are clearly forks and a single branch that departs at an angle of greater than 45 degrees from either existing fork. This branch is ignored when placing diameters. The tree on the right also has two stems that clearly qualify as forks, plus a third stem that is within 45 degrees of one fork, but not the other. So long as it is within 45 degrees of an adjacent qualifying fork, it too is considered a fork. In this case, it is the third fork from approximately the same location on this tree and the Measure Low Approach must be applied.

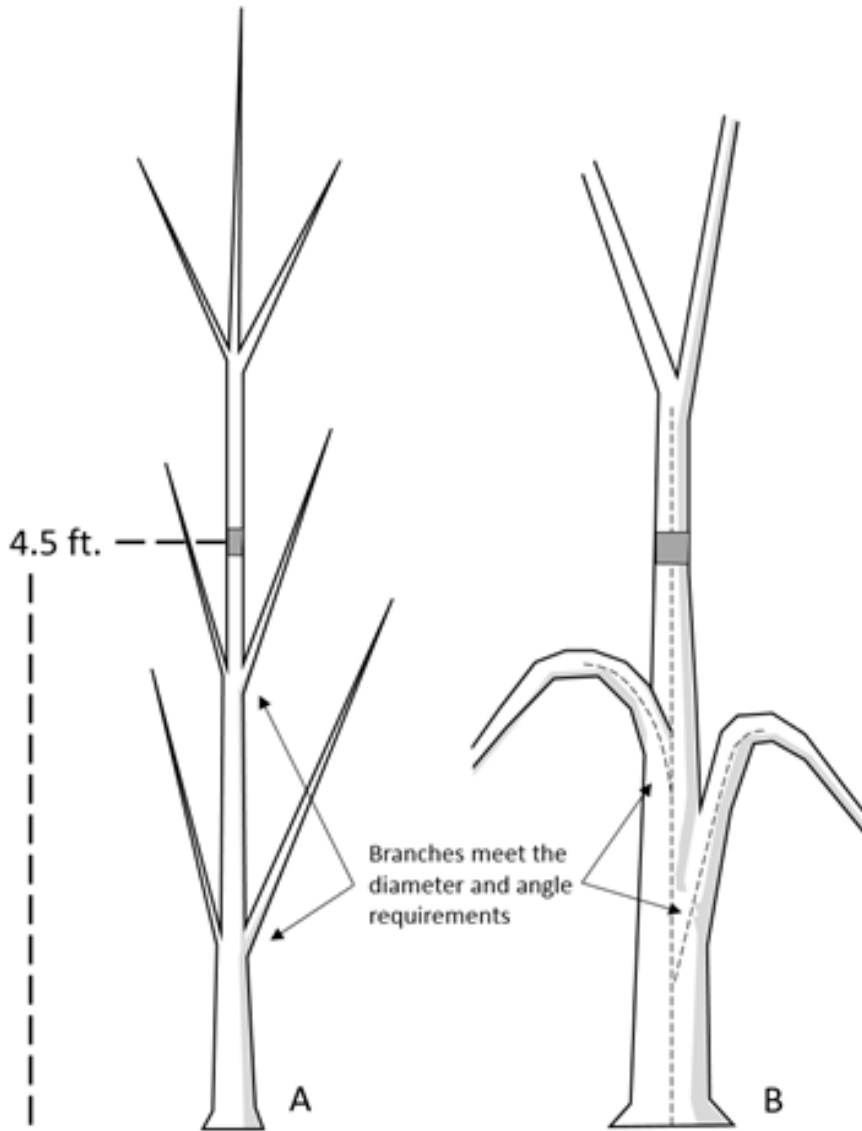


Figure 29. Forks that have branch-like form and function, leading to the tally of a single tree instead of multiple trees. In example A, although the potential fork is currently 1/3 the diameter of the main bole and is within 45 degrees of the main bole at the point of attachment, it appears to be serving as a branch as opposed to an additional independent tree. In addition, as the main bole continues to grow, the “branch” may reach the point where it is no longer 1/3 the main bole, dropping out of the inventory based on definition. Such potential forks would be ignored and the main bole would be tallied as a single tree with diameter measured at 4.5 feet. The tree is evaluated at each future visit and tallied following standard remeasurement procedures. In example B, although the potential fork is 1/3 the diameter of the main bole and is within 45 degrees of the main bole at point of attachment, it deviates drastically beyond 45 degrees about 1 inch from the main bole, taking on the form and function of a branch. This should be tallied as a single tree with diameter measured at 4.5 feet.

- a. Trees forked below 1.0 foot. Trees forked below 1.0 foot are treated as distinctly separate trees (Figure 30). Distances and azimuths are measured individually to the center of each stem where it splits from the stump (Figure 35 A-C). DBH is measured for each stem at 4.5 feet above the ground. When stems originate from pith intersections below 1 foot, it is possible for some stems to be within the limiting distance of the microplot or subplot, and others to be beyond the limiting distance. If stems originating from forks that occur below 1.0 foot fork again between 1.0 and 4.5 feet (Figure 35 E), the rules in the next paragraph apply.

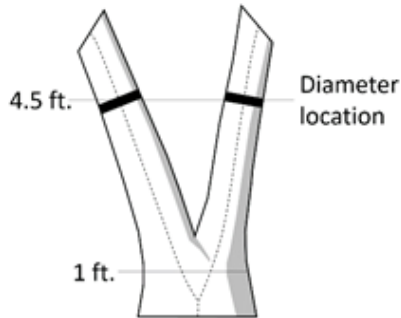


Figure 30. Forked below 1.0 ft.

- b. Trees forked between 1.0 foot and 4.5 feet. Trees forked between 1.0 foot and 4.5 feet are also counted as separate trees (Figure 31), but only one distance and azimuth (to the central stump) is recorded for each stem (Figure 35 D-F). Although a single azimuth and distance applies to all, multiple stems should be recorded as they occur in clockwise order (from front to back when one stem is directly in front of another). The DBH of each fork is measured at a point 3.5 feet above the pith intersection. When forks originate from pith intersections between 1.0 and 4.5 feet, the limiting distance is the same for all forks--they are either all on, or all off the plot.

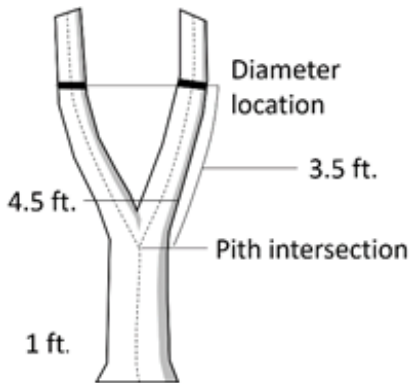


Figure 31. Forked between 1.0-4.5 ft.

Measure Low Approach

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

In cases where such multiple forks (≥ 3) all originate from approximately the same point on the main stem, follow the Measure Low Approach, where the diameter is taken at the highest, most repeatable location between the 1-foot stump and initial pith separation. This approach is applicable in instances where any of the following are present between the 1-foot stump and DBH (4.5 feet):

- i. Multiple forks (≥ 3) (Figure 32 D)
- ii. Prolific branching originating from approximately the same location that prevents accurate and repeatable diameter (Figure 32 A-B). Prolific branching, as defined here, are those trees that often lack a defined main stem and/or qualifying forks, and take on a bushy appearance as the lower bole splits out into multiple branches at or below 4.5 feet. This is a rare situation that should not be confused with normal branching patterns that allow for accurate diameter placement (Figure 32 C).
- iii. Any combination of multiple forks (≥ 3) and prolific branching originating at approximately the same location.
- iv. The stems of a forked tree are grown together in such a fashion that an accurate DBH cannot be measured or estimated due to deformation resulting from the presence of the above mentioned criteria (Figure 33)

Figure 32 and Figure 33 illustrate a combination of forks and or branches all originating at the approximate same location will trigger a measure low approach.

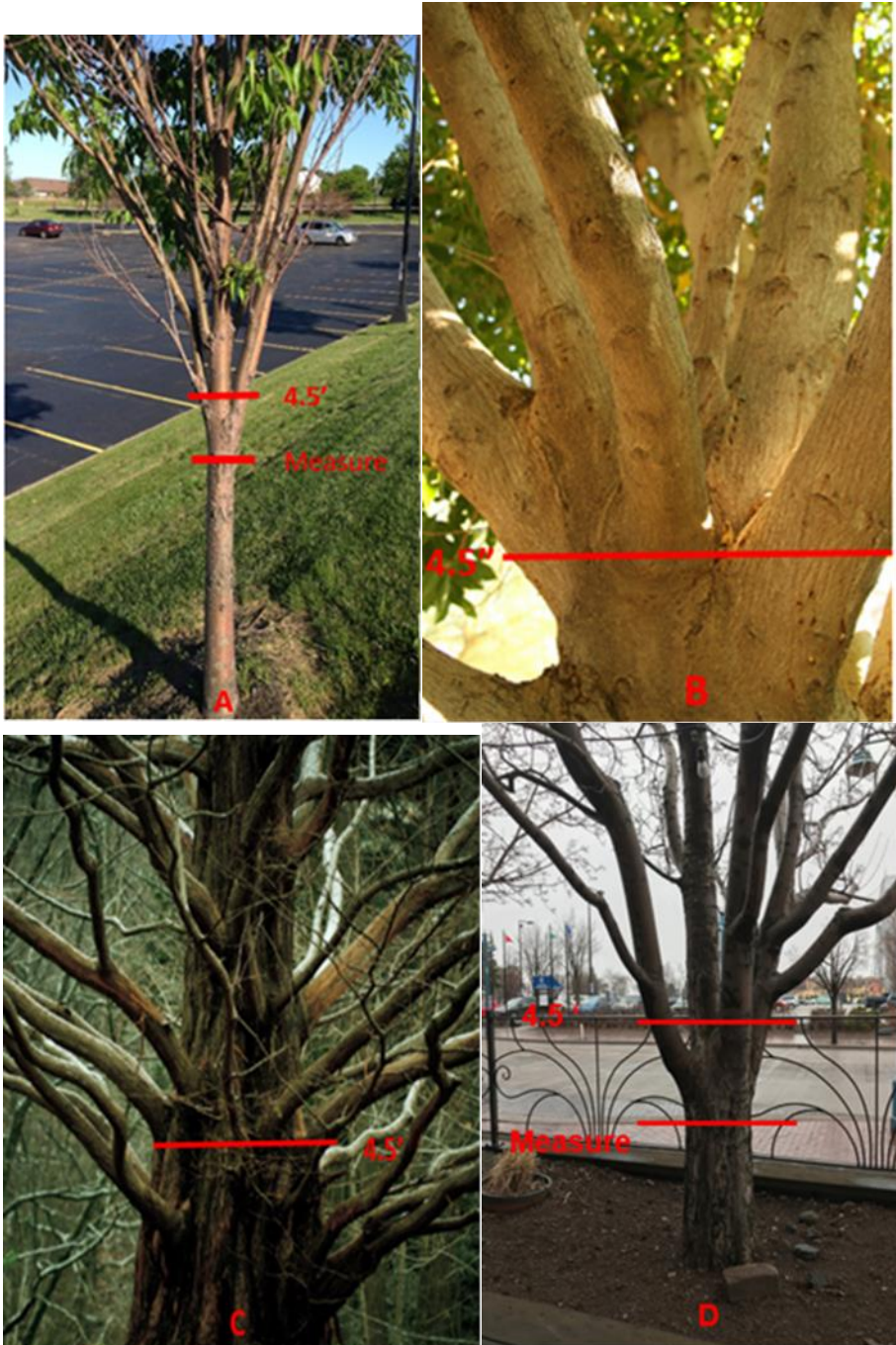


Figure 32. Both A and B are examples of Prolific Branching where the Measure Low Approach must be implemented causing the diameter to be taken below 4.5 feet. Although C has many branches it is not a candidate for the Measure Low Approach because the branching is not deemed "Prolific"; traditional DBH measurement protocols would apply. D is an example of multiple forks originating from approximately the same area. Similar to Prolific Branching, the diameter is taken low, and D is treated as one tree.

NRS Note: Diameter measurement due to a fork is to be taken 3.5 feet above the pith separation or at a "reasonable" reach for remeasurement. Place a diameter mark that can be consistently

reached and remeasured by the next crew. If a diameter mark has already been placed, review the diameter procedures for “Remeasurement Trees” described in 5.9 Diameter.

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

Once a stem is tallied as a fork that originated from a pith intersection between 1.0 and 4.5 feet, do not recognize any additional forks (or potential forks) that may occur on that stem. Secondary forks need only meet the 1/3 diameter and 45 degree requirements to be considered forks; they do not need to be tree-like or 1 inch in diameter. **These secondary forks need only meet the 1/3 diameter and 45 degree requirements to be considered forks. They do not need to be tree like or 1 inch in diameter.** When such secondary forks are encountered, measure/estimate the diameter of such stems at the most repeatable location below stem separation but above the first pith separation (Figure 35 F-I while attempting to avoid measuring double piths (Figure 41) where possible (i.e., do not move the point of diameter the entire 3.5 feet above the first fork).

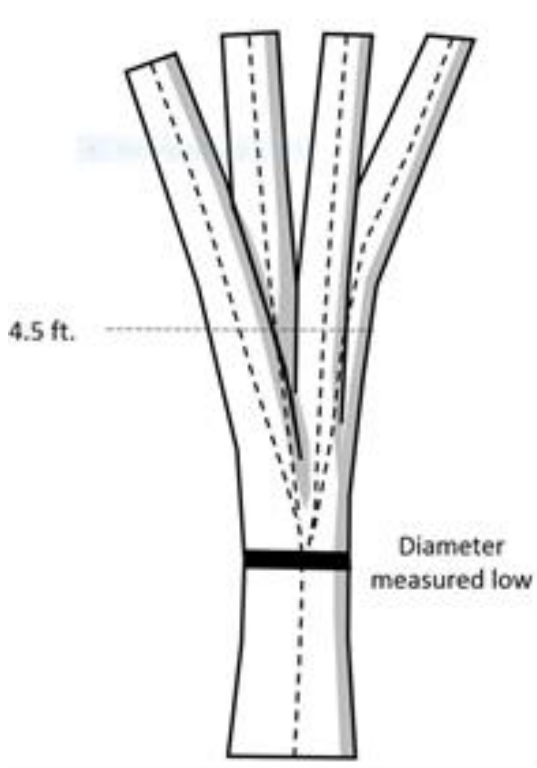


Figure 33. Using pith separation to determine diameter locations. In this example it is clear that all piths appear to separate from approximately the same location; this triggers the “Measure Low Approach”. In cases where the piths do NOT originate within approximately the same location, normal forking rules are applied as demonstrated in Figure 35 A-D and F-I.

- c. Trees forked at or above 4.5 feet. Trees forked at or above 4.5 feet count as one single tree (Figure 34). If a fork occurs at or immediately above 4.5 feet, measure diameter below the fork just beneath any swelling that would inflate DBH.

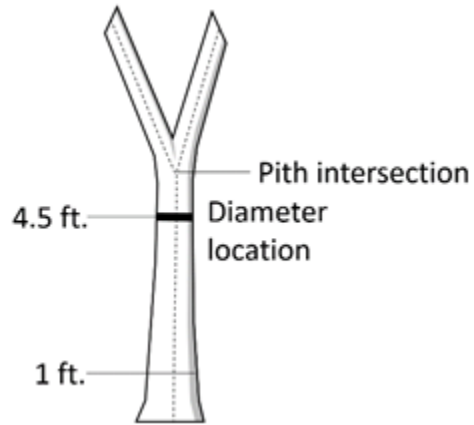


Figure 34. One tree.

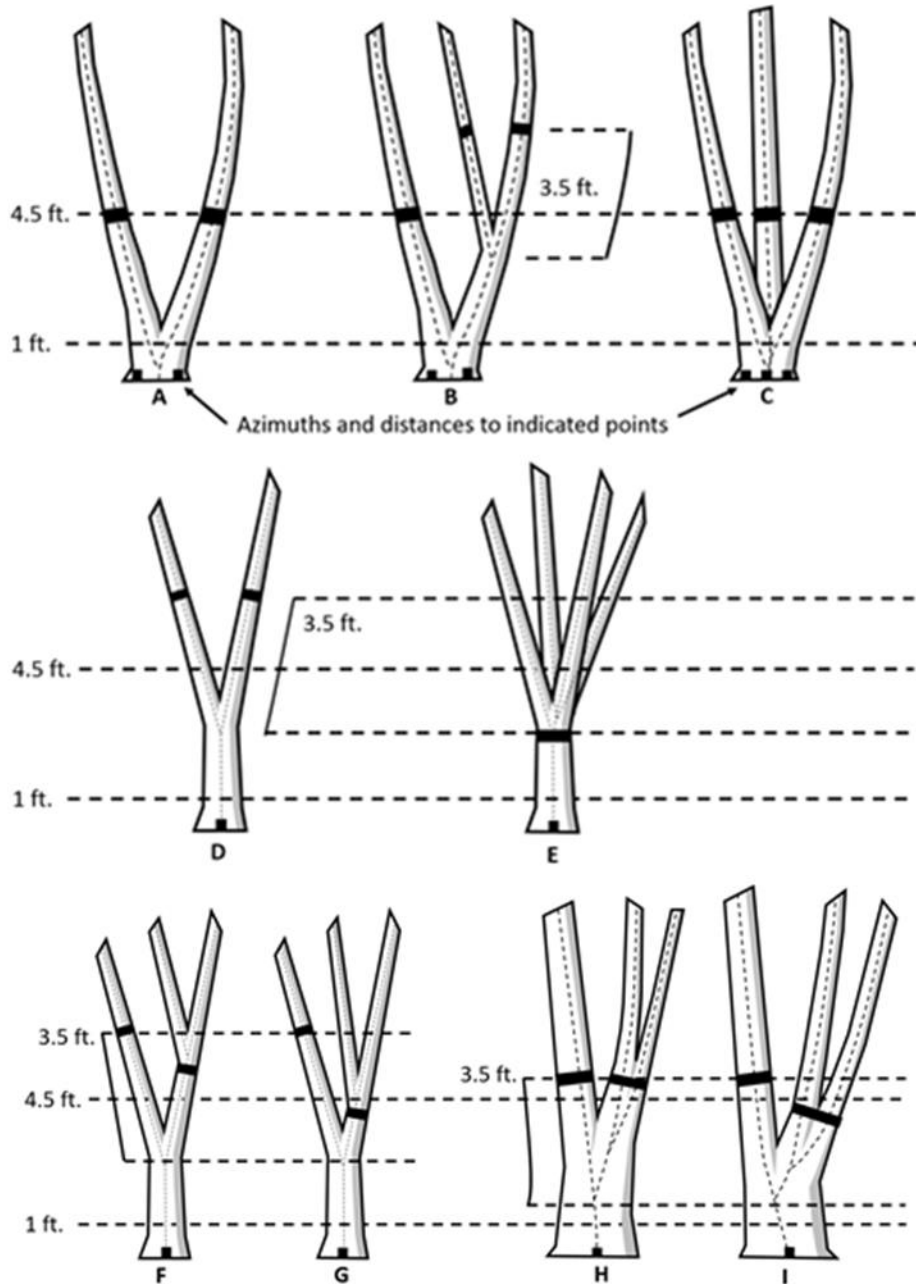


Figure 35. Summary of where to measure diameter, distance and azimuth on trees that fork below 1.0 foot (A, B, C) and trees that fork above 1.0 foot (D, E, F, G, H, I). Figure E represents the Measure Low Approach. Figures F and G represent secondary forks with abnormal diameters at stem separation. Figures H and I represent secondary forks with normal diameters at stem separation.

2. Stump sprouts: Stump sprouts originate between ground level and 4.5 feet on the boles of trees that have died or been cut. Stump sprouts are handled the same as forked trees, with the exception that stump sprouts are not required to be 1/3 the diameter of the dead bole. Stump sprouts originating below 1.0 foot are measured at 4.5 feet from ground line. Stump sprouts originating between 1.0 foot and 4.5 feet are measured at 3.5 feet above their point of occurrence. As with forks, rules for measuring distance and azimuth depend on whether the sprouts originate above or below 1.0 foot. For multi-stemmed woodland species, treat all new sprouts as part of the same new tree.
3. Tree with butt-swell or bottleneck: Measure these trees 1.5 feet above the end of the swell or bottleneck if the swell or bottleneck extends 3.0 feet or more above the ground (Figure 36).

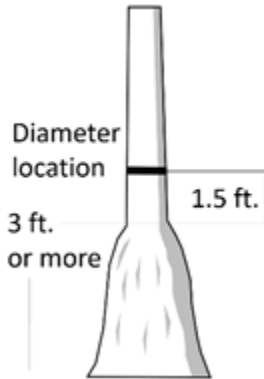


Figure 36. Bottleneck tree.

4. Tree with irregularities at DBH: On trees with swellings (Figure 37), bumps, depressions, and branches (Figure 38) at DBH, diameter will be measured immediately above the irregularity at the place it ceases to affect normal stem form. If the diameter point is out of reach above the irregularity, the diameter will be measured below the irregularity at the best repeatable location. If normal stem form does not exist, the diameter will be estimated at the prescribed location.

NRS Note: If the normal diameter point is out of reach due to the irregularity, it is acceptable to measure the diameter below 4.5 feet. Indicate the diameter height with variable 5.24 LENGTH TO DIAMETER MEASUREMENT POINT.

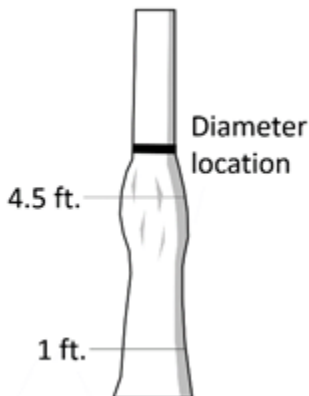


Figure 37. Tree with swelling.

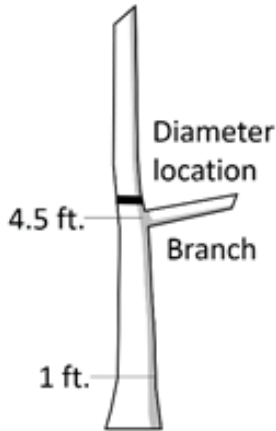


Figure 38. Tree with branch.

5. Tree on slope: Measure diameter at 4.5 feet from the ground along the bole on the uphill side of the tree (Figure 39).

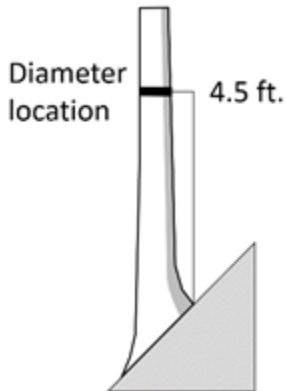


Figure 39. Tree on a slope.

6. Leaning tree: Measure diameter at 4.5 feet from the ground along the bole. The 4.5-foot distance is measured along the underside face of the bole (Figure 40).

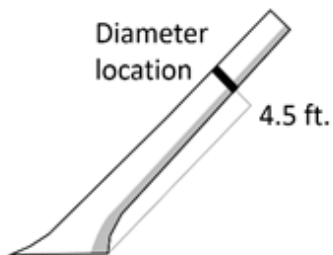


Figure 40. Leaning tree.

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 **in the PDR** (Figure 41).

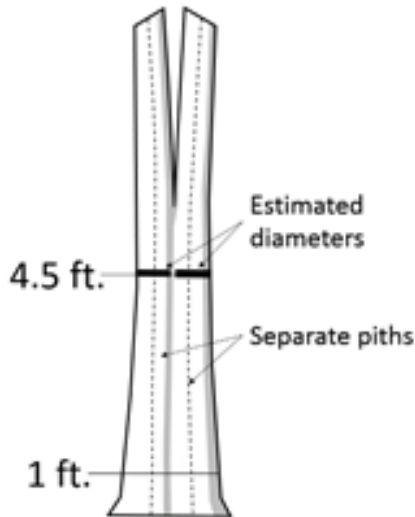


Figure 41. Independent trees grown together.

9. Missing wood or bark: Do not reconstruct the DBH of a tree that is missing wood or bark at the point of measurement. Record the diameter, to the nearest 0.1 inch, of the wood and bark that is still attached to the tree (Figure 42). If a tree has a localized abnormality (gouge, depression, etc.) at the point of DBH, apply the procedure described for trees with irregularities at DBH (Figure 37).

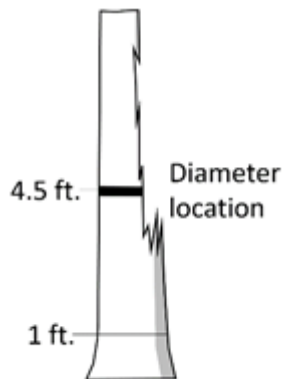


Figure 42. Tree with part of stem missing.

10. Live windthrown tree: Measure from the top of the root collar along the length to 4.5 feet (Figure 43).

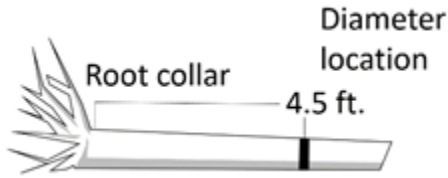


Figure 43. Tree on the ground.

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

- a. If the general pith line of the main bole is above the duff layer, use the same forking rules specified for a forked tree, and take all measurements accordingly (Figure 44+N).

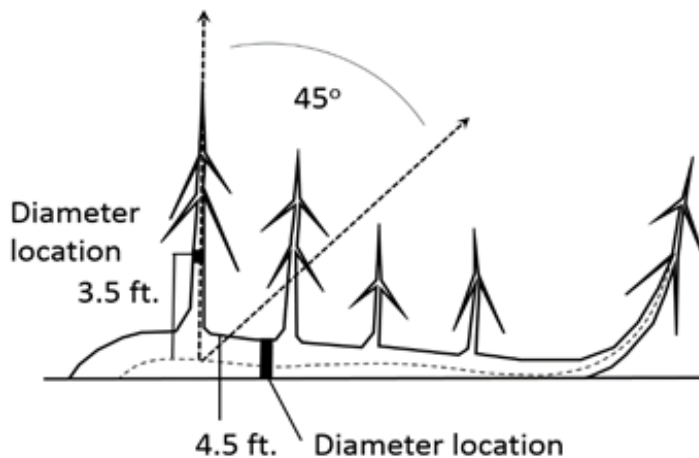


Figure 44+N. Down tree with pith above the duff.

- b. If the pith intersection of the main down bole and vertical tree-like branch occurs below 4.5 feet from the stump along the main bole, treat that branch as a separate tree, and measure DBH 3.5 feet above the pith intersection for both the main bole and the tree-like branch.
- c. If the intersection between the main down bole and the tree-like branch occurs beyond the 4.5 feet point from the stump along the main bole, treat that branch as part of the main down bole.
- d. If the general pith line of main tree bole is below the duff layer (Duff = ground level below the green sphagnum), ignore the main bole, and treat each tree-like branch as a separate tree; take DBH and length measurements from the ground, not necessarily from the top of the down bole (Figure 45). 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.

NRS Note: If the general pith line of a remeasurement tally tree is now below the duff layer, code PRESENT TREE STATUS as 0 and RECONCILE as 6 and measure each tree-like branch as a new tree with a RECO =1. Record a TREE NOTE in the PDR to explain the situation.

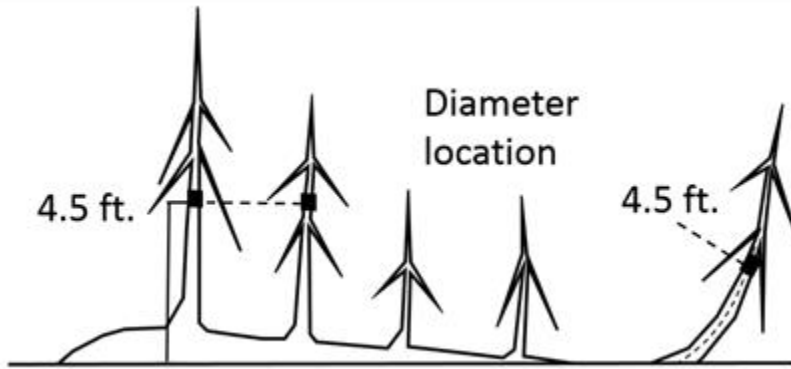


Figure 45. Down tree with pith below the duff.

12. Tree with curved bole (pistol butt tree): Measure along the bole on the uphill side (upper surface) of the tree (Figure 46).

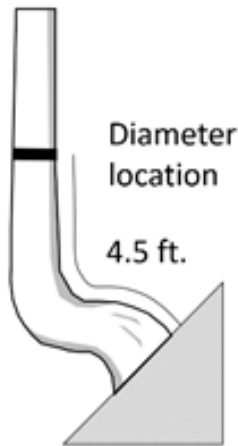


Figure 46. Tree with curved bole (pistol butt tree).

13. N Tree growing on objects: When trees are growing on objects, such as rocks or logs, measure at 4.5 feet above the root crown rather than above the forest floor. (Figure 46.aN). [Source: FSH2409.12-2000] Trees that reside in water much of the year can also produce "prop-like" roots, measure diameter in a similar method at 4.5 feet above the root crown.

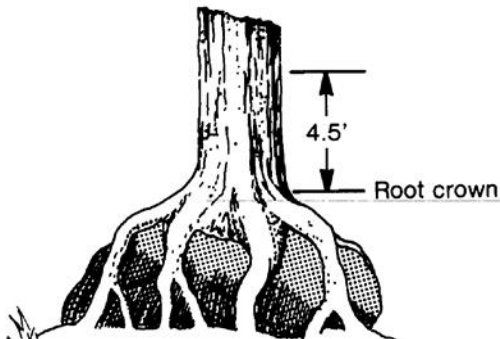


Figure 46.aN. Trees growing on objects (e.g., rocks, logs).

5.9.3 PREVIOUS DIAMETER AT ROOT COLLAR **Not Collected in WisCFI**

5.9.4 Diameter At Root Collar (DRC) **Not Collected in WisCFI**

5.10 PAST NUMBER OF STEMS **[PSTM]** **Not Collected in WisCFI**

5.11 CURRENT NUMBER OF STEMS **[#STM]** **Not Collected in WisCFI**

5.12+WisCFI DIAMETER CHECK **[DCHE]**

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 inch DBH and standing dead tally trees ≥ 5.0 inches DBH

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.

5.12.2N TREE CLASS (USE REGIONAL DEFINITIONS) **[TCC]**

This code represents a classification of the overall quality of a tree that is ≥ 5.0 inches DBH. It classifies the quality of a live sawtimber tree based on the present condition. It also forecasts the potential quality of a live poletimber tree when it becomes sawtimber size. For standing dead trees, it will identify those trees that could be salvaged for wood fiber (i.e., chips) if a salvage operation was imminent.

Prior to assigning a tree class, it is necessary to determine sawlog length and the amount of board-foot cull present within the sawlog length. When evaluating the sawlog length for tree class, the sawlog length is measured between a 1 foot stump and a 9.0-in Top Diameter Outside Bark (DOB) for hardwoods or a 7.0-in Top DOB for softwoods. For trees that fork, only use one stem when determining sawlog length (i.e., follow the stem yielding the most merchantable volume). See % ROUGH BOARD-FOOT CULL and % ROTTEN BOARD-FOOT CULL in Regional Appendix D for the criterion that determines cull within the sawlog length.

When estimating the potential sawlog length for live poletimber size trees, apply the following "Two-inch Rule". Take the current DBH minus two-inches on a poletimber size tree. This calculated diameter is used to determine the potential Top DOB of the future sawlog length when the tree becomes sawtimber-size. Once the potential Top DOB is determined, the tree must maintain this diameter for at least the length of a potential sawlog to receive a TREE CLASS 2, Growing Stock. For example, a tree with an 8.0-in DBH today, applies a 6.0-in Top DOB on today's bole to project the potential sawlog length when the tree reaches sawtimber size. If 6.0-in is not maintained within the potential sawlog length then the tree is not eligible to receive a TREE CLASS of 2. (The "Two-inch Rule" assumes that a tree's diameter increases uniformly along its bole.)

When estimating the potential of Other Softwoods poletimber, branch diameters can be forecast in order to determine TREE CLASS. If multiple branches within the merchantable log/s are receiving direct sunlight and have the potential to exceed 2 inches, the poletimber sized tree can be given a TREE CLASS of '3'. Once the tree reaches sawlog size, forecasting is no longer an acceptable practice.

During the determination of TREE CLASS, Dead Tops within live trees will factor into the classification. The dead material is considered Cull so it will not contribute to the tree being classified as Growing Stock. Determination must still be made whether the Cull is predominantly Rough or Rotten. The TREE CLASS will be classified depending on the assessment of the total volume of the tree. All dead sections within the sawlog portion will be considered either rough or rotten cull.

When collected: All trees ≥ 5.0 inches DBH/DRC when PRESENT TREE STATUS = 1 or
PRESENT TREE STATUS = 2 and STANDING DEAD = 1

Field width: 1 digit

Tolerance: No errors

MQO: At least 90% of the time

Values:

- 2 Growing Stock – A live sawtimber-size tree with one-third or more of the gross board-foot volume in the entire sawlog length meeting grade, soundness, and size requirements; or the potential to do so for poletimber-size trees. It must contain one merchantable 12-foot log or two non-contiguous merchantable 8-foot logs, now (sawtimber) or prospectively (poletimber).
- 3 Rough Cull – A live tree that does not contain at least one 12-foot sawlog or two non-contiguous 8-foot logs now (sawtimber) or prospectively (poletimber), primarily because of roughness or poor form within the sawlog length. Or sawtimber and prospectively poletimber with two-thirds or more of its gross board-foot volume that does not meet size, soundness, and grade requirements; and 50% or more of the assigned total board-foot cull within the sawlog length is rough cull.
- 4 Rotten Cull – A live tree that does not contain at least one 12-foot sawlog or two non-contiguous 8-foot logs now (sawtimber) or prospectively (poletimber) and/or do not meet grade specifications for percent sound primarily because of rot within the sawlog length. Or sawtimber and prospectively poletimber with two-thirds or more of its gross board-foot volume that does not meet size, soundness, and grade requirements; and 50% or more of the assigned total board-foot cull within the sawlog length is rotten cull.
- 5 Salvable Dead – A standing dead tree with at least 50 percent sound cubic-foot volume in the bole. (ROTTEN/MISSING CUBIC-FOOT CULL does not exceed 49 percent.) Note: ROUGH CUBIC-FOOT CULL is not a criterion. For the initial measurement of a tree, the tree must have been live during the previous Cycle/Subcycle. For Remeasurement Trees, the tree must have been alive during previous measurement.
- 6 Nonsalvable Dead – A standing dead tree that does not qualify as salvable.

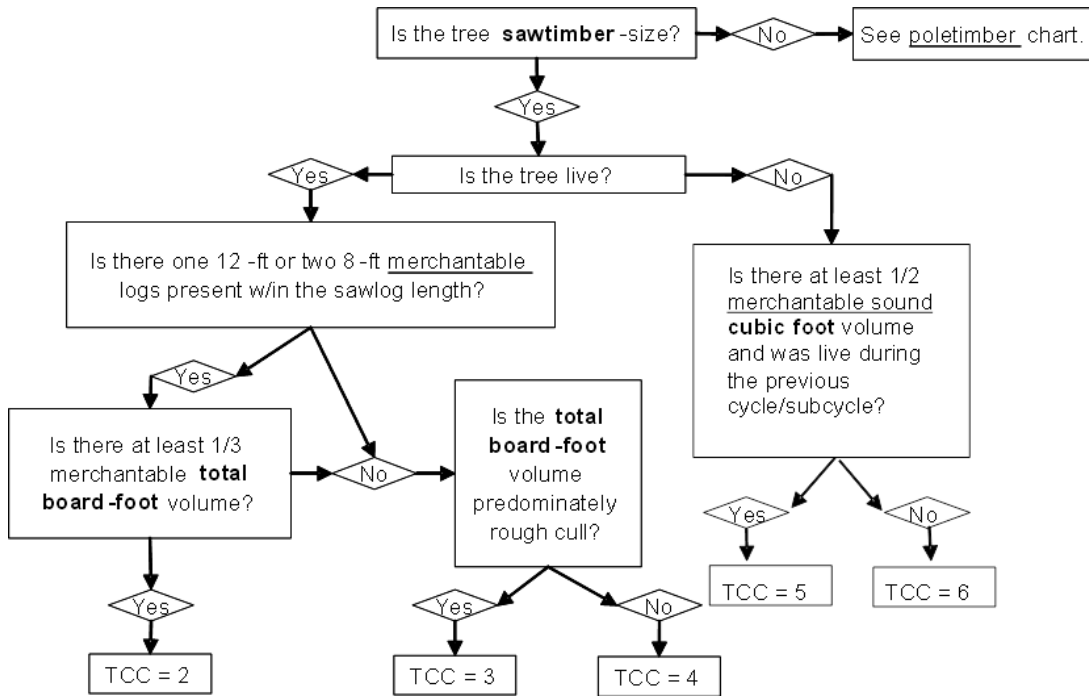


Figure 47.1N. TREE CLASS flowchart for sawtimber-size trees -- ≥ 9.0 -inches for softwoods or ≥ 11.0 -inches DBH for hardwoods.

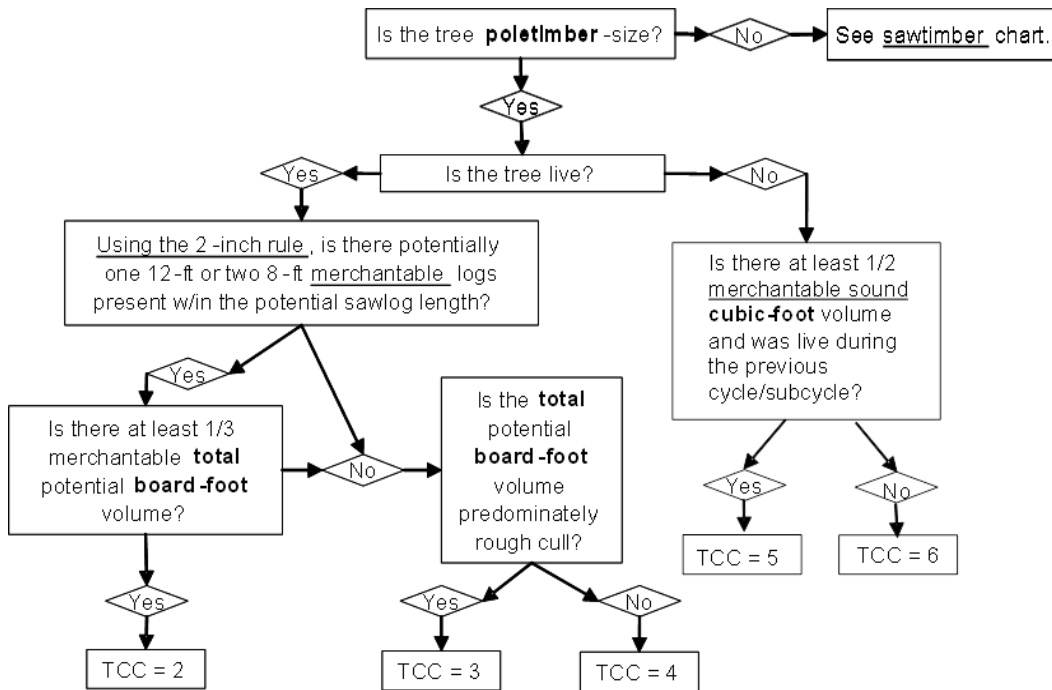


Figure 47.2N. TREE CLASS flowchart for poletimber-size trees – ≥ 5.0 -inches DBH all trees.

1. Step 1: When determining TREE CLASS, the entire sawlog length (1 foot stump to a 9.0-in Top DOB hardwoods or 7.0-in Top DOB softwoods) must be visually divided into 8 foot or longer log lengths. The length of 8 foot or longer logs is determined by the presence of “stoppers” within the entire sawlog length. The following is a list of “stoppers” to be applied:

- a. Fork – A fork must be at least 1/3 the diameter of the main stem and branch out from the main stem at 45 degrees or less where the pith enters the main stem. For trees that fork, only use one stem when determining the remaining sawlog length (i.e., follow the stem yielding the most merchantable volume). When one of the forks is dead, the live fork will provide the most merchantable volume.
- b. Evaluate the angle that the pith enters the main stem, not the general form extending from the tree, to determine if it is a fork or a branch.
- c. A dead or missing stem is treated the same as a live stem on forked trees for the purpose of determining TREE CLASS. Do not consider missing forks when locating the diameter measurement or when determining what constitutes a tally tree.
- d. Excessive sweep or crook – To determine if the sweep or crook exceeds the maximum allowed; refer to the sweep or crook deduction tables in Regional Appendix E.
- e. Rot or missing wood – A cross-section that is 50% or more affected by rot or missing wood. All conks and fungal wedges are stoppers, except *Phellinus Tremulae* on aspen.
- f. Cankers – A canker that is at least 50% or more of the circumference at the point of occurrence. Galls and Rust can be included in the Canker section when identifying Stoppers. Note: One face or side represents 40% of the circumference. A canker is measured at the widest distance between the outside of the canker swelling. (Do not confuse burls with cankers. Burls are not classified as a stopper.)
- g. Metal – All metal except aluminum research tags and nails.

Note: “Rough stoppers” include forks, excessive sweep and crook as described above. “Rot stoppers” include rot/missing wood, cankers and metal as described above. Depending on the type of stopper, the board-foot cull associated below a stopper is either rough board-foot cull or rotten/missing board-foot cull.

2. Step 2: Assume that all live trees will reach sawtimber-size. Assume all poletimber-size trees will become sawtimber. Use the “two-inch rule” for poletimber-size trees to estimate the future Top DOB for either a hardwood or a softwood. Do not attempt to predict mortality. The goal of the tree classification system is basically a check of the straightness and soundness of the sawlog length or the potential sawlog length for poletimber-size trees. A small diameter poletimber-size tree should be allowed more leeway due to the possibilities of growing out of deformities. Noncommercial species should be treated the same as commercial species.
 - a. Live Trees
 - i. Start at a 1 ft stump and continue up the stem until the first stopper is encountered. Note: If the tree forks between 1 ft and 4.5 ft, start at the pith intersection (see Figure 31).
 - ii. Measure the distance between the starting point and the stopper.
 - iii. If the length is less than 8 ft, the entire length is either rough or rotten board-foot cull. If a rot stopper is encountered, the associated volume below the stopper is assessed as rotten/missing board-foot cull. If a rough stopper is encountered, the associated volume below the stopper is assessed as rough board-foot cull.
 - iv. If the length is 8 ft or more, the 8 ft or longer length must meet minimum grading specification for that species. If grading specifications are not met, the portion of the 8 ft or longer length that does not meet grade is assessed as board-foot cull. E.g., 20 ft is measured between a starting point and a stopper. The 20 ft length can be divided into an 8 ft and 12 ft logs. The 12 ft log meets grade and is not culled, but the 8 foot log does not meet grade and is culled.

- v. The first stopper becomes the next starting point. Again measure up the tree until the next stopper is encountered. Continue this process until a 9.0-in Top DOB for hardwoods or a 7.0-in Top DOB for softwoods is reached.
 - vi. If one 12 ft or two noncontiguous 8 ft merchantable logs are not present, the tree is classified as either rough or rotten cull. If the majority of the total board-foot cull in the entire sawlog length is assessed as rough cull, TREE CLASS = 3. If the majority of total board-foot cull in the entire sawlog length is assessed as rotten/missing cull, TREE CLASS = 4.
 - vii. If one 12 ft or two noncontiguous 8 ft merchantable logs are present, the entire sawlog length is next assessed for total board-foot cull including any rot or missing wood that is assessed to be less than 50% at the cross-section (i.e., sector cull). If the tree has one-third or more merchantable volume (i.e., 67% or less total board-foot cull), TREE CLASS = 2. If total board-foot cull is greater than 67%, TREE CLASS = 3 or 4.
- b. Standing Dead Trees: If the tree is dead (sawtimber or poletimber), determine whether or not the ROTTEN/MISSING CUBIC-FOOT CULL in the entire bole length is greater than 49%. If yes, TREE CLASS = 6. If no, TREE CLASS = 5.

ROTT = 01 - 49%, TREE CLASS = 5.

ROTT = 50 - 99%, TREE CLASS = 6.

SEE TREE CLASS ILLUSTRATIONS IN REGIONAL APPENDIX F.

5.12.3N TREE GRADE (USE REGIONAL DEFINITIONS) [TRGD]

Record a tree grade for all sawtimber size trees classified as Growing Stock. To be classified as Growing Stock and receive a TREE GRADE, all rules in Section 5.12.1N for Growing Stock must be met.

In order to receive a TREE GRADE 1, 2, 3 or 4 (when valid), at least a 12 foot grading section is required in the butt 16 feet for all species. Trees meeting the definition of Growing Stock that do not have a merchantable grade in the butt 16 but do have a 12 ft or two 8 ft gradable sections somewhere in the tree will be assigned a TREE GRADE 5.

When collected: TREE CLASS = 2 when DBH \geq 9.0 inches for softwoods or \geq 11.0 inches DBH for hardwoods

Field width: 1 digit

Tolerance: No errors

MQO: At least 90% of the time

Values: See Regional Appendix E for complete grading specifications for each species group

Hardwoods – Use the specifications for Hardwood Tree Grades (1, 2 or 3) or the Tie and Timber Grade (4) for all hardwood trees. Trees meeting the definition of Growing Stock that do not have a merchantable grade in the butt 16 but do have a 12 foot or two 8 foot gradable sections somewhere in the tree will be assigned grade 5. Note: When determining the grade of upper logs, 8-foot sawlogs need to meet all the minimum grading factors except for length for hardwood tree grades 3 or 4.

Eastern white pine – Use the Eastern White Pine Tree Grades (1, 2, 3 or 4) for eastern white pine only. Trees meeting the definition of Growing Stock that do not have a merchantable grade in the butt 16 but do have a 12 foot or two 8 foot gradable sections somewhere in the tree will be assigned grade 5. Note: When determining the grade of upper logs, 8-foot sawlogs need to meet all the minimum grading factors except for length for white pine tree grade 4.

Other pines – Use the Pine Tree Grades (1, 2 or 3) for all pines except eastern white pine. There is no grade 4 for the Pine Tree Grades. Trees meeting the definition of Growing Stock that do not have a merchantable grade in the butt 16 but do have a 12 foot or two 8 foot gradable sections somewhere in the tree will be assigned grade 5. Note: When determining the grade of upper logs, 8-foot sawlogs need to meet all the minimum grading factors except for length for pine tree grade 3.

Other softwoods– Use the Other Softwoods Tree Grade (1) for spruce, fir, hemlock, larch (tamarack), cedar and cypress. Trees meeting the definition of Growing Stock that do not have a merchantable grade in the butt 16 but do have a 12 foot or two 8 foot gradable sections somewhere in the tree will be assigned grade 5. Note: When determining the grade of upper logs, 8-foot sawlogs need to meet all the minimum grading factors except for length for other softwood grade 1.

A minimum of 12 feet gradable length within the butt 16 feet is required to meet minimum grading specs for Grades 1-4 (depending on available grades per species). The 12 feet gradable length can be located anywhere within the butt 16 feet as long as all four grading faces are contained in the same linear 12 feet that is sliding. To explain further, the 12 foot graded section can be slid up or down within the butt 16 feet to obtain the highest possible grade while continuing to maintain all grading faces within that sliding 12 foot grading section.

The grading section is determined by the position of “stoppers” as defined in TREE CLASS within the butt 16 feet. E.g., if a stopper is positioned at 9 feet, then a 12 foot grading section cannot be obtained within the butt 16 feet. These trees are potentially graded as 5 if they still meet the definition of Growing Stock and contain a merchantable 12 foot gradable length or two 8 foot gradable lengths somewhere in the sawlog section. Any section containing a rot or metal stopper is unsound cull. Rot does not necessarily eliminate grades 1-4 unless it is positioned so it is impossible to get a grading section that meets the minimum merchantable tree grade associated with the species. Metal does not necessarily eliminate grades 1-4 unless the metal is positioned so it is impossible to obtain a 12 foot section free of metal in the 16 foot grading section.

Note: Aluminum DBH tags and nails that have been placed for research are ignored and are not treated as cull and does not affect grade.

5.13+N % ROTTEN/MISSING CUBIC FOOT CULL [ROTT]

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.

(“Missing” is wood absent from a log or part of a log that otherwise would usually be regarded as naturally complete. It may be caused by advanced decay, fire, or the operation of a machine or tool. It also includes sections that contain metal other than aluminum research tags and nails.)

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.

NRS Note: Rotten and missing cubic-foot cull includes sections that contain rot or missing wood or as determined by sector cull. Estimate percent rotten cull volume by using the appropriate cubic-foot volume cull estimating aid tables for all species found in Regional Appendix E.

NRS Note: Do not include rotten material contained within dead tops in the percent ROTT estimate.

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 – any presence.
- 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 (except aluminum research nails and tags) – Cull at least a 1 foot cross-section above and below the metal at the point of occurrence.

NRS Note: Sounding of the tree can be used to help determine the percent ROTT when visual evidence of rotten material is present and sounding will not further damage the tree.

When collected: CORE: All live tally trees \geq 5.0 inches DBH/DRC

Field width: 2 digits

Tolerance: Zero Tolerance 0%-1%

+/- 10 % between 1%-99%

MQO: At least 90% of the time

Values: 00 to 99

5.14+N+WisCFI TOTAL LENGTH [THGT]

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 length 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.

NRS Note: TOTAL LENGTH for DRC species is recorded as the highest top of all the stems.

When collected: All live tally trees \geq 5.0 inches DBH/DRC

Field width: 3 digits

Tolerance: +/- 10 % of true length

MQO: At least 90% of the time

Values: 001 to 400

5.15+N+WisCFI ACTUAL LENGTH [ACTU]

Record for trees with missing tops (top on live trees is completely detached from the tree).

Examples:

- Live tree with live broken top with more than 50% detachment from the tree but is minimally attached – do not record ACTUAL LENGTH. TOTAL LENGTH is taken through or past the break as are BOLE and SAWLOG LENGTHS.
- Live tree with dead broken top with more than 50% detachment from the tree – record ACTUAL LENGTH in addition to TOTAL LENGTH.

If the break is along the stem length, the actual length terminates where there is 50% of the stem remaining. If the top is intact including dead tops on live trees, 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.

NRS Note: Record ACTUAL LENGTH for DRC species if what would have been the highest top is now missing.

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

When collected: All live tally trees (with broken or missing tops) \geq 5.0 inches DBH/DRC

Field width: 3 digits

Tolerance: +/- 10 % of true length

MQO: At least 90% of the time

Values: 001 to 400

5.16+N+WisCFI LENGTH METHOD [METH]

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

When collected: All live tally trees \geq 5.0 inches 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, laser).
- 2 Total length is visually estimated, actual length is measured with an instrument.
- 3 Total and actual lengths are visually estimated.

5.17+N CROWN CLASS [CCC]

Rate tree crowns in relation to the sunlight received and proximity to neighboring trees (Figure 47). 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.

NRS Note: Following is a systematic approach in determining Crown Class

- Determine the midpoint of the canopy of the neighboring trees
- Determine the height to the top of the crown
- Determine where the crown is receiving direct light
- Determine how crowded the crown is

Once the above items have been evaluated, a combination of each will be used to assign a Crown Class. (CCC 1 is addressed differently)

- If the top of the crown is below the midpoint, consider the amount of light received
 - If it receives no light, code CCC 5

- If it receives some light but is very crowded, code CCC 4
- If the top of the crown reaches the midpoint, consider light received and how crowded it is
 - If it receives no light, code CCC 5
 - If it receives some light but is very crowded, code CCC 4
 - If it receives some light and is somewhat crowded by similar crowns, code CCC 3
- If the top of the crown extends above the general level
 - If it receives significant light, and is taller than the average trees, code CCC 2

The midpoint is defined as the neighboring trees' halfway point for their average Compacted Crown Ratio.

Crowded is defined as sunlight being partially blocked along with smaller and possibly malformed crowns.

When collected: All live tally trees \geq 1.0 inch DBH/DRC

Field width: 1 digit

Tolerance: No errors

MQO: At least 85% of the time

Values:

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

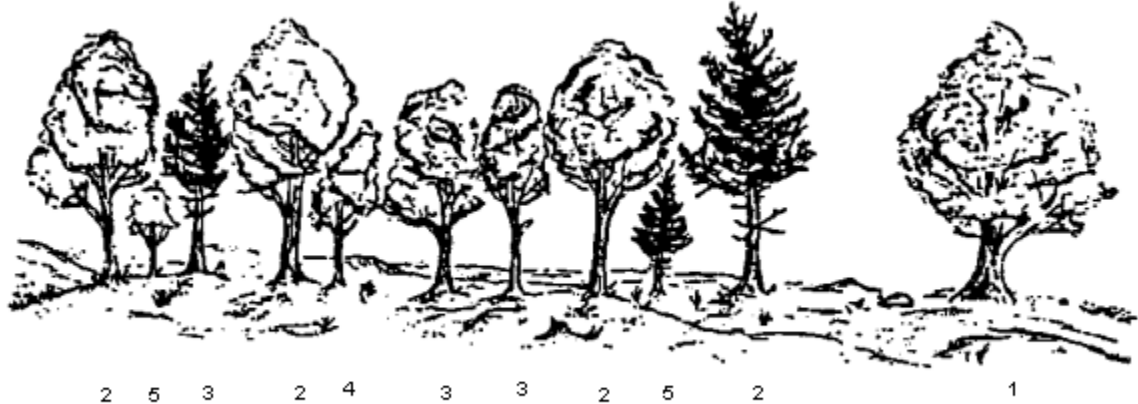


Figure 47. Examples of CROWN CLASS code definitions (numbers are the CROWN CLASS codes).

5.18+WisCFI UNCOMPACTED LIVE CROWN RATIO (Phase 2 – CORE OPTIONAL, Phase 3 – CORE) [UCRC] Not Collected in NRS P2

NRS CORE Note: Variable not collected for PHASE 2 in the North. See VOLUME II : FIELD DATA COLLECTION PROCEDURES FOR PHASE 3 INDICATORS

5.19+N COMPACTED CROWN RATIO [CRC]

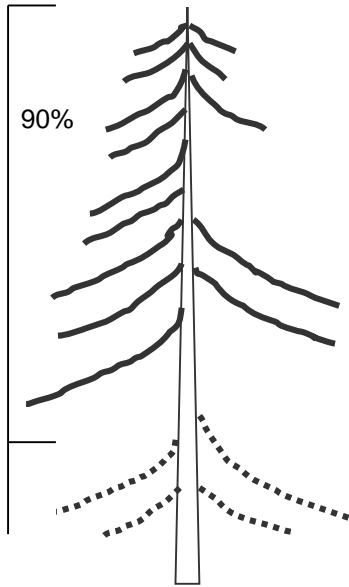
Record the COMPACTED CROWN RATIO for each live tally tree, 1.0 inch and larger, to the nearest one percent. COMPACTED CROWN RATIO is that portion of the tree supporting live foliage (or in the case of extreme defoliation should be supporting live foliage) and is expressed as a percentage of the ACTUAL LENGTH. To determine COMPACTED CROWN RATIO, ocularly transfer lower live branches to fill in large holes in the upper portion of the tree until a full, even crown is visualized. On trees with an unrecovered broken top, do not include foliage above the break.

Do not over-compact trees beyond their typical full crown situation. For example, if tree branches tend to average 2 feet between whorls, do not compact crowns any tighter than the 2-foot spacing (Figure 48). Figure 49 shows an example of COMPACTED CROWN RATIO on a leaning tree.

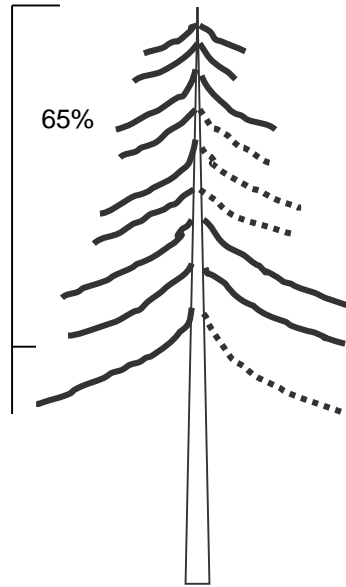
NRS Note: Epicormic branches do very little for the productivity of a tree. Therefore, they will account for very little when it comes to CRC. When calculating CRC for a tree that has nothing more than epicormic branches, picture a normal crown for the tree and then ocularly estimate the percentage the epicormic branches would fill. For these trees, CRC will likely be less than 10%.

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

Uncompacted:

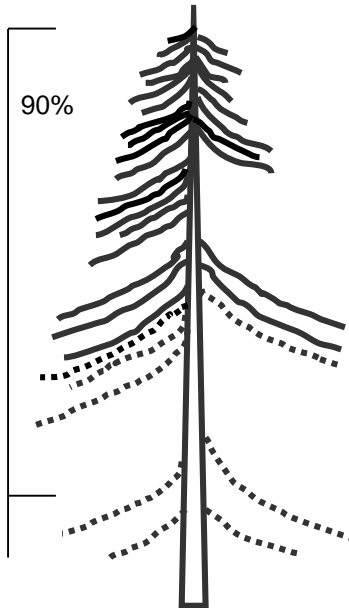


Compacted:



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

Uncompacted:



Compacted:

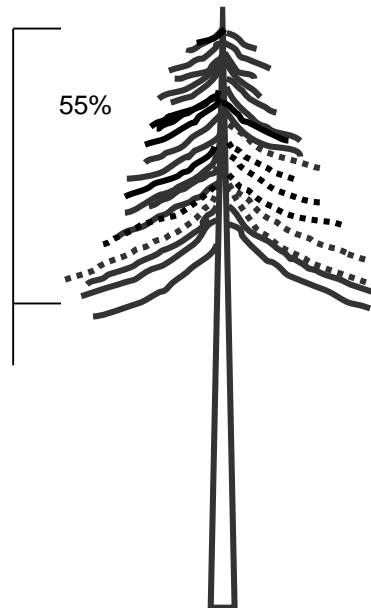


Figure 48+N. Examples of and comparison between COMPACTED CROWN RATIO and UNCOMPACTED LIVE CROWN RATIO of open-crown and dense-crown conifers.

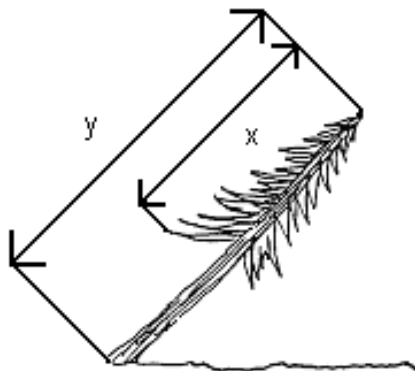


Figure 49. COMPACTED CROWN RATIO on a leaning tree. CROWN RATIO = $(x/y)100$.

For multi-stemmed woodland species, ocularly transfer lower live foliage to fill large holes on all stems and form an even crown across the tree (Figure 50).

When collected: All live tally trees ≥ 1.0 inch DBH/DRC

Field width: 2 digits

Tolerance: +/- 10 %

MQO: At least 80% of the time

Values: 00 to 99

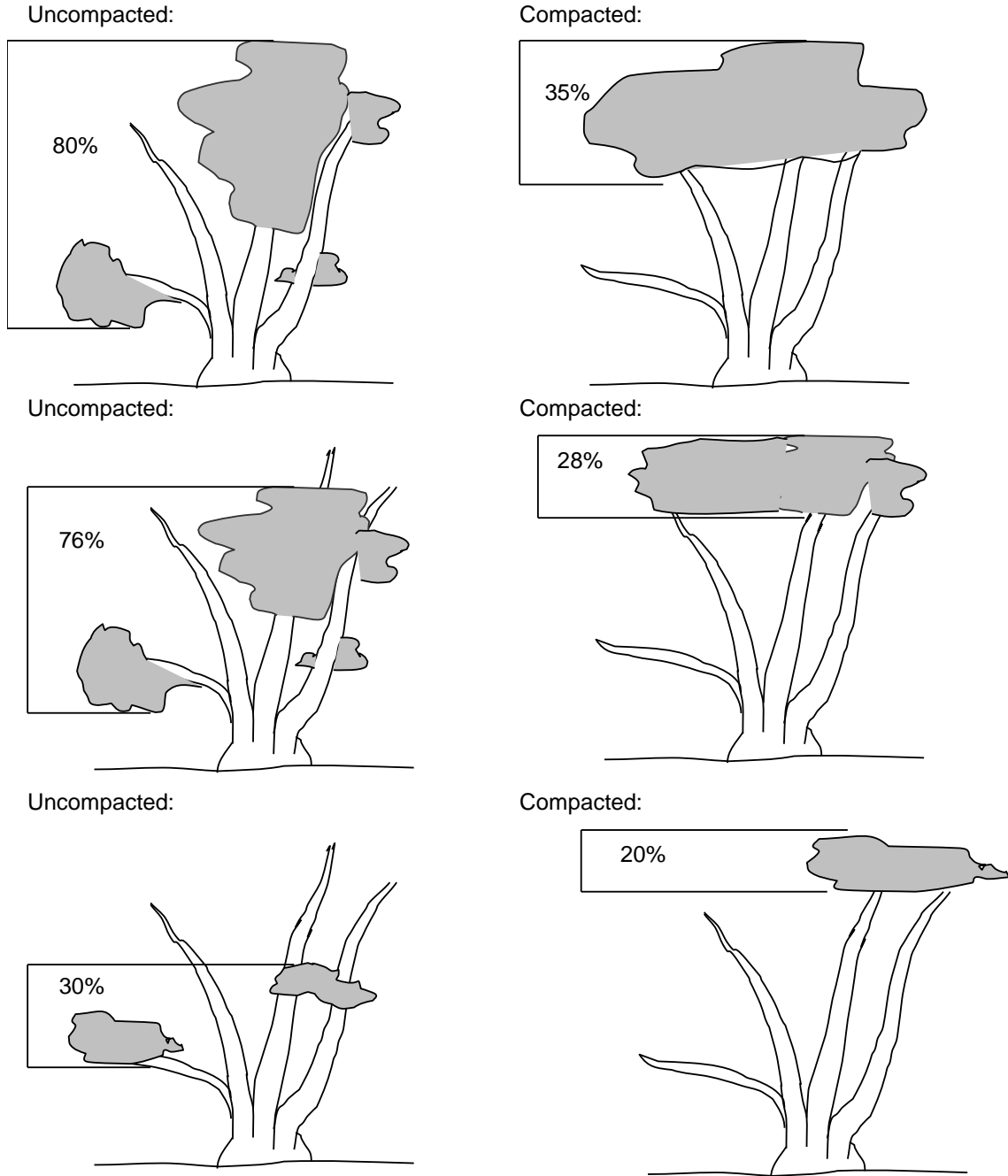


Figure 50. Examples of and comparison between COMPACTED CROWN RATIO and UNCOMPACTED LIVE CROWN RATIO of woodland species.

5.20+N 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.

NRS Note: Do not divulge pest, disease or invasive species information on public or private property. See Section 0.2 of the field guide for more information.

5.20.1+N+WisCFI DAMAGE AGENT 1 [1DAM]

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 \geq 5.0 inches DBH/DRC

CORE OPTIONAL: All live tally trees \geq 1.0 inch DBH/DRC

Field width: 5 digits

Tolerance: No errors

MQO: Will be established following blind audit results

Values: Appendix 11

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

NRS Note: coding instructions (all examples assume that damage thresholds are met).

1. Do not describe the same tree damage with multiple damage codes:
 - a. Example: A broken top from a wind storm is coded as 50013 (Wind); do not code both Wind and 90001 (Broken top). If there is a broken top of an unknown origin, just code the broken top.
 - b. Example: A portion of a dead top from an unknown origin has broken off, code 90002 (Dead top) and ignore the broken top.
 - c. Example: An open wound from a fire scar. Code as 30000 (Fire), not both Fire and 90000 (Other Damages and Symptoms).
2. Coding two damages at the same location:
 - a. Example: An open wound caused by fire that has rotten wood going into the tree bole, code 30000 (Fire) and 22500 (Stem decay).
 - b. Example: A Hypoxylon canker located on the bole at the point where the top of the tree has broken off. Code 22038 (Hypoxylon canker) and 90001 (Broken top).
3. Miscellaneous coding examples:
 - a. Example: A wind storm breaks off a tree and it falls causing an open wound on a tally tree, code as 50013 (Wind). If a tree falls into a tally tree causing the open wound and the cause of the tree falling is unknown, code as 90000 (Other Damages and Symptoms) for the open wound.
4. 90000 (Other Damages and Symptoms) vs. 99000 (unknown). Code 99000 if you have a damage that does not fit within any other Agent code. Make a tree note explaining the damage whenever 99000 is used:
 - a. Example: An Open wound on the bole of a tree that meets thresholds and is not addressed within another Agent code would be coded as 90000.
 - b. Example: Resinosis on the bole of a tree that meets thresholds and that is not addressed within another Agent code would be coded as 90000.

NRS Note: Damage threshold clarifications.

1. Bole/Stem is defined as the main stem of a tree which yields greatest merchantable volume, extending from the 1 foot stump to the point on the tree where DOB reaches 4 inches. On forked trees use the same fork as is used to assign tree class to the tree.
2. Branches are defined as the primary branches on the tree that are not already defined as part of the bole/stem.

NRS Note: Damage within the dead top or branches of the tree will only be coded if it was the direct cause of the dead area and meets the required threshold.

NRS Note: This list has been modified to include the NRS Specific Agent codes.

Code	General Agent / Specific Agents	Damage Threshold*	Descriptions
0	No Damage		

Code	General Agent / Specific Agents	Damage Threshold*	Descriptions
10000	General insects	Any damage to the terminal leader; damage $\geq 20\%$ 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 $\geq 20\%$ of the foliage with $\geq 50\%$ of the leaf/needle affected.	Insect damage that cannot be placed in any of the following insect categories.
10017	Bagworm moth	Any damage to the terminal leader; damage $\geq 20\%$ of the foliage with $\geq 50\%$ of the leaf/needle affected.	
11000	Bark beetles	Any evidence of a successful attack (successful attacks generally exhibit boring dust, many pitch tubes and/or fading crowns).	Bark beetles (<i>Dendroctonus</i> , <i>Ips</i> , 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.
11006	Mountain pine beetle	Any evidence of a successful attack	
11012	Red turpentine beetle	Any evidence of a successful attack	
11030	<i>Ips</i> engraver beetles	Any evidence of a successful attack	

Code	General Agent / Specific Agents	Damage Threshold*	Descriptions
12000	Defoliators	Any damage to the terminal leader; damage $\geq 20\%$ of the foliage with $\geq 50\%$ 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.
12005	Sawflies	Any damage to the terminal leader; damage $\geq 20\%$ of the foliage with $\geq 50\%$ of the leaf/needle affected.	
12029	Oak skeletonizer	Any damage to the terminal leader; damage $\geq 20\%$ of the foliage with $\geq 50\%$ of the leaf/needle affected.	
12038	Spruce budworm	Any damage to the terminal leader; damage $\geq 20\%$ of the foliage with $\geq 50\%$ of the leaf/needle affected.	
12041	Jack pine budworm	Any damage to the terminal leader; damage $\geq 20\%$ of the foliage with $\geq 50\%$ of the leaf/needle affected.	
12047	Larch casebearer	Any damage to the terminal leader; damage $\geq 20\%$ of the foliage with $\geq 50\%$ of the leaf/needle affected.	
12048	Birch casebearer	Any damage to the terminal leader; damage $\geq 20\%$ of the foliage with $\geq 50\%$ of the leaf/needle affected.	
12064	Elm spanworm	Any damage to the terminal leader; damage $\geq 20\%$ of the foliage with $\geq 50\%$ of the leaf/needle affected.	
12068	Browntail moth	Any occurrence.	
12081	Cherry scallop shell moth	Any damage to the terminal leader; damage $\geq 20\%$ of the foliage with $\geq 50\%$ of the leaf/needle affected.	
12086	Satin moth	Any damage to the terminal leader; damage $\geq 20\%$ of the foliage with $\geq 50\%$ of the leaf/needle affected.	
12089	Gypsy moth	Any occurrence. NRS note: Code damage if egg masses and body parts are on the tree.	
12093	Eastern tent caterpillar	Any damage to the terminal leader; damage $\geq 20\%$ of the foliage with $\geq 50\%$ of the leaf/needle affected.	
12096	Forest tent caterpillar	Any damage to the terminal leader; damage $\geq 20\%$ of the foliage with $\geq 50\%$ of the leaf/needle affected.	
12136	Yellowheaded spruce sawfly	Any damage to the terminal leader; damage $\geq 20\%$ of the foliage with $\geq 50\%$ of the leaf/needle affected.	
12197	Winter moth	Any occurrence.	

Code	General Agent / Specific Agents	Damage Threshold*	Descriptions
12200	Pyralid moth	Any damage to the terminal leader; damage \geq 20% of the foliage with \geq 50% of the leaf/needle affected.	
13000	Chewing insects Note: this is only collected by IW and SRS.	Any damage to the terminal leader; damage \geq 20% of the foliage with \geq 50% of the leaf/needle affected.	Insects, like grasshoppers and cicadas that chew on trees (those insects not covered by defoliators in code 12000).
14000	Sucking insects	Any damage to the terminal leader; damage \geq 20% of the foliage with \geq 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.
14001	Scale insects	Any damage to the terminal leader; damage \geq 20% of the foliage with \geq 50% of the leaf/needle affected.	
14003	Balsam woolly adelgid	Any occurrence.	
14004	Hemlock woolly adelgid	Any occurrence.	
14016	Beech scale	Any occurrence.	
14020	Elongate hemlock scale	Any damage to the terminal leader; damage \geq 20% of the foliage with \geq 50% of the leaf/needle affected.	
14033	Red pine scale	Any occurrence.	
15000	Boring insects	Any damage to the terminal leader; damage \geq 20% of the roots, stems, or branches. NRS Note: Do not code if confined to dead wood. Example when you have the holes on exposed dead wood on an open wound.	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.

Code	General Agent / Specific Agents	Damage Threshold*	Descriptions
15001	Shoot borer	Any damage to the terminal leader; damage $\geq 20\%$ of the roots, stems, or branches.	
15004	Bronze birch borer	Any damage to the terminal leader; damage $\geq 20\%$ of the roots, stems, or branches.	
15026	Red oak borer	Damage to $\geq 10\%$ of the bole circumference.	
15031	Sugar maple borer	Any damage to the terminal leader; damage $\geq 20\%$ of the roots, stems, or branches.	
15087	Emerald ash borer	Any occurrence.	
15088	Hemlock borer	Any damage to the terminal leader; damage $\geq 20\%$ of the roots, stems, or branches.	
17000	Gallmaker Insects		
17011	Balsam gall midge	Any damage to the terminal leader; damage $\geq 20\%$ of the foliage with $\geq 50\%$ of the leaf/needle affected.	
19000	General diseases	Any damage to the terminal leader; damage $\geq 20\%$ 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 $\geq 20\%$ of the foliage with $\geq 50\%$ of the leaf/needle affected.	Diseases that cannot be placed in any of the following disease categories.

Code	General Agent / Specific Agents	Damage Threshold*	Descriptions
21000	Root/butt diseases	Any occurrence.	<p>Root disease kills all or a portion of a tree's roots. Quite often, the pathogenic fungus girdles the tree at the root collar. Tree damage includes mortality (often occurring in groups or "centers"), reduced tree growth, and increased susceptibility to other agents (especially bark beetles). General symptoms include resin at the root collar, thin, chlorotic (faded) foliage, and decay of roots. A rot is a wood decay caused by fungi. Rots are characterized by a progression of symptoms in the affected wood. First, the wood stains and discolors, then it begins to lose its structural strength, and finally the wood starts to break down, forming cavities in the stem. Even early stages of wood decay can cause cull due to losses in wood strength and staining of the wood. Rot can lead to mortality, cull, an increased susceptibility to other agents (such as insects), wind throw, and stem breakage.</p>
21001	Armillaria root disease	Any occurrence.	
21010	Heterobasidion root disease	Any occurrence.	

Code	General Agent / Specific Agents	Damage Threshold*	Descriptions
22000	Cankers (non-rust)	Any occurrence.	<p>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.</p> <p>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.</p>
22006	Black knot of cherry	Any occurrence on the bole or on branches ≤ 1 foot from bole; damage to $\geq 50\%$ of branches.	
22011	Caliciopsis canker	Any occurrence.	
22023	Chestnut blight	Any occurrence.	
22030	Eutypella canker	Any occurrence.	
22038	Hypoxylon canker of aspen	Any occurrence.	
22042	Beech bark disease	Any occurrence.	
22043	Nectria canker	Any occurrence.	
22053	Butternut canker	Any occurrence.	
22075	Lachnellula canker	Any occurrence.	
22076	Strumella canker	Any occurrence.	

Code	General Agent / Specific Agents	Damage Threshold*	Descriptions
22087 (was 22083 in WisCFI 3.0)	nonrust canker	Damage \geq 20% of bole circumference (in a running 3-foot section) at point of occurrence	
22500	Stem decays	Any visual evidence (conks; fruiting bodies; rotten wood) NRS Note: Code damage even if on dead wood within live portion of tree.	Rot occurring in the bole/stems of trees above the roots and stump.
23000	Parasitic / Epiphytic plants	Dwarf mistletoes with Hawksworth rating of \geq 3; true mistletoes and vines covering \geq 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.
23003	Vine damage	Vines covering \geq 50% of crown	
23015	Eastern dwarf mistletoe	Any occurrence.	
24000	Decline Complexes/ Dieback/Wilts	Damage \geq 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.
24001	Alaska-yellow cedar decline		
24004	Ash decline/yellows	Damage \geq 20% dieback of crown area.	
24021	Oak wilt	Damage \geq 20% dieback of crown area.	
24022	Dutch elm disease	Damage \geq 20% dieback of crown area.	
25000	Foliage diseases	Damage \geq 20% of the foliage with \geq 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.
25057	Sirococcus tip blight	Damage \geq 20% of the foliage with \geq 50% of the leaf/needle affected.	
25072	Sirococcus shoot blight	Damage \geq 20% of the foliage with \geq 50% of the leaf/needle affected.	

Code	General Agent / Specific Agents	Damage Threshold*	Descriptions
26000	Stem rusts	Any occurrence on the bole or stems (on multi-stemmed woodland species), or on branches ≤1 foot from boles or stems; damage to ≥20% of branches	A stem rust is a disease caused by fungi that kill or deform all or a portion of the stem or branches of a tree. Stem rusts are obligate parasites and host specialization is very common. They infect and develop on fast-growing tissues and cause accelerated growth of infected tissues resulting in galls or cankers. Heavy resinosis is usually associated with infections. Sometimes yellow or reddish-orange spores are present giving a “rusty” appearance. Damage occurs when the disease attacks the cambium of the host, girdling and eventually killing the stem above the attack. Symptoms of rusts include galls (an abnormal and pronounced swelling or deformation of plant tissue that forms on branches or stems) and cankers (a sunken lesion on the stem caused by death of the cambium which often results in the death of tree tops and branches).
27000	Broom rusts	≥50% of the crown area affected.	Broom rust is a disease caused by fungi that kill or deform all or a portion of the branches of a tree. Broom rusts are obligate parasites and host specialization is very common. They infect and develop on fast-growing tissues and cause accelerated growth of infected tissues resulting in galls. Symptoms of rusts include galls, an abnormal and pronounced swelling or deformation of plant tissue that forms on branches or stems.

Code	General Agent / Specific Agents	Damage Threshold*	Descriptions
30000	Fire	Damage \geq 20% of bole circumference; >20% of stems on multi-stemmed woodland species affected; \geq 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 \geq 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 \geq 20% of the foliage with \geq 50% of the leaf/needle affected. NRS Note: Code damage even if on dead wood within live portion of tree.	Wild animals from birds to large mammals cause open wounds. Some common types of damage include: sapsucker bird peck, deer rub, bear clawing, porcupine feeding, and beaver gnawing.
42000	Domestic animals	Any damage to the terminal leader; damage \geq 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 \geq 20% of the foliage with \geq 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 \geq 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 \geq 20% of the foliage with \geq 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).
50002	Chemical	Any damage to the terminal leader; damage \geq 20% of the roots, stems, or branches; damage \geq 20% of the foliage with \geq 50% of the leaf/needle affected.	

Code	General Agent / Specific Agents	Damage Threshold*	Descriptions
50003	Drought	Any damage to the terminal leader; damage > 20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; > 20% of the branches affected ; damage > 20% of the foliage with > 50% of the leaf/needle affected.	
50004	Flooding/high water	Any damage to the terminal leader; damage > 20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; > 20% of the branches affected ; damage > 20% of the foliage with > 50% of the leaf/needle affected.	
50008	Lightning	Any damage to the terminal leader; damage > 20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; > 20% of the branches affected ; damage > 20% of the foliage with > 50% of the leaf/needle affected.	
50011	Snow/ice	Any damage to the terminal leader; damage > 20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; > 20% of the branches affected ; damage > 20% of the foliage with > 50% of the leaf/needle affected.	

Code	General Agent / Specific Agents	Damage Threshold*	Descriptions
50013	Wind	Any damage to the terminal leader; damage > 20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; > 20% of the branches affected ; damage > 20% of the foliage with > 50% of the leaf/needle affected.	
60000	Competition	Overtopped shade intolerant trees that are not expected to survive for 5 years or saplings not expected to reach tree size (5.0 inches DBH/DRC). NRS Note: Must show evidence of decline that will lead to death.	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.
70003	Imbedded objects	Any occurrence on the bole. NRS Note: Do not code damage for metal that does not make it into the cambium. Example small staples that are in bark only. Also research nails and tags would not be coded as a damage.	
70007	Logging damage	Any damage to the terminal leader; damage > 20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; > 20% of the branches affected ; damage > 20% of the foliage with > 50% of the leaf/needle affected.	
71000	Harvest	Removal of ≥10% of cubic volume	Only recorded for woodland species trees that have partial cutting

Code	General Agent / Specific Agents	Damage Threshold*	Descriptions
90000	Other damage	Any damage to the terminal leader; damage $\geq 20\%$ 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 $\geq 20\%$ of the foliage with $\geq 50\%$ of the leaf/needle affected. NRS Note: Only use this code for checks, bole cracks, open wounds, Resinosis, and broken branches that meet thresholds. Do not include "tree form" situations (fork, crook, sweep, etc.) such as 90003 limby-wolf tree, 90004 forked tree, and 90005 forked below merch top as damage.	
90001	Broken top	When actual length is less than total length	
90002	Dead top	Any occurrence NRS Note: If the tree forks and only a portion of the top is dead, do not code as dead top. All forks must have dead tops in order to code this damage.	
90008	Foliage discoloration	Damage $\geq 20\%$ of crown affected.	
90009- WisCFI	Mortality		

Code	General Agent / Specific Agents	Damage Threshold*	Descriptions
90010	Dieback	Damage \geq 20% of crown affected.	Dieback This is recent mortality of branches with fine twigs, which begins at the terminal portion of a branch and proceeds toward the trunk. Dieback is only considered when it occurs in the upper and outer portions of the tree. When whole branches are dead in the upper crown, without obvious signs of damage such as breaks or animal injury, assume that the branches died from the terminal portion of the branch. Dead branches in the lower portion of the live crown are assumed to have died from competition and shading. Dead branches in the lower live crown are not considered as part of crown dieback, unless there is continuous dieback from the upper and outer crown down to those branches.
99000	Unknown damage	Any damage to the terminal leader; damage \geq 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 \geq 20% of the foliage with \geq 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.

NRS Note: If unknown damage, add a damage description to TREE NOTES.

5.20.2 DAMAGE AGENT 2 [2DAM]

Follow procedures described for DAMAGE AGENT 1

When collected: CORE: All live tally trees \geq 5.0 inches DBH/DRC

CORE OPTIONAL: All live tally trees \geq 1.0 inch DBH/DRC

Field width: 5 digits

Tolerance: 1 of 2 damages correct

MQO: Will be established following blind audit results

Values: See 5.20.1

5.20.3 DAMAGE AGENT 3 [3DAM]

Follow procedures described for DAMAGE AGENT 1

When collected: CORE: All live tally trees ≥ 5.0 inches DBH/DRC

CORE OPTIONAL: All live tally trees ≥ 1.0 inch DBH/DRC

Field width: 5 digits

Tolerance: 2 of 3 damages correct

MQO: Will be established following blind audit results

Values: See 5.20.1

5.21 CAUSE OF DEATH [CAUS]

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.

NRS Note: A remeasure tree that has died and is now in a nonforest condition is assigned the appropriate CAUSE OF DEATH. For example, a tree that was previously live in accessible forest land and died due to disease in a residential area is coded as 20.

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

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

5.22-R1 and R2 MORTALITY YEAR [MORT] (CORE OPTIONAL) Not Collected in WisCFI

5.23+WisCFI DECAY CLASS [DECA]

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 inches 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+N+WisCFI LENGTH TO DIAMETER MEASUREMENT POINT [DIAH]

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.

NRS Note: Record diameter height for all trees not measured at 4.5 feet, even if diameter was previously monumented.

When collected: All live tally trees \geq 1.0 inch DBH and standing dead tally trees \geq 5.0 inches DBH
Field width: 3 digits
Tolerance: +/- 0.2 ft
MQO: At least 90% of the time
Values: 00.1 – 15.0

5.25+N-ME ROUGH CULL (CORE OPTIONAL) Not Collected in WisCFI

5.26-R1 and R2 DWARF MISTLETOE CLASS (CORE OPTIONAL) Not Collected in WisCFI

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

5.33 SRS SPECIES CODE Not Collected in WisCFI

5.34N FOREST TO NONFOREST VARIABLES

Tree and/or saplings previously tallied on accessible forest land and are now located in a nonforest condition require the following variables.

NumberData	Element Name	PDR Prompt
5.2	TREE RECORD NUMBER	TR#
5.3	CONDITION CLASS NUMBER	CON#
5.4	AZIMUTH	AZM
5.5	HORIZONTAL DISTANCE	DIST
5.6	PREVIOUS TREE STATUS	PAST
5.7	PRESENT TREE STATUS	TRST
5.7.1	RECONCILE	RECO
5.7.2	STANDING DEAD	DEAD
5.8	SPECIES	SPP
5.21	CAUSE OF DEATH	CAUS

Note: A RECONCILE code is required if PRESENT TREE STATUS = 0. A STANDING DEAD code is required if PRESENT TREE STATUS = 2. Ingrowth trees are not tallied. Missed trees from the last cycle are not to be reconciled, since the collection of this data is subjective due to the condition change. Erroneously tallied trees from the last cycle can be reconciled if it is determined that a cruiser error or a procedural change has taken place since the last cycle.

NRS PDR Note: To prevent trees from mistakenly being coded on a nonforest condition, each tree will receive the following critical PDR message: "You have a tree on a nonforest condition. This is only valid if condition went from forest to nonforest."

When collected: All trees when previous CONDITION CLASS STATUS = 1 and current CONDITION CLASS STATUS = 2, 3, 4 or 5

5.35N BIRCH BARK HARVESTED [BHAR]

Record if the bark has been harvested between 1 foot and 9 feet on the bole for all Live or Standing Dead Paper Birch (0375) trees greater than or equal to 5.0 inches DBH.

Incidental human or natural caused damage should not be coded as Bark Harvest.

A value of 0 will be auto coded in the data recorder. If harvest is present, replace the value of 0 with a value of 1.

When collected: STATE = (26, 27, 55) and All Paper Birch (0375) trees \geq 5.0 inches DBH when
PRESENT TREE STATUS = 1 or PRESENT TREE STATUS = 2 and
STANDING DEAD = 1

Field width: 1 digit

Tolerance: No errors

MQO: At least 90% of the time

Values:

- 0 Bark not harvested
- 1 Bark has been harvested

6.0+N+WISCFI 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 two 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 may be estimated. Only count seedlings occurring in accessible forest land CONDITION CLASSES.

NRS Note: A seedling is measured from the base to the tip of the terminal bud. If the minimum length requirement is met for either a hardwood or softwood, the seedling is tallied.

6.1 SUBPLOT NUMBER

Use the same procedures described in Section 3.1.

When collected: All counts of seedlings

6.2 SPECIES [SPP]

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+N

6.3 CONDITION CLASS NUMBER [CON#]

Use the same procedures described in Section 2.0.

When collected: All counts of seedlings

6.4+N+WisCFI SEEDLING COUNT [SED#]

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. Do not tally any height classes if smallest is under water.

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

NRS (West) Note: This applies to Rocky Mountain juniper (0066) in the states of KS, NE, ND and SD.

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.

NRS Note: If snow amounts are excessive on the microplot, the seedling tally is restricted to seedlings visible above the snow. Do not excavate snow from the microplot to achieve a better measurement. This practice may compromise the integrity of the microplot by exposing seedlings and other vegetation to animal browsing; and by exposing seedlings to extreme temperatures that may lead to mortality.

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+N 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
- On the previous visit the selected site tree(s) did not yield suitable site information.
- Since the last visit there has been a change in condition class that renders the previous data incompatible with the current conditions

NRS Note: Site tree data will not be required for many remeasurement plots (SK 2). If a remeasurement plot has only one defined condition that is forested, and it has a site tree from a previous visit, only CONDITION CLASS LIST will be required for the Site Tree screen. The previous data will be populated in the Historical file for reference, but the fields will be locked so no information can be added or adjusted.

Plots that do not have previous site tree data, or have multiple forested conditions defined, will require site tree data to be populated.

If a site tree is needed; select a 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, or site trees are not collected, record that the reason in the PDR plot notes and leave this section blank.

NRS Note: A suitable site index tree must not be further than 200 ft from any subplot center and must be off the subplots.

NRS Note: A tree cored for stand age may or may not be suitable site tree. If the tree cored for stand age meets the site tree selection criteria, then this tree can be used for both stand age and site index.

NRS Note: On plots that require additional site tree data on the existing site tree record, if any site tree data item is changed other than CONDITION CLASS LIST, the old tree record must be deleted and a new tree record with the next available Tree Record Number will be created.

7.2 Site Tree Data Variables

7.2.0N TREE RECORD NUMBER [TR#]

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

When collected: All site trees

Field width: 3 digits

Tolerance: No errors

MQO: At least 99% of the time

Values: 001 to 999

7.2.1 CONDITION CLASS LIST [CONL]

List all CONDITION CLASS NUMBERS 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+N+WisCFI SPECIES [SPP]

Use the same procedures described in Section 5.8. Ideally, site trees in the eastern U.S. should be between 20-70 years old. If preferred trees cannot be found in this age range, expand the age range to 15-120 years. Reject trees outside the 15-120 200 year age range, trees that exhibit signs of damage, trees with ring patterns that show signs of suppression, trees less than 5.0 3.0 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.

NRS Note: Site index trees that are 5.0" DBH and larger should be selected if available. If no site index trees 5.0" DBH or larger are available then trees from 3.0" DBH - 4.9" DBH should be selected. Trees used for Site Index that are under 5.0" DBH will need to be re-input, with updated DBH, Length, and age, as a new tree at time of next inventory with next available Tree Record Number. Do not select trees less than 3.0" DBH. Site trees should be at least 20 years old actual age. Actual Age can be calculated by adding “Add Years” to DBH age. The “Add Years” can be found in the Site Index Curves booklet. If no suitable site index trees 20 years actual age or older are available, then trees 15 - 19 years old actual age can be selected. Site trees should be less than 120 years old actual age. If no suitable site index trees 120 years old actual age and less are available then trees 200 years old actual age and less can be selected. The Legal files are set at 10 to 200.

NRS Note: In the East, do not establish a new site index species of 602 (Black Walnut) or 762 (Black Cherry). In the West, do not establish a new site index species of 602 (Black Walnut). These species can remain as site index trees if they have already been established.

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:

NRS Note: The species table below has been modified for WisCFI. Species indicated with a "W" are acceptable to core in WI.

Code	Common Name	NRS		West Model Species (Figure #)
0012	balsam fir	E	W	balsam fir (55)
0068	eastern redcedar	E	W	eastern redcedar (58)
0070	larch (introduced)	E		
0071	tamarack	E	W	tamarack (60)
0094	white spruce	E	W	white spruce (67)
0095	black spruce	E	W	black spruce (70)
0097	red spruce	E		
0105	jack pine	E	W	jack pine (74)
0125	red pine	E	W	red pine (95)
0128	pond pine	E		
0129	eastern white pine	E	W	eastern white pine (103)
0130	Scotch pine	E	W	jack pine (74)
0241	northern white-cedar	E	W	northern white-cedar (126)
0261	eastern hemlock	E	W	eastern hemlock (127)
0316	red maple	E	W	red maple (1)
0317	silver maple	E	W	silver maple (4)
0318	sugar maple	E	W	sugar maple (3)
0371	yellow birch	E	W	yellow birch (6)
0375	paper birch	E	W	paper birch (9)
0402	bitternut hickory	E	W	hickory spp. (10)
0403	pignut hickory		W	hickory spp. (10)
0404	pecan		W	hickory spp. (10)
0405	Shellbark hickory		W	hickory spp. (10)
0407	shagbark hickory	E	W	hickory spp. (10)
0408	black hickory		W	hickory spp. (10)
0409	mockernut hickory		W	hickory spp. (10)
0462	hackberry		W	Plains hackberry (Plains 3)
0531	American beech	E	W	American beech (11)
0541	white ash	E	W	white ash (13)
0543	black ash	E	W	black ash (14)
0544	green ash	E	W	green ash (15)
0611	sweetgum	E	W	sweetgum (21)
0621	yellow-poplar	E	W	yellow-poplar (25)
0741	balsam poplar		W	bigtooth and quaking aspen (32)
0742	eastern cottonwood	E	W	eastern cottonwood (28)
0743	bigtooth aspen	E	W	bigtooth and quaking aspen (32)
0746	quaking aspen	E	W	bigtooth and quaking aspen (32)
0762	black cherry		W	black cherry (34)
0802	white oak	E	W	white oak (41)
0806	scarlet oak	E	W	black oak (49)
0809	northern pin oak		W	black oak (49)
0823	bur oak		W	white oak (41)
0826	Chinkapin oak		W	white oak (41)

Code	Common Name	NRS		West Model Species (Figure #)
0830	pin oak	E	W	black oak (49)
0832	chestnut oak	E		
0833	northern red oak	E	W	northern red oak (48)
0837	black oak	E	W	black oak (49)
0901	black locust	E	W	black locust (50)
0951	American basswood	E	W	American basswood (51)
0972	American elm	E	W	American elm (53)
0975	slippery elm		W	American elm (53)
0977	rock elm		W	American elm (53)

7.2.3 DIAMETER [DBH]

Use the same procedures described in Section 5.9.

When collected: All site trees

Field width: 4 digits (xxx.y)

Tolerance: +/- 0.1 inch per 20.0 inches increment of measured diameter on all live trees and dead trees with DECAY CLASS = 1, 2

+/- 1.0 inch per 20.0 inches increment of measured diameter on dead trees with DECAY CLASS = 3, 4, 5

For woodland species: +/- 0.2 inch per stem

MQO: At least 95% of the time. For example: a tree with a diameter of 41.0 inches would have a tolerance of plus or minus 0.3 inch. (Note: the MQO for point of measurement is +/- 0.2 inch when the tree is first measured and within 1 ft of the location established by the previous crew when the tree is remeasured.)

Values: 001.0 to 999.9

7.2.4 SITE TREE LENGTH [HGHT]

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 [AGE]

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+N+WisCFI SUBPLOT NUMBER (CORE OPTIONAL) [SUB#]

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 Not Collected in WisCFI
- 4 Southwest subplot Not Collected in WisCFI

7.2.8+N+AZIMUTH (CORE OPTIONAL) [AZM]

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+N+HORIZONTAL DISTANCE (CORE OPTIONAL) [DIST]

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

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

NRS Note: A suitable site index tree must not be further than 200 feet from any subplot center.

12.0N-WISCFI WISCFI FOREST HABITAT TYPE IDENTIFICATION

Each forested condition class will receive a habitat type designation and completed data sheet with species list. If two or more forested condition classes occur within a plot, then a separate data sheet and habitat type designation must be completed for each condition class.

Data to collect and enter on each data collection sheet:

- WI CFI plot number and condition class
- Property and County names
- Name(s) of person(s) collecting data and identifying habitat type
- Date data collected
- Forest cover type – predominant tree species
- Habitat type name (abbreviation) and habitat type CFI code
 - The habitat type should be identified on site using the appropriate field guide(s)
 - Habitat type computer software can be used for consideration and verification
- Identification (ID) method
 - ID methods: 1 – on site, 2 – extrapolated, 3 – undefined
- For each species present, estimate and record canopy coverage class.
 - For trees, separate seedlings (trees <1 inch DBH) from larger trees and record coverage separately.
 - Important species not listed on data sheet can be added on the front or back of the data sheet.
 - ❖ Coverage classes: 1, <1% - present; 2, 1-5% - common; 3, 6-25% - well represented; 4, >25% - abundant
- Notes can be added on the back of the data sheet

Area to evaluate, collect species list, and identify habitat type:

- On, around, and between subplots, as long as condition class and habitat type remain relatively constant. Boundaries (subplot, plot, search area) should be considered soft – precise distance measures are not necessary – site and vegetation homogeneity/heterogeneity should guide the evaluation.
 - The normal search area forms an ellipse around the CFI plot, extending about 48 feet from plot and subplot center points – see first diagram.
 - If additional area is required for evaluation to identify the habitat type and collect a complete species list, and the habitat type (site) appears to remain constant, then the search area can be expanded to an area approximately one acre in size – this expanded search area can be generally defined as a circle with a 120 foot radius around plot center – see second diagram.
 - When data is collected by this standard method, a “1” (on site) should be entered in the “ID Method” box on the data sheet.

- If unable to determine the habitat type of the condition class on site because of a lack of diagnostic vegetation, then the search may be expanded to a larger area, adjacent stand, or nearby stand (may be a different cover type) if you believe that the habitat type remains constant. If this method of habitat type determination is used, then a “2” (extrapolated) should be entered in the “ID Method” box on the data sheet. On the back of the data sheet describe the reason for extrapolation, location of data collection, and key stand characteristics where data was collected.

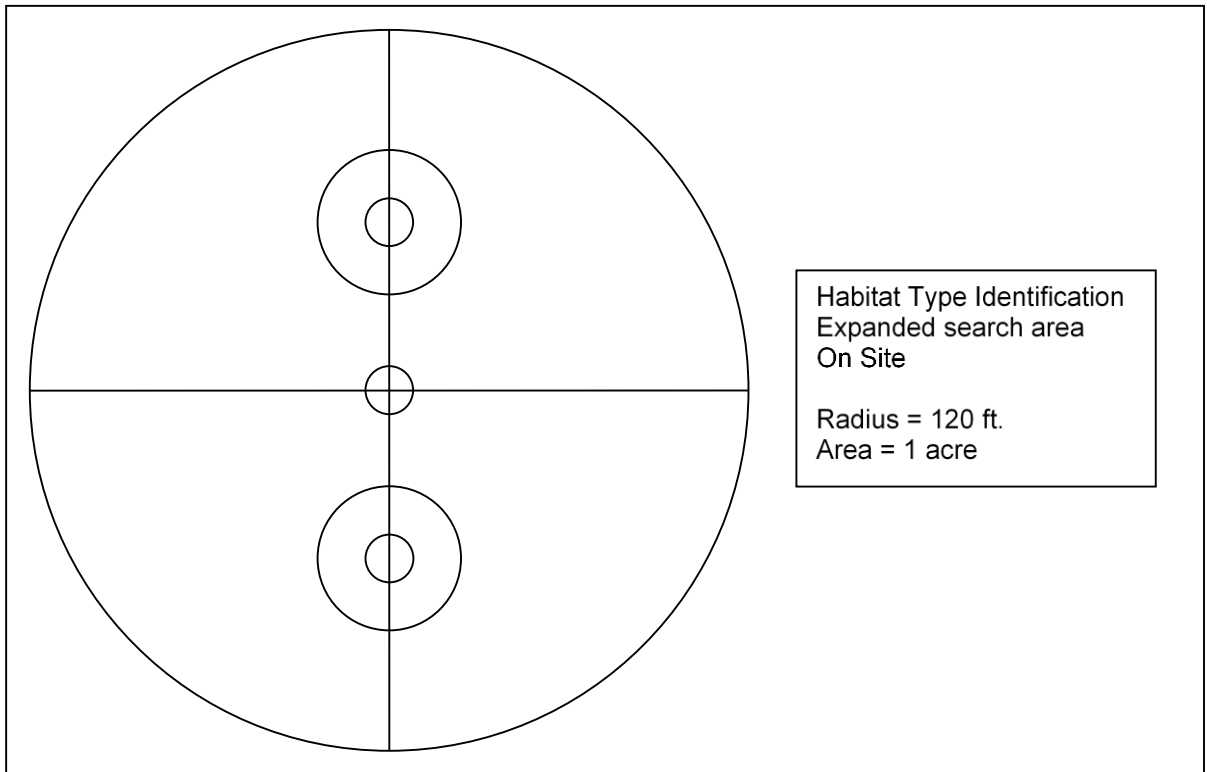
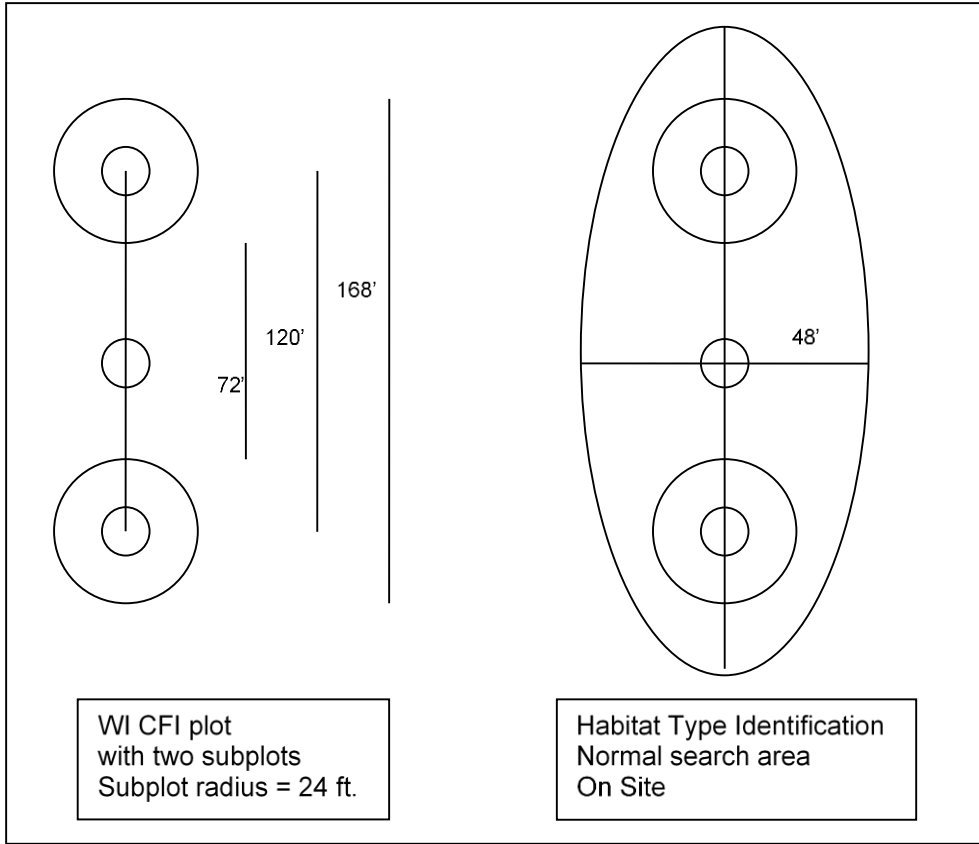
In the case where more than one habitat type exists within a condition class, then:

- If one habitat type is predominant, occurring on >50% of the subplot(s) condition class area, then the predominant habitat type will be recorded with the species list from that portion of the stand and site. Note the situation on the back of the data sheet (draw diagram if possible).
- If no single habitat type is predominant (>50%) on the subplot(s), then an undefined name and code will be applied. In this case, the “Undefined – Plot too complex” designation will be used.
 - Always attempt to identify the habitat type. In some cases, a habitat type cannot be identified either on site or by extrapolation. In such cases, the habitat type will be undefined. If conditions exist that make habitat type determination highly uncertain, then enter “undefined” and specify the reason in the “Habitat Type” box on the data sheet. In the “Habitat Type Code” box, enter the appropriate code for undefined – reason. Appropriate codes are 93-100. Try to be as specific as possible as to the reason when selecting an undefined designation and code. In the “ID Method” box, enter “3” (undefined). When the habitat type is undefined, the species list does not need to be completed.
 - Standard field equipment is required (e.g. map, compass, distance tape, clip board, pencil, etc.).

Equipment specific to habitat type data collection and identification:

- CFI plot information – plot no., location, layout, condition classes, etc.
- Habitat type identification and data collection guidelines
- Habitat type data collection data sheet
- List of forest habitat types and habitat type CFI codes
- Habitat type guide(s)
 - A Guide to Forest Communities and Habitat Types of Northern Wisconsin, second edition, 2002
 - A Guide to Forest Communities and Habitat Types of Central and Southern Wisconsin, 1996
- Habitat type software – can be field or office based (handheld, laptop, or desktop)
 - Wisconsin Forest Habitat Type Program, 2004
- Plant identification guide(s) (e.g. Newcomb’s Wildflower Guide, 1977)

WI CFI plot, subplots, and area for habitat type identification



Forest Habitat Type List and WI CFI Codes			
Habitat Type Name	CFI Code	Habitat Type Group #	Habitat Type Group Name and Abbreviation
PQE	1	1	N. Very Dry to Dry
PQG	2	1	N VD-D
PQGCe	3	1	
PArV	4	1	
PArV-U	5	1	
PArVAo	6	1	
QAp	7	1	
PArVAm	8	2	N. Dry to Dry-mesic
PArVAa	9	2	N D-DM
PArVAa-Vb	10	2	
PArVAa-Po	11	2	
PArVPo	12	2	
AVVb	13	3	N. Dry-mesic
AVCI	14	3	N DM
TFAa	15	3	
AVDe	16	3	
AVb-V	17	3	
ACI	18	3	
AVb	19	3	
AAAt	20	3	
ATFPo	21	3	
AFVb	22	4	N. Mesic
ATM	23	4	N M
ATFSt	24	4	
ATFD	25	4	
AAAs	26	4	
ATD	27	4	
ATDH	28	4	
AHVb	29	4	
AFAAd	30	4	
AFAI	31	4	
ACaCi	32	4	
AOCa	33	4	
AH	34	4	
AHI	35	5	N. Mesic to Wet-mesic
ACal	36	5	N M-WM
ASal	37	5	
ATAtOn	38	5	
ASnMi	39	5	
AAAtRp	40	5	
TMC	41	5	
ArAbCo	42	5	
ArAbSn	43	5	
ArVRp	44	5	

ArAbVCo	45	5	
ArAbVC	46	5	
Forest Lowland North	90	6	N. Wet-mesic to Wet (N WM-W)
PVGy	51	7	S. Dry
PEu	52	7	S D
PArVHa	50	7	
PVCr	53	7	
PVG	54	7	
ArDe-V	55	8	S. Dry-mesic
ArDe	56	8	S DM
AQVb-Gr	57	8	
ArCi	58	8	
ArCi-Ph	59	8	
AArVb	60	8	
AArL	61	8	
ATiDe-Ha	62	9	S. Dry-mesic to Mesic
ATiDe	63	9	S DM-M
ATiDe-As	64	9	
ATiFrCi	65	9	
ATiFrVb	66	9	
AFrDe	67	9	
AFrDeO	68	9	
ATiDe(Pr)	69	10	S. Dry-mesic to Mesic (phase)
ATiCr(O)	70	10	S DM-M(p)
ATiCr(As)	71	10	
ATiFrVb(Cr)	72	10	
AFrDe(Vb)	73	10	
ATTr	74	11	S. Mesic
AFTD	75	11	S M
ATiSa-De	76	11	
ATiSa	77	11	
ATiFrCa	78	11	
ATiCa-La	79	11	
ATiCa	80	11	
ATiCa-Al	81	11	
ATiH	82	11	
AFH	83	11	
AFAs	84	11	
AFAs-O	85	11	
ATiAs(De)	86	12	S. Mesic (phase)
ATiFrCa(O)	87	12	S M(p)
PArVRh	49	13	S. Mesic to Wet-mesic
Wetmesic South	91	13	S M-WM
Forest Lowland South	92	14	S. Wet-mesic to Wet (S WM-W)
Undefined habitat type (other)	93	15	No habitat type identified (undefined)
Undefined - Lack of diagnostics (other)	94	15	

Undefined - Plantation (lack diagnostics)	95	15	
Undefined - Clearcut (lack diagnostics)	96	15	
Undefined - Grazed (lack diagnostics)	97	15	
Undefined - Disturbed (lack diagnostics)	98	15	
Undefined - Plot too complex	99	15	
Undefined - Not done / No data	100	15	

WI CFI - Forest Habitat Type Data Collection Sheet			
CFI Plot No.:		Condition Class:	
Property:		County:	
Collected by:		Date:	
Habitat Type:		Cover Type:	
Habitat Type Code:		ID Method:	
ID Method: 1 - on site; 2 - extrapolated; 3 - undefined			
Coverage Classes: 1, <1% - present; 2, 1-5% - common; 3, 6-25% - well represented; 4, >25% - abundant			
Acer spicatum	Crataegus spp.	Lycopodium annotinum	Rubus flagellaris
Achillea millefolium	Cryptotaenia can.	Lycopodium clavatum	Rubus hispidus
Actaea spp.	Cuscuta gronovii	Lycopodium comp.	Rubus parviflorus
Adiantum pedatum	Cypripedium acaule	Lycopodium lucidulum	Rubus pubescens
Agrimonia spp.	Desmodium glutinosum	Lycopodium obscurum	Rubus spp.
Allium tricoccum	Desmodium nudiflorum	Lycopus uniflorus	Rudbeckia laciniata
Alnus rugosa	Diervilla lonicera	Lysimachia ciliata	Salix spp.
Amelanchier spp.	Dioscorea villosa	Lysimachia quadrifolia	Sambucus canadensis
Amorpha canescens	Dirca palustris	Maianthemum can.	Sambucus pubens
Amphicarpa bracteata	Dryopteris disjuncta	Matteuccia struth.	Sanguinaria canadensis
Andromeda glauco.	Dryopteris phegopteris	Medeola virginiana	Sanicula spp.
Anemone quinquefolia	Dryopteris spinulosa	Melampyrum lineare	Sarracenia purpurea
Anemone virginiana	Dryopteris thelypteris	Menispermum can.	Scutellaria lateriflora
Apocynum andro.	Epifagus virginiana	Mitchella repens	Sium suave
Aquilegia canadensis	Epigaea repens	Mitella diphylla	Smilacina racemosa
Aralia nudicaulis	Equisetum spp.	Mitella nuda	Smilacina stellata
Aralia racemosa	Eupatorium rugosum	Monarda fistulosa	Smilacina trifolia
Arctostaphylos uva-ursi	Euphorbia corollata	Monotropa uniflora	Smilax herbacea
Arenaria lateriflora	Fragaria spp.	Nemopanthus mucro.	Smilax tamnoides
Arisaema atrorubens	Galium aparine	Onoclea sensibilis	Solanum dulcamara
Arisaema dracontium	Galium asprellum	Osmorhiza claytoni	Solidago flexicaulis
Aronia melanocarpa	Galium boreale	Osmunda cinnamomea	Sorbus spp.
Asarum canadense	Galium spp.	Osmunda claytoniana	Stachys tenuifolia
Aster macrophyllus	Galium triflorum	Osmunda regalis	Staphylea trifolia
Athyrium filix-femina	Gaultheria hispidula	Oxalis montana	Streptopus roseus
Betula pumila	Gaultheria procumbens	Parthenocissus quinq.	Symplocarpus foetidus
Boehmeria cylindrica	Gaylussacia baccata	Pedicularis canadensis	Teucrium canadense
Botrychium virginianum	Geranium maculatum	Petasites palmatus	Thalictrum dasycarpum
Caltha palustris	Geum spp	Phryma leptostachya	Thalictrum dioicum

Campanula rotundifolia	Habenaria spp.	Physostegia virginiana	Toxicodendron vernix
Caulophyllum thalic.	Hamamelis virginiana	Pilea pumila	Trientalis borealis
Ceanothus americanus	Helianthus spp.	Podophyllum peltatum	Trillium spp.
Cephalanthus occi.	Hepatica acutiloba	Polemonium reptans	Triosteum aurantiacum
Chamaedaphne caly.	Hepatica americana	Polygala paucifolia	Urtica spp
Chimaphilla umbellata	Heracleum maximum	Polygonatum pub.	Uvularia grandiflora
Cicuta maculata	Hydrophyllum virginia.	Potentilla spp	Uvularia sessifolia
Circaea spp.	Ilex verticillata	Prenanthes alba	Vaccinium ang./myrt.
Cladonia rang./mit.	Impatiens capensis	Prunus pennsylvanica	Vaccinium macrocarpa
Clintonia borealis	Iris versicolor	Prunus virginiana	Vaccinium oxycoccus
Comptonia peregrina	Kalmia polifolia	Pteridium aquilinum	Viburnum acerifolium
Coptis groenlandica	Laportea canadensis	Ranunculus spp	Viburnum lentago
Cornus alternifolia	Lathyrus/Vicia spp.	Rhamnus alnifolia	Viburnum raf.
Cornus amomum	Ledum groenlandicum	Rhus radicans	Viburnum trilobum
Cornus canadensis	Linnaea borealis	Ribes spp.	Viola canadensis
Cornus racemosa	Lobelia cardinalis	Rosa spp.	Viola pub./penn.
Cornus rugosa	Lonicera canadensis		Vitis riparia
Cornus stolonifera	Lonicera spp.		Waldsteinia fragarioides
Corylus americana	Lupinus perennis		Xanthoxylum amer.
Corylus cornuta			

Moss/Grass/Sedge	SE	Trees	Sap+
Mosses (other)		Abies balsamea	
Feather mosses		Acer negundo	
Sphagnum mosses		Acer rubrum	
		Acer saccharinum	
Grasses & Sedges		Acer saccharum	
Carex spp.		Betula allghaniensis	
Carex pensylvanica		Betula nigra	
Cinna spp.		Betula papyrifera	
Elymus spp.		Carpinus caroliniana	
Eriophorum spp.		Carya cordiformis	
Leersia spp.		Carya ovata	
Muhlenbergia spp.		Celtis occidentalis	
		Fagus grandifolia	
		Fraxinus amer./penn.	
		Fraxinus nigra	
		Juglans cinerea	
		Juglans nigra	
		Larix laricina	
		Ostrya virginiana	
		Picea glauca	
		Picea mariana	
		Pinus banksiana	
		Pinus resinosa	
		Pinus strobus	
		Populus balsamifera	

Moss/Grass/Sedge	SE	Trees	Sap+
		Populus deltoides	
		Populus grandidentata	
		Populus tremuloides	
		Prunus serotina	
		Quercus alba	
		Quercus bicolor	
		Quercus ellipsoidalis	
		Quercus macrocarpa	
		Quercus rubra	
		Quercus velutina	
		Salix nigra	
		Thuja occidentalis	
		Tilia americana	
		Tsuga canadensis	
		Ulmus spp.	
SE = seedling, SAP+ = sapling and larger			

APPENDIX 1+N+WISCFI. STATE AND UNIT, COUNTY, PARISH, OR BOROUGH FIPS CODES AND STATE FOREST PROPERTY CODES

(55) Wisconsin	(101) Racine
(001) Adams	(103) Richland
(003) Ashland	(105) Rock
(005) Barron	(107) Rusk
(007) Bayfield	(109) St. Croix
(009) Brown	(111) Sauk
(011) Buffalo	(113) Sawyer
(013) Burnett	(115) Shawano
(015) Calumet	(117) Sheboygan
(017) Chippewa	(119) Taylor
(019) Clark	(121) Trempealeau
(021) Columbia	(123) Vernon
(023) Crawford	(125) Vilas
(025) Dane	(127) Walworth
(027) Dodge	(129) Washburn
(029) Door	(131) Washington
(031) Douglas	(133) Waukesha
(033) Dunn	(135) Waupaca
(035) Eau Claire	(137) Waushara
(037) Florence	(139) Winnebago
(039) Fond du Lac	(141) Wood
(041) Forest	0400 Bayfield County Forest]
(043) Grant	2600 Iron County Forest
(045) Green	4475 American Legion State
(047) Green Lake	Forest
(049) Iowa	2777 Black River State Forest
(051) Iron	1674 Brule River State Forest
(053) Jackson	3213 Coulee Experimental
(055) Jefferson	Forest
(057) Juneau	5873 Flambeau River State
(059) Kenosha	Forest
(061) Kewaunee	4979 Governor Knowles
(063) La Crosse	State Forest
(065) Lafayette	6717 Kettle Moraine State
(067) Langlade	Forest -- NU
(069) Lincoln	6813 Kettle Moraine State
(071) Manitowoc	Forest -- SU
(073) Marathon	6476 Northern Highland State
(075) Marinette	Forest
(077) Marquette	3810 Peshtigo River State
(078) Menominee	Forest
(079) Milwaukee	3672 Point Beach State
(081) Monroe	Forest
(083) Oconto	
(085) Oneida	
(087) Outagamie	
(089) Ozaukee	
(091) Pepin	
(093) Pierce	
(095) Polk	
(097) Portage	
(099) Price	

APPENDIX 2+N+WISCFI. FIA FOREST TYPE CODES

This following list includes all forest types in the Continental U.S. and Alaska – modified for WisCFI.

NRS Note: When determining FOREST TYPE, first try to match the plurality of the stocking present with the “named” type. If the “named” type does not match the plurality of the stocking in the stand, match the plurality of the stocking in the stand with the trees listed as associates under each type even if the “named” type species are not represented in the plurality of the stocking present.

Code	Species Type
	White / Red / Jack Pine Group
101	Jack pine
102	Red pine
103	Eastern white pine
104	Eastern white pine / eastern hemlock
105	Eastern hemlock
	Spruce / Fir Group
121	Balsam fir
122	White spruce
123	Red spruce
124	Red spruce / balsam fir
125	Black spruce
126	Tamarack
127	Northern white-cedar
	Other Eastern Softwoods Group
171	Eastern redcedar
	Exotic Softwoods Group
381	Scotch pine
383	Other exotic softwoods
384	Norway spruce
385	Introduced larch
	Other Softwoods Group
391	Other Softwoods
	Oak / Pine Group
401	Eastern white pine / N. red oak / white ash
402	Eastern redcedar / hardwood
404	Shortleaf pine / oak
405	Virginia pine / southern red oak
406	Loblolly pine / hardwood
409	Other pine / hardwood
	Oak / Hickory Group
501	Post oak / blackjack oak
503	White oak / red oak / hickory
504	White oak
505	Northern red oak
509	Bur oak

510	Scarlet oak
512	Black walnut
513	Black locust
515	Chestnut oak / black oak / scarlet oak
516	Cherry / white ash / yellow-poplar
517	Elm / Ash / black locust
519	Red maple / oak
520	Mixed upland hardwoods
	Elm / Ash / Cottonwood Group
701	Black ash / American elm / red maple
702	River birch / sycamore
703	Cottonwood
704	Willow
705	Sycamore / pecan / American elm
706	Sugarberry / hackberry / elm / green ash
707	Silver maple / American elm
708	Red maple / lowland
709	Cottonwood / willow
	Maple / Beech / Birch Group
801	Sugar maple / beech / yellow birch
802	Black cherry
805	Hard (Sugar) maple / basswood
809	Red maple / upland
	Aspen / Birch Group
901	Aspen
902	Paper birch
903	Gray birch
904	Balsam poplar
905	Pin cherry
	Exotic Hardwoods Group
991	Paulownia
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.

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.

DOUGLAS-FIR GROUP

201 Douglas-fir: **NRS Note: Sites – unmanaged or abandoned Christmas tree plantations in the North.**

EXOTIC SOFTWOODS GROUP

381 Scotch pine: plantation type, not naturally occurring.

383 Other exotic softwoods; Austrian pine

384 Norway spruce: plantation type, not naturally occurring

385 Introduced larch: introduced larch (species code 0070)

OTHER SOFTWOODS GROUP

391 Other softwoods: All softwood species identified to genus level only, except cypress, baldcypress, and larch.

OAK/PINE GROUP

In these oak/pine forest types, stocking of the pine component needs to be 25-49 percent.

401 Eastern white pine/northern red oak/white ash: Associates – red maple, basswood, yellow birch, bigtooth aspen, sugar maple, beech, paper birch, black cherry, hemlock, and sweet birch. Sites --deep, fertile, well-drained soil.

402 Eastern redcedar/hardwood: Associates – oak, hickory, walnut, ash, locust, dogwood, blackgum, hackberry, winged elm, shortleaf pine, and Virginia pine. Sites -- usually dry uplands and abandoned fields.

404 Shortleaf pine/oak: Associates - (oaks generally include white, scarlet, blackjack, black, post, and southern red) hickory, blackgum, sweetgum, Virginia pine, and pitch pine. Sites --generally in dry, low ridges, flats, and south slopes.

405 Virginia pine/southern red oak: Associates – black oak, scarlet oak, white oak, post oak, blackjack oak, shortleaf pine, blackgum, hickory, pitch pine, table-mountain pine, chestnut oak. Sites -- dry slopes and ridges.

406 Loblolly pine/hardwood: Associates – wide variety of moist and wet site hardwoods including blackgum, sweetgum, yellow-poplar, red maple, white and green ash, and American elm; on drier sites associates include southern and northern red oak, white oak, post oak, scarlet oak, persimmon, and hickory. Sites -- usually moist to very moist though not wet all year, but also on drier sites.

409 Other pine/hardwood: A type used for those unnamed pine-hardwood combinations that meet the requirements for oak-pine. These are stands where hardwoods (usually oaks) comprise the plurality of the stocking with at least a 25 to 49 percent pine, eastern redcedar, or southern redcedar component.

OAK/HICKORY GROUP

501 Post oak/blackjack oak (includes dwarf post oak): Associates – black oak, hickory, southern red oak, white oak, scarlet oak, shingle oak, live oak, shortleaf pine, Virginia pine, blackgum, sourwood, red maple, winged elm, hackberry, chinkapin oak, shumard oak, dogwood, and eastern redcedar. Sites -- dry uplands and ridges.

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.

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.

512: Black walnut: Associates – yellow-poplar, white ash, black cherry, basswood, beech, sugar maple, oaks, and hickory. Sites -- coves and well-drained bottoms.

513 Black locust: Associates – many species of hardwoods and hard pines may occur with it in mixture, either having been planted or from natural seeding. Sites -- may occur on any well-drained soil but best on dry sites, often in old fields.

515 Chestnut oak/black oak/scarlet oak: Associates—northern and southern red oaks, post oak, white oak, sourwood, shagbark hickory, pignut hickory, yellow-poplar, blackgum, sweetgum, red maple, eastern white pine, pitch pine, Table Mountain pine, shortleaf pine, and Virginia pine. Sites -- dry upland sites on thin-soiled rocky outcrops on dry ridges and slopes.

516 Cherry/white ash/yellow-poplar: Associates – sugar maple, American beech, northern red oak, white oak, blackgum, hickory, cucumbertree, and yellow birch. Sites -- fertile, moist well-drained sites.

517 Elm/ash/black locust: Associates – Black locust, silver maple, boxelder, blackbead ebony, American elm, slippery elm, rock elm, red maple, green ash predominate. Found in North Central region, unknown in 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.

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. Sites--low ridges and flats in flood plains.

707 Silver maple/American elm: Silver maple and American elm are the majority species in this type. Associates – chalk maple, sweetgum, pin oak, swamp white oak, eastern cottonwood, sycamore, green ash, and other moist-site hardwoods, according to the region. Sites -- primarily on well-drained moist sites along river bottoms and flood plains, and beside lakes and larger streams.

708 Red maple/lowland: Red maple comprises a majority of the stocking. Because this type grows on a wide variety of sites over an extensive range, associates are diverse. Associates include yellow-poplar, blackgum, sweetgum, and loblolly pine, white ash, green ash, sycamore, American elm, red maple and boxelder. 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.

MAPLE/BEECH/BIRCH GROUP

801 Sugar maple/beech/yellow birch: Associates – butternut, basswood, red maple, hemlock, northern red oak, white ash, white pine, black cherry, sweet birch, American elm, rock elm, and eastern hophornbeam. Sites -- fertile, moist, well-drained sites.

802 Black cherry: Associates – sugar maple, northern red oak, red maple, white ash, basswood, sweet birch, butternut, American elm, and hemlock. Sites -- fertile, moist, well-drained sites.

803 Cherry/ash/yellow-poplar: Retired – see code 516.

805 Hard (Sugar) maple/basswood (includes American, Carolina and white basswood): Associates – black maple, white ash, northern red oak, eastern hophornbeam, American elm, red maple, eastern white pine, eastern hemlock. Sugar maple and basswood occur in different proportions but together comprise the majority of the stocking. Sites -- fertile, moist, well-drained sites.

807 Elm/ash/locust: Retired – see code 517.

809 Red maple/upland: Associates – the type is dominated by red maple and some of the wide variety of northern hardwood associates include sugar maple, beech, birch, aspen, as well as some northern softwoods like white pine, red pine, and hemlock; this type is often the result of repeated disturbance or cutting. Sites -- uplands. (See Type 519 under oak/hickory group)

ASPEN/BIRCH GROUP

901 Aspen: Associates – Engelmann spruce, lodgepole pine, ponderosa pine, Douglas-fir, subalpine fir, white fir, white spruce, balsam poplar, and paper birch. Sites -- aspen has the capacity to grow on a variety of sites and soils, ranging from shallow stony soils and loamy sands to heavy clays.

902 Paper birch (includes northern paper birch): Associates – aspen, white spruce, black spruce, and lodgepole pine. Sites -- can be found on a range of soils, but best developed on well-drained sandy loam and silt loam soils.

903 Gray birch: Associates – oaks, red maple, white pine and others. Sites- poor soils of abandoned farms and burns.

NRS Note: Associates – primarily red maple, but including aspen, pin cherry, black cherry, birches (yellow, sweet and paper), white pine, white ash, sugar maple, northern red and white oak. Sites – poor soils that are commonly found on abandoned farms, severe burns, and mining or logged areas. [Source: Forest Cover Types of the U.S. and Canada, 1980]

904 Balsam poplar: Associates – paper birch, white spruce, black spruce, and tamarack. Sites -- occurs on rich floodplains where erosion and folding are active.

905 Pin cherry: Associates – quaking and bigtooth aspen; paper and yellow birch; striped, red and sugar maple; beech; northern red oak; balsam fir; and red spruce. In the Appalachians, Fraser fir and mountain-ash are additional associates. In the central and Lake States, chokecherry and black cherry are common. Sites -- occurs over a wide range of soils and drainage classes, found on sites varying from dry rocky ledges and sandy plains to moist loamy soils.

EXOTIC HARDWOODS GROUP

991 Paulownia: Stands with the majority of stocking comprised of Paulownia tomentosa, commonly known as Princess tree, royal paulownia or empress tree. Sites -- can be found along roadsides, streambanks, and forest edges. It tolerates infertile and acid soils and drought conditions. It easily adapts to disturbed habitats, including previously burned areas, forests defoliated by pests (such as the gypsy moth) and landslides and can colonize rocky cliffs and scoured riparian zones. Paulownia can also be found in plantations.

995 Other exotic hardwoods: Includes any of the following species: Norway maple, ailanthus, mimosa, European alder, Chinese chestnut, ginkgo, Lombardy poplar, European mountain-ash, West Indian mahogany, Siberian elm, saltcedar spp., chinaberry, Chinese tallowtree, tung-oil-tree, Russian-olive, and avocado.

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

APPENDIX 3N-WISCFI. FIA TREE SPECIES CODES (NRS FIA VERSION 7.0.1)

This list includes all tree species tallied in the Continental U.S., Alaska, and the Caribbean. – modified for the North. Species designated East/West/Caribbean are commonly found in those regions (East includes NRS and SRS and West includes PNW and IW), 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”. The North tallies all Core and “core optional” species.

NRS Note: All larch (*Larix* spp.), serviceberry (*Amelanchier* spp.), hawthorn (*Crataegus* spp.), apple (*Malus* spp.), cottonwood and poplar (*Populus* spp.), and mountain ash (*Sorbus* spp.) are tallied. These species can be coded using the generic genus code (0070, 0356, 0500, 0660, 0740, and 0934), if the species cannot be determined. If a hybrid species is found, naturally or planted, code the species with the most dominant characteristic from Appendix 3+N. When a willow species (*Salix* spp.) cannot be positively identified to species, but has many of the characteristics associated with White willow (*S. alba*) (0927), Peachleaf willow (*S. amygdaloides*) (0921), Black willow (*S. nigra*) (0922), or Coastal Plain willow (*S. caroliniana*) (0925) tally the willow using the generic code 0920. The generic code 0920 should not be used for Weeping willow (*S. sepulcralis*) (0929) or Balsam willow (*S. pyrifolia*) (0926).

Core	East	West	Caribbean	Woodland	FIA Code	PLANTS Code	Common Name	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	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	Cupressus	bakeri
X		W			0053	CUFO2	tecate cypress	Cupressus	forbesii

Core	East	West	Carib bean	Wood land	FIA Code	PLANTS Code	Common Name	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	lyalii
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
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

Core	East	West	Carib bean	Wood land	FIA Code	PLANTS Code	Common Name	Genus	Species
X		W		w	0106	PIED	Common pinyon, two- needle 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
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	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	PIV2	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	Pinus	quadrifolia
X		W			0139	PITO	Torrey pine	Pinus	torreyana

Core	East	West	Carib bean	Wood land	FIA Code	PLANTS Code	Common Name	Genus	Species
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
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
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

Core	East	West	Carib bean	Wood land	FIA Code	PLANTS Code	Common Name	Genus	Species
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
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

Core	East	West	Carib bean	Wood land	FIA Code	PLANTS Code	Common Name	Genus	Species
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
	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	illinoensis
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.
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

Core	East	West	Carib bean	Wood land	FIA Code	PLANTS Code	Common Name	Genus	Species
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	chrysoarpa
	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
	E	W	C		0510	EUCAL	eucalyptus spp.	Eucalyptus	spp.
X		W			0511	EUGL	Tasmanian bluegum	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	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

Core	East	West	Carib bean	Wood land	FIA Code	PLANTS Code	Common Name	Genus	Species
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	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
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	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	Magnolia	fraseri
X	E				0657	MAPY	pyramid magnolia	Magnolia	pyramidata
X	E				0658	MATR	umbrella magnolia	Magnolia	tripetala

Core	East	West	Carib bean	Wood land	FIA Code	PLANTS Code	Common Name	Genus	Species
	E	W			0660	MALUS	apple spp.	Malus	spp.
X		W			0661	MAFU	Oregon crabapple	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
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	Populus	fremontii

Core	East	West	Carib bean	Wood land	FIA Code	PLANTS Code	Common Name	Genus	Species
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	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	Prunus	virginiana
	E				0764	PRPE3	peach	Prunus	persica
X	E				0765	PRNI	Canada plum	Prunus	nigra
X	E				0766	PRAM	American 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	Quercus	agrifolia
X	E				0802	QUAL	white oak	Quercus	alba
X		W		w	0803	QUAR	Arizona white 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

Core	East	West	Carib bean	Wood land	FIA Code	PLANTS Code	Common Name	Genus	Species
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	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
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	Quercus	gravesii

Core	East	West	Carib bean	Wood land	FIA Code	PLANTS Code	Common Name	Genus	Species
	E				8512	QUPO2	Mexican white oak	Quercus	polymorpha
	E				8513	QUBU2	Spanish oak	Quercus	buckleyi
	E				8514	QULA	lacey oak	Quercus	laceyi
	E		C		0852	AMEL	torchwood	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
	E		C		0858	CICA	camphor tree	Cinnamomum	camphora
	E		C		0859	CIFR	fiddlewood	Citharexylum	fruticosum
	E		C		0860	CITRU2	citrus spp.	Citrus	spp.
	E		C		0863	CODI8	pigeon plum, tietongue	Coccoloba	diversifolia
	E		C		0864	COEL2	soldierwood	Colubrina	elliptica
	E		C		0865	COSE2	geiger tree	Cordia	sebestena
	E				8651	COBO2	anacahuita	Cordia	boissieri
	E				0866	CUAN4	carrotwood	Cupaniopsis	anacardioides
	E			w	0867	COHO	bluewood	Condalia	hookeri
	E				0868	EBEB	blackbead ebony	Ebenopsis	ebano
	E				0869	LEPU3	great leucaena	Leucaena	pulverulenta
	E				0870	SOAF	Texas sophora	Sophora	affinis
	E		C		0873	EURH	red stopper	Eugenia	rhombea
	E		C		0874	EXPA	Inkwood, butterbough	Exothea	paniculata
	E				0876	FIAU	strangler fig	Ficus	aurea
	E		C		0877	FICI	shortleaf fig, wild banyantree	Ficus	citrifolia
	E		C		0882	GUDI	Blolly, 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	Metopium	toxiferum
	E				0887	PIPI3	fishpoison tree	Piscidia	piscipula
	E		C		0888	SCAC2	schefflera, octopus tree	Schefflera	actinophylla
	E		C		0890	SIFO	false mastic	Sideroxylon	foetidissimum
	E		C		0891	SISA6	white bully, willow bustic	Sideroxylon	salicifolium
	E				0895	SIGL3	paradise tree	Simarouba	glauca
	E				0896	SYCU	Java plum	Syzygium	cumini

Core	East	West	Carib bean	Wood land	FIA Code	PLANTS Code	Common Name	Genus	Species
	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	Acoelorrhaphe	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	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
		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

Core	East	West	Carib bean	Wood land	FIA Code	PLANTS Code	Common Name	Genus	Species
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
	E		C		0987	COER2	buttonwood mangrove	Conocarpus	erectus
	E		C		0988	LARA2	white mangrove	Laguncularia	racemosa
X	E		C		0989	RHMA2	American mangrove	Rhizophora	mangle
		W		w	0990	OLTE	desert ironwood	Olneya	tesota
	E	W	C		0991	TAMAR2	saltcedar	Tamarix	spp.
X	E		C		0992	MEQU	melaleuca	Melaleuca	quinquenervia
X	E		C		0993	MEAZ	chinaberry	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

APPENDIX 6+N+WISCFI. GLOSSARY

“Two-inch Rule” – Take the current DBH minus two-inches on a poletimber size tree. This calculated diameter is used to determine the potential Top DOB of the future sawlog length when the tree becomes sawtimber-size. Once the potential Top DOB is determined, the tree must maintain this diameter for at least the length of a potential sawlog to receive a TREE CLASS 2, Growing Stock.

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:
2. 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.
3. 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
4. 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.
5. 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.
6. To qualify as forest land, the prospective condition must be at least 1.0 acre in size and 120.0 feet wide measured stem-to-stem from the outer-most edge. Forested strips must be 120.0 feet wide for a continuous length of at least 363.0 feet in order to meet the acre threshold. Forested strips that do not meet these requirements are classified as part of the adjacent nonforest land.

ACTUAL LENGTH – For trees with broken or missing tops. The actual length of the tree is recorded to the nearest 1.0 foot from ground level to the highest remaining portion of the tree still present and attached to the bole. If the top is intact, this item may be omitted. Forked trees should be treated the same as unforked trees.

Agricultural Land – Land managed for crops, pasture, or other agricultural use. Evidence includes geometric field and road patterns, fencing, and the traces produced by livestock or mechanized equipment. The area must be at least 1.0 acre in size and 120.0 feet wide at the point of occurrence.

ARTIFICIAL REGENERATION SPECIES – Indicates the predominant species that is planted or seeded in an artificially regenerated condition.

Bay forests – These forests are restricted to coastal depressions or floodplains where saturated conditions prevail. Surface flooding is common, but usually not persistent. They occur exclusively in the Coastal Plain Physiographic province, and range from Maryland to southeast Texas.

Blind check – a re-installation of a production plot done by a qualified crew without production crew data on hand. A full re-installation of the plot is recommended for the purpose of obtaining a measure of uncertainty in the data. If a full plot re-installation is not possible, then full subplots will be completed with a minimum of 15 total trees being remeasured. All plot-level information (e.g., boundary and condition information) will be collected on each blind check plot. The two data sets are maintained separately. Discrepancies between the two sets of data are not reconciled. Blind checks are done on production plots only.

Bogs – Peatlands usually lacking an overlaying layer of mineral soils. They occur primarily in formerly glaciated areas of the northeastern U.S., the north-central states, and Canada and often develop in deep glaciated lakes. Bogs are characterized by evergreen trees and shrubs and are often covered with sphagnum moss.

Bole – The main stem of a tree, 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.

Carolina bays – Elliptical depressions of the southeastern Coastal Plain which are consistently oriented in a northwest-southeast direction and many of which contain shrub bog communities. They occur predominately in the coastal areas of South Carolina and in southeastern North Carolina.

Census Water – Rivers and streams that are more than 200 feet wide and bodies of water that are greater than 4.5 acres in size.

Certification plot – a plot installed by a certification candidate. It may be a certification plot or a production plot. The candidate working alone installs the plot.

Clear-cut – The cutting of all merchantable trees from an area. Often leaves a large number of unsalable trees.

Cold check – An inspection of a production plot done either as part of the certification 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**, **RESERVED STATUS** and stand density.

Conservation easement – A conservation easement is a restriction placed on a piece of property to protect its associated resources. The easement is either voluntarily donated or sold by the landowner and constitutes a legally binding agreement that limits certain types of uses or prevents development from taking place on the land in perpetuity while the land remains in private hands. A conservation easement is legally binding, whether the property is sold or passed on to heirs. [Source: nature.org]

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.

Cultivar - The international term cultivar denotes an assemblage of cultivated plants that is clearly distinguished by any characters (morphological, physiological, cytological, chemical, or others) and when reproduced (sexually or asexually), retains its distinguishing characters. The term is derived from “cultivated variety,” or their etymological equivalents in other languages. For cultivated plants, the term cultivar is the equivalent of a botanical variety, in accordance with the International Code of Nomenclature of Cultivated Plants 1980. Usage: cultivar names are not italicized and are indicated by single quotes at first use, or the word cultivar (but not both). The abbreviation cv. is properly used only with a binomial name: Genus species cv. cultivar name. Omit the abbreviation if single quotes are used: Genus species 'cultivar name'. (National Resources Conservation Service [NRCS] 2010. Title 190 – National Plant Materials Manual: Part 542.1 Glossary of Terms for Use in Plant Materials. 190-V-NPMM, Fourth Edition, July 2010. p. 13. Available online: [https://www.nrcs.usda.gov/wps/portal/nrcs/main/plantmaterials/about/handbook/.](https://www.nrcs.usda.gov/wps/portal/nrcs/main/plantmaterials/about/handbook/))

Deflection/Departure – A deviation from the normal stem form measured in the number of inches the pith strays from a straight line at its most excessive location.

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).

Fens – A type of peatland which resemble bogs. However, fens support marsh-like vegetation including sedges and wildflowers. The main differences between fens and bogs are in flora,

hydrology and water chemistry. Fens, like bogs, tend to occur in glaciated areas of the northern United States. [Source: www.aquatic.uoguelph.ca and EPA 843-F-01-002b]

Forest Industry Land – Land owned by companies or individuals that operate wood-using plants.

FOREST TYPE – A classification of forest land based upon the trees or tree communities that constitute the majority of stocking on the site.

Good Face – One that is free of knots of any type larger than ½ inch in diameter, overgrowths indicating larger knots, and conks or punk knots. This term is used when grading pines trees.

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 certification process. The inspector is present on the plot with the crew and provides immediate feedback regarding data quality. Data errors are corrected. Hot checks can be done on certification plots or production plots.

Hybrid - (1) Offspring of a cross between genetically dissimilar individuals. (2) First-generation progeny resulting from the controlled cross-fertilization between individuals that differ in one or more genes. (National Resources Conservation Service [NRCS] 2010. Title 190 – National Plant Materials Manual: Part 542.1 Glossary of Terms for Use in Plant Materials. 190-V-NPMM, Fourth Edition, July 2010. p. 27. Available online: [https://www.nrcs.usda.gov/wps/portal/nrcs/main/plantmaterials/about/handbook/.](https://www.nrcs.usda.gov/wps/portal/nrcs/main/plantmaterials/about/handbook/))

Idle Farmland -- Former cropland or pasture that has not been tended within the last 2 years and that has less than 10 percent canopy cover 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 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.

Legal Description – A legal description is used to describe the location of land in legal documents. The Land Ordinance of 1785 devised a system base lines and meridian lines using to survey the western lands outside the initial 13 colonies. Base lines run east/west and meridian lines run north/south. Along these lines the land was divided into 6 square mile blocks, called "Townships". Each Township is given an identifying number, according to where it falls. The east/west numbers are identified by the term "Range" and the north/south numbers are identified by the term

"Township". Each township is divided into 36 square-mile parcels of 640 acres, called "Sections". Every section is numbered from 1 to 36, depending upon its position within the township. A section can be further divided into halves, quarters, etc. [Source: <http://www.csuchico.edu/lbib/maps/townships.html>]

Mainland Exclusion (MLE) Not Collected in WisCFI

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. Marshes are separated into freshwater and saltwater types. Freshwater marshes are primarily inland, while salt marshes line the coasts of North America. [Source: www.aquatic.uoguelph.ca]

Master Species List - All species listed in Appendix 3. After taking into account the three geographical exclusion areas, these are the species used to define FIA Forest Land. Species not listed are considered shrubs and do not factor into defining FIA Forest.

Measure Low Approach – A method of measuring DBH on trees where the following originate at the approximate same location on the bole preventing accurate and repeatable diameter measurement: multiple forks, prolific branching, or a combination of multiple forks and prolific branching. This method is also applied in situations where forked trees are grown together in such a fashion that an accurate and repeatable diameter cannot be measured OR estimated due to the deformation resulting from the presence of the above mentioned criteria. In such cases a single tree is tallied and the diameter is measured at the highest most repeatable location between the 1-foot stump and the initial pith separation.

Meadows – Wet meadows are herb-dominated areas saturated for long periods during the growing season, but are seldom flooded. Some sedge meadows may have standing surface water and look more marsh-like in appearance. Wet meadows are often associated with agricultural lands, especially pastures. Wet meadows commonly occur in poorly drained areas such as shallow lake basins, low-lying depressions, and the land between shallow marshes and upland areas. Precipitation serves as their primary water supply, so they are often dry in the summer. [Source: Tiner and EPA 843-F-01-002b]

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.

National Forest Region Exclusion (NFS 1, 2, 3, 4, 5, 6, 8, 9, and/or 10) Not Collected in WisCFI

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.

Non-Urban Exclusion (NUE) Not Collected in WisCFI

Urban Areas – These are census defined areas with a population density of 500 people per square mile associated with a town or city with a population of at least 2,500.

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 Not Collected in WisCFI

OWNER GROUP Not Collected in WisCFI

Phase 1 (P1) – activities done as part of remote-sensing and/or aerial photography.

Phase 2 (P2) – activities done on the network of ground plots formerly known as FIA plots.

Phase 2 + (NRS P2+) – activities done on a subset of Phase 2 plots. A “lite” set of variables are collected for P2 Down Wood Materials and P2 Veg. Also, two additional crowns variables, Invasive Plants, and NRS Advance Tree Seedling Regeneration Data are collect on these plots.

Phase 3 (P3) – 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. For NRS, all P2 + variables listed above are collected along with the addition of Soils data.

Plot – cluster of two subplots. The subplots are established so that subplot 1 is centered within the sample and the center of subplot 2 is located 120.0 feet from the center of subplot 1 at an azimuth of 360 degrees. Each subplot has an associated microplot.

Pocosins – The word pocosin comes from the Algonquin Native American word for "swamp on a hill". These evergreen shrub and tree dominated landscapes are found on the Atlantic Coastal Plain from Virginia to northern Florida, though most are found in North Carolina. Usually, there is no standing water present in pocosins, but a shallow water table leaves the soil saturated for much of the year. They range in size from less than an acre to several thousand acres located

between and isolated from old or existing stream systems in most instances. [Source: www.epa.gov/owow/wetlands/types/]

PRIVATE OWNER INDUSTRIAL STATUS Not Collected in WisCFI

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 certification purposes.

Punk Knot --Soft, decayed branch stubs that usually indicate the presence of decay in a tree.

Reference plot (off grid) – A plot that is used for crew certification. These plots are NOT included in the ongoing inventory process and data from these plots do not become part of the standard inventory data base. To ensure that these plots do not enter into the inventory data base, they are assigned plot numbers outside the normal range of production plots or other invalid plot identification information such as an invalid STATE code (STATECD).

REGENERATION STATUS – A stand descriptor that indicates whether a stand has been naturally or artificially regenerated.

Reserved Land – Land that is withdrawn from timber utilization by a public agency or by law.

RESERVED STATUS – An indication of whether the land in a condition has been reserved.

Saplings – Live trees 1.0 to 4.9 inches DBH.

Scaling Diameter – The average small end diameter inside bark in inches at the top of the log being evaluated in a tree that is standing.

Seedlings – Conifer seedlings 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 most canopy cover 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.

Subspecies - A grouping within a species used to describe geographically isolated variants, a category above “variety,” and is indicated by the abbreviation “ssp.” in the scientific name (Natural Resource Conservation Service (NRCS) PLANTS Database September 15, 2017 version maintained by the Forest Inventory and Analysis Information management group as database table REF_PLANT_DICTIONARY [USDA, NRCS. September 15, 2017. The Plants Database. <http://plants.usda.gov/plants>. National Plant Data Center, Baton Rouge, LA 70874-4490])

Swamps – Wet areas dominated by woody shrubs and trees, some with hardwoods such as red maple and ashes and others with softwoods like cedar and spruce. Willows, alders, shrubby dogwoods, and buttonbush dominate shrub swamps. Some shrub swamps are permanent, while others slowly transform to forested swamps.

TOTAL LENGTH – The total length of the tree, recorded to the nearest 1.0 foot from ground level to the tip of the apical meristem. For trees growing on a slope, measure on the uphill side of the tree. If the tree has a broken or missing top, the TOTAL LENGTH is estimated to what the length would be if there were no missing or broken top. Forked trees should be treated the same as unforked trees

Transition Zone – An area where a distinct boundary between two or more different conditions cannot be determined.

Tree (FIA definition) - All species on the Master Species List. In FIA, a tree is defined as any plant on the tree list in the current field manual. When deciding whether to add or remove species from the tree list, species form is taken into account and a tree is generally described as a woody perennial plant, typically large, with a single well-defined stem carrying a more or less definite crown, sometimes defined as attaining a minimum diameter of 3.0 inches (7.6 cm) and a minimum height of 15 feet (4.6 m) at maturity.

Variety - (1a) The botanical nomenclature division consisting of more or less recognizable entities within a species that are not genetically isolated from each other, below the level of subspecies, and is indicated by the abbreviation “var.” in the scientific name (see “botanical variety”); (1b) The rank of taxa below subspecies but above forma; a plant which retains most of the characteristics of the species, but differs in some way such as flower or leaf color, size of mature plant, etc. A variety is added to the specific binomial and preceded by “var.,” such as saxatilis in the epithet *Juniperus communis* var. *saxatilis*. (2) Term used in some national and international legislation to denominate one clearly distinguishable taxon from another; equivalent to “cultivar.” (Note: the PMP does not recognize the terms “variety” and “cultivar” as equivalent.). (National Resources Conservation Service [NRCS] 2010. Title 190 – National Plant Materials Manual: Part 542.1 Glossary of Terms for Use in Plant Materials. 190-V-NPMM, Fourth Edition, July 2010. p. 54. Available online:[https://www.nrcs.usda.gov/wps/portal/nrcs/main/plantmaterials/about/handbook/.](https://www.nrcs.usda.gov/wps/portal/nrcs/main/plantmaterials/about/handbook/))

Wetlands – Areas subject to periodic tidal flooding or other areas where water is present for extended periods during the growing season and for longer periods during the non-growing season. Water usually comes from rainfall, snowmelt, a rising water table, groundwater seepage, or incoming tides. Water may be present on the surface of wetlands for varying periods, as in

flooded or ponded wetlands, or it may simply keep the underlying soils saturated near the surface with no surface water present. [Source: Tiner]

APPENDIX 7+N+WISCFI. TOLERANCE / MQO / VALUE / UNITS / FIELD WIDTH/ WHEN COLLECTED TABLE

Core optional variables are in italics. N/A is not applicable. Variables with both a core and core optional listing are marked with an asterisk.

NRS Note: Regional-specific rows are shaded. Light gray text indicates national data items we do not collect in the North.

WisCFI Note: WisCFI-specific rows are shaded

General Description

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
New Subplot Location	+/- 7 feet	At least 95% of the time	N/A	feet	N/A	N/A
New Microplot Location	+/- 1 foot	At least 95% of the time	N/A	feet	N/A	N/A
MONUMENT TYPE*	No tolerance	At least 99% of the time	1, 2, 3	N/A	1 digit	Record a Starting Point (SP) for all initial installment, PIQA, and PIQA Special plots. Record a Witness Object or Reference Trees when a situation warrants.
MONUMENT NUMBER	No tolerance	At least 99% of the time	1-11	N/A	2 digits	MONUMENT TYPE 1, 2
SUBPLOT NUMBER	No tolerance	At least 99% of the time	1, 2	N/A	2 digits	Record for each MONUMENT TYPE 1 or 2
WITNESS OBJECT / SP / RP TYPE	No tolerance	At least 99% of the time	1-14, 99	N/A	2 digits	Record for each MONUMENT TYPE 1 or 2
WITNESS OBJECT / SP / RP SPECIES	No tolerance	At least 99% of the time	See Appendix 3+N	N/A	4 digits	Record for WITNESS OBJECT / SP / RP TYPE=1
OBJECT DESCRIPTION	No tolerance	At least 99% of the time	Letters, numbers, and special characters	N/A	240 characters	Record for WITNESS OBJECT / SP / RP TYPE 2-12
MONUMENT AZIMUTH	+/- 10 degrees	At least 90% of the time	001 to 360	degrees	3 digits	Record for MONUMENT TYPE 1 or 2
MONUMENT HORIZONTAL DISTANCE	Monument Type 1: +/- 33.0 ft to 0139.9 ft.: +/- 1.0 ft. Monument Type 2: 0000.1 ft. to 0500.0 ft.: +/- 2.0 ft. 0500.1 ft. to 0999.9 ft.: +/- 3.0 ft.	Monument Type 1: 99% of the time Monument Type 2: At least 90% of the time	Monument Type 1: 0000.1 to 9999.9 Monument Type 2: 0000.1 ft to 0999.9	feet	5 digits (xxxx.y)	Record for MONUMENT TYPE 1 or 2

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
MONUMENT DBH / DRC	+/- 0.1 inch per 20.0 inches increment of measured diameter For woodland species: +/- 0.2 inch per stem	At least 95% of the time	001.0 to 999.9	inches	4 digits (xxx.y)	WITNESS OBJECT / SP / RP TYPE = 1
SP/RP GPS UNIT	No errors	At least 99% of the time	0-4	N/A	1 digit	MONUMENT TYPE = 1
SP/RP GPS ENTRY METHOD	No errors	At least 99% of the time	0	N/A	1 digit	GPS UNIT > 0
SP/RP GPS DATUM	No errors	At least 99% of the time	NAD83	N/A	5 characters (cccn)	When GPS UNIT >0
SP/RP COORDINATE SYSTEM	No errors	At least 99% of the time	1, 2	N/A	1 digit	When GPS UNIT > 0
SP/RP LATITUDE DEGREES	No errors	At least 99% of the time	N/A	N/A	3 digits (1st digit is + or -, last 2 digits are numeric)	When COORDINATE SYSTEM = 1
SP/RP LATITUDE MINUTES	No errors	At least 99% of the time	1 – 59	N/A	2 digits	When COORDINATE SYSTEM = 1
SP/RP LATITUDE SECONDS	+/- 140 feet	At least 99% of the time	0.00 - 59.99	feet	4 digits	When COORDINATE SYSTEM = 1
SP/RP LONGITUDE DEGREES	No errors	At least 99% of the time	N/A	N/A	4 digits (1st digit is + or -, last 3 digits are numeric)	When COORDINATE SYSTEM = 1
SP/RP LONGITUDE MINUTES	No errors	At least 99% of the time	1 – 59	N/A	2 digits	When COORDINATE SYSTEM = 1
SP/RP LONGITUDE SECONDS	+/- 140 feet	At least 99% of the time	0.00 – 59.99	feet	4 digits	When COORDINATE SYSTEM = 1

Plot Level Data

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
CYCLE	N/A	N/A	N/A	N/A	2 digits	All plots
SUB-CYCLE	N/A	N/A	N/A	N/A	1 digit	All plots
STATE	No errors	At least 99% of the time	Appendix 1 55	N/A	2 digits	All plots
UNIT	No errors	At least 99% of the time	Appendix 1	N/A	1 digit	All plots
WisCFI STATE FOREST PROPERTY CODE	No errors	At least 99% of the time	Appendix 1	N/A	4 digits	All plots
COUNTY	No errors	At least 99% of the time	Appendix 1	N/A	3 digits	All plots
PLOT NUMBER	No errors	At least 99% of the time	00001 to 99999	N/A	5 digits	All plots
PLOT STATUS	No errors	At least 99% of the time	1 to 3	N/A	1 digit	All plots
NONFOREST SAMPLING STATUS	No errors	At least 99% of the time	0 to 1	N/A	1 digit	All plots
NONFOREST PLOT STATUS	No errors	At least 99% of the time	1 to 3	N/A	1 digit	When PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1
PLOT NONSAMPLED REASON	No errors	At least 99% of the time	01 to 03 and 05 to 11	N/A	2 digits	When PLOT STATUS = 3
NONFOREST PLOT NONSAMPLED REASON	No errors	At least 99% of the time	02, 03, 08, 09, 10	N/A	2 digits	When PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS = 3
SUBPLOTS EXAMINED	No errors	At least 90% of the time	1, 2	N/A	1 digit	All plots
SAMPLE KIND	No errors	At least 99% of the time	1 to 3	N/A	1 digit	All plots
PHASE	N/A	N/A	N/A	N/A	1 digit	All plots
PREVIOUS PLOT NUMBER	No errors	At least 99% of the time	00001 to 99999	N/A	5 digits	When SAMPLE KIND = 3
FIELD GUIDE VERSION	No errors	At least 99% of the time	5.0	N/A	2 digits	All plots
YEAR	No errors	At least 99% of the time	≥2003	year	4 digits	All plots
MONTH	No errors	At least 99% of the time	Jan – Dec (01 – 12)	month	2 digits	All plots

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
DAY	No errors	At least 99% of the time	01 to 31	day	2 digits	All plots
PREVIOUS YEAR	N/A	N/A	N/A	N/A	4 digits	All plots
PREVIOUS MONTH	N/A	N/A	N/A	N/A	2 digits	All plots
DECLINATION	No errors	At least 99% of the time	+/- 50	degrees	5 digits including sign (+xxx.y)	CORE OPTIONAL: All plots
HORIZONTAL DISTANCE TO IMPROVED ROAD	No errors	At least 90% of the time	1 to 9	N/A	1 digit	When PLOT STATUS = 1 or PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS = 1
WATER ON PLOT	No errors	At least 90% of the time	0 to 5, 9	N/A	1 digit	When PLOT STATUS = 1 or PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS = 1
QA STATUS	No errors	At least 99% of the time	1 to 7	N/A	1 digit	All plots
CREW NUMBER	No errors	At least 99% of the time	WisCFI 150001- 159999 NRS 240001- 249999 SRS 330001- 339999 RMRS 220001- 229999 PNW 260001- 269999	N/A	6 digits	All plots
1 OR 2 PERSON PLOT	n/a	n/a	1, 2	n/a	1 digit	All plots where Plot Status (STAT) = 1 or 2
PLOT SEASON	n/a	n/a	1 to 3	n/a	1 digit	All plots where Plot Status (STAT) = 1 or 2
TRAINING PLOT	N/A	N/A	0, 1	N/A	1 digit	All plots
QA SCORE	No errors	At least 99% of the time	000.0 to 100.0	N/A	4 digits	Plots with PLOT STATUS = 1 or 2 and QA STATUS = 2 or 6. Do not collect for QAQC PI and QAQC Special.
QA SCORE CREW NUMBER	No errors	At least 99% of the time	240001 – 249999	N/A	6 digits	Plots with PLOT STATUS = 1 or 2 and QA STATUS = 2 or 6. Do not collect for QAQC PI and QAQC Special.

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
DENIED ACCESS REASON	No errors	At least 99% of the time	1 to 7	N/A	1 digit	When PLOT STATUS = 3 (Nonsampled with possibility of forest land present) and PLOT NONSAMPLED REASON = 2 (Denied access).
GPS UNIT	No errors	At least 99% of the time	0,2,3,4	N/A	1 digit	All field visited plots
GPS SERIAL NUMBER	No errors	At least 99% of the time	000001 to 999999	N/A	6 digits	When GPS UNIT > 0
GPS ENTRY METHOD	No errors	At least 99% of the time	0, 1	N/A	1 digit	GPS UNIT > 0
GPS DATUM	No errors	At least 99% of the time	NAD83	N/A	5 characters (ccnn)	GPS UNIT > 0
COORDINATE SYSTEM	No errors	At least 99% of the time	1, 2	N/A	1 digit	GPS UNIT > 0
LATITUDE DEGREES	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	0-90	degrees	3 digits (1st digit is + or -, last 2 digits are numeric)	When COORDINATE SYSTEM = 1
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	2 digits	When COORDINATE SYSTEM = 1

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
LATITUDE SECONDS	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	0.00 – 59.99	seconds	4 digits	When COORDINATE SYSTEM = 1
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	4 digits (1st digit is + or -, last 3 digits are numeric)	When COORDINATE SYSTEM = 1
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	2 digits	When COORDINATE SYSTEM = 1
LONGITUDE SECONDS	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	0.00 – 59.99	seconds	4 digits	When COORDINATE SYSTEM = 1

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
UTM ZONE	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	Number varies from 2 in Alaska to 19 on the East Coast. The letter varies from Q in Hawaii to W in Alaska	N/A	3 digits: (##C)	When COORDINATE SYSTEM = 2
EASTING (X) UTM	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	0000000-9999999		7 digits	When COORDINATE SYSTEM = 2
NORTHING (Y) UTM	When GPS ENTRY METHOD = 0, no errors in data entry When GPS ENTRY METHOD = 1, not applicable	When GPS ENTRY METHOD = 0, at least 99% of the time When GPS ENTRY METHOD = 1, not applicable	0000000-9999999		7 digits	When COORDINATE SYSTEM = 2
AZIMUTH TO PLOT CENTER	+/- 3 degrees	At least 99% of the time	000 at plot center 001 to 360 not at plot center	degrees	3 digits	When GPS UNIT = 2, 3 or 4

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
DISTANCE TO PLOT CENTER	+/- 6 ft	At least 99% of the time	000 at plot center 001 to 200 if a Laser range finder not used 001 to 999 if a Laser range finder is used	feet	3 digits	When GPS UNIT = 2, 3 or 4
COORDINATE DIFFERENCE	N/A	N/A	0-999999	feet	6 digits	When GPS UNIT = 2, 3 or 4
GPS ELEVATION	No errors	At least 99% of the time	-00100 to 20000	feet	6 digits (1st digit is + or -, last 5 digits are numeric)	When GPS UNIT = 2 or 4
GPS ERROR	No errors	At least 99% of the time	000 to 999	feet	3 digits	When GPS UNIT = 2
GPS PDOP	No errors	At least 90% of the time	0.0 to 8.0	N/A	2 digits (x.y)	When GPS UNIT = 2
NUMBER OF READINGS	No errors	At least 99% of the time	001 to 999	N/A	3 digits	When GPS UNIT = 2
GPS FILENAME	No errors	At least 99% of the time	English words, phrases and numbers	N/A	15 characters	When GPS UNIT = 3
MACROPLOT BREAKPOINT DIAMETER	No errors	At least 99% of the time	21, 24, and 30	inches	2 digits (xx)	All plots
PLOT NOTES	N/A	N/A	English, alpha-numeric	N/A	Unlimited alphanumeric character field	All plots

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
SAFETY	No errors	At least 99% of the time	0, 1	N/A	1 digit	All plots. If CONDITION NONSAMPLED REASON = 3 then SAFETY = 1 is required
SAFETY DESCRIPTION	No errors	At least 99% of the time	English words or phrases that describe safety concerns on the plot.	N/A	2000 characters	SAFETY = 1

Condition Class Information

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
CONDITION CLASS NUMBER	No errors	At least 99% of the time	1 to 9	N/A	1 digit	All condition classes
CONDITION CLASS STATUS	No errors	At least 99% of the time	1, 2, 3, 4, 5	N/A	1 digit	All condition classes
FOREST LAND CONDITION STATUS CHANGE	No errors	At least 99% of the time	0, 1, 2, 3, 4, 5	N/A	1 digit	CONDITION CLASS STATUS = 1, 2, 3, or 4 on remeasured plots with a newly recognized forested condition OR a new Condition Class Status = 2, 3 or 4 that is the direct result of a former forested condition no longer qualifying as such
CONDITION NONSAMPLED REASON	No errors	At least 99% of the time	01, 03, 06	N/A	2 digits	When CONDITION CLASS STATUS = 5
NONFOREST CONDITION CLASS STATUS	No errors	At least 99% of the time	2, 5	N/A	1 digit	When CONDITION CLASS STATUS = 2 and NONFOREST SAMPLING STATUS = 1
NONFOREST CONDITION NONSAMPLED REASON	No errors	At least 99% of the time	02, 03, 10	N/A	2 digits	When CONDITION CLASS STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST CONDITION CLASS STATUS = 5
RIPARIAN PERCENT AREA SUBPLOT	± 10%	At least 99% of the time	0 to 100	N/A	3 digits	CONDITION CLASS STATUS = 1
RESERVED STATUS*	No errors	At least 99% of the time	0, 1	N/A	1 digit	CORE: CONDITION CLASS STATUS = 1 CORE OPTIONAL: All condition classes

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
FOREST TYPE	No errors in group or type	At least 99% of the time in group At least 95% of the time in type no MQO when STAND SIZE CLASS = 0	Appendix 2	N/A	3 digits	When CONDITION CLASS STATUS = 1
STAND SIZE CLASS	No errors	At least 99% of the time	0, 1, 2, 3, 4, 5	class	1 digit	When CONDITION CLASS STATUS = 1
REGENERATION STATUS	No errors	At least 99% of the time	0, 1	N/A	1 digit	When CONDITION CLASS STATUS = 1
TREE DENSITY	No errors	At least 99% of the time	1, 2, 3	N/A	1 digit	When CONDITION CLASS STATUS = 1
RESERVED AREA NAME	No errors	At least 99% of the time	English language word, phrases, and numbers	N/A	Alphanumeric character field	All conditions with RESERVED STATUS=1
ARTIFICIAL REGENERATION SPECIES	No errors	At least 99% of the time	Appendix 3	N/A	4 digits	When CONDITION CLASS STATUS = 1 and REGENERATION STATUS = 1
STAND AGE	+/- 10%	At least 95% of the time	000 to 997, 998, 999	year	3 digits	When CONDITION CLASS STATUS = 1
DISTURBANCE 1	No errors	At least 99% of the time	00; 10-12; 20-22; 30-32; 40-46; 50-54; 60; 70; 80; 90-95	N/A	2 digits	When CONDITION CLASS STATUS = 1 or NONFOREST SAMPLING STATUS = 1 and NONFOREST CONDITION CLASS STATUS = 2

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
DISTURBANCE YEAR 1	+/- 1 year for 5-year measurement cycles +/- 2 years for >5-year measurement cycles	At least 99% of the time	Since the previous plot visit, or the past 5 years for plots visited for the first time; 9999 if disturbance occurs continuously over time	year	4 digits	When DISTURBANCE 1 > 00
DISTURBANCE 2	No errors	At least 99% of the time	00; 10-12; 20-22; 30-32; 40-46; 50-54; 60; 70; 80; 90-95	N/A	2 digits	When CONDITION CLASS STATUS = 1 or NONFOREST SAMPLING STATUS = 1 and NONFOREST CONDITION CLASS STATUS = 2
DISTURBANCE YEAR 2	+/- 1 year for 5-year measurement cycles +/- 2 years for >5-year measurement cycles	At least 99% of the time	Since the previous plot visit, or the past 5 years for plots visited for the first time; 9999 if disturbance occurs continuously over time	year	4 digits	When DISTURBANCE 2 > 00

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
DISTURBANCE 3	No errors	At least 99% of the time	00; 10-12; 20-22; 30-32;40-46; 50-54; 60; 70; 80; 90-95	N/A	2 digits	When CONDITION CLASS STATUS = 1 or NONFOREST SAMPLING STATUS = 1 and NONFOREST CONDITION CLASS STATUS = 2
DISTURBANCE YEAR 3	+/- 1 year for 5-year measurement cycles +/- 2 years for >5-year measurement cycles	At least 99% of the time	Since the previous plot visit, or the past 5 years for plots visited for the first time; 9999 if disturbance occurs continuously over time	year	4 digits	When DISTURBANCE 3 > 00
TREATMENT 1	No errors	At least 99% of the time	00, 10, 20, 30, 40, 50	N/A	2 digits	When CONDITION CLASS STATUS = 1
TREATMENT YEAR 1	+/- 1 year for 5-year measurement cycles +/- 2 years for >5-year measurement cycles	At least 99% of the time	Since the previous plot visit, or the past 5 years for plots visited for the first time	year	4 digits	When TREATMENT 1 > 00
TREATMENT 2	No errors	At least 99% of the time	00, 10, 20, 30, 40, 50	N/A	2 digits	When CONDITION CLASS STATUS = 1

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
TREATMENT YEAR 2	+/- 1 year for 5-year measurement cycles +/- 2 years for >5-year measurement cycles	At least 99% of the time	Since the previous plot visit, or the past 5 years for plots visited for the first time	year	4 digits	When TREATMENT 2 > 00
TREATMENT 3	No errors	At least 99% of the time	00, 10, 20, 30, 40, 50	N/A	2 digits	When CONDITION CLASS STATUS = 1
TREATMENT YEAR 3	+/- 1 year for 5-year measurement cycles +/- 2 years for >5-year measurement cycles	At least 99% of the time	Since the previous plot visit, or the past 5 years for plots visited for the first time	year	4 digits	When TREATMENT 3 > 00
STAND STRUCTURE	No errors	At least 99% of the time	1 to 5	N/A	1 digit	STATE = 23 and CONDITION CLASS STATUS = 1
PHYSIOGRAPHIC CLASS	No errors	At least 80% of the time	xeric: 11, 12, 13, 19 mesic: 21, 22, 23, 24, 25, 29 hydric: 31, 32, 33, 34, 35, 39	N/A	2 digits	When CONDITION CLASS STATUS = 1 or NONFOREST SAMPLING STATUS = 1 and NONFOREST CONDITION CLASS STATUS = 2
PRODUCTIVITY STATUS	No errors	At least 99% of the time	0, 1	N/A	1 digit	CONDITION CLASS STATUS = 1
COVER CLASS	No errors	At least 95% of the time	01-05; 08-10	N/A	2 digits	All condition classes
PRESENT NONFOREST LAND USE	No errors	At least 99% of the time	10-17; 20; 30-34; 40, 41, 42, 43, 45	N/A	2 digits	CONDITION CLASS STATUS = 2
CANOPY COVER SAMPLE METHOD	None	At least 90% of the time	1-4	N/A	1 digit	CONDITION CLASS STATUS = 1, 2, or 5

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
LIVE CANOPY COVER	No errors for 0-12% live canopy cover; 10% for 13-20% live canopy cover; 25% for 21-100% live canopy cover	At least 99% of the time	00-99 (where 99 = 99-100)	percent	2 digits	CONDITION CLASS STATUS = 1, 2, or 5
LIVE PLUS MISSING CANOPY COVER	No errors% for 0-12% live plus missing canopy cover; 10% for 13-20% live plus missing canopy cover; 25% for 21-100% live plus missing canopy cover	At least 80% of the time	00-99 (where 99 = 99-100)	percent	2 digits	CONDITION CLASS STATUS = 1, 2 or 5
CURRENT AFFORESTATION CODE	No errors	At least 99% of the time	0, 1	N/A	1 digit	CONDITION CLASS STATUS = 1 or 2
PREVIOUS AFFORESTATION CODE	No errors	At least 99% of the time	0, 1	N/A	1 digit	When SAMPLE KIND = 2 and CONDITION CLASS STATUS = 1 or 2
TOTAL STEMS	10%	At least 90% of the time	00000-99999	N/A	5 digits	CURRENT AFFORESTATION CODE = 1 or PREVIOUS AFFORESTATION CODE = 1
CHAINING CODE	No errors	At least 99% of the time	0, 1	N/A	1 digit	When CONDITION CLASS STATUS = 1 or 2
WisCFI HABITAT TYPE			1 -- 100		3 digits	CONDITION CLASS STATUS = 1
WisCFI HABITAT TYPE ID METHOD			1, 2, 3		1 digit	CONDITION CLASS STATUS = 1
WisCFI WORM IMPACT ESTIMATE	One class	At least 90% of the time	0, 1, 2, 3		1 digit	All forested condition classes on each subplot

Subplot Information

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
SUBPLOT NUMBER	No errors	At least 99% of the time	1, 2	N/A	1 digit	All subplots
SUBPLOT/MACRO PLOT STATUS	No errors	At least 99% of the time	1, 2, 3, 4	N/A	1 digit	All subplots
SUBPLOT NONSAMPLED REASON	No errors	At least 99% of the time	01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11	N/A	2 digits	When SUBPLOT/MACRO PLOT STATUS = 3

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
NONFOREST SUBPLOT/MACROPLOT STATUS	No errors	At least 99% of the time	1, 2, 3	N/A	1 digit	When NONFOREST SAMPLING STATUS = 1 and SUBPLOT/MACROPLOT STATUS = 2
NONFOREST SUBPLOT/MACROPLOT NONSAMPLED REASON	No errors	At least 99% of the time	02, 03, 04, 10	N/A	2 digits	When NONFOREST SAMPLING STATUS = 1 and SUBPLOT/MACROPLOT STATUS = 2 and NONFOREST SUBPLOT/MACROPLOT STATUS = 3
SUBPLOT CENTER CONDITION	No errors	At least 99% of the time	1 to 9	N/A	1 digit	All subplots
SUBPLOT PIN FOUND	No errors	At least 99% of the time	0, 1	N/A	1 digit	SUBPLOT STATUS = 1, 2, or 4
MICROPLOT CENTER CONDITION	No errors	At least 99% of the time	1 to 9	N/A	1 digit	All microplots
MICROPLOT PIN FOUND	No errors	At least 99% of the time	0, 1	N/A	1 digit	SUBPLOT STATUS = 1, 2, or 4
SUBPLOT SLOPE	+/- 10 %	At least 90% of the time	000 to 155	percent	3 digits	When SUBPLOT/MACROPLOT STATUS = 1 or NONFOREST SUBPLOT/MACROPLOT STATUS = 1
SUBPLOT ASPECT	+/- 10 degrees	At least 90% of the time	000 to 360	degrees	3 digits	When SUBPLOT/MACROPLOT STATUS = 1 or NONFOREST SUBPLOT/MACROPLOT STATUS = 1
SNOW/WATER DEPTH	+/- 0.5 ft	At the time of measurement	0.0 to 9.9	feet		When SUBPLOT/MACROPLOT STATUS = 1 or NONFOREST SUBPLOT/MACROPLOT STATUS = 1)
CROWN CLOSURE	+/- 1 class	At least 90% of the time	See Appendix D	percent	1 digit	STATE = 23 and SUBPLOT STATUS = 1
SUBPLOT / MACROPLOT CONDITION LIST	No errors	At least 99% of the time	1000 to 9876	N/A	4 digits	All plots
UNLISTED TREE PRESENT	No errors	At least 90% of the time	0, 1	N/A	1 digit	All subplots with CONDITION CLASS STATUS = 1; CONDITION CLASS STATUS = 2, 3, 4 when completing nonforest inventories
UNLISTED TREE GENUS	No errors	At least 70% of the time	English language letters	N/A	70 characters	When UNLISTED TREE PRESENT = 1
UNLISTED TREE SPECIES	No errors	At least 70% of the time	English language letters	N/A	70 characters	When UNLISTED TREE PRESENT = 1

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
UNLISTED TREE SPECIES COUNT	+/- 10%	At least 70% of the time	1 to 99	N/A	2 digits	For each UNLISTED SPECIES encountered
UNLISTED TREE SPECIMEN COLLECTED	No errors	At least 99% of the time	0, 1	N/A	1 digit	All UNLISTED TREE SPECIES records. Collected in NRS, RMRS
SPECIMEN LABEL NUMBER	No errors	At least 99% of the time	1 to 99999, as pre-assigned by unit	N/A	5 digits	When UNLISTED TREE SPECIMEN COLLECTED = 1. Collected in NRS, RMRS.
UNLISTED TREE NOTES	N/A	N/A	English language words, phrases, and numbers	N/A	Unlimited alphanumeric character field	Required for each UNLISTED TREE SPECIES record

Boundary Data

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
SUBPLOT NUMBER	No errors	At least 99% of the time	1, 2, 3, 4	N/A	1 digit	All boundaries
PLOT TYPE	No errors	At least 99% of the time	1, 2, 3, 4	N/A	1 digit	All boundaries
BOUNDARY CHANGE	No errors	At least 99% of the time	0, 1, 2, 3	N/A	1 digit	SAMPLE KIND = 2, All boundaries
CONTRASTING CONDITION	No errors	At least 99% of the time	1 to 9	N/A	1 digit	All boundaries
LEFT AZIMUTH	+/- 10 degrees	At least 90% of the time	001 to 360	degrees	3 digits	All boundaries
CORNER AZIMUTH	+/- 10 degrees	At least 90% of the time	000 to 360	degrees	3 digits	All boundaries

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
CORNER DISTANCE	+/- 1 ft	At least 90% of the time	microplot: 001 to 007 (6.8 ft actual limiting distance) subplot: 001 to 024 macroplot: 001 to 059 (58.9 ft actual limiting distance) hectare: 001 to 185	feet	3 digits	All boundaries when CORNER AZIMUTH > 000
RIGHT AZIMUTH	+/- 10 degrees	At least 90% of the time	001 to 360	degrees	3 digits	All boundaries
PERCENT AREA	N/A	N/A	1 to 100	percent	3 digits	All boundaries

Tree and Sapling Data

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
SUBPLOT NUMBER	No errors	At least 99% of the time	1, 2, 3, 4	N/A	1 digit	All tree records
TREE RECORD NUMBER	No errors	At least 99% of the time	000, 001 to 999	N/A	3 digits	All tree records
CONDITION CLASS NUMBER	No errors	At least 99% of the time	1 to 9	N/A	1 digit	All tree records
AZIMUTH	+/- 10 degrees	At least 90% of the time	001 to 360	degrees	3 digits	All live tally trees ≥ 1.0 in DBH and standing dead tally trees ≥ 5.0 in DBH

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
HORIZONTAL DISTANCE	Microplot: +/- 0.2 ft; Microplot woodland species: +/- 0.4 ft; Subplot: +/- 1.0 ft from 0.1 to 23.0 ft; Subplot: +/- 0.2 ft from 23.1 to 24.0 ft; Subplot multi-stemmed woodland species: +/- 2.0 ft; Annular plot: +/- 3.0 ft from 24.0 to 55.9 ft; Annular plot: +/- 1.0 ft from 55.9 to 58.9 ft; Annular plot woodland species: +/- 6.0 ft	At least 90% of the time	Microplot: 00.1 to 06.8 Subplot: 00.1 to 24.0 Annular plot: 24.1 to 58.9	feet	3 digits (xx.y)	All live tally trees \geq 1.0 inch DBH and standing dead tally trees \geq 5.0 inches DBH
PREVIOUS TREE STATUS	No errors	At least 95% of the time	1, 2	N/A	1 digit	On SAMPLE KIND = 2, all previously tallied trees \geq 1.0 in DBH
PRESENT TREE STATUS	No errors	At least 95% of the time	0, 1, 2, 3	N/A	1 digit	All new live tally trees \geq 1.0 inch DBH and all new standing dead tally trees \geq 5.0 inches On remeasurement plots, all previously tallied trees

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
RECONCILE	No errors	At least 95% of the time	1 to 2: valid for new trees on the plot (PRESENT TREE STATUS = 1 or 2) 5 valid only for remeasured trees (PRESENT TREE STATUS = 0) that no longer qualify as tally 6 to 9: valid for both new tally trees (PRESENT TREE STATUS = 1 or 2) and remeasured trees that no longer qualify as tally (PRESENT TREE STATUS = 0)	N/A	1 digit	On SAMPLE KIND = 2; All new live tally trees ≥ 1.0 inch DBH and all new standing dead tally trees ≥ 5.0 inches (PRESENT TREE STATUS = 1 or 2 and no PREVIOUS TREE STATUS) and all no status trees (PRESENT TREE STATUS = 0)
STANDING DEAD	No errors	At least 99% of the time	0, 1	N/A	1 digit	SAMPLE KIND = 2 only: All dead tally trees (PRESENT TREE STATUS = 2)

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
SPECIES	No errors	At least 99% of the time for genus At least 95% of the time for species	Appendix 3+N	N/A	4 digits	All trees
DIAMETER	+/- 0.1 inch per 20.0 inch increment of measured diameter on all live trees and standing dead trees with DECAY CLASS = 1, 2; +/-1.0 inch per 20.0 inch increment of measured diameter on standing dead trees with DECAY CLASS = 3, 4, 5; For woodland species: +/- 0.2 inch per stem	At least 95% of the time	001.0 to 999.9	inches	4 digits (xxx.y)	All live tally trees ≥ 1.0 in DBH and standing dead tally trees ≥ 5.0 in DBH
DIAMETER CHECK	No errors	At least 99% of the time	0, 1, 2	N/A	1 digit	All live tally trees ≥ 1.0 in DBH and standing dead tally trees ≥ 5.0 in DBH
TREE CLASS	No errors	At least 90% of the time	2 to 6	N/A	1 digit	All trees ≥ 5.0 in DBH/DRC when PRESENT TREE STATUS = 1 or PRESENT TREE STATUS = 2 and STANDING DEAD = 1
TREE GRADE	No errors	At least 90% of the time	1 to 5	N/A	1 digit	TREE CLASS = 2 when DBH ≥ 9.0 in for softwoods or ≥ 11.0 in DBH for hardwoods
% ROTTEN / MISSING CUBIC-FOOT CULL*	Zero Tolerance 0%-1% +/- 10% between 1%-99%	At least 90% of the time	00 to 99	percent	2 digits	CORE: All live tally trees ≥ 5.0 in DBH/DRC CORE OPTIONAL: All live and standing dead tally trees ≥ 5.0 in DBH/DRC
TOTAL LENGTH*	+/- 10% of true length	At least 90% of the time	001 to 400	feet	3 digits	All live tally trees ≥ 5.0 inches DBH/DRC
ACTUAL LENGTH*	+/- 10% of true length	At least 90% of the time	001 to 400	feet	3 digits	All live tally trees (with broken or missing tops) ≥ 5.0 inches DBH/DRC
LENGTH METHOD*	No errors	At least 99% of the time	1,2, 3	N/A	1 digit	All live tally trees ≥ 5.0 inches DBH/DRC
CROWN CLASS	No errors	At least 85% of the time	1, 2, 3, 4, 5	N/A	1 digit	All live tally trees ≥ 1.0 in DBH/DRC
COMPACTED CROWN RATIO	+/- 10%	At least 80% of the time	00 to 99	percent	2 digits	All live tally trees ≥ 1.0 in DBH/DRC

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
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	5 digits	CORE: All live tally trees ≥ 5.0 in DBH/DRC CORE OPTIONAL: All live tally trees ≥ 1.0 in DBH/DRC

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
DAMAGE AGENT 2*	1 of 2 damages correct	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	5 digits	CORE: All live tally trees ≥ 5.0 in DBH/DRC CORE OPTIONAL: All live tally trees ≥ 1.0 in DBH/DRC

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
DAMAGE AGENT 3*	2 of 3 damages correct	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	5 digits	CORE: All live tally trees ≥ 5.0 in DBH/DRC CORE OPTIONAL: All live tally trees ≥ 1.0 in DBH/DRC
CAUSE OF DEATH*	No errors	At least 80% of the time	10, 20, 30, 40, 50, 60, 70, 80	N/A	2 digits	CORE: SAMPLE KIND = 2 plots: all PREVIOUS TREE STATUS = 1 and PRESENT TREE STATUS = 2 or 3; or PRESENT TREE STATUS = 2 and RECONCILE = 1, 2 CORE OPTIONAL: SAMPLE KIND = 1 plots; all MORTALITY = 1
MORTALITY YEAR- (R1 and R2)	+/- 1 year for 5-year measure. cycles +/- 2 years for > 5-year measure. cycles	At least 70% of the time	1994 or higher	year	4 digits	Plots where SAMPLE KIND = 2: all PREVIOUS TREE STATUS = 1 and PRESENT TREE STATUS = 2 or 3; or PRESENT TREE STATUS = 2 and RECONCILE = 1, 2.

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
DECAY CLASS	+/- 1 class	At least 90% of the time	1, 2, 3, 4, 5	class	1 digit	All standing dead tally trees ≥ 5.0 inches DBH/DRC
LENGTH TO DIAMETER MEASUREMENT POINT	+/- 0.2 ft	At least 90% of the time	00.1 – 15.0	feet		All live tally trees ≥ 1.0 inch DBH and standing dead tally trees ≥ 5.0 inches DBH
DWARF MISTLETOE CLASS-(R1 and R2)	+/- 1 class	At least 90% of the time	0 to 6	class	1 digit	CORE OPTIONAL: All live conifer (except juniper) tally trees ≥ 1.0 in DBH/DRC
TREE NOTES	N/A	N/A	English, alpha-numeric	N/A	Alphanu-meric character field	All trees
BIRCH BARK HARVESTED	No errors	At least 90% of the time	0, 1	N/A	1 digit	STATE = (26, 27, 55) and All Paper Birch (0375) trees ≥ 5.0 inches DBH when PRESENT TREE STATUS = 1 or PRESENT TREE STATUS = 2 and STANDING DEAD = 1

Seedling Data

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
SUBPLOT NUMBER	No errors	At least 99% of the time	1, 2	N/A	1 digit	All tree records
SPECIES	No errors	At least 90% of the time for genus At least 85% of the time for species	Appendix 3+N	N/A	4 digits	All counts of seedlings
CONDITION CLASS NUMBER	No errors	At least 99% of the time	1-9	N/A	1 digit	All counts of seedlings
SEEDLING COUNT	No errors for 5 or less per species +/- 20% over a count of 5	At least 90% of the time	001-999	number	3 digits	Each accessible forest land condition class on each microplot

Site Tree Information

Variable Name	Tolerance	MQO	Values	Units	Field Width	When Collected
TREE RECORD NO.	No errors	At least 99% of the time	001 to 999	N/A	3 digits	All site trees
CONDITION CLASS LIST	No errors	At least 99% of the time	1000 to 9876	N/A	4 digits	All site trees
SPECIES	No errors	At least 99% of the time for genus At least 95% of the time for species	See code list in text	N/A	4 digits	All site trees
DIAMETER	+/- 0.1 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	4 digits	All site trees
SITE TREE LENGTH	+/- 10% of true length	At least 90% of the time	005 to 999	feet	3 digits	All site trees
TREE AGE AT DIAMETER	+/- 5 years	At least 95% of the time	001 to 999	year	3 digits	All site trees
SITE TREE NOTES	N/A	N/A	English, language words, phrases and numbers	N/A	alphanumeric character field	All site trees
SUBPLOT NUMBER	No errors	At least 99% of the time	1, 2	N/A	1 digit	All site trees
AZIMUTH	+/- 10 degrees	At least 90% of the time	001 to 360	degrees	3 digits	All site trees
HORIZONTAL DISTANCE	+/-5 ft	At least 90% of the time	000.1 to 200.0	feet	4 digits (xxx.y)	All site trees

APPENDIX 8+N+WISCFI. TREE CODING GUIDE

	Previous Measurement	Present Measurement	PREVIOUS TREE STATUS	PRESENT TREE STATUS	RECONCILE	STANDING DEAD	CAUSE OF DEATH
	SAMPLE KIND 1 or 3						
1		Live 1.0+ DBH/DRC		1			
2		Standing dead 5.0+ DBH/DRC		2		Null – Office inserts code 1	Core optional
	SAMPLE KIND 2 (Remeasure)	Changes in Present Tree Status, Diameter or Location from Microplot to Subplot					
3	Live 5.0+ DBH/DRC	Live 5.0+ DBH/DRC	1	1			
4	Live 1.0-4.9 DBH/DRC on microplot	Live 5.0+ DBH/DRC Note: this live tally tree should be referenced with a new distance and azimuth from the subplot center.	1	1			
5	Live 1.0-4.9 DBH/DRC on microplot	Live 1.0-4.9 DBH/DRC on microplot	1	1			
6	Live 1.0+ DBH/DRC	Standing dead 5.0+ DBH/DRC	1	2		1	10-80
7	Live 5.0+ DBH/DRC	Down dead 5.0+ DBH/DRC	1	2		0	10-80
8	Live 1.0-4.9 DBH/DRC on microplot	Dead 5.0+ DBH/DRC (standing or down) Note: if standing, this dead tally tree should be referenced with a new distance and azimuth from the subplot center.	1	2		0 or 1	10-80
9	Live 1.0+ DBH/DRC	Cut and left in the woods	1	2		0	80
10	Live 1.0+ DBH/DRC	Tree removed (cut and hauled away)	1	3			80
11	Dead 5.0+ DBH/DRC	Dead standing 5.0 DBH/DRC	2	2		1	
12	Dead 5.0+ DBH/DRC	Dead down 5.0+ DBH/DRC	2	2		0	
13	Dead 5.0+ DBH/DRC	Tree removed (cut and hauled away)	2	3			
14	< 5.0 live DBH/DRC	5.0+ DBH/DRC live (not on the microplot)		1	1		
15	< 1.0 live DBH/DRC	1.0-4.9 DBH/DRC live (on the microplot)		1	1		
17	< 1.0 live DBH/DRC	5.0+ DBH/DRC live (through growth on the microplot)		1	2		
18	< 5.0 live DBH/DRC	5.0+ DBH/DRC dead (standing, not on the microplot)	1	2	1	1	10-80
19	< 5.0 live DBH/DRC	5.0+ DBH/DRC dead (standing or down, on the microplot)	1	2		0 or 1	10-80
	SAMPLE KIND 2 (Remeasure)	Shrinking Diameter Scenarios					
22	Live 5.0+ DBH/DRC	Tree shrank <5.0 and live, NOT on microplot	1	0	5		

	Previous Measurement	Present Measurement	PREVIOUS TREE STATUS	PRESENT TREE STATUS	RECONCILE	STANDING DEAD	CAUSE OF DEATH
23	Live 5.0+ DBH/DRC	Live but shrank < 5.0 and on microplot Note: this live sapling should be referenced with a new distance and azimuth from the microplot center.	1	1			
24	Live 5.0+ DBH/DRC	Tree shrank <5.0 but ≥ 1.0 (e.g., bark loss) and is standing dead, located on subplot (not located on microplot)	1	2		0	10-80
25	Live 5.0+ DBH/DRC	Tree shrank <5.0 but ≥ 1.0 (e.g., bark loss) and is standing dead located on microplot. Note: this dead sapling should be referenced with a new distance and azimuth from the microplot center	1	2		1	10-80
26	Live 1.0-4.9 DBH/DRC	Tree shrank <1.0 and live	1	0	5		
27	Live 1.0 – 4.9 DBH/DRC	Tree shrank <1.0 and dead	1	2	0		10-80
	SAMPLE KIND 2 (Remeasure)	Trees Moving On or Off Subplots and Microplots					
28	Live 1.0+ DBH/DRC	Tree moved off plot/microplot due to a geologic (e.g., slight earth movement) or weather event (e.g., hurricane) and you can still see it (live before, live now)	1	0	6		
29	Live 1.0+ DBH/DRC	Cruiser unable to locate tree due to a weather, geologic (such as landslide), or fire event & assume tree is down dead or you can see tree is dead and down, and off the plot	1	2		0	30 or 50
30	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 is standing dead	2	0	6		
31	Dead 5.0+ DBH/DRC	Cruiser is unable to locate tree due to a weather, geologic (such as landslide), or fire event & assume it is down dead or you can see tree and it is down dead and off the plot	2	2		0	
32	No status	Live tree moved onto plot due to a geologic (e.g. small earth movement) or weather event (e.g. hurricane)		1	6		

	Previous Measurement	Present Measurement	PREVIOUS TREE STATUS	PRESENT TREE STATUS	RECONCILE	STANDING DEAD	CAUSE OF DEATH
33	No Status	Previously live tree moved onto plot due to a geologic (e.g. small earth movement) or weather event (e.g. hurricane) and now dead	1	2	6	1	10-80
34	No Status	Previously dead tree moved onto plot due to a geologic (e.g. small earth movement) or weather event (e.g. hurricane)	2	2	6	1	
	SAMPLE KIND 2 (Remeasure)	Added or Missed Trees					
35	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		
36	Live or dead 5.0+ DBH/DRC	Live or dead 5.0+ DBH/DRC, shouldn't have been tallied—beyond 24.0—cruiser error	1 or 2	0	7		
37	Live or dead 24.0/30.0+ DBH/DRC	Live or dead 24.0/30.0+ DBH/DRC, shouldn't have been tallied—beyond 58.9—cruiser error	1 or 2	0	7		
38	Live 1.0+ DBH/DRC	Live 1.0+ DBH/DRC, shouldn't have been tallied—not a tally species—cruiser error	1	0	7		
39	Dead 5.0+ DBH/DRC	Dead 5.0+ DBH/DRC, shouldn't have been tallied—not a tally species—cruiser error	2	0	7		
40	No Status	Live 1.0+ DBH/DRC, should have been tallied—was a tally species—cruiser error		1	7		
41	No Status	Dead 5.0+ DBH/DRC, should have been tallied—was a tally species previously alive—cruiser error	1	2	7	1	10-80
42	No Status	Dead 5.0+ DBH/DRC, should have been tallied—was a tally species previously standing dead—cruiser error	2	2	7	1	
	SAMPLE KIND 2 (Remeasure)	Tally Species Change					
43	Live 1.0+ DBH/DRC	No longer a tally species (alive or dead)	1	0	8		
44	Dead 5.0+ DBH/DRC	No longer a tally species	2	0	8		
45	No Status	Live tree now on tally tree species list		1	8		
46	No Status	Standing Dead tree now on tally tree species list and previously alive	1	2	8	1	10-80
47	No Status	Standing Dead tree now on tally tree species list and previously dead	2	2	8	1	
	SAMPLE KIND 2 (Remeasure)	Forest and Nonforest Land Changes					

	Previous Measurement	Present Measurement	PREVIOUS TREE STATUS	PRESENT TREE STATUS	RECONCILE	STANDING DEAD	CAUSE OF DEATH
48	Live 1.0+	Live tree status but land no longer qualifies as forest	1	1			
49	Live 1.0 + DBH/DRC	Dead (standing or down) and land no longer qualifies as forest (land clearing or conversion to nonforest land use)	1	2		0 or 1	10-80
50	Live 1.0+ DBH/DRC	Gone (cut and removed) and land no longer qualifies as forest	1	3			80
51	Nonforest before	Forest now, Live 1.0+ DBH/DRC		1	1		
52	Nonforest before	Forest now, Previously live, now Standing Dead 5.0+ DBH/DRC	1	2	1	1	10-80
53	Nonforest before	Forest now, Previously dead, now Standing Dead 5.0+ DBH/DRC	2	2	1	1	
	SAMPLE KIND 2 (Remeasure)	Plots with Nonforest Inventories (NONFOREST SAMPLING STATUS = 1)					
54	Non-measurable nonforest before, <1.0 live DBH/DRC	Measurable nonforest now, Live 1.0+ DBH/DRC		1	8		
55	Non-measurable nonforest before, 1.0+ live DBH/DRC	Measurable nonforest now, Live 1.0+ DBH/DRC		1	8		
56	Non-measurable nonforest before	Measurable nonforest now, Standing Dead 5.0+ DBH/DRC	1	2	8	1	10-80
57	Non-measurable nonforest before	Measurable nonforest now, Standing Dead 5.0+ DBH/DRC	2	2	8	1	
	SAMPLE KIND 2 (Remeasure)	Sampled and Nonsampled Changes					
58	Live 1.0+ DBH/DRC	Nonsampled area now	1	0	9		
59	Dead 5.0+ DBH/DRC	Nonsampled area now	2	0	9		
60	Nonsampled area before	Live 1.0 + DBH/DRC		1	9		
61	Nonsampled area before (tree was previously alive)	Standing Dead 5.0+ DBH/DRC	1	2	9	1	10-80
62	Nonsampled area before (tree was previously dead)	Standing Dead 5.0+ DBH/DRC	2	2	9	1	

Note: After completion of 1 cycle with the new standing dead sapling protocols, additional tree coding combinations will be applicable.

REGIONAL APPENDIX A+WISCFI. PLOT ESTABLISHMENT AND RELOCATION PROCEDURES

Note: This aspect of the data collection will continue to evolve with technology and other procedures determined to be more efficient for the region. If you have questions on what procedures to follow, contact your supervisor or contractor officer representative.

This appendix describes how remeasured sample plots are relocated and how new sample plots are established.

Note: Prior to plot establishment, land owner permission (verbal or written) must be obtained for all plots that require access. (WisCFI note: for non-state land crossed when accessing WisCFI plot).

A.1 PROCEDURES TO LOCATE PLOTS

A.1.1 LOCATING PLOTS FROM A PREVIOUS CYCLE

Most remeasurement plots revisited during this cycle have an established starting point (SP) and course to sample location. In addition, GPS coordinates were collected at plot center and the SP location. On these plots use this information for locating the plot center (PC).

The plot packet will contain the information needed for relocating a plot. This packet should contain an SP location map drawn by previous crew, GPS coordinates (SP and PC), an aerial image of plot site, and a topographic map marked with the location of plot center. Navigate to plot center by entering the PC coordinates into the GPS unit. An alternate method is to locate SP and use the distance and azimuth listed on the plot sheets under the course to sample location to traverse to PC.

Visiting and measuring SP is no longer required. However, we are maintaining the SP information and course to sample location information. Record this information from the old plot sheet to the new plot sheet and check that this information was downloaded in the PDR correctly. NOTE: Some of the eastern states do not have complete old SP information on the old plot sheets.

A.1.2 LOCATING A REMEASUREMENT PLOT USING ORIGINAL SP AND COURSE TO SAMPLE

After locating the SP, traverse to the plot using the distance and azimuth recorded by the last crew. If the original PC is not found at the end of the traverse, search the area for evidence of the old plot. Items to look for are paint on the tree bases (vertical line) and at breast height (horizontal line). In the west, look for 10-inch wire pins and bits of flagging at each subplot. In the east, look for a dowel at subplot center.

If your GPS unit is not working and the SP cannot be found, a remeasurement plot can be located using the aerial image. (See: LOCATING A PLOT USING THE IMAGE)

A.1.3 ESTABLISHING A PLOT USING GPS COORDINATES

Use the GPS coordinates provided when establishing a plot for the first time. These coordinates are listed on the printed plot sheet provided to the crew. The true location of the plot is the 'X' on the image. Plots must be established as close to this location as possible. Acceptable tolerance for the placement of newly established plots is based primarily on the relationship of the actual plot location to the prescribed location on the imagery, relative to landmarks that appear on both the ground and image. Landmarks may include, but are not limited to features such as sidewalks, roads, trails, streams, forest openings, topography, boundaries, visible changes in forest type, stand density and other easily identifiable features and landscape characteristics. Image quality can vary, but within those practical limitations the plot should be located within 10% of the distance from the nearest accessible landmarks. For plots where the only landmarks are greater than 200 feet from the plot and image location, the GPS coordinates collected at plot center will

be used to determine if the plot is in the correct location. The collected coordinates must be within 50 feet of the prescribed coordinates or the plot location must be corrected.

Level of hierarchy for plot location:

1. Pinprick on an aerial photo image from last cycle
2. Pinprick on a DOQ from last cycle
3. 'X' on a DOQ
4. GPS coordinates from last crew (assuming an error was not made when collecting)
5. GPS coordinates on the plot sheet

Navigating from SP to PLOT CENTER (PC) using GPS coordinates.

1. Enter PC coordinates from plot sheet into GPS unit
2. Establish an SP and collect and record coordinates
3. Navigate to within 100 to 120 feet of the PC coordinates entered
4. Establish a Waypoint (WP) by averaging 180 points with the GPS unit
5. Calculate the distance and azimuth from the WP to PC
6. Chain the remaining distance and azimuth from the WP to PC
7. Check to see if the ground location matches the image location
8. If the location matches establish the plot
9. Calculate distance from SP to PC using the GPS unit and record on the plot sheet and in the PDR

NOTE: The distance and azimuth from the WP to PC to locate the plot is not recorded.

A.1.4 LOCATING A PLOT USING THE IMAGE

Use this method of locating a plot when the GPS unit is not working. This method will work for establishing a new plot or relocating old plots when old information is unavailable. Image quality can vary, but within those practical limitations the new plots should be located within 10% of the distance from the nearest accessible landmarks.

Establishing a new course to sample

- Select and record a BASELINE on the aerial image.
- Select and record SP description
- Monument the Starting point
- Determine "Course to sample"
- Distance and azimuth computation
- Record and traverse the "course to sample"
 - Chaining
 - Location correction

A.1.5 BASELINE

A BASELINE (or reference line) links the photo image and the ground with a compass bearing. This reference line may then be used to determine the azimuth from SP to PC.

Locate the BASELINE by finding two features on the ground that are easily recognized on the aerial image. The two features should be at least 10 chains apart when using an aerial image with a scale 1:15,840. Select such features as straight road sections, drainage ditches, or two distinct trees. Avoid using railroads or major power lines since they influence the compass reading.

Pinprick both features on the photo and circle the pinpricks on the back of the photo. Draw a line between these pinpricks on the back of the photo with an arrow at one end of the line to indicate the azimuth direction.

Important Note: East-west azimuths are reversed when working on back of photo.

Measure the azimuth between the two features with a compass to the nearest half-degree and record it on the back of the photograph.

A.2 STARTING POINT INFORMATION

A.2.1 STARTING POINT (SP)

A starting point is established for the purpose of locating a sample plot. It should be as near as possible to the sample location yet not on the same acre as the sample plot. An SP must be at least 140 feet from PC, to utilize the MIDAS PDR Application utility "Locate Subplot". This utility allows you to traverse directly to subplots 2 – 4, and requires that an "off plot" location like SP be at least 140 feet from the destination subplot. When selecting the SP, make sure it is easily located on the ground, and on the image, and not likely to die or be cut by next survey. Select a prominent tree located at the edge of a field or clearing, at a bend in a stream, or any landmark easy to find on the next survey. An SP tree must provide the next crew a point from which to physically and efficiently chain to PC during all seasons and water levels (i.e., without the aid of a GPS). It will help re-locate the plot center at the time the plot is re-measured.

Using both the new and/or old photograph(s) and/or provided image, locate the SP.

Pinprick the SP on the image that has the sample location pinpricked. Label and circle the pinprick "SP" on the back of the image.

A.2.2 STARTING POINT TREE MONUMENTATION

Mark the SP with paint facing the direction of normal approach. Paint "SP" (in letters four-inches tall) at 5-1/2 ft above ground. Paint three-inches tall "SP" below an imaginary 1 ft high stump. Place on the downhill side of the tree whenever possible. Again this is done in case the SP is cut.

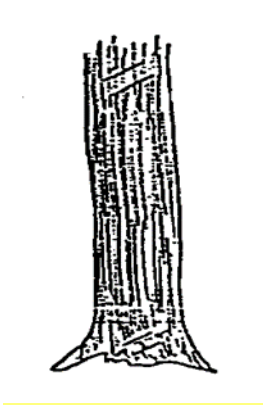


Figure 51N. Illustration of SP marks in the west.

Never paint or scribe trees located on a landowner's yard without permission from the landowner.

Note: Use discretion in painting or scribing trees on private lands and in other well-traveled areas like public trails. Make a note on the plot sheet when the marking deviates from normal procedures. In reserved areas, paint and scribes are not used unless the manager of the reserved area indicates otherwise. Instead, nail an aluminum tag marked with "SP" to the base of the tree. Please make a note on the plot sheet if reserved areas are marked differently than with a nail and tag at the base.

Describe the SP on the plot sheet under "Starting Point Description." Include the landmarks you used to locate SP. Specify details of the SP such as:

- Species, DBH, and the aspect on which the tree is painted or scribed
- Any nearby road, fence, pasture, etc. and the tree's location in relation to that feature.
- Any noticeable characteristic of the SP tree, such as a fork at 10 feet, multiple stems, deer stand, etc.

A.3 COURSE TO SAMPLE LOCATION

A.3.1 AZIMUTH AND DISTANCE COMPUTATION

On the back of the photograph, connect the pinpricks for the SP and plot center (PC) with a straight line. Extend this line to intersect the BASELINE. Lines should extend well beyond the intersection to allow reading the back-sight off the 360° protractor to check the accuracy of the angle being measured.

If the BASELINE and the line to the sample location do not intersect on the photograph, draw an additional REFERENCE LINE that will intersect the BASELINE and the "Course to Sample" line (i.e., course to plot). Indicate the directions of the sample location line and the BASELINE by putting an arrow at the end of each line. Measure the angle between these lines starting from the BASELINE.

Be sure to use an inverted 360° protractor or flip a standard 360° protractor over because east-west azimuths are reversed 180° when working on the back of the photo. Align the 360° protractor over the azimuth of the BASELINE to get the azimuth of the sample location line. The azimuth is read directly off the protractor once the azimuth of the BASELINE is correctly aligned on the inverted protractor. To minimize error, check the back-sights of both BASELINE and

“Course to Sample” lines. Back-sight is the surveying method taken backwards or 180° in the opposite direction. Ex: If your baseline was 20° then the back-sight would be 200°. If the SP to PC was 90° then the back-sight (or PC to SP) would be 270°. If the protractor is precisely aligned then the two lines (baseline and SP to PC line) will be lined up accurately with each of their back-sights being 180° in the opposite direction. This is a check to see if the protractor is precisely aligned for an accurate reading. Repeat this procedure if a REFERENCE LINE is needed to intersect the course to sample line. Refer to Figure 52N.

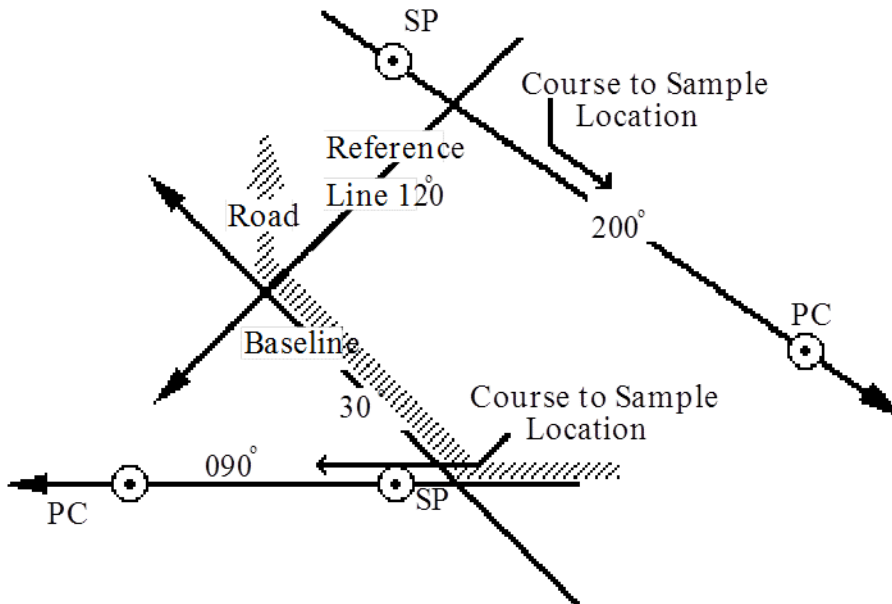


Figure 52N. Back of photo documentation that includes azimuths for baseline, reference line and course to sample location. Identification of SP and PC are also included.

With a photo scale, measure the distance on the photo from the SP to the PC, to the nearest quarter chain (Photo scales, corresponding to the aerial image, are supplied.) Hold the photo up to the light and carefully measure, from the center of one pinprick to the center of the other. Record both the distance (in feet) and the direction on the back of the image, on the plot sheet under "Course to Sample", and in the data recorder.

A.3.2 TRAVERSING or CHAINING

Using compass and measuring tape run a course on the computed azimuth. Distance correction for slope is necessary when slope exceeds 10%. Using the Suunto clinometer, slope correction can be quickly determined and added after the line is run out. In Regional Appendix E a slope correction table is available to determine the correct adjustment that is added to the line along the slope. For example, to chain a horizontal distance of 66.0 feet on a 25% slope, chain 68.0 feet (66.0 + 2.0) on the slope. Once the computed course has been run, place a permanent stake at the end of the computed course.

Important: Make sure that photograph location agrees with ground location.

A.3.3 LOCATION CORRECTION FOR PLOTS ESTABLISHED BY PINPRICK

If the ground location is clearly not the point pinpricked on the photograph (more than 2 chains error), and the correct location can be determined on the ground, place a second pin at the correct location. Note the azimuth and distance from the initial pin to the relocated pin and record these items under "Course to Sample Location" on the plot header sheet and remove the first pin. The initial pin is referred to as a "Turning Point." The second pin becomes the location of the plot.

This is only done on a NEW PLOT when it is obvious that the location determined by chaining azimuth and distance does not agree with the location on the photo or image provided.

For REMEASUREMENT plots chain the computed azimuth and distance along the approach line and mark the location. If the original PC is found here, continue to relocate other subplots and establish any new subplot or microplot locations as needed. If the original PC is not found search the area for evidence of the plot. Once located, a "Turning Point" may be needed. After finding PC, establish a Turning Point (TP) if the distance between PC and the end of the approach line exceeds 3% of the chaining distance.

A.3.4 OTHER NOTES on locating plots and subplots
If no evidence of the old plot can be found try the following.

Search the area of five chains around the area you navigated too.

If you used GPS navigation to PC, find the old SP and follow course to sample listed on plot sheets and search the area around your ending point.

Look for trees marked at the base and at DBH with paint or scribe marks. When several of these trees are found in close proximity, examine the original plot data and try to match these trees to trees on one of the original subplots.

Match current tree species by comparing azimuths, distances, and DBH to the data for trees listed in the historic tree records and determine the subplot number. Use triangulation to find the subplot center and mark it a wooden dowel or a piece of galvanized or aluminum wire bent into a loop with a piece of blue flagging tied through it. If this is not the plot center move to the plot center by knowing which subplot you are on and chaining the distance and azimuth to plot center (PC).

After finding the old pin at Plot Center, inspect the condition of the old pin or dowel. If the old pin or dowel requires replacement, remove the old pin or dowel and place a new marker at the same location. The use of multiple markers at PC is not required. Multiple markers can degrade the accuracy of horizontal distance measurements to individual tally trees. If the old pin or dowel cannot be found, triangulate to accurately re-establish the plot center in the original location.

If several tally trees are identifiable, use the triangulation method to relocate the subplot center. If this is not possible, due to lack of trees or other circumstances, locate adjacent subplots and use these to triangulate to the missing subplot. This procedure should provide the general location of the missing subplot and reduce the search area.

It is very important to locate each individual subplot center as accurately as possible. Finding each subplot may be a challenge—most of the flagging disintegrates and the wires rust and may appear like twigs or roots. The best method is to run out 120 feet (add slope if greater than 10%) from subplot 1 at the proper azimuth, mark the spot, and search by running your hands through the area. Check plot sheets for reference tree information if no 5 inch trees were tallied at the last measurement.

A.3.5+WisCFI NAVIGATING TO SUBPLOTS OTHER THAN PC

When navigating to PC, you may encounter some condition that makes it impossible or impractical to physically reach PC and put in a marker. PC may be in water, the center of a barn, or on a busy highway. Other subplots on the plot may be in a forest condition and must be installed. In this case, chain to any one of the outer subplots and establish it first. This can be done by using the MIDAS PDR Application utility "Locate Subplot" to compute the direct distance

and azimuth from SP to any subplot center and chaining directly to a given subplot. This method is best when you can see you will have trouble reaching PC before you start chaining.

Note: The MIDAS PDR Application utility works only if you are farther than 140 ft away from PC.

A “Turning Point” can also be used at any point when chaining to reach another subplot center. At any point while chaining, establish a Turning Point, chain the distance and azimuth from PC to the subplot you wish to occupy, and then continue the original course. For example, the course from the SP to PC is 700 ft. @ 200°. After chaining 600 ft you can see that PC will be in a river and it would be best to chain to subplot 2. At 600 ft, establish a Turning Point and traverse 120 ft. @ 360° (the distance and azimuth from PC to subplot 2). Establish another Turning Point and complete the original course (200° for the remaining 100 ft) to reach subplot 2.

The following example illustrates using a “Turning Point” to locate subplot 2 when subplot 1 is inaccessible. The stream is noncensus water that is too deep to access or cross. The crew establishing the plot does not know that the subplot is inaccessible until they encounter the stream while chaining from SP to PC.

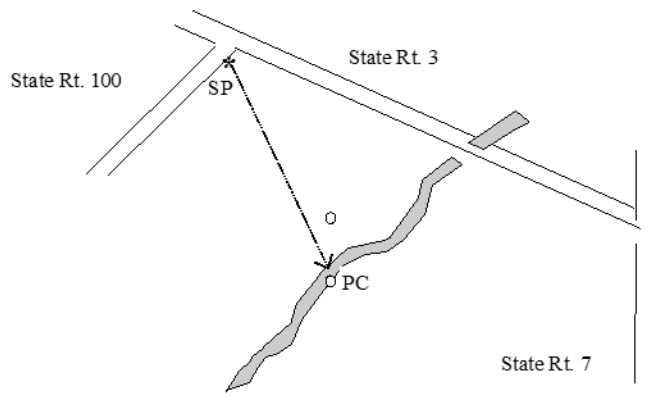


Figure 53N-WisCFI. Using a “Turning Point” to locate subplot 2 when subplot 1 is inaccessible.

Originally, the course to plot was 534 ft at 150°. The crew chains 500 ft to the edge of the stream and finds that subplot 1 cannot be occupied.

To establish subplot 2 without occupying subplot 1, the crew can establish a turning point (TP1) at the 400 ft station of the course to sample location and proceed due north for 120 ft. Here a second turning point (TP2) is established and the crew proceeds 134 ft at the original course to sample location azimuth of 150°. This is the proper location of subplot 2. Note that TP1 could be established at any distance along the original traverse as long as the distance from TP2 to subplot 2 is adjusted as well.

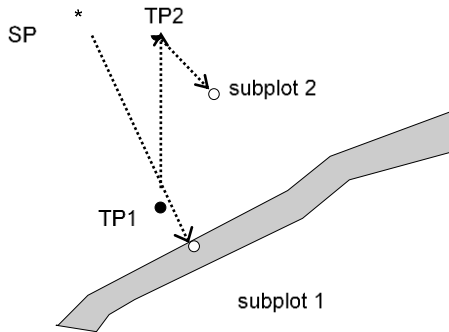


Figure 54N. Establishing subplot 2 without occupying subplot 1.

Whenever subplots are established without occupying subplot 1, a detailed description of the methods used must be written in the PLOT NOTES. Photos with more than one SP and course to sample location must be properly labeled. Also, whenever subplot 1 is not physically occupied, the crew should reference subplot 2 with witness trees and collect GPS coordinates at this point. These coordinates are recorded in the PLOT NOTES only since they do not reflect PC at subplot 1.

A.4 PROBLEMS IN LOCATING PLOTS

A.4.1 Lost Plots

For a remeasurement plot where there has been no major disturbance to the plot area, the initial crew must do their best to find the previous plot location. If the first crew fails to locate the plot, a second veteran crew, crew leader, QA personnel or field supervisor should attempt to find it. This second effort is forewarned and, with careful notes from the first crew detailing circumstances encountered, may have success. If both efforts fail, then a replacement plot is established at the location of the X' on the image or the corresponding GPS coordinate.

- PLOT STATUS of 3 is assigned to the lost location data file.
- A plot file will be completed with the original number of the lost plot.
- A second plot file will be created with the new PLOT NUMBER for the plot sampled.
- Both data files and plot sheets will be returned to the regional office.
- The crew must bring this plot to the attention of the crew leader, QA personnel or field supervisor

A.4.2 Disturbed Plots

When there has been a major disturbance (such as the area has been clearcut and bulldozed) and it is obvious that the plot cannot be relocated, establish the plot as near as possible to the old PC.

This plot does not get a new PLOT NUMBER.

Account for previous trees before entering any new tree data.

A.4.3 PLOT IN THE WRONG LOCATION

If a re-measurement plot was established in the wrong location (i.e., not in the same location as marked on the aerial image), re-establish the plot in that same location. If the error is more than 2

chains or if it needs clarification for next crew, pinprick the new photo where the plot is actually located.

Note: Occasionally the error will be less than 2 chains; but due a physical feature on the ground or photo, the PC mark requires correction. Example, the PC mark is on the north side of the road, but the plot is on the south side of the road. In this case please pinprick the aerial image.

In the "Notes" section of the plot sheet, indicate that you moved the PC mark to agree with the original location the plot was installed. Record the distance and azimuth (using a photo scale) from the original PC mark on the image to where the plot is actually located. Bring such plots to the attention of the crew leader or state supervisor. It is assumed that the plot is located in the correct location unless physical evidence of the plot is found in the wrong place (i.e., pins/dowels, paint or flagging).

A.4.4 PREVIOUSLY DENIED ACCESS PLOTS

- Denied Access (DA) plots from the last cycle will be sent out to attempt access in this cycle.
- Contact the current land owner to ask for permission
- Code as DA if owner denies access.
- If permission is granted, reference the previous Sample Kind (SK) on last cycle's plot sheet
 - If it was a SK 1, then it was a new plot during the last cycle and it has never been installed. Install the plot as a new plot.
 - If the plot was installed (i.e., 2 cycles ago), determine the location from the data of the last successful visit. Try to find the old subplot centers, but treat as a new plot for data collection. (i.e., do not reconcile data from 2 cycles ago).
 - If the plot that was installed, but the plot data from the last successful visit is not available or inadequate for relocation, establish the plot at the 'X' on the photo or provided GPS coordinates.

A.4.5 LOCATION DIFFERENT THAN REMEASUREMENT PLOT LOCATION

When the new DOQ location and/or the coordinates do not match the previous DOQ and/or coordinates, the previous information is considered correct. Be sure to place the plot in the same location as the previous crew. Example: if the previous crew placed the plot completely in a nonforest condition but the new DOQ places a point in a forested condition, assume the previous crew was correct. Locate the established plot using the SP to PC "Course to Sample Location" or the subplot "Reference Tree" information.

A.5 PLOT LOCATION DATA recorded on plot sheets

A.5.1 PLOT LOCATION MAP

A Plot Location Map is required on all plots unless the Plot Diagram (Cluster Map) provides enough specific detail (roads, trails landmarks, etc.) to relocate the plot accurately and efficiently. The Plot Location Map should provide enough information for a plot to be relocated. Details (sidewalks, fences, buildings, patios, driveways, trails, etc.) and mileage to an easily located intersection or reference point must be included. Inspectors check the quality of these maps by attempting to locate the plot without aerial photos or GPS coordinates. A plot that can't be located efficiently due to a poor map will be considered unsatisfactory. Neatness and clarity are required. Artwork is not necessary and is not required. A good Plot Location Map should take no more than five to ten minutes to complete.

Starting Point (SP) is only required on new samples if needed for plot establishment and on remeasurement that require SP for plot relocation.

The Plot Location Map or Cluster Map (if Plot Location Map is not needed) must include:

- References to the nearest road intersection, include exit numbers when appropriate
- Names and/or numbers (if available) for all roads shown on the map along with house or box numbers, when appropriate
- Key landmarks (natural and manmade) near SP (if required), PC, and witness objects, as well as important intersections along route
- Use common symbols to represent features like fences, railroads, power lines etc.
- Include North arrow (on Plot Location Map)
- Location of SP (when SP is required), witness objects (if helpful), and PC identified
- Location for safe vehicle parking and route to PC from there
- Record distance between road intersections from an originating intersection to parking location. Distances are recorded in miles, tenths of mile, chains, or feet.
- Gates – locked or unlocked
- Off road trails/paths used to drive or hike to PC
- Changes in land ownership between parking to PC and on plot

A.5.2 PLOT DIAGRAM (Cluster map)

Use this space to show the location of contrasting condition classes and any unique features on or near the plot that may be helpful in relocating the plot at the next inventory. Condition class boundaries must be sketched in accurately to avoid problems on the next cycle when these boundaries will be remeasured.

In situations where the Cluster Map can be used as Plot Location Map and Cluster Map, it must also contain all information listed above for the Plot Location Map.

A.5.3 SUBPLOT REFERENCE TREES

Subplot reference trees are used whenever there is a concern that the next crew may have a problem locating a subplot. Make complete notes of everything that you do so that it will be clear to the next crew. In some cases an object other than a tree can be used as a suitable reference marker.

Subplot center is referenced for the following situations:

- SUBPLOT STATUS = 1, subplot center is forested and no live trees ≥ 5.0 in DBH tallied on subplot or live saplings ≥ 3.0 in DBH tallied on the microplot.
- SUBPLOT STATUS = 1, subplot center is nonforest and no live trees ≥ 5.0 in DBH tallied on subplot or live saplings ≥ 3.0 in DBH tallied on the microplot.
- SUBPLOT STATUS = 2, subplot center is within 60 feet of a tree or other suitable object.
- A subplot that is used for a canopy cover check to determine condition must be referenced. This includes temporary subplots.

Reference trees should be within 60 feet of the subplot center and marked above DBH and at the base with paint or scribe marks facing the subplot center. There is no preferred reference mark.

E.g., if using paint, an appropriate mark may be the associated subplot number. This mark makes it easier for the next cycle’s crew to identify the subplot. If using a scribe, an appropriate mark may be an “X” or a triple-scribe mark “\\”. Whichever mark is used, indicate the mark type on the plot sheet’s “Reference Tree” grid along with the other reference information as shown in the example.

Sub#	Spp	DBH	Dist	Azm	Mark
1	0931	060	265	003	///

In reserved areas do not use paint (or scribes) unless permission is granted. If permission is denied, a nail and tag is used with a reference mark at the base of the reference tree only. National Parks or National Wilderness areas require a nail and tag be used for a reference tree.

Tolerances and MQOs for reference trees (Spp, DBH, Dist, Azm) will be the same as described in the tree section for these variables.

A.5.4 NOTES

Record any additional information regarding ownership, plot and/or subplot relocation.

“Notes should be full and exact so as to furnish for the benefit of later comers a complete record of the work done. In the case of resurveys they should be particularly clear as to the old marks found, so that the evidence which governed in the resurvey may be a matter of record. This rule holds especially in regard to starting points and corners...Notes should be so plainly and clearly written that any fairly intelligent man can understand them. They should be honest as well, not concealing actual errors...Errors are normal and to be expected. They grow out of imperfections in method that are imposed on the survey or by limitations in the matter of expense. Errors are not to be confused with mistakes or blunders.” – Austin Carey, Woodsman’s Manual, Fourth Edition, 1932.

REGIONAL APPENDIX C. ADDITIONAL NORTHERN DATA COLLECTION PROCEDURES

This appendix covers items that are not fully explained in the main text of Sections 0 through 9.

C.1 ALTERNATE PLOTS (East/West)

C.2 DENIED ACCESS PROCEDURES

C.2.1 PREVIOUS DENIED ACCESS THAT IS NOW DESIGNATED NEW GROUND (SK 1)

These plots, with new ground designation, require all trees measured to receive the NEXT AVAILABLE TREE NUMBERS. This allows a break from the historical tree records.

If the plot was established in a previous Cycle in the field, the SK1 plot should be placed in the exact same location. Reference the previous crews plot map, reference information, and tally trees to locate the dowels or pins.

C.2.2 PROCEDURE FOR PLOTS THAT ARE DENIED ACCESS OR HAZARDOUS

For plots that are completely Denied Access or Hazardous, the MIDAS program will automatically populate some of the required variables and remove unnecessary variables. The Plot Level Data screen will need to be completed by the field crew. Once all Plot Level Data items have been populated, running the editor will populate most necessary data items with exception of a few remaining variables.

The Condition Level Data will populate everything except CONDITION NONSAMPLED REASON, COVER CLASS, CANOPY COVER SAMPLE METHOD, LIVE CANOPY COVER, LIVE PLUS MISSING CANOPY COVER, AND OWNERSHIP INFORMATION.

All subplots will populate everything except SUBPLOT NONSAMPLED REASON.

All existing Remeasurement Tree records will receive a TREE STATUS of 0 and a RECONCILE of 9. All other Historical data items such as GPS Data, Boundary Data, and Site Index Data will be removed automatically from the data file.

C.2.3 DENIED ACCESS CONDITION THAT IS FORESTED WITH A STRIP OF ACCESSIBLE TREES

If part of a plot is DA but would qualify as forested and it is adjacent to an accessible strip of trees that is less than 120 ft wide and would not qualify as forested, the strip of trees cannot stand alone as its own condition. It must be lumped with an adjacent area that is accessible, even if that area is a nonforest condition.

C.3 REMEASUREMENT PLOTS (SK 2) NOT SAMPLED LAST CYCLE:

C.3.1 PREVIOUSLY PARTIALLY DENIED ACCESS OR PARTIALLY HAZARDOUS PLOTS

A reconcile code is required for trees on portions of plots that were not sampled during the last cycle due to access denied or hazardous conditions. If trees in these portions now become available for measure they will need a reconcile code. RECO 1 (ingrowth or reversions) is the best choice.

C.3.2 PREVIOUSLY PI NONFOREST NOW PI FOREST

Plots that have "Previous Field Plot?" = 'N' and a Sample Kind 2 on the current plot sheets were PI in the office as Nonforest last Cycle and now determined to possibly be forested in this Cycle. If it turns out that this type of a plot has a Forested condition there will be several ways to define the trees depending upon the circumstances.

1. Previous PI of NF was Correct = RECO 1. If the plot has reverted from a Nonforest condition and the PI shop was correct in not sending the plot to the field previously, all of the trees will receive a RECO code of 1 (Ingrowth or reversions) regardless of size.
2. Previous PI of NF was Incorrect = RECO. If the plot contained forest land previously and should have been sent to the field, then the trees will be handled as either Missed or Ingrowth depending on their size. We are considering the PI process an inventory so if the plot should have been measured in the field previously; we are considering the trees that were present and of size last time as Missed. It will depend on the situation of the tree in order to determine the RECO code as follows:
 - a. RECO = 1 (Ingrowth or reversions) If the DBH is near 5.0" for subplot or 1.0" for microplot and potentially grew onto the plot since last Cycle (size range will depend on growing condition of site). Live or dead currently.
 - b. RECO = 2 (Through growth) will RARELY be used in NRS. Trees are unlikely to grow from seedling to 5.0 DBH in 5 yrs.
 - c. RECO = 3 (Missed live) If the DBH exceeds the expected range of growth for Ingrowth for a Cycle (i.e. 9.5" DBH). This can apply to a dead tree if it can be determined the tree was live at time of previous measurement.
 - d. RECO = 4 (Missed dead) If it is determined the tree was dead at time of previous measurement and is 5.0" or greater.

C.4 TREES ENTERED ON THE WRONG SUBPLOT

C.4.1 Trees Entered on the Wrong Subplot in Previous Cycle

Give all trees entered on the wrong subplot a Status of '0' (No Status) and a Reconcile of '7' (Cruiser Error). Then all of the previously measured trees will be tallied on their correct subplot as Reconcile '3' (Missed Live) or Reconcile '4' (Missed Dead). Be sure to write notes to explain the situation.

All trees that did not meet size requirements previously will receive Reconcile '1' (Ingrowth). If a tree was less than 5.0" or 1.0" previously and now is of size it wouldn't be considered missed and would be tallied as a new tree.

C.4.2 Tree Entered on the Wrong Subplot in Current Cycle

If trees were tallied on the wrong subplot during the current inventory, they can easily be adjusted at the St. Paul level. If the plot is SK 1 or a Reverting Condition and the newly measured trees were entered on the wrong subplot send the data file to St. Paul via email with a note of what subplots to shift. Also include if the subplot data, seedling data, and/or boundary data needs shifting. Adjustments can be made on the subplots within the data file so the trees will be loaded correctly the first time.

C.5 RESERVED LAND: see Section 2 and Appendix 12.

C.6 CONDITION CHANGE FROM FOREST TO NONFOREST (required entries)

If the current condition of previous tally trees converts from forest to nonforest between cycles, the following data is required on trees now in a nonforest condition.

Site Index data is downloaded, so if the entire plot is now nonforest, it will need to be deleted to avoid errors relating to SI. If a portion of the plot is forested, make sure only forest conditions are in the CONDITION CLASS list.

Tree and Sapling requirements for previously tallied trees now on nonforest condition:

- TREE RECORD NUMBER – Download
- PRESENT TREE STATUS
- PREVIOUS TREE STATUS – Download
- RECONCILE, if PRESENT TREE STATUS = 0
- HORIZONTAL DISTANCE – Download
- PREVIOUS DBH – Download
- SPECIES – Download
- AZIMUTH – Download
- CONDITION CLASS NUMBER
- STANDING DEAD, if PRESENT TREE STATUS = 2
- CAUSE OF DEATH

Ingrowth trees are not tallied. Missed trees from the last cycle are not to be reconciled, since the collection of this data is subjective due to the condition change. Erroneously tallied trees from the last cycle can be reconciled if it is determined that a cruiser error or a procedural change has taken place since the last cycle.

NRS PDR Note: To prevent trees from mistakenly being coded on a nonforest condition, each tree will receive the following critical PDR message: “You have a tree on a nonforest condition. This is only valid if condition went from forest to nonforest.”

C.7 Reconciling the Previous Tally

On remeasurement plots (SK 2), the trees that fall on any of the subplots or microplots will be reconciled to itself from the previous inventory based on azimuth, distance, etc. Only trees 5.0 inches DBH and greater within the 24.0 ft subplot radius will be tallied and reconciled. Also, only trees 1.0 to 4.9 inches DBH within the 6.8 ft microplot radius will be tallied and reconciled. All trees that are further than 24.0 ft or 6.8 ft, respectively, away from subplot center will be ignored.

National Appendix 8 shows tree coding for many situations. Refer to this appendix for proper coding. If you are still unsure on how to code a tree, contact your supervisor.

The following examples are common, simple situations. A correct reconciliation may be time demanding and complex. However, this is a critical part of the inventory. Certification will be provided. Crews are to direct any questions to supervisors as soon as possible.

Examples:

1. The first tree to be tallied at subplot 1 is now an ingrowth, dead ingrowth, or previously missed tree. Assign the first available tree number and record the appropriate current data. If the highest tree number was previously #35 on this subplot the last time, assign this tree #36. Tree #36 will receive PRESENT TREE STATUS = 1 or 2 and RECONCILE = 1. The next tree tallied was tree #1 at the last inventory. Since trees are no longer being renumbered each inventory, previous tally tree #1 is current tree #1.

2. The first tree on the old plot record was a 24.0-inch DBH sugar maple, followed by an 8.0-inch DBH beech. The beech is present and is the first live tree starting from an azimuth of 001. There is no evidence of the sugar maple. Check the area to the plot radius limit to see if there is a stump of the maple. Perhaps there is -- perhaps not. In this case, tree is dead and down. The maple was, and still is, tree #1 and receives PRESENT TREE STATUS = 2 and STANDING DEAD = 0. The beech tree is tree #2 and is still present and receives PRESENT TREE STATUS = 1.

C.8 QAQC PLOT DESIGNATIONS

Quality Assessment / Quality Control (QAQC) is required for the office Photo Interpretation (PI) plots just as QAQC is required for P2/P3 plots that are completed in the field. 4% of all plots PI'ed in the office are reviewed a second time by another office staff to evaluate repeatability. Of those 4%, any plots that were determined to contain forest land by both PI crews will be sent out as a Mandatory Field P2 / P3 QAQC. Of the 4% that were determined to be nonforest, up to 25 total plots will be sent out per state as QAQC PI plots. Lastly, any of the 4% that had a discrepancy between the two PI checks in forest/nonforest calls will be sent out as QAQC Special.

- Mandatory Field QAQC plots require a second visit in the field by a QAQC crewmember. (Additional Field QAQC checks may also be performed)
- QAQC PI plots are thought to be nonforest by both PI crews. The field crew must visit the area to complete a visual check to verify. It is not a requirement to visit PC if the site is clearly nonforest. If the status is in question or the site is not visible from a convenient location, the site must be visited. A canopy cover check may be necessary to determine the status.
- QAQC Special plots had a discrepancy between the PI crews. The field crew must visit the area to complete a visual check to verify. It is not a requirement to visit PC if the site is clearly nonforest. If the status is in question or the site is not visible from a convenient location, the site must be visited. A canopy cover check may be necessary to determine the status.

A Starting Point is required, along with SP coordinates, for all QAQC PI and QAQC Special plots. If PC is not visited, PC coordinates are not required. Do not enter coordinates that are printed on the plotsheet. Only enter PC coordinates if PC was visited or if the Offset function is used. GPS Type should be coded as '0' and all other GPS data items left blank if no GPS data are collected.

If a forested condition is present on QAQC PI or QAQC Special plots, only some of the plot data items are required. All Plot, Condition, Subplot, and Boundary data are required. Trees, Seedlings, Invasives, DWM, Tree Seedling Regeneration, P2 Veg, Soils and Site Index trees data are not required because this is a QAQC plot on the PI call and this info was not collected at the office level. Next subcycle this plot will go out as a production P2/P3 plot.

Note: It is important to code Subplot Status as '4' (Sampled – QA crew did not measure trees, saplings, seedlings, DWM, Tree Seedling Regeneration, P2 Veg or Invasives. QA crew did measure all other data items.) if a forested condition is present and the above items are not collected. A Subplot Status code of '4' indicates these items may be present but were not considered for this type of QA plot.

C.9 CODING UNDERSTORY VEGETATION AS A DISTURBANCE

When coding understory vegetation as a disturbance, consider how this vegetation is affecting the stand as a whole. The following are a few examples as to how the stand size class and composition may affect the decision.

STAND SIZE CLASS = 3 (sawtimber < 20") Oak stand in WV with a thick understory of Rhododendron and few seedlings

- The Rhododendron is native, but both native and invasive plants can cause a disturbance.
- The Rhododendron may or may not be the reason new seedlings are not being established in the stand but does this vegetation affect the stand of 13 inch Oaks enough to code a disturbance? No.
- So in this case, we would not code this understory vegetation as a disturbance.

STAND SIZE CLASS = 3 (sawtimber < 20") Maple stand in PA before and after a harvest

- A healthy stand of Maple with no seedlings possibly due to the lack of a seed source or a thick layer of understory vegetation. Either way there would be no disturbance since the overall condition of these size class 3 Maples is good.
- The stand is next visited a year or two after major harvest. The entire area is covered with thick Raspberry plants and there are a few Maples slowly sprouting under the Raspberry. This Raspberry seems to be affecting both the establishment and growth of these seedlings. In this case we do have a disturbance.
- On the next visit, five years later, the Maple seedlings are growing into saplings and starting to shade out the berry bushes. In this case the Raspberries are no longer a factor so we would not code them as an understory vegetation disturbance.

If you feel that the Raspberry is affecting this new stand take the following into consideration prior to coding a disturbance:

- How thick is the competing vegetation? If you were able to look down from above would there be significant gaps?
- Look at the stand as a whole and not as small localized pockets.
- Do you see a fair amount of seedling growth intermixed within the berries?
- Is lack of establishment of new seedlings due to something other than the competing vegetation, such as lack of an adequate seed source?
- Is at least one acre of the stand affected?

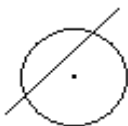
If one or more of these conditions creates a debate as to whether the competing vegetation is affecting 25% of the area or not, it may not qualify as a Disturbance

C.10 SPLIT SUBPLOTS

Consider the following when a subplot has both an accessible condition and non-accessible condition present.

If PLOT STATUS = 1 and subplot center cannot be occupied due to Denied Access (DA), Hazardous (Haz), or inaccessible water condition, code the whole subplot DA or Haz. No boundary would be measured. If any other subplots are accessible on the plot, they would be measured.

Accessible Condition



DA or Haz or Inaccessible Water Condition

If PLOT STATUS =1 and subplot center is accessible but a portion of the plot is DA, Haz, or Inaccessible water; collect the data on the accessible portion and map a boundary for the DA, Haz, or water area. If it is water, define the area as noncensus or census water.

DA or Haz or Inaccessible Water Condition



Accessible Condition

If PLOT STATUS = 1 and the DA area of an accessible subplot is clearly visible as a Nonforest condition, define the DA area as Nonforest. Since there is no requirement to physically access the property to determine that it is Nonforest, there is no need to code it as DA.

DA – Nonforest Area Define as Nonforest



Accessible Condition

If all of a subplot has been DA but is clearly Nonforest, code the subplot as Nonforest. There is no requirement to physically access the property if it can be visually defined.

If a complete subplot falls in Census or Noncensus water code the whole subplot as water. Since we know the entire subplot is contained within water we want to define it as such.

The reason behind not mapping a boundary when the subplot center is inaccessible is we do not want to estimate the boundary information and then estimate what trees will be in or out of the subplot.

C.11+WisCFI Two Alternating Strips – Figure 9b+N, Section 2.4

On the following pages are 4 examples on how to apply "Exception Rule 6b" for two alternating strips of forest and nonforest between two qualifying areas of nonforest land and forest land (From Section 2.4). The nonforest strip for Figure 9.b+N is not developed or noncensus water and both the forest strip and the nonforest strip are at least 30 ft and less than 120 ft wide and 1 acre in size. If either strip does not meet these dimensions, then the strip is treated as an inclusion of the adjacent condition. Note: Not all plot scenarios are shown.

From Figure 9.b+N, Section 2.4



Example 1

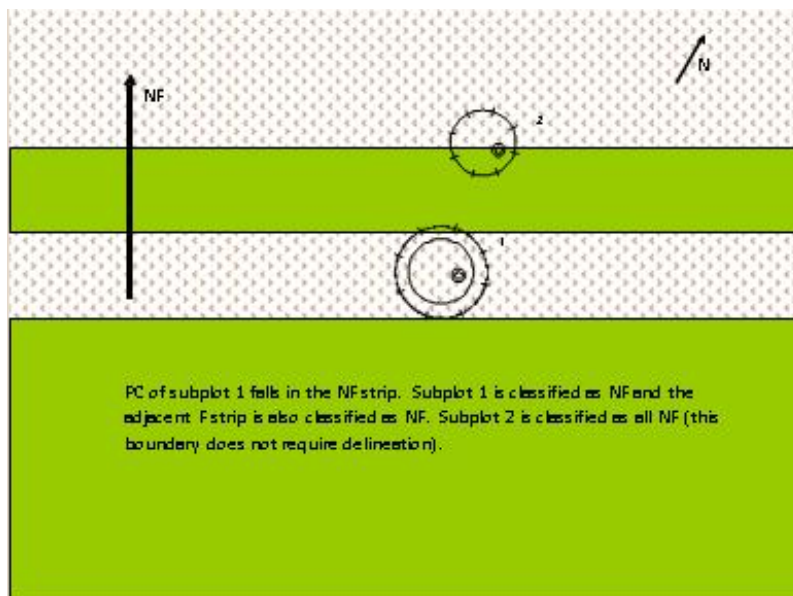


Figure 55N-WisCFI. PC of subplot 1 falls in a NF strip.

Example 2

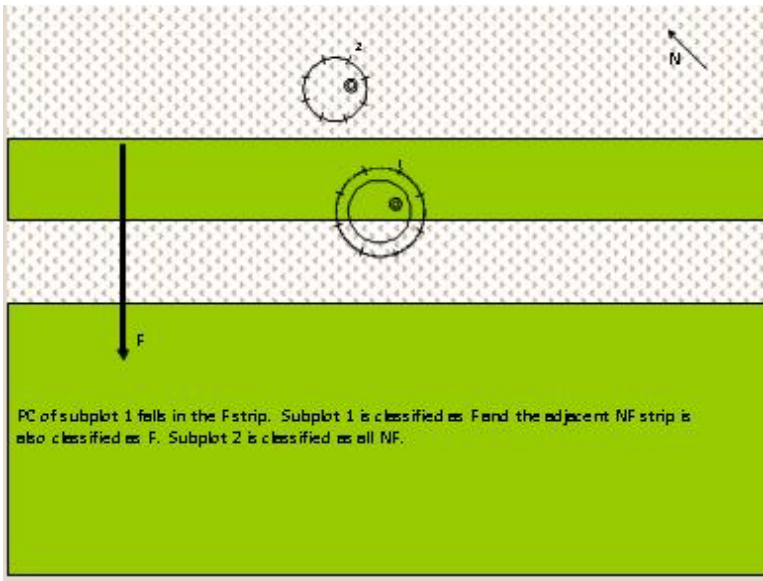


Figure 56N-WisCFI. PC of subplot 1 falls in the F strip.

Example 3

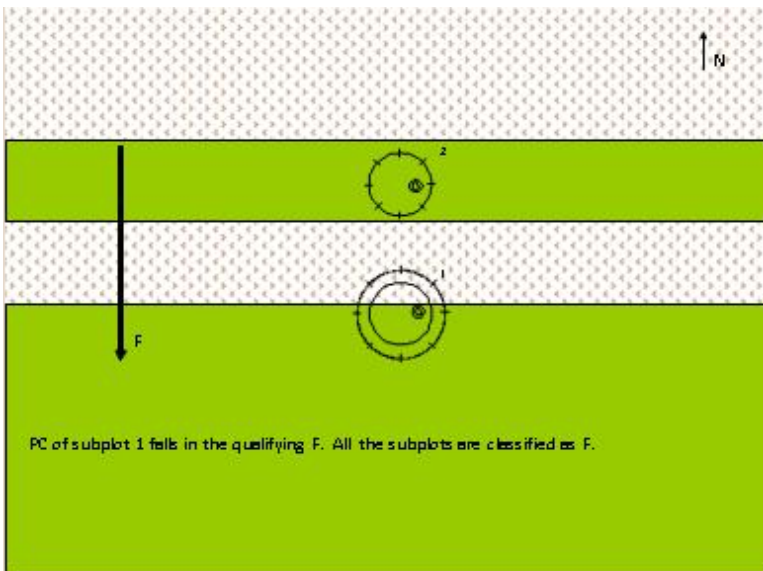


Figure 57N-WisCFI. PC of subplot 1 falls in the qualifying F.

Example 4

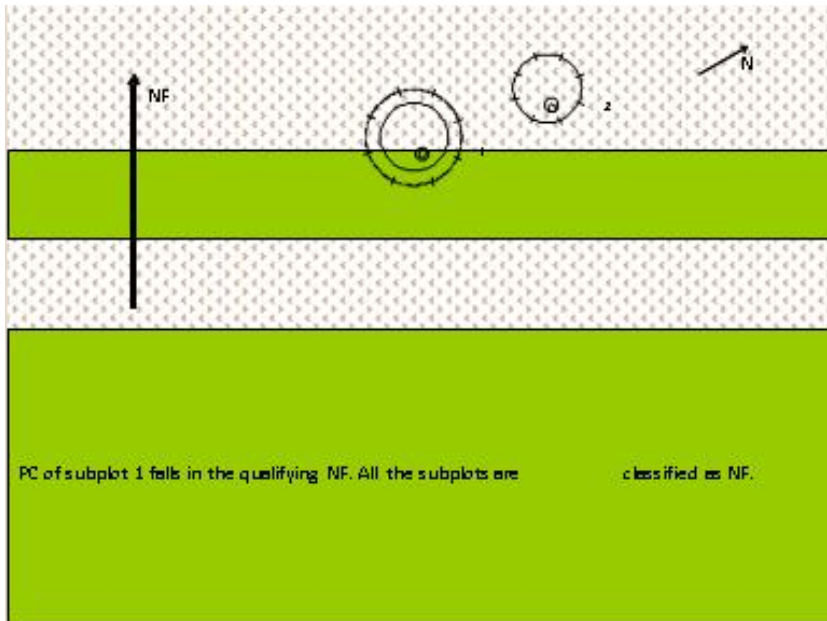


Figure 58N-WisCFI. PC of subplot falls in the qualifying NF.

C.12+WisCFI “SWITCHBACK” RULE – Figure 8, Section 2.4

The following illustrations show examples of how to apply the “switchback” rule from Section 2.4, Figure 8 in NRS. Switchbacks are not common in the northern region, but other situations that resemble switchbacks can be found like crisscrossing roads or oxbows formed by waterways that exist in large tracts of forest. The “switchback” rule, if properly applied, reduces forest fragmentation caused by R.O.W., other “developed” conditions, and noncensus linear water features that are less than 120.0 feet wide that exist within accessible forest land.

The key to understanding the “switchback” rule is that the questionable subplot **MUST BE** within a parcel of forest that qualifies as accessible forest land and there must be one opposing parcel on the opposite side of the nonforest strip that also qualifies as accessible forest land.

Note: If there ever is any doubt as to whether or not a parcel qualifies as forest land, it is better to err on the side of forest land and contact your supervisor to discuss the unique plot situation.

In this illustration the plot falls in a parcel of forest represented by sub-parcels Q1 through Q4. Each sub-parcel meets the minimum specifications for accessible forest land that is 120.0 ft wide and at least 1 acre. Applying the “switchback” rule, subplot 1 can be classified as accessible forest land. Note that “120.0 feet and less than 90 degree” rule (see Section 2.2, Figure 5) does not apply to subplot 1 since the sub-parcels Q2, Q3 and Q4 are accessible forestland.

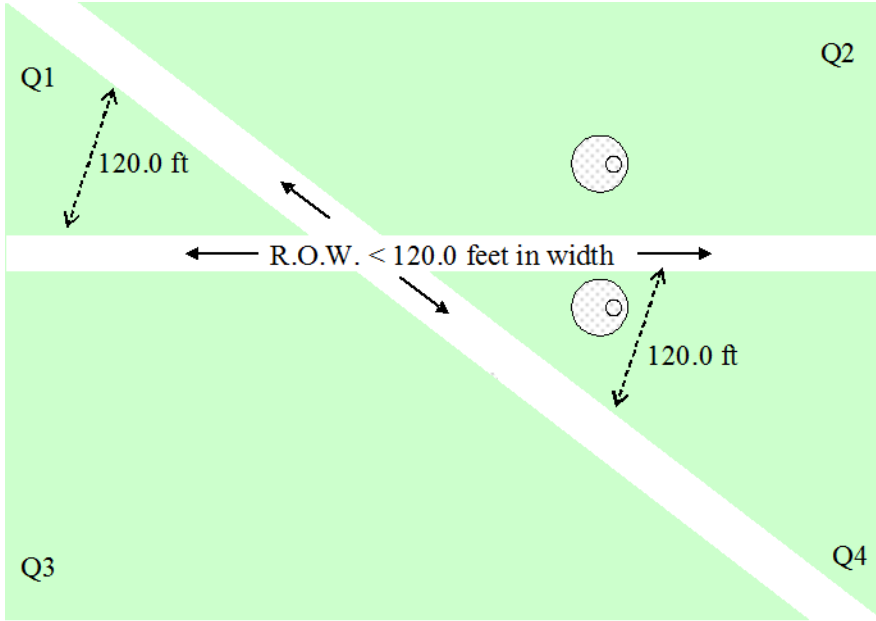


Figure 59N-WisCF. Plot falls in a parcel of forest. Each sub-parcel meets the minimum specifications for accessible forest land. Subplot 1 classified as accessible forest land.

In this next illustration the plot falls in a parcel of forest represented by sub-parcels Q1, Q3 and Q4. Q2 is nonforest. Sub-parcels Q1, Q3 and Q4 meet the minimum specifications for accessible forest land. Sub-parcel Q2 qualifies as nonforest land. Applying the “switchback” rule, subplot 1 can still be classified as accessible forest land. Note that “120.0 feet and less than 90 degree” rule does not apply to subplot 1 since the sub-parcel Q3 and Q4 are accessible forestland. Subplot 2 is classified as nonforest.

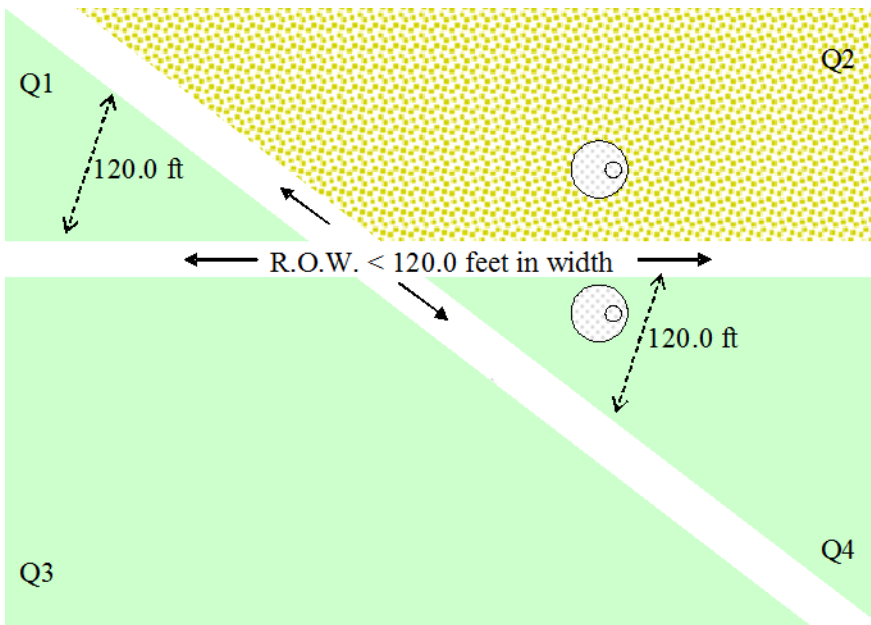


Figure 60N-WisCFI. Plot falls in a parcel of forest. One sub-parcel is nonforest. Subplot 2 classified as nonforest.

In this illustration the plot falls in a parcel of forest represented by sub-parcel Q1 and Q3. Q2 and Q4 are nonforest. Sub-parcels Q1 and Q3 meet the minimum specifications for accessible forest land. Sub-parcel Q2 and Q4 qualifies as nonforest land. Subplots classified as nonforest.

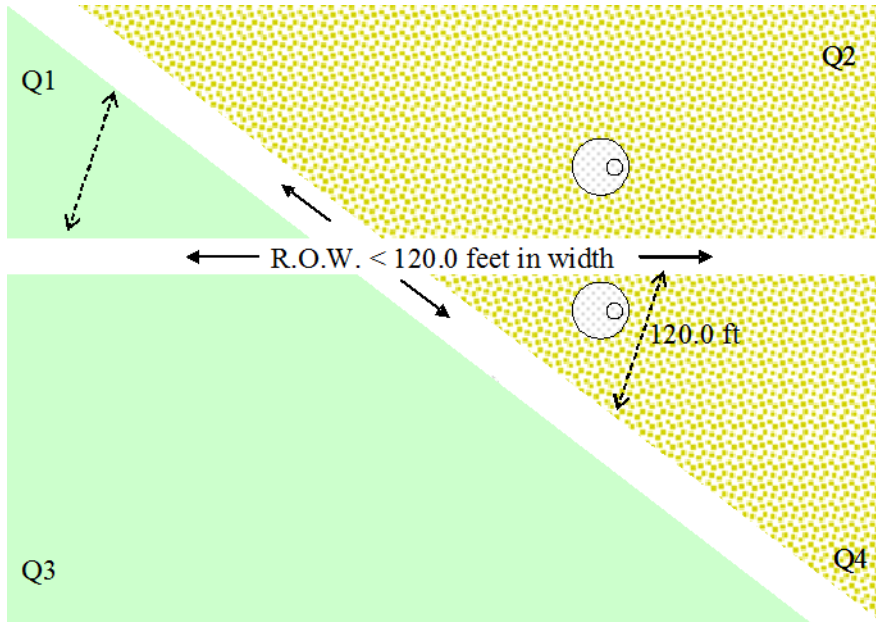


Figure 61N-WisCFI. Plot falls in a parcel of forest. Two sub-parcels are nonforest. Subplot 1 classified as nonforest.

In this final illustration the plot falls in a parcel of forest represented by sub-parcel Q1 and Q4. Q2 and Q3 are nonforest. Sub-parcels Q1 and Q4 meet the minimum specifications for accessible forest land. Note that "120.0 feet and less than 90 degree" rule now applies to subplot 1 since the sub-parcel Q2 and Q3 are nonforest. Subplots classified as nonforest.

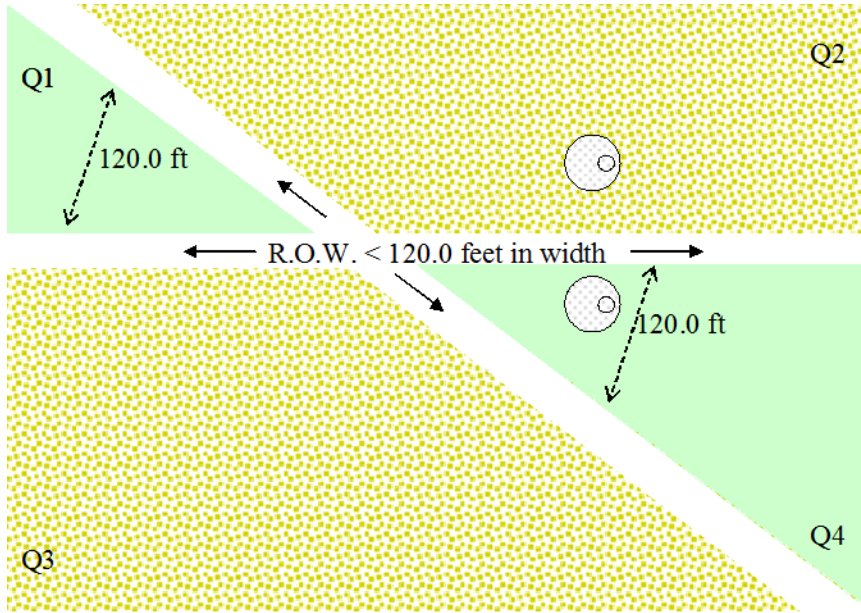


Figure 62N-WisCF. Plot falls in a parcel of forest. Two sub-parcels are nonforest. Sub-parcels Q1 and Q4 meet the minimum specifications for accessible forest land. Subplot 1 classified as nonforest.

REGIONAL APPENDIX E. TABLES AND CHARTS

This appendix includes tree grading tables, hardwood tree grade defects, cull estimation tables, and other aids for data collection.

HARDWOOD TREE GRADES			
GRADING FACTORS	GRADE 1	GRADE 2	GRADE 3
Length of grading zone (ft)	Butt 16	Butt 16	Butt 16
Length of grading section ^a (ft)	Best 12	Best 12	Best 12
Minimum DBH (in)	16 ^b	13	11
Minimum DIB at the top of the grading section (in)	13 ^b 16 20	11 ^c 12	8
Clear cuttings on 3rd best face ^d			
minimum length (ft)	7 5 3	3 3	2
number on face (max)	2	2 3	unlimited
yield in face length (min)*	5/6	4/6	3/6
Cull deduction, including crook and sweep but excluding shake, maximum w/in grading section (%)	9	9 ^e	50

^a Whenever a 14- or 16-ft section of the butt log is better than the best 12-ft section, the grade of the longer section will become the grade of the tree. This longer section, when used, is the basis for determining the grading factors, such as diameter and cull deduction.

^b In basswood and ash, DIB at the top of the grading section may be 12-in and DBH may be 15-in.

^c Grade 2 trees can be 10-in DIB at the top of the grading section if otherwise meeting surface requirements for small grade 1's.

^d A clear cutting is a portion of a face free of defects, extending the width of the face. A face is one-fourth of the surface of the grading section as divided lengthwise.

^e 15% crook and sweep, or 40% total cull deduction are permitted in grade 1 if size and surface of grading section qualify as grade 1. If rot shortens the required clear cuttings to the extent of dropping the butt log to grade 2, do not drop the tree's grade to 3 unless the cull deduction for rot is greater than 40%.

*Minimum Yield in Face Length			
Face Length	Grade 1 Min. Yield	Grade 2 Min. Yield	Grade 3 Min. Yield
12-ft	10-ft	8-ft	6-ft
14-ft	11.7-ft	9.3-ft	7-ft
16-ft	13.3-ft	10.7-ft	8-ft

Source: U.S.D.A. Forest Service Research Paper NE-333, 1976.

Hardwoods – Use the specifications for Hardwood Tree Grades (1, 2 or 3) or the Tie and Timber Grade (4) for all hardwood trees. Growing Stock trees that do not have a merchantable grade in the butt 16 but do have a 12 foot or two 8 foot gradable sections somewhere in the tree will be assigned grade 5. Note: When determining the grade of upper logs, 8-foot saw logs need to meet all the minimum grading factors except for length for hardwood tree grades 3 or 4.

LOG SURFACE ABNORMALITIES THAT ARE HARDWOOD TREE GRADING DEFECTS

Bark distortions – Many log surface abnormalities appear to be only breaks in the normal bark pattern. Overgrown knots, mechanical wounds, holes of all types, ingrown bark, and bird peck are

typical defects under bark distortions which can be definitely established from bark appearance. They are all grading defects. A slight bark distortion consisting of a simple horizontal break across the normal bark patten is not a grading defect. Beech Scale is not considered a defect for grading.

Bulge – A general enlargement of a section of the log and a sign of internal rot.

Bump – Bumps usually indicate overgrown knots or other defects. Surface swells (less than 1" rise in 12" of length) can be disregarded as a grading defect.

Burls – A sound, hard, woody protuberance on the log with no protruding limbs, etc.

Butt scar – Damage at the base of the tree. Scars of recent origin are usually associated with a limited amount of rotten or stained wood. Severe rot is usually associated with older scars. If the scar extends into the log beyond the slab section, the area involved is a grading defect.

Bird peck – There must be four bird pecks within a square foot to affect the tree grade and be considered a defect. First, determine the tree grade without the bird pecks. If the tree grade is determined to be 1 or 2, then down grade the tree by one grade. If the tree graded out to be a 3 or 4 without the bird pecks, then ignore them as defects and record the initial tree grade.

Canker – A definite, relatively localized lesion, primarily of bark and wood. Cankers that don't meet the 50% threshold to be a stopper are considered defects.

Conk – It is the fruiting body of a wood rotting fungus located on the bole of the tree and is an indication of serious internal rot. The only conks that are considered defects are *Phellinus* associated with aspen. All other conks are considered stoppers, regardless of size.

Epicormic branches and dormant bud clusters – Epicormic branches are found at point on the stem. Dormant bud clusters may develop on the stem any time during the life of a tree.

Holes – All holes are grading defects.

Knots – Cut or broken-off limbs or sprout branches, green or dead, protruding, flush or depressed but with exposed sound or rotten wood.

Rot – Wood which has decayed to the point where it is useless. Coded only if visible.

Seams – Seams are cracks or splits running with the grain for part of or full length of the log. They are generally caused by wind or lightning and extend from the bark to the center of the log. They may be open or completely healed. They are very damaging and especially so when they run spirally around the log.

- No clear cuttings can be taken on a log face that includes a full-length straight seam or a spiral seam. However, one straight seam can be placed on the edge of one face and ignored. This fixes the location of all other defects.
- A deep seam entering a face but not running full length may be overlaid with a clear cutting for one-third of its length, starting at the inner end. Note: This is difficult to determine on a standing tree. See Figure 63N.
- When a deep seam is entirely within a log, clear cuttings can be laid over from each end for a distance equal to one-fourth its full length. Note: This is difficult to determine on a standing tree. See Figure 64N.

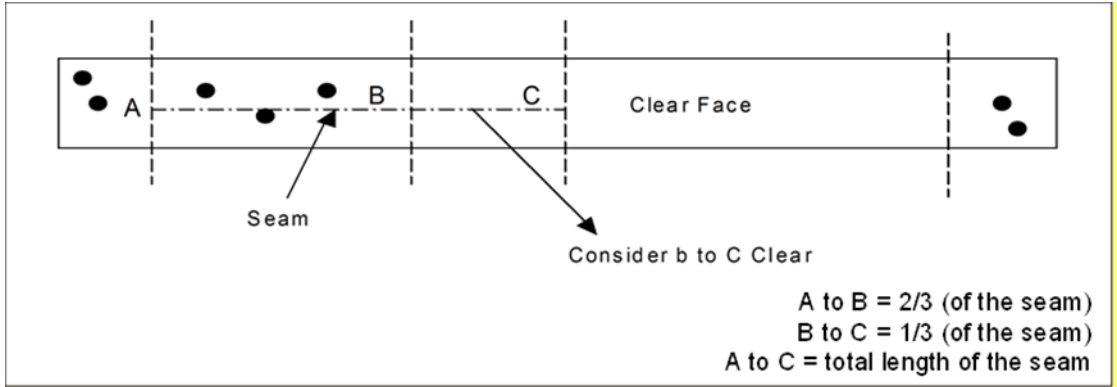


Figure 63N. The 1/3 rule.

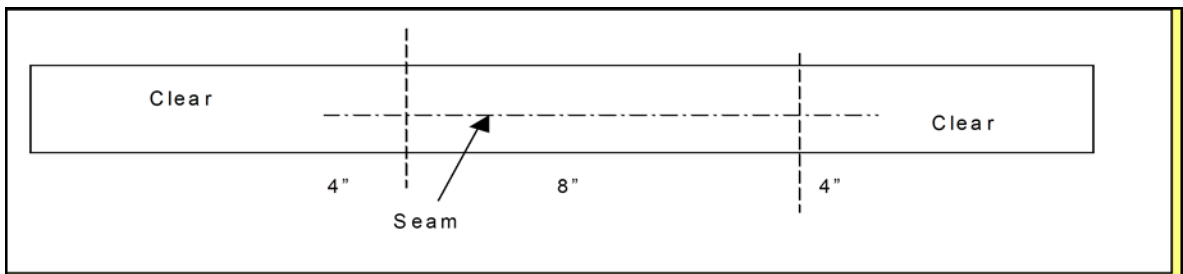


Figure 64N. The 1/4 Rule.

Wounds – Wounds or injuries that expose sapwood and/or heartwood are defects. The following are a few guidelines for wounds:

- Old wounds are commonly associated with stain, decay, and/or insects and the affected area becomes a defect.
- New “fresh” wounds (less than 1 year old) are disregarded as long as deterioration is not visible.
- If new or old wounds look superficial, disregard them.

Source: Official Grading Rules for Northern Hardwood and Softwood Logs and Tie Cuts (Effective Sept. 1, 1998).

HARDWOOD CONSTRUCTION GRADE 4	
GRADING FACTORS	SPECIFICATIONS
Position in tree	Butts and uppers
Scaling diameter (in)	8-in DIB and larger
Length, w/o trim (ft)	12-ft and longer
Clear cuttings	No requirements (not graded on cutting basis)
Maximum sweep allowance	One-fourth DIB of small end for half logs, and one-half DIB for logs 16-ft long
Sound surface defects -	
Single knots	Any number, if none has an average collar ^a diameter that is more than one-third of the log diameter at the point of occurrence.
Whorled knots	Any number, provided the sum of the collar diameters does not exceed one-third the log diameter at the point of occurrence.
Holes	Any number not exceeding knot specifications, if they do not extend more than 3-in into the contained tie or timber.
Unsound surface defects ^b	Any number and size, if they do not extend into contained tie or timber. If they extend into contained tie or timber, they shall not exceed size, number, and depth of limits for sound defects.

^a Knot collar is the average of the vertical and horizontal diameters of the limb, or knot swelling, as measured at the point where they would be trimmed from the main stem.

^b Interior defects are not visible in standing trees. They are considered in grading cut logs. No interior defects are permitted except one shake not more than one-third the width of the contained tie or timber, and one split not more than 5-in long.

Note: The hi-lighted text indicates NRS modification from the original hardwood construction log grade (U.S.D.A. Forest Service General Technical Report NE-1, 1973).

Hardwoods – Use the specifications for Hardwood Tree Grades (1, 2 or 3) or the Tie and Timber Grade (4) for all hardwood trees. Growing Stock trees that meet the definition of growing stock without a merchantable grade in the butt 16 but with a 12 foot or two 8 foot gradable sections somewhere in the tree will be assigned grade 5. Note: When determining the grade of upper logs, 8-foot or longer saw logs need to meet all the minimum grading factors except for length for hardwood tree grades 3 or 4.

The presence of a crack or seam \geq to 1 foot of continuous length is considered an indication that the grading section does not contain the structural soundness required for construction grade 4 logs. Consider single or numerous cracks or seams $<$ 1 foot as sound, regardless of their proximity to each other (as long as they do not contain visible signs of advanced decay). Callus tissue from open wounds is not considered cracks or seams.

For grade 4, there will be no minimum size requirement for individual knots. Whorled knots will be the sum of all overlapping knots present at any given cross section. If the sum of all knots, in a cross section, exceeds 1/3 the diameter of the log at that point, it will not meet requirements for Hardwood construction grade 4. The diameter of each knot is measured above the callus.

EASTERN WHITE PINE TREE GRADES				
GRADING FACTORS	GRADE 1	GRADE 2	GRADE 3	GRADE 4
Minimum DBH (in)	9	9	9	9
Length of grading zone (ft)	Butt 16	Butt 16	Butt 16	Butt 16
Length of grading section (ft)	Best 12	Best 12	Best 12	Best 12
Maximum w eevil injury in butt 16 ft (number)	None	None	2 Injuries	No limit
Minimum face requirements on grading section	Two full length or four 8-ft 50% length good faces ¹ . (In addition, knots on balance of faces shall not exceed size limitations for Grade 2 sections.)	NO GOOD FACES REQUIRED. Maximum diameter of knots on 3 best faces: SOUND RED KNOTS not to exceed 1/6 of scaling diameter or 3-in maximum ² . DEAD OR BLACK KNOTS , including overgrown knots, not to exceed 1/12 scaling diameter and 1-1/2-in maximum.	NO GOOD FACES REQUIRED. Maximum diameter of knots on 3 best faces: SOUND RED KNOTS not to exceed 1/3 of scaling diameter of 5-in maximum ² . DEAD OR BLACK KNOTS , including overgrown knots, not to exceed 1/6 scaling diameter and 2-1/2-in maximum.	Includes all trees not qualifying for Grade 3 or better and judged to have at least 1/3 of their gross volume in sound wood suitable for manufacture into standard lumber.
Maximum sweep or crook in grading section (%)	20	30	40	No limit
Maximum total scaling deduction in grading section (%)	50	50	50	No limit

After the tentative grade of the section is established from face examination, the section will be **reduced one grade** whenever the following defects are evident³:

CONKS, PUNK KNOTS AND PINE BORER DAMAGE ON THE SURFACE OF THE SECTION

Degrade one grade if present on one face.
Degrade two grades if present on two faces.
Degrade three grades if present on three to four faces.

If the final grade of the grading section is 1, 2 or 3, examine the tree for w eevil injuries in the merchantable stem **above** 16-ft. If the total apparent w eevil damage exceeds 3, degrade the tree grade one below the section grade³. Otherwise the tree grade is the same as the final section grade.

¹ Trees under 16-in DBH require four 8-ft full length good faces. Good face – One that is free of knots of any type larger than ½ inch in diameter, overgrowths indicating larger knots, and conks or punk knots.

² Scaling diameter is estimated at the top of the grading section.

³ No tree will be designated below Grade 4 unless net tree scale is less than one-third of gross tree scale.

Note: The hi-lighted text indicates NRS modification from the original EWP Tree Grade Table (U.S.D.A. Forest Service Research Paper NE-214, 1971).

NRS does not allow conks in a grading section (as they are stoppers).

Eastern white pine – Use the Eastern White Pine Tree Grades (1, 2, 3 or 4) for eastern white pine only. Growing Stock trees that do not have a merchantable grade in the butt 16 but do have a 12 foot or two 8 foot gradable sections somewhere in the tree will be assigned grade 5. Note: When determining the grade of upper logs, 8-foot saw logs need to meet all the minimum grading factors except for length for white pine tree grade 4.

WHITE PINE COLLAR DIAMETER LIMITS FOR WHITE PINE TREE GRADING

WHITE PINE COLLAR DIAMETER LIMITS FOR RED AND BLACK KNOTS				
SCALING DIAMETER (D.I.B. inches)	GRADE 1 AND 2		GRADE 3	
	BLACK KNOTS 1/12 th	RED KNOTS 1/6 th	BLACK KNOTS 1/6 th	RED KNOTS 1/3 rd
7	7/12"	1 - 1/6"	1 - 1/6"	2 - 1/3"
8	2/3"	1 - 1/3"	1 - 1/3"	2 - 2/3"
9	3/4"	1 - 1/2"	1 - 1/2"	3"
10	5/6"	1 - 2/3"	1 - 2/3"	3 - 1/3"
11	11/12"	1 - 5/6"	1 - 5/6"	3 - 2/3"
12	1"	2"	2"	4"
13	1 - 1/12"	2 - 1/6"	2 - 1/6"	4 - 1/3"
14	1 - 1/6"	2 - 1/3"	2 - 1/3"	4 - 2/3"
15	1 - 1/4"	2 - 1/2"	2 - 1/2" MAX	5" MAX
16	1 - 1/3"	2 - 2/3"		
17	1 - 5/12"	2 - 5/6"		
18	1 - 1/2" MAX	3 MAX"		

Red knots – Visible branches, stubs or sockets that are from living branches or branches that have recently died. They are inter-grown with the surrounding wood and contain no rot.

Dead or black knots – Visible branches, stubs or sockets that do not conform to the definition of red knots.

Overgrown knots – Identified by a distinctive circular/elliptical pattern in the bark and are treated the same as dead knots.

Average diameter of red and black knots on white pine – Measured at the point where the limb would normally be trimmed from the main stem. For red knots measure only the heartwood portion of the knot. For black knots measure the whole limb.

PINE TREE GRADES (All pines except White Pine.)			
FACE LENGTH	GRADE 1	GRADE 2	GRADE 3
Best 12 or longer within the butt 16 ft grading section	3 or 4 clear faces	1 or 2 clear faces	No clear faces

After the tentative grade is established, the tree will be **reduced one grade** for each of the following:

Sweep - Degrade any tentative Grade 1 or 2 tree one grade if sweep in the lower 12-ft of the grading section amounts to 3 or more inches and equals or exceeds one-fourth the DBH.

Heart rot - Degrade any tentative Grade 1 or 2 tree one grade if conks, punk knots, or other evidence of advanced heart rot is found anywhere on the tree stem.

Note - No tree can be degraded below Grade 3, provided the total scaling deductions for sweep and/or rot do not exceed two-thirds the gross scale of the tree. Trees with total scaling deductions in excess of two-thirds are classified as cull.

A face is one-fourth the circumference of the grading section and extends the full length of the grading section. Clear faces are those free from knots measuring more than 1/2-in in diameter, overgrown knots of any size, and holes more than 1/4-in in diameter. Faces may be rotated, if necessary, to obtain the maximum number of clear faces on the grading section.

Note: The hi-lighted text indicates NRS modification from the original Southern Pine Tree Grades (U.S.D.A. Forest Service Research Paper SE-40, 1968).

Other pines – Use the Pine Tree Grades (1, 2 or 3) for all pines except eastern white pine. There is no grade 4 for the Pine Tree Grades. Growing Stock trees that do not have a merchantable grade in the butt 16 but do have a 12 foot or two 8 foot gradable sections somewhere in the tree will be assigned grade 5. Note: When determining the grade of upper logs, 8-foot saw logs need to meet all the minimum grading factors except for length for pine tree grade 3.

OTHER SOFTWOODS					
Minimum Merchantability Specifications for Grade 1					
Grade the best 12 ft within the 1st 16 ft.¹					
Grade	DIB at the top of the grading section	Length (2-ft multiples w/o trim)	Total Deduction	Sweep Permitted	Other Requirements*
1	6" - 12"	12' - 16'	50%	25%	Sound knots not over 2" in diameter are permitted.
	13" +	12' - 16'	50%	25%	Sound knots not over 3" in diameter are permitted.
¹ When ever a 14-ft or 16-ft section of the butt log is better than the best 12-ft section, the grade of the longer section will become the grade of the tree. This longer section, when used, is the basis for determining the grading factors, such as DIB and sweep.					
* One branch or sound knot that exceeds the diameter limitations is permitted to meet Grade 1 specifications. This is a Northern allowance. Sound knots are measured at the point where the limb would normally be trimmed from the main stem.					

Note: The hi-lighted text indicates NRS modification from the original specifications from the Northeast Field Guide, Version 3.0. The above specifications are based on a log grade. Tree grades have never been developed for these other softwood species that include spruce, fir, hemlock, larch (tamarack), cypress and cedar.

Other softwoods – Use the Other Softwoods Tree Grade (1) for spruce, fir, hemlock, larch (tamarack), cedar and cypress. Growing Stock trees that do not have a merchantable grade in the butt 16 but do have a 12 foot or two 8 foot gradable sections somewhere in the tree will be assigned grade 5. Note: When determining the grade of upper logs, 8-foot saw logs need to meet all the minimum grading factors except for length for other softwood grade 1.

The following table is applied to determine the percent of hardwood board-foot cull within the sawlog length (or potential sawlog for a poletimber-size tree) that starts from a 1 foot stump to 9-in top DOB. These tables can be used to determine “sector” cull of a 4-ft section. Any 4-ft section can be reduced by quarters, thirds or one-half. E.g., a 32 ft hardwood sawlog has a fork within the 6th section. The fork accounts for one-half of the volume for that section, and therefore represents 6% board-foot cull.

PERCENT OF BOARD-FOOT CULL OF HARDWOOD SAWTIMBER
[BY 4-FT SECTIONS & LOCATION IN THE TREE]

LOG (FT)	1ST	2ND	3RD	4TH	5TH	6TH	7TH	8TH	9TH	10TH	11TH	12TH	13TH	14TH	15TH	16TH
1 (16)	29	26	24	21												
1-1/2 (24)	19	18	16	16	16	15										
2 (32)	15	14	13	13	12	12	11	10								
2-1/2 (40)	12	12	11	11	10	10	9	9	8	8						
3 (48)	12	10	10	9	9	9	8	7	7	7	6	5				
3-1/2 (56)	10	10	9	9	9	8	8	7	7	6	5	5	4	3		
4 (64)	9	9	9	8	8	7	7	7	6	6	5	5	4	4	3	3

The following table is applied to determine the percent of softwood board-foot cull within the sawlog length (or potential sawlog for a poletimber-size tree) that starts from a 1 foot stump to 7-in top DOB. These tables can be used to determine “sector” cull of a 4-ft section. Any 4-ft section can be reduced by quarters, thirds or one-half. E.g., a 32 ft softwood sawlog has a fork within the 6th section. The fork accounts for one-half of the volume for that section, and therefore represents 5% board-foot cull.

PERCENT OF BOARD-FOOT CULL OF SOFTWOOD SAWTIMBER
[BY 4-FT SECTIONS & LOCATION IN THE TREE]

LOG (FT)	1ST	2ND	3RD	4TH	5TH	6TH	7TH	8TH	9TH	10TH	11TH	12TH	13TH	14TH	15TH	16TH
1 (16)	33	27	21	19												
1-1/2 (24)	26	20	16	15	12	11										
2 (32)	21	17	14	12	10	9	9	8								
2-1/2 (40)	19	15	12	10	9	8	7	7	7	6						
3 (48)	16	13	11	10	8	7	7	6	6	6	5	5				
3-1/2 (56)	13	12	10	9	7	7	6	6	6	5	5	5	5	4		
4 (64)	10	9	9	8	7	7	6	6	6	5	5	5	5	4	4	4

The following table is applied to determine the percent of cubic-foot cull within the bole length that starts at a 1 foot stump to a 4-in top DOB for all species. These tables can be used to determine “sector” cull of a 4-ft section. Any 4-ft section can be reduced by quarters, thirds, or one-half. E.g., a 32 ft bole length has a fork within the 6th section. The fork accounts for one-half of the volume for that section, and therefore represents 4% cubic-foot cull.

PERCENT OF CUBIC-FOOT CULL VOLUME FOR ALL TREES
[BY 4-FT SECTIONS & LOCATION IN THE TREE]

FEET	1ST	2ND	3RD	4TH	5TH	6TH	7TH	8TH	9TH	10TH	11TH	12TH	13TH	14TH	15TH	16TH	17TH	18TH
LENGTH	8	57	43															
	12	42	32	26														
	16	30	26	23	21													
	20	26	23	21	19	11												
	24	24	21	18	17	10	10											
	28	21	19	17	16	10	9	8										
	32	20	18	16	14	10	8	7	7									
	36	19	16	14	13	9	8	8	7	6								
	40	17	15	13	12	9	8	7	7	6	6							
	44	16	14	12	11	9	7	7	7	6	6	5						
	48	15	13	12	10	8	7	7	6	6	6	5	5					
	52	14	12	11	9	8	7	6	6	6	6	5	5	5				
	56	13	11	10	9	8	6	6	6	6	6	5	5	5	4			
	60	12	11	10	9	7	6	6	6	6	5	5	5	5	4	4		
	64	11	10	9	9	7	6	6	6	5	5	5	5	5	4	4	4	
	68	10	10	9	8	6	6	6	5	5	5	5	5	4	4	4	4	4
	72	10	9	8	8	6	6	6	5	5	5	4	4	4	4	4	4	4

METHODS OF DETERMINING SCALING DEDUCTION (Examples based on an 8-foot log with 20-inch scaling diameter)	
<p>If <u>section</u> of bole is affected, deduct percent of log length affected.</p> <p>Example: $\frac{2}{8} = 25$ percent cull</p>	
<p>If <u>sector</u> is affected, multiply percent of circle times percent of length.</p> <p>Example: $\frac{60^\circ}{360^\circ} \times \frac{3}{8} = 6\%$ cull</p>	
<p>For a <u>crook</u>, multiply proportion of diameter displaced times proportion of log length affected by crook.*</p> <p>Example: $\frac{10}{20} \times \frac{2}{8} = 12\%$ b.f. cull</p>	
<p>For a <u>sweep</u>, determine sweep departure and subtract 1" for 8' logs or 2" for 16' logs. Divide by log diameter.</p> <p>Example: $\frac{8-1}{20} = 35\%$ b.f. cull**</p>	
<p>For <u>interior cull</u>, square out interior cull as a percent of total volume of the section. For bd. ft. cull, add 1" to width and to thickness; for cu. ft. cull, use actual dimensions of rot. For bd. ft. cull divide width and thickness by the scaling diameter (ave. d.i.b., small end) minus 1; for cu. ft. cull, divide by scaling diameter. Multiply fractions by percent of log affected.</p> <p>Example: $\frac{8 \times 10}{(20-1)^2} \times \frac{2}{8} = 6\%$ cubic-foot cull</p>	

* No reduction of cubic-foot volume will be made.

** If a straight line between A and B falls outside the bark, the affected section is over 50% cull in board feet.

Excessive Crook – Project a line along the complete length of the potential log that would represent a straight pith regardless of the crook deflection. If the projected line no longer remains within the cylinder of the potential log (include bark as part of the cylinder), the log is considered to have excessive crook. If the tree is pole sized, project what the crook deflection will be once the tree reaches sawlog size.

Excessive Sweep – Project a line from the pith at the bottom of the potential log to the pith at the top of the potential log regardless of the sweep deflection. If the projected line no longer remains within the cylinder of the potential log (include bark as part of the cylinder), the log is considered to have excessive sweep. If the tree is pole sized, project what the sweep deflection will be once the tree reaches sawlog size.

In the table below, excessive sweep is indicated by the “boxed” values or where values are blank. The values in this table are actual board-feet and not a percentage. Blank spaces indicate that excessive sweep culls the entire section. Boxed numbers are considered sound for softwoods, but cull for hardwoods.

SWEEP DEDUCTION IN BOARD FEET

Sweep departure length (inches)	Sweep length (feet)	Scaling diameter of section with sweep (inches)													
		6	7	8	9	10	12	14	16	18	20	22	24	26	28
2	6	1	1	2	2	3	3	4	5	6	6	7	8	9	9
	8	1	1	2	2	3	4	5	6	7	8	8	9	10	
	10	1	1	2	2	3	4	5	6	7	7	8	9	10	
	12	1	1	2	2	3	4	5	6	6	7	8	9	10	
	14	1	1	1	1	1	2	2	2	3	3	3	4	4	5
3	6	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8	2	3	3	4	5	6	7	9	10	11	13	14	15	17
	10	2	4	5	6	6	8	10	12	13	15	17	19	20	22
	12	3	4	5	6	7	9	11	12	14	16	18	19	21	23
	14	3	4	5	6	7	9	10	12	14	16	17	19	21	23
4	6	3	4	5	6	6	8	10	11	13	14	16	18	19	21
	8	4	5	6	7	9	11	14	16	18	21	23	25	28	30
	10	5	6	8	9	10	13	16	19	21	24	27	29	32	35
	12	5	7	8	10	12	14	18	20	23	26	29	32	35	38
	14	6	8	9	11	12	16	19	22	25	28	31	35	38	41
5	6	6	8	10	11	13	16	19	23	26	29	32	35	39	42
	8	5	7	8	10	12	15	18	21	24	27	31	34	37	40
	10	6	8	10	12	15	18	21	25	29	33	36	40	44	48
	12	8	10	12	12	16	20	25	29	33	37	41	45	50	54
	14	9	11	13	16	18	22	27	32	36	41	45	50	54	59
6	6	10	12	15	17	20	24	29	34	39	44	48	53	58	63
	8	8	9	11	14	17	20	24	27	30	33	36	39	42	46
	10	10	13	15	18	23	27	32	36	41	46	51	56	60	
	12	12	15	18	21	26	32	37	42	48	53	58	64	69	
	14	11	15	18	20	23	29	36	41	47	53	59	65	71	77
7	6	13	16	20	23	26	32	39	45	52	58	64	71	77	83
	8	11	13	16	18	21	26	32	37	42	48	53	58	64	69
	10	15	17	22	27	31	36	41	46	51	56	62	67	73	
	12	19	21	27	33	39	44	50	56	62	67	73	78	84	
	14	22	25	32	39	45	52	58	65	71	78	84	88	95	
8	6	24	28	33	40	49	57	64	72	80	88	96	104		
	8	11	13	16	21	24	28	32	36	39	43	47			
	10	15	17	22	27	31	36	41	46	51	56	60			
	12	19	21	27	33	39	44	50	56	62	67	73			
	14	22	25	32	39	45	52	58	65	71	78	84			
9	6	25	29	36	44	51	58	66	73	81	88	95			
	8	25	29	36	44	51	58	66	73	81	88	95			
	10	30	37	46	53	61	69	76	84	92	100				
	12	34	43	52	61	69	78	87	96	105	113				
	14	34	39	48	58	68	77	87	97	106	116				
9	6	19	24	28	33	37	42	48	54	59	65	70			
	8	25	31	37	42	48	54	59	66	72	79	86			
	10	25	32	39	46	53	61	69	76	84	92	100			
	12	30	37	46	53	61	69	76	84	92	100				
	14	34	43	52	61	69	78	87	96	105	113				
9	6	34	39	48	58	68	77	87	97	106	116				
	8	27	32	37	42	48	54	59	65	71	77				
	10	29	36	42	48	55	61	68	74	80					
	12	37	44	52	60	67	75	83	91	99					
	14	43	52	61	70	80	88	97	106	115					
9	6	50	61	71	81	91	101	111	121	131					
	8	57	68	79	90	102	113	124	135	146					
	10	57	68	79	90	102	113	124	135	146					
	12	57	68	79	90	102	113	124	135	146					
	14	57	68	79	90	102	113	124	135	146					

In the table below, excessive crook is indicated by the “boxed” values or where values are blank. The values in this table are actual board-feet and not a percentage. Blank spaces indicate that crook has exceeded the allowed maximum value. Boxed numbers are considered sound for softwoods, but cull for hardwoods.

CROOK DEDUCTION IN BOARD FEET

Crook departure length (inches)	Crook length (feet)	Scaling diameter of section with crook (inches)													
		6	7	8	9	10	12	14	16	18	20	22	24	26	28
1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	2	0	0	0	1	1	1	1	1	1	2	2	2	2	2
	3	1	1	1	1	1	1	2	2	2	2	3	3	3	4
	4	1	1	1	1	1	2	2	3	3	3	4	4	4	5
	5	1	1	1	1	2	2	3	3	4	4	5	5	6	6
	6	1	1	2	2	2	3	3	4	5	5	6	6	7	8
2	1	0	0	0	1	1	1	1	1	1	2	2	2	2	3
	2	1	1	1	1	1	2	2	3	3	4	4	4	4	5
	3	1	1	2	2	2	3	3	4	4	5	6	6	7	7
	4	1	1	2	2	3	3	4	5	6	7	8	8	9	10
	5	1	2	2	3	3	4	5	6	8	8	10	10	11	13
	6	2	2	3	4	4	5	7	8	9	10	12	13	14	15
3	1	0	0	1	1	1	1	2	2	2	3	3	3	3	4
	2	1	1	2	2	2	2	3	4	4	5	6	6	7	7
	3	1	2	2	3	3	4	5	6	7	8	9	9	10	11
	4	2	2	3	3	4	5	6	8	9	10	11	12	13	15
	5	2	3	4	4	5	6	8	10	11	13	14	16	17	19
	6	2	3	4	5	6	8	10	12	14	15	17	19	20	23
4	1	1	1	1	1	2	2	2	3	3	4	4	4	4	5
	2	1	2	2	3	3	4	5	6	7	8	8	9	10	10
	3	1	2	3	4	4	5	7	8	9	10	11	12	13	15
	4	2	3	4	4	5	7	9	10	12	13	15	17	18	20
	5	3	3	5	6	7	9	11	13	15	17	19	21	22	25
	6	3	5	6	7	8	11	13	15	18	20	23	25	27	30
5	1		1	2	2	2	3	3	4	4	5	5	6	6	6
	2		2	3	4	4	5	6	7	8	9	10	11	12	12
	3		4	4	5	7	8	10	11	12	14	16	17	19	19
	4		5	6	6	9	11	13	15	17	19	21	22	25	25
	5		6	7	8	11	13	16	19	21	24	26	28	31	31
	6		8	9	10	13	16	19	23	26	29	32	34	38	38
6	1			2	2	2	3	4	4	5	6	6	7	8	8
	2			3	4	5	6	7	9	10	11	13	13	15	15
	3			5	6	8	10	12	13	15	17	19	20	22	22
	4			7	8	10	13	15	18	20	23	25	27	30	30
	5			9	10	13	16	19	23	25	29	32	34	38	38
	6			11	13	16	20	23	27	31	34	38	41	45	45
8	1					3	5	5	6	7	8	8	9	10	10
	2					7	9	10	12	13	15	17	18	20	20
	3					10	13	16	18	20	23	25	27	30	30
	4					14	17	20	24	27	30	33	36	40	40
	5					17	22	26	30	34	38	42	45	50	50
	6					21	26	31	36	41	46	51	54	60	60
10	1							6	7	8	10	10	11	12	12
	2							12	14	16	19	21	23	25	25
	3							19	22	25	28	31	34	37	37
	4							26	29	34	37	41	45	49	49
	5							32	37	42	47	52	57	62	62
	6							39	45	51	57	63	69	75	75

GROSENBAUGH'S RULE 3 & 4 FOR SWEEP AND CROOK DEDUCTION

In determining sweep the number subtracted from actual sweep depends on the log length as follow: 8 thru 10 ft is -1 in, 11 thru 13 ft is -1 ½ in, and 14 thru 16 ft is -2 in.

Rule 3 from Grosenbaugh	Rule 4 from Grosenbaugh
% Sweep = (total sweep – 2 [16' log]) / DIB	% Crook = (deflection / DIB) x (length of crook / log length)
% Sweep = (total sweep – 1 [8' log]) / DIB	

The following table allows for quick assessment of whether a log is merchantable without using the formula. E.g., an 8 ft log with a scaling diameter of 12-in and 6-in departure has a 42% cull deduction due to sweep. If the departure for the same log is ≥ 9 -in, then the 8 ft log has $\geq 67\%$ cull deduction due to sweep and therefore the entire 8 ft log is not merchantable due to sweep and is culled.

Table 5.—Sweep deduction from gross scale by length and diameter (in percent; based on rule 3)

Absolute sweep in inches		Scaling diameter, average small end inside bark, in inches											
8-9-10 foot logs	14-15-16 foot logs	8	10	12	14	16	18	20	22	24	26	28	30
—	3	12	10	8	7	6	6	5	5	4	4	4	3
3	4	25	20	17	14	12	11	10	9	8	8	7	7
4	5	38	30	25	21	19	17	15	14	12	12	11	10
5	6	50	40	33	29	25	22	20	18	17	15	14	13
6	7	62	50	42	36	31	28	25	23	21	19	18	17
7	8	—	60	50	43	38	33	30	27	25	23	21	20
8	9	—	—	58	50	44	39	35	32	29	27	25	23
9	10	—	—	67	57	50	44	40	36	33	31	29	27
10	11	—	—	—	64	56	50	45	41	38	35	32	30
11	12	—	—	—	—	62	56	50	45	42	38	36	33
12	13	—	—	—	—	—	61	55	50	46	42	39	37
13	14	—	—	—	—	—	—	60	54	50	46	43	40
14	15	—	—	—	—	—	—	65	59	54	50	46	43
15	16	—	—	—	—	—	—	—	64	58	54	50	47
16	17	—	—	—	—	—	—	—	—	62	58	54	50
17	18	—	—	—	—	—	—	—	—	—	62	57	53
18	19	—	—	—	—	—	—	—	—	—	65	61	57
19	20	—	—	—	—	—	—	—	—	—	—	64	60
20	21	—	—	—	—	—	—	—	—	—	—	—	63
21	22	—	—	—	—	—	—	—	—	—	—	—	67
11-12-13 foot logs													
3		19	15	12	11	9	8	8	7	6	6	5	5
4		31	25	21	18	16	14	12	11	10	10	9	8
5		44	35	29	25	22	19	18	16	15	13	12	12
6		56	45	38	32	28	25	22	20	19	17	16	15
7		—	55	46	39	34	31	28	25	23	21	20	18
8		—	65	54	46	41	36	32	30	27	25	23	22
9		—	—	62	54	47	42	38	34	31	29	27	25
10		—	—	—	61	53	47	42	39	35	33	30	28
11		—	—	—	—	59	53	48	43	40	37	34	32
12		—	—	—	—	66	58	52	48	44	40	38	35
13		—	—	—	—	—	64	58	52	48	44	41	38
14		—	—	—	—	—	—	62	57	52	48	45	42
15		—	—	—	—	—	—	—	61	56	52	48	45
16		—	—	—	—	—	—	—	66	60	56	52	48
17		—	—	—	—	—	—	—	—	65	60	55	52
18		—	—	—	—	—	—	—	—	—	63	59	55
19		—	—	—	—	—	—	—	—	—	67	62	58
20		—	—	—	—	—	—	—	—	—	—	66	62
21		—	—	—	—	—	—	—	—	—	—	—	65

Note: For odd lengths and half inches of sweep, deductions can be interpolated from the figures given.

Source: Grosenbaugh, L. R. 1952. SHORTCUTS FOR CRUISERS AND SCALERS. Occasional Paper 126, Southern Forest Experiment Station, USDA Forest Service

TO DETERMINE THE LENGTH OF A SIDE WHEN THE INTERIOR ANGLE IS KNOWN (SOLVING FOR RIGHT TRIANGLES)

Many times it will be easier to measure along the edge of a potential contrasting condition than across. The following steps and table can be used to determine when the width across an interior corner angle becomes 120 ft wide.

Determine interior angle of corner.

Refer to table below to find limiting distance along edge of condition.

Interior Angle of Corner	Limiting Distance (FT)	Interior Angle of Corner	Limiting Distance (FT)
88	86.4	58	123.8
86	88.0	56	127.8
84	89.7	54	132.2
82	91.5	52	136.9
80	93.3	50	142.0
78	95.3	48	147.5
76	97.5	46	153.6
74	99.7	44	160.2
72	102.1	42	167.4
70	104.6	40	175.4
68	107.3	38	184.3
66	110.2	36	194.2
64	113.2	34	205.2
62	116.5	32	217.7
60	120.0	30	231.8

The following formula was used to create the preceding table.

$$\text{Limiting Distance} = 60 / \text{SIN} (\text{Interior Angle} \times .5)$$

See Figure 65N on next page.

EXAMPLE

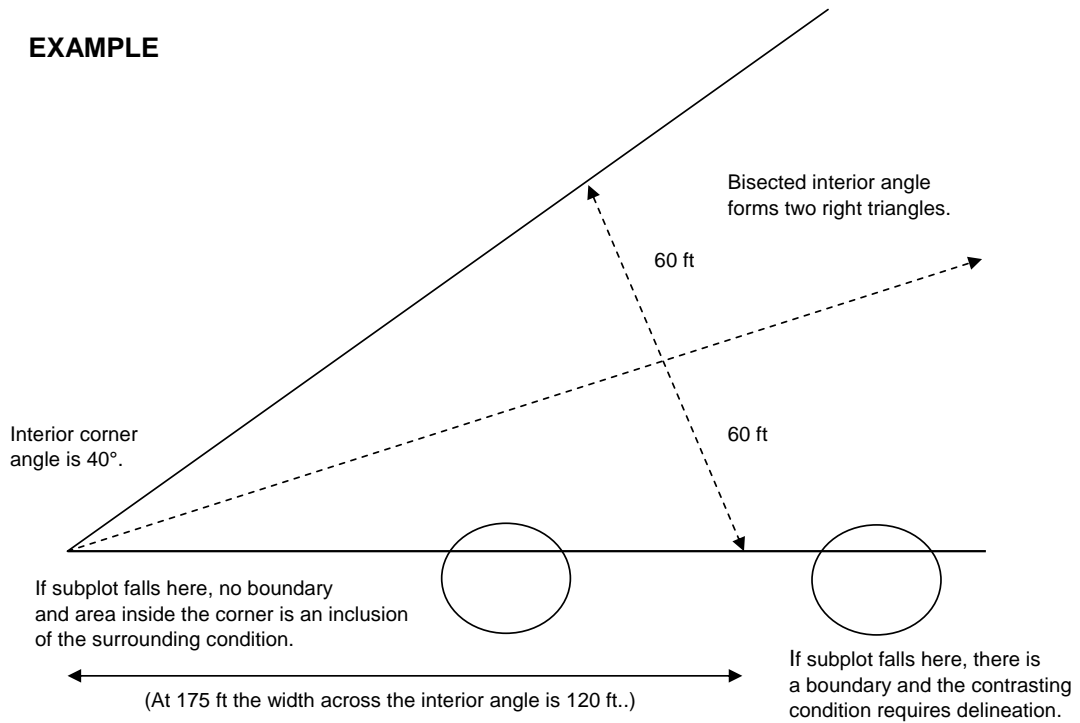


Figure 65N. Solving for right triangles.

FOREST LAND PRODUCTIVITY GUIDE

The table below may be used by eastern field crews to assist in the determination of unproductive forest land; that is, land on which the potential productivity is less than 20 cubic feet of industrial wood per acre, per year.

From an increment boring, determine the age class of a tree that is located on the site in question. For example, a 27 year old black spruce in the 20 year age class must be at least 8 feet tall if the site is to be considered as being productive. Sample trees must be representative of the site. The factors of drainage, soils, elevation, and exposure must also be considered.

Total height in feet at upper limit of the unproductive site class				
AGE CLASS	BLACK SPRUCE HEIGHT	BLACK ASH HEIGHT	RED MAPLE HEIGHT	CHESTNUT OAK HEIGHT
20	8	12	10	12
30	13	21	17	21
40	19	29	24	29
50	25	34	32	34
60	30	39	37	39
70	33	45	43	45
80	39	50	49	50
90	41	53	53	52
100	43	57	57	56
110	47	60	60	57
120	50	60	61	58
130	51	61	61	59
140	52	62	62	60
150	53	63	62	--
160	--	64	63	--
170	--	65	63	--
180	--	65	63	--

Slope Correction in feet
(Distance is measured on slope)

Percent	Feet				
	50'	60'	66'	70'	99'
10	.25	.3	.3	.3	.5
15	.5	.6	.7	.8	1.1
20	1.0	1.2	1.3	1.4	2.0
25	1.5	1.7	2.0	2.2	3.0
30	2.2	2.6	2.9	3.1	4.4
35	3.0	3.6	3.9	4.2	5.9
40	3.9	4.6	5.1	5.4	7.6
45	4.8	5.8	6.4	6.8	9.6
50	5.9	7.1	7.8	8.3	11.7
55	7.1	8.5	9.3	9.9	14.0
60	8.3	10.0	11.0	11.6	16.5
65	9.6	11.6	12.7	13.5	19.1
70	11.0	13.2	14.6	15.5	21.9
75	12.5	15.0	16.5	17.5	24.7
80	14.0	16.8	18.5	19.7	27.8
85	15.6	18.7	20.6	21.9	30.9
90	17.3	20.7	22.8	24.2	34.2
95	18.9	22.8	25.0	26.6	37.6
100	20.7	24.9	27.3	29.0	41.0

Additional percent slope and distances are available in the next table.

SLOPE CORRECTION TABLE									
% SLOPE	Chaining Distances								
	120.0	100.0	98.4	60.0	52.7	49.0	37.2	34.6	24.0
1 - 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
6	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.0
8	0.4	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1
10	0.6	0.5	0.5	0.3	0.3	0.2	0.2	0.2	0.1
12	0.9	0.7	0.7	0.4	0.4	0.4	0.3	0.2	0.2
14	1.2	1.0	1.0	0.6	0.5	0.5	0.4	0.3	0.2
16	1.5	1.3	1.2	0.8	0.7	0.6	0.5	0.4	0.3
18	1.9	1.6	1.6	1.0	0.8	0.8	0.6	0.6	0.4
20	2.4	2.0	1.9	1.2	1.0	1.0	0.7	0.7	0.5
22	2.9	2.4	2.4	1.4	1.3	1.2	0.9	0.8	0.6
24	3.4	2.8	2.8	1.7	1.5	1.4	1.1	1.0	0.7
26	4.0	3.3	3.3	2.0	1.7	1.6	1.2	1.1	0.8
28	4.6	3.8	3.8	2.3	2.0	1.9	1.4	1.3	0.9
30	5.3	4.4	4.3	2.6	2.3	2.2	1.6	1.5	1.1
32	6.0	5.0	4.9	3.0	2.6	2.5	1.9	1.7	1.2
34	6.7	5.6	5.5	3.4	3.0	2.8	2.1	1.9	1.3
36	7.5	6.3	6.2	3.8	3.3	3.1	2.3	2.2	1.5
38	8.4	7.0	6.9	4.2	3.7	3.4	2.6	2.4	1.7
40	9.2	7.7	7.6	4.6	4.1	3.8	2.9	2.7	1.8
42	10.2	8.5	8.3	5.1	4.5	4.1	3.1	2.9	2.0
44	11.1	9.3	9.1	5.6	4.9	4.5	3.4	3.2	2.2
46	12.1	10.1	9.9	6.0	5.3	4.9	3.7	3.5	2.4
48	13.1	10.9	10.7	6.6	5.8	5.4	4.1	3.8	2.6
50	14.2	11.8	11.6	7.1	6.2	5.8	4.4	4.1	2.8
52	15.3	12.7	12.5	7.6	6.7	6.2	4.7	4.4	3.1
54	16.4	13.7	13.4	8.2	7.2	6.7	5.1	4.7	3.3
56	17.5	14.6	14.4	8.8	7.7	7.2	5.4	5.1	3.5
58	18.7	15.6	15.4	9.4	8.2	7.6	5.8	5.4	3.7
60	19.9	16.6	16.4	10.0	8.8	8.1	6.2	5.8	4.0
62	21.2	17.7	17.4	10.6	9.3	8.7	6.6	6.1	4.2
64	22.5	18.7	18.4	11.2	9.9	9.2	7.0	6.5	4.5
66	23.8	19.8	19.5	11.9	10.4	9.7	7.4	6.9	4.8
68	25.1	20.9	20.6	12.6	11.0	10.3	7.8	7.2	5.0
70	26.5	22.1	21.7	13.2	11.6	10.8	8.2	7.6	5.3
72	27.9	23.2	22.8	13.9	12.2	11.4	8.6	8.0	5.6
74	29.3	24.4	24.0	14.6	12.9	12.0	9.1	8.4	5.9
76	30.7	25.6	25.2	15.4	13.5	12.5	9.5	8.9	6.1
78	32.2	26.8	26.4	16.1	14.1	13.1	10.0	9.3	6.4
80	33.7	28.1	27.6	16.8	14.8	13.7	10.4	9.7	6.7
82	35.2	29.3	28.9	17.6	15.5	14.4	10.9	10.1	7.0
84	36.7	30.6	30.1	18.4	16.1	15.0	11.4	10.6	7.3
86	38.3	31.9	31.4	19.1	16.8	15.6	11.7	11.0	7.7
88	39.8	33.2	32.7	19.9	17.5	16.3	12.4	11.5	8.0
90	41.4	34.5	34.0	20.7	18.2	16.9	12.8	12.0	8.3
92	43.1	35.9	35.3	21.5	18.9	17.6	13.3	12.4	8.6
94	44.7	37.2	36.6	22.3	19.6	18.2	13.9	12.9	8.9
96	46.3	38.6	38.0	23.2	20.4	18.9	14.4	13.4	9.3
98	48.0	40.0	39.4	24.0	21.1	19.6	14.9	13.8	9.6
100	49.7	41.4	40.8	24.9	21.8	20.3	15.4	14.3	9.9

REGIONAL APPENDIX F. TREE CLASS ILLUSTRATIONS

The following illustrations are examples of how to determine TREE CLASS using the “Percent Board-foot Cull” tables for hardwoods and softwoods located in Regional Appendix E.

For the determination of excessive crook and sweep, use the CROOK DEDUCTION IN BOARD FEET or SWEEP DEDUCTION IN BOARD FEET tables located in Regional Appendix E. Note: GROSENBAUGH’S RULE 3 & 4 FOR SWEEP AND CROOK DEDUCTION can also be applied.

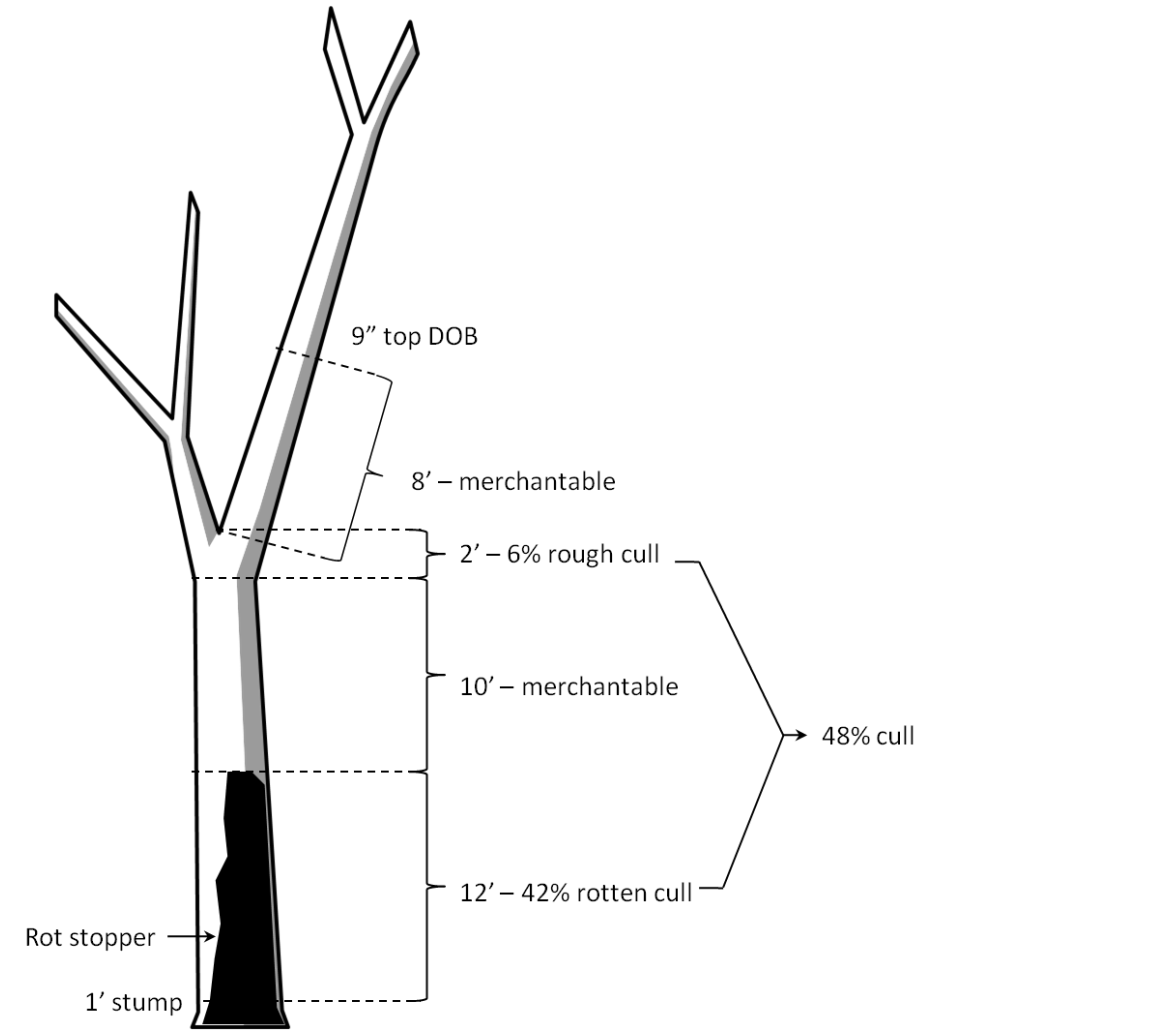


Figure 66N. TREE CLASS = 2: This live hardwood tree contains a merchantable 10' section and a merchantable 8' section. The bottom 12' is rotten and contributes 42% rotten board foot cull to the tree. In addition, the fork contributes 6% rough board ft cull for a total non-merchantable volume of 48%. Because the cull is less than 67%, the tree is considered growing stock.

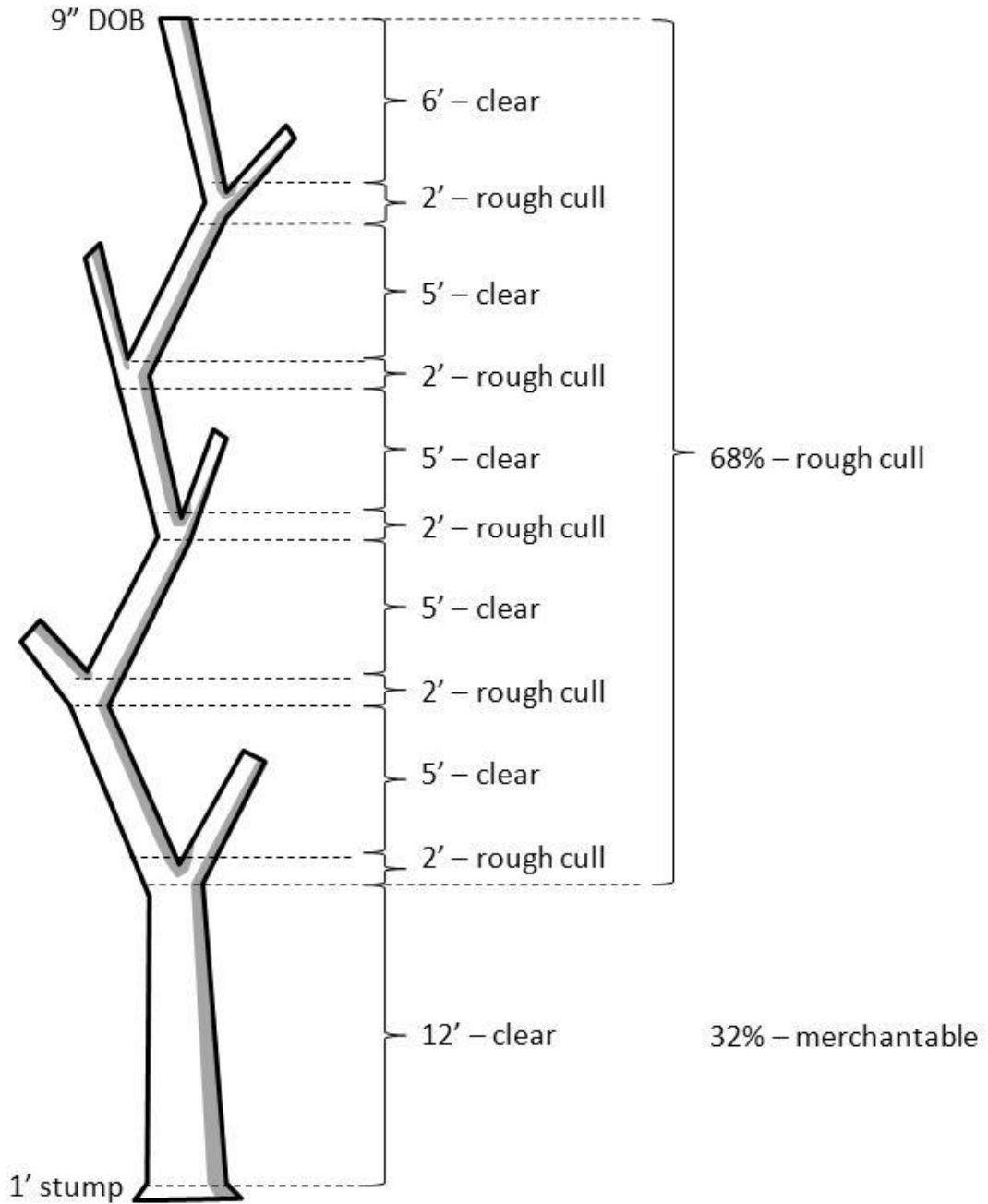


Figure 67N. TREE CLASS = 3: This live hardwood tree contains a merchantable 12' section. However, the remaining sawlog is entirely cull. Although the tree meets the minimum merchantability specifications, it contains 68% rough cull and is considered Tree Class 3 because it does not have at least 33% of its volume in merchantable material.

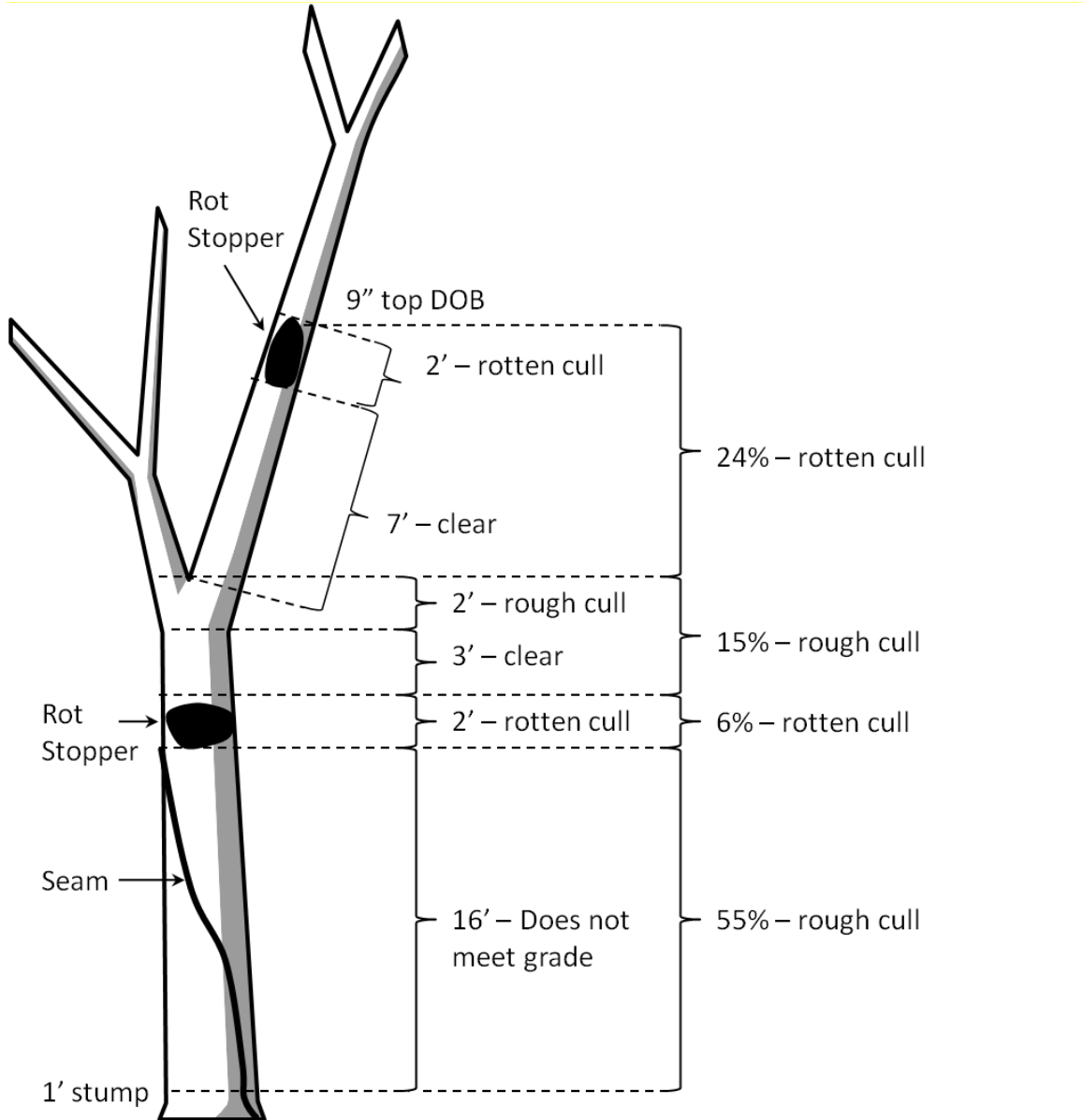


Figure 68N. TREE CLASS = 3: (hardwood) – The bottom 16' of this live tree does not meet minimum grade specifications and is not considered merchantable. It contributes 55% rough cull to the tree. There is also a 2' section of rot that contributes 6% rotten cull to the tree. Just above this is a 3' clear section. However, sections that are less than 8 feet in length are considered cull based on the type of stopper (rough or rotten), at the top of the section. In this case, the section is rough cull due to fork. Above the fork is a 7' clear section that is considered rotten cull because of a rot stopper at the top of that section. The tree is entirely cull, the majority of which is rough cull.

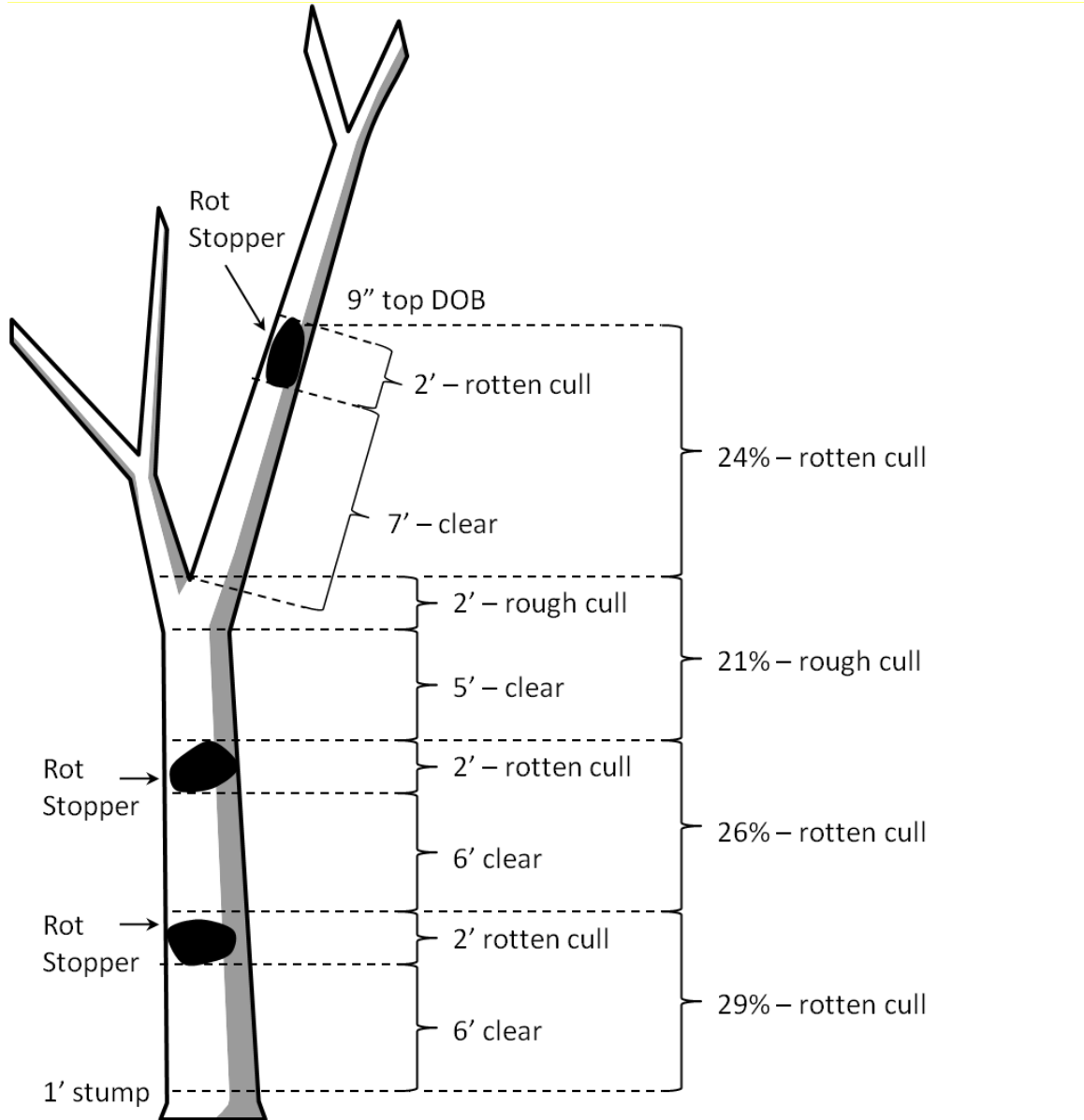


Figure 69N. TREE CLASS = 4: This live tree contains no merchantable 8' or 12' sections and is therefore considered a cull tree. Clear sections that do not meet the minimum 8' length requirement are considered cull based on the type of stopper at the top of the section (rough or rotten). In this case, there are two clear 6' sections on the main stem with rot stoppers at the top of the sections. Thus, the entire bottom 16' of the sawlog are considered cull. There is also a 5' clear section with a fork stopper at the top of the section that is considered rough cull. Finally, there is a 7' clear section on the right fork with a rot stopper at the top of the section that is considered rotten cull. The tree is entirely cull with rotten cull being predominant.

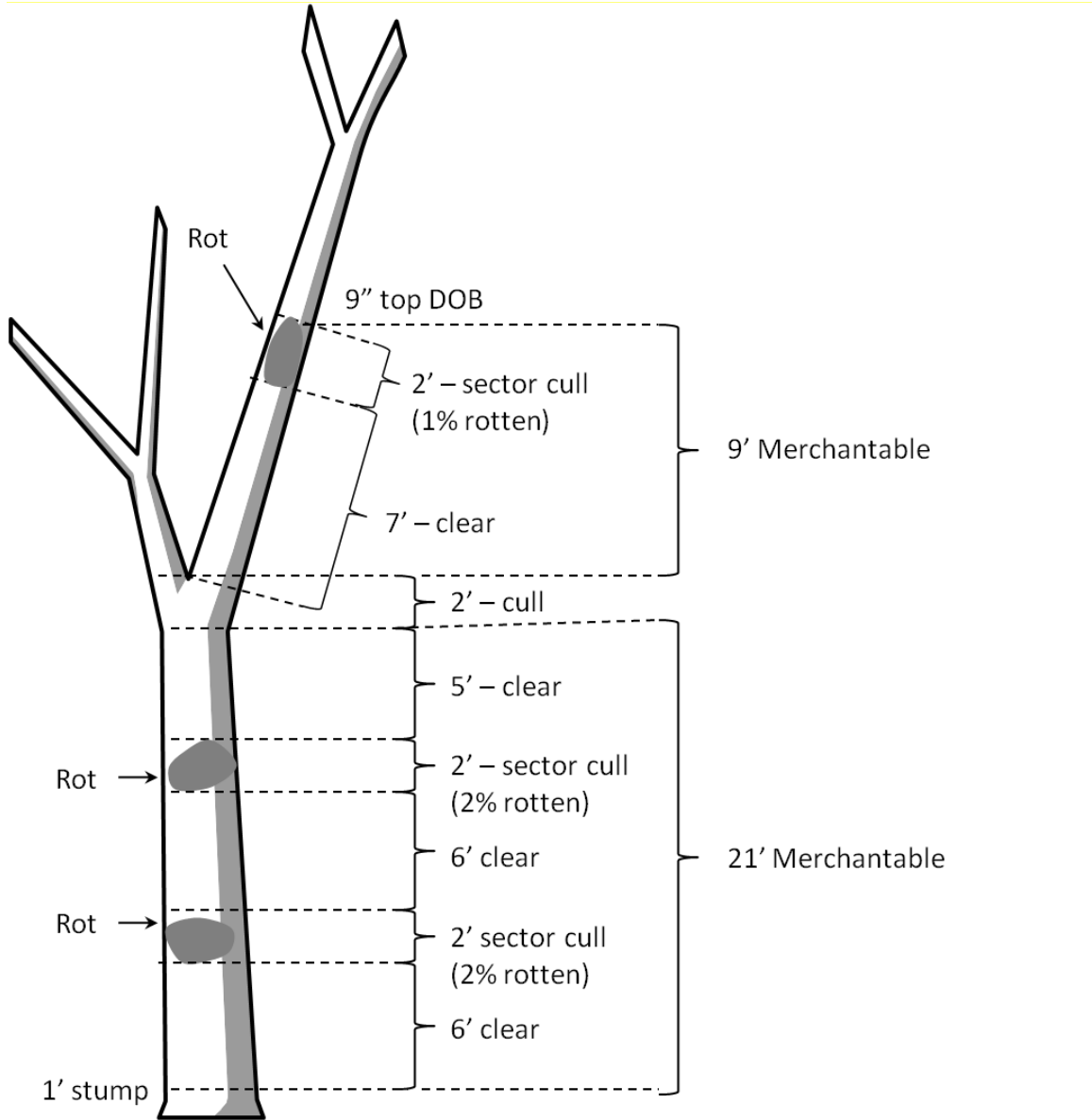


Figure 70N. TREE CLASS = 2: This live tree contains rot similar to Figure 57N. However, in this case the rot is not considered a stopper. Even though there is some deduction for the rot, it does not limit the length of the logs. Assuming the logs otherwise meet minimum grading specifications, the tree is considered growing stock.

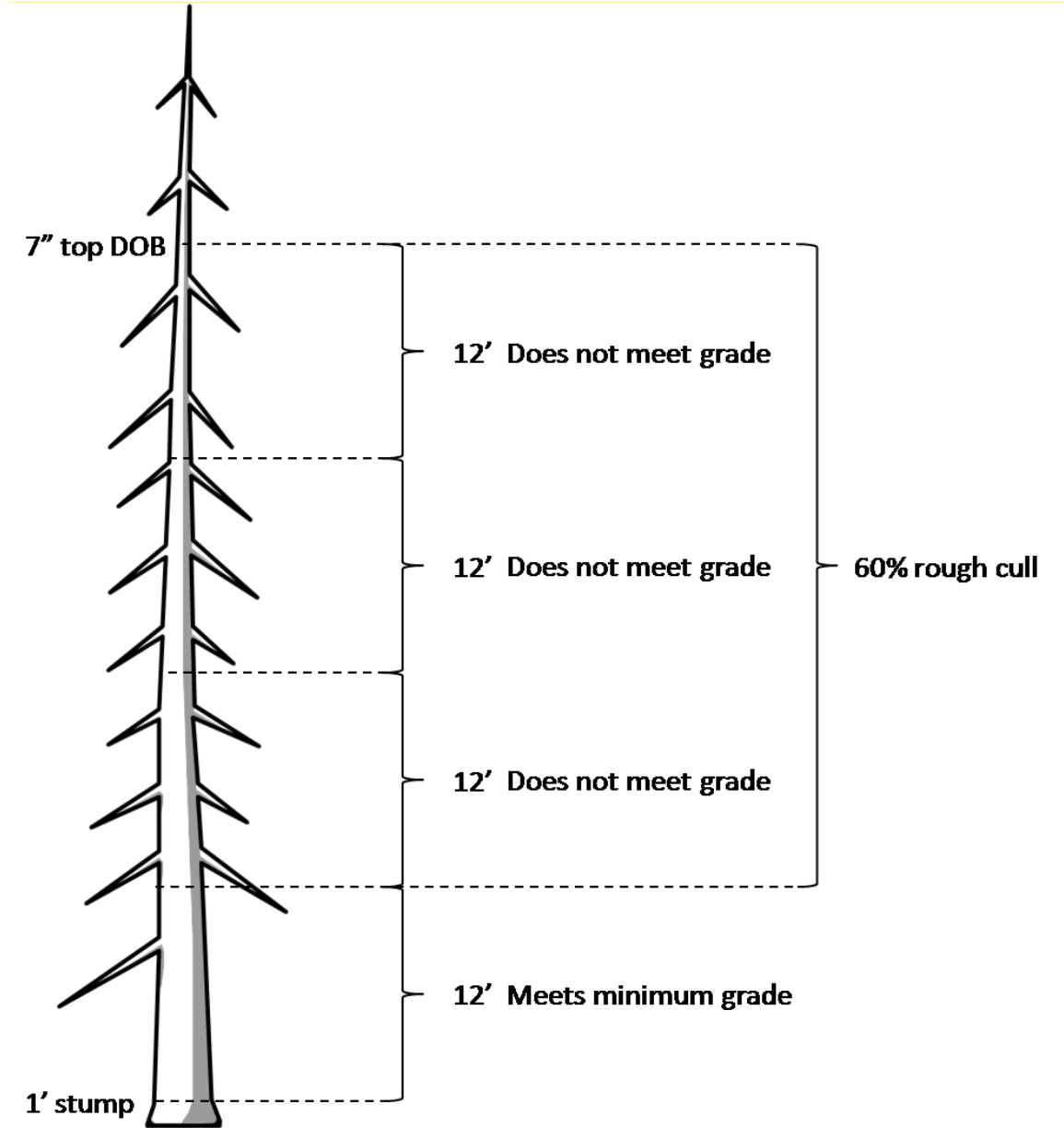


Figure 71N. TREE CLASS = 2: (other softwoods - not white, red or jack pine) – Although the sawlog on this live tree is straight and has no “stoppers”, the upper logs do not meet minimum grade specifications because of branch size and are considered rough cull. Because the bottom 12’ section has no rot or defect and is Grade 1, the tree meets minimum merchantability requirements and the section contributes 40% merchantable volume to the tree, thus meeting the 1/3 merchantability requirement for growing stock.

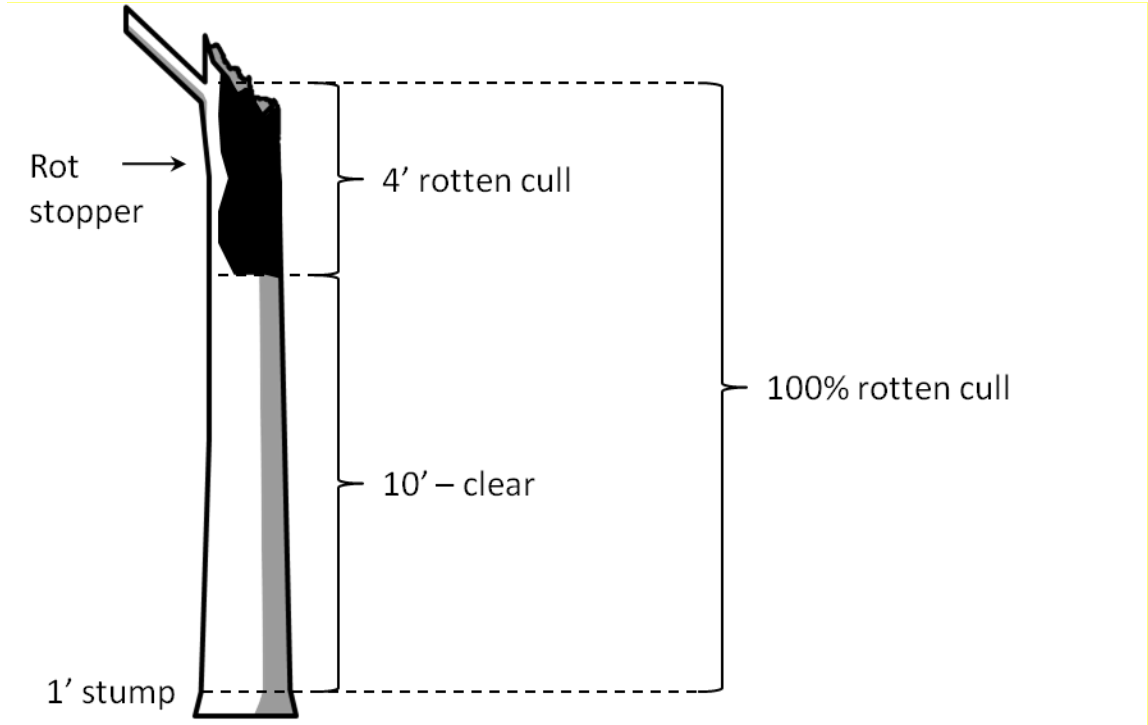


Figure 72N. TREE CLASS = 4: In order to meet minimum merchantability requirements, this live tree must contain either a single 12' merchantable log or two noncontiguous 8' merchantable logs. Because this stem is less than 16' in length, we cannot have two 8' sections and therefore cannot consider sections less than the minimum merchantable length of 12' as merchantable. In this case, the 10' clear section is too short to be considered, and is therefore cull because of the rot stopper at the top of the section. The entire stem is considered rotten cull.

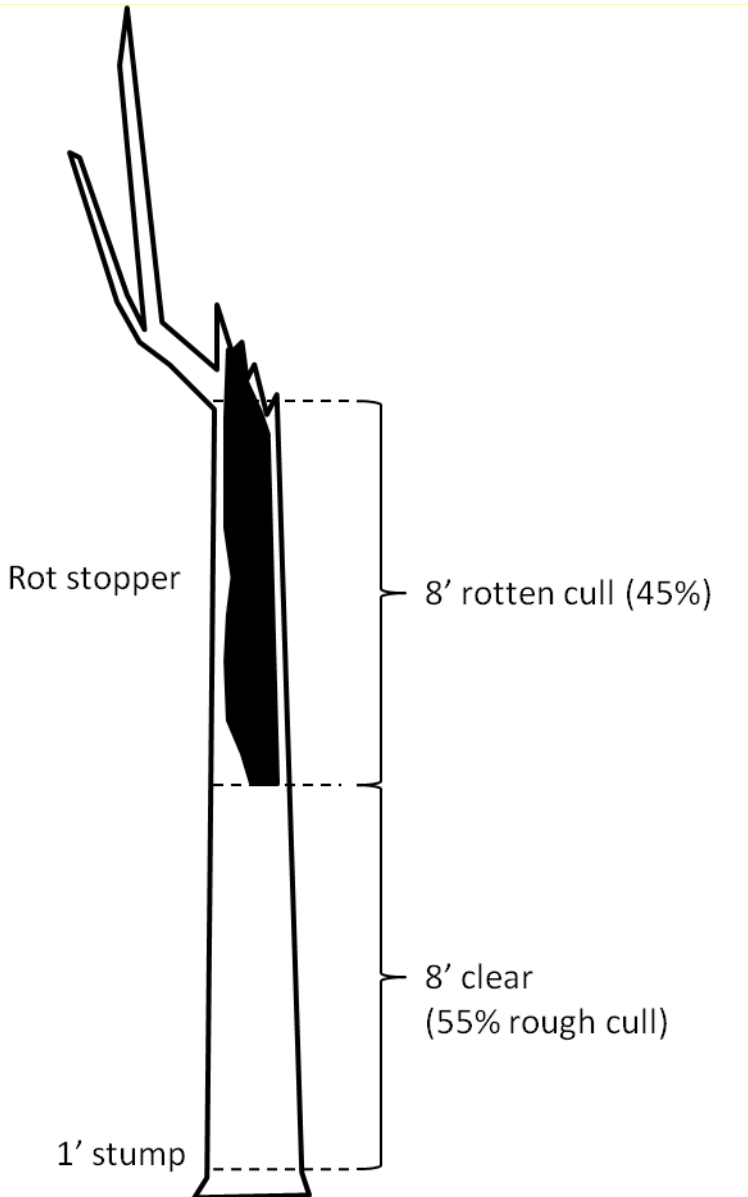


Figure 73N. TREE CLASS = 3: In order to meet minimum merchantability requirements, this live tree must contain either a single 12' merchantable log or two noncontiguous 8' merchantable logs. Because this sawlog is 16' in length, we can consider two 8' merchantable logs. However, the upper section is entirely rotten. Even though the tree contains in excess of 1/3 of its volume in merchantable wood, the tree is still considered cull because it does not contain two merchantable 8' sections. The lower section is considered rough cull only because the minimum merchantability specifications are not met. Because the majority of the cull is rough, the stem is considered Tree Class 3.

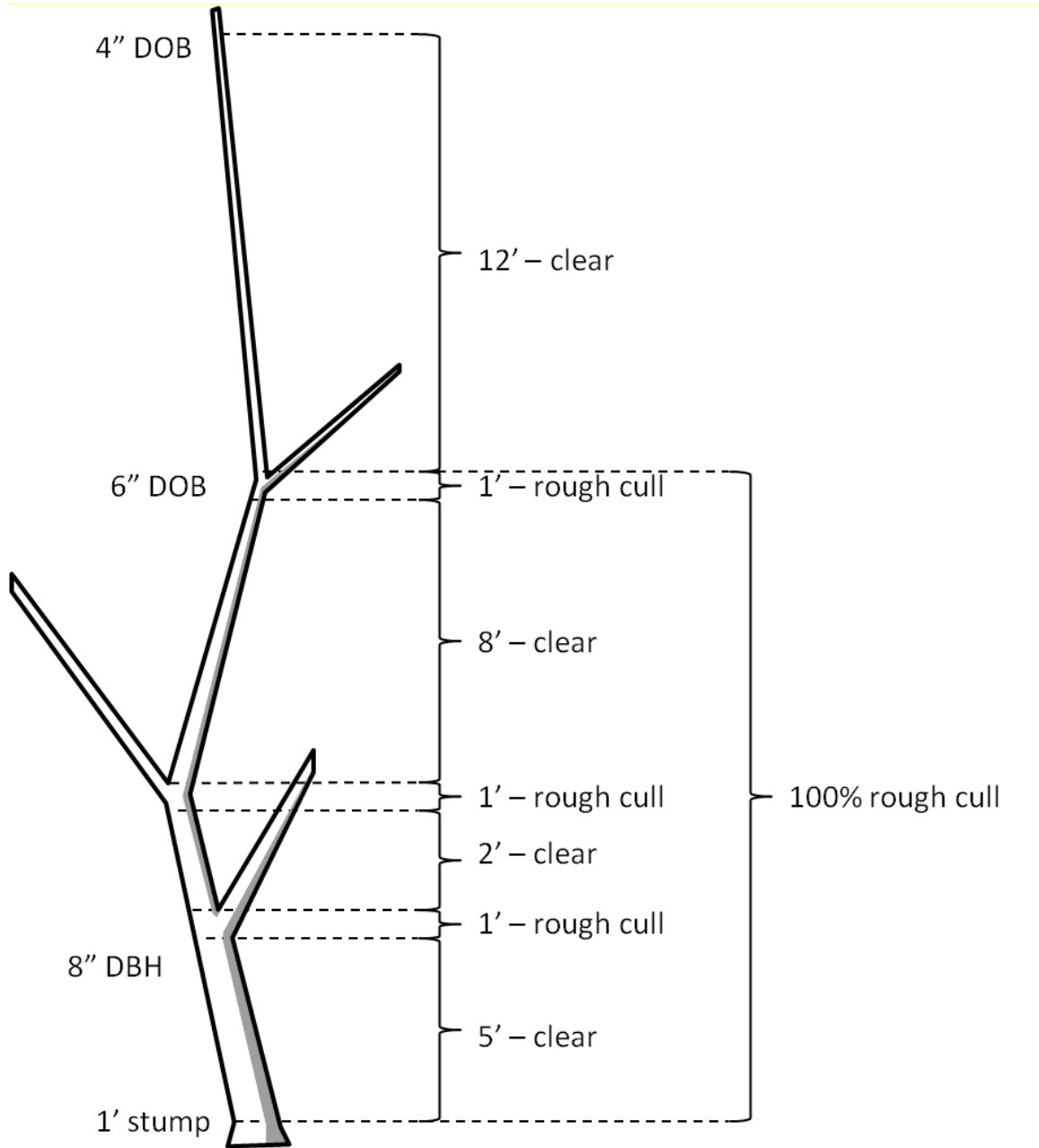


Figure 74N. TREE CLASS = 3: HARDWOOD (projecting tree class on live poletimber sized trees) – Initially, the tree appears to have a merchantable 8' and a merchantable 12' section. However, after applying the 2" rule, the top of the projected sawlog is stopped at the location where the diameter is 6" and does not include the top 12'. This tree will not meet minimum merchantability requirements at the time it reaches sawlog size because it will not have two merchantable 8' sawlogs or one merchantable 12' log. However, if at some point in the future the top 12' section reaches sawlog size, the clear 8' section would no longer be considered rough cull because minimum merchantability specifications will have been met.

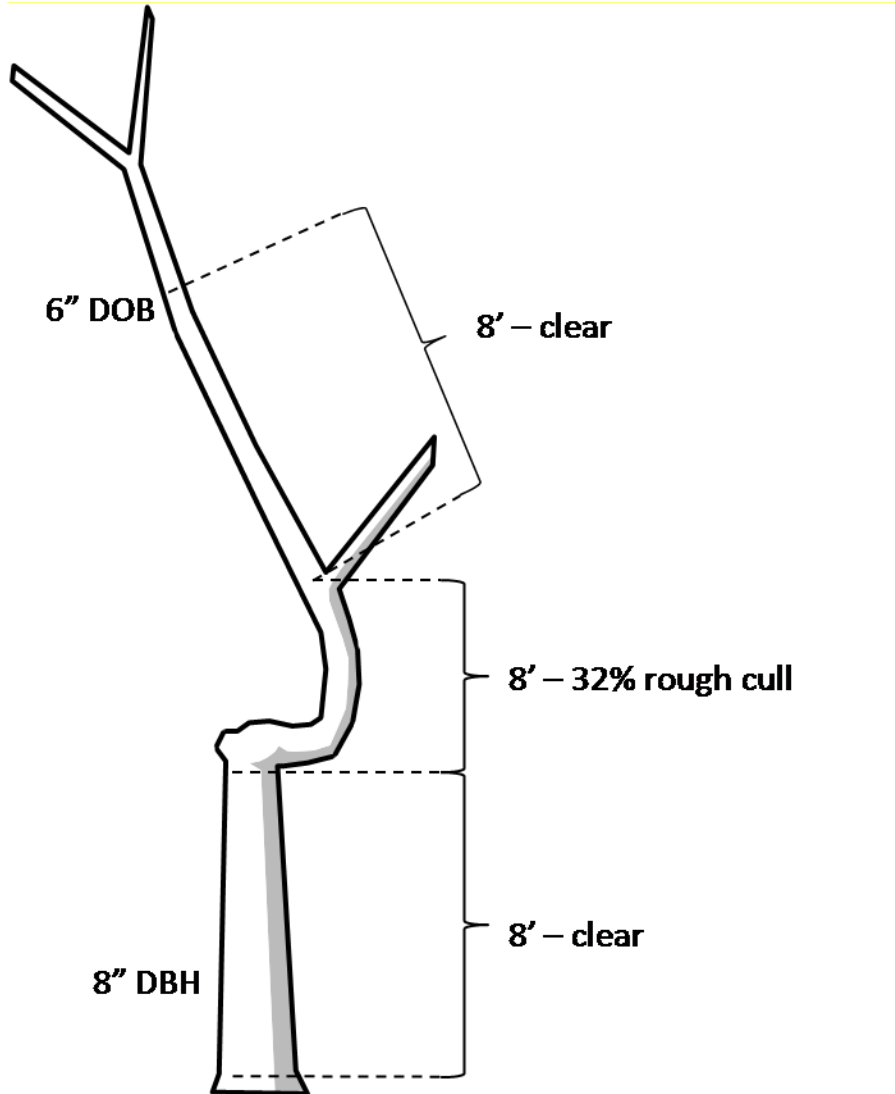


Figure 75N. TREE CLASS = 2: HARDWOOD (projecting tree class on poletimber sized trees) – Initially, the tree appears to be non- merchantable. However, the bottom 8' is merchantable and by applying the 2" rule, we can include a second 8' clear section above the fork. The crook and fork contribute only 32% rough cull to the tree. Because the tree will be at least 1/3 merchantable it is considered growing stock.

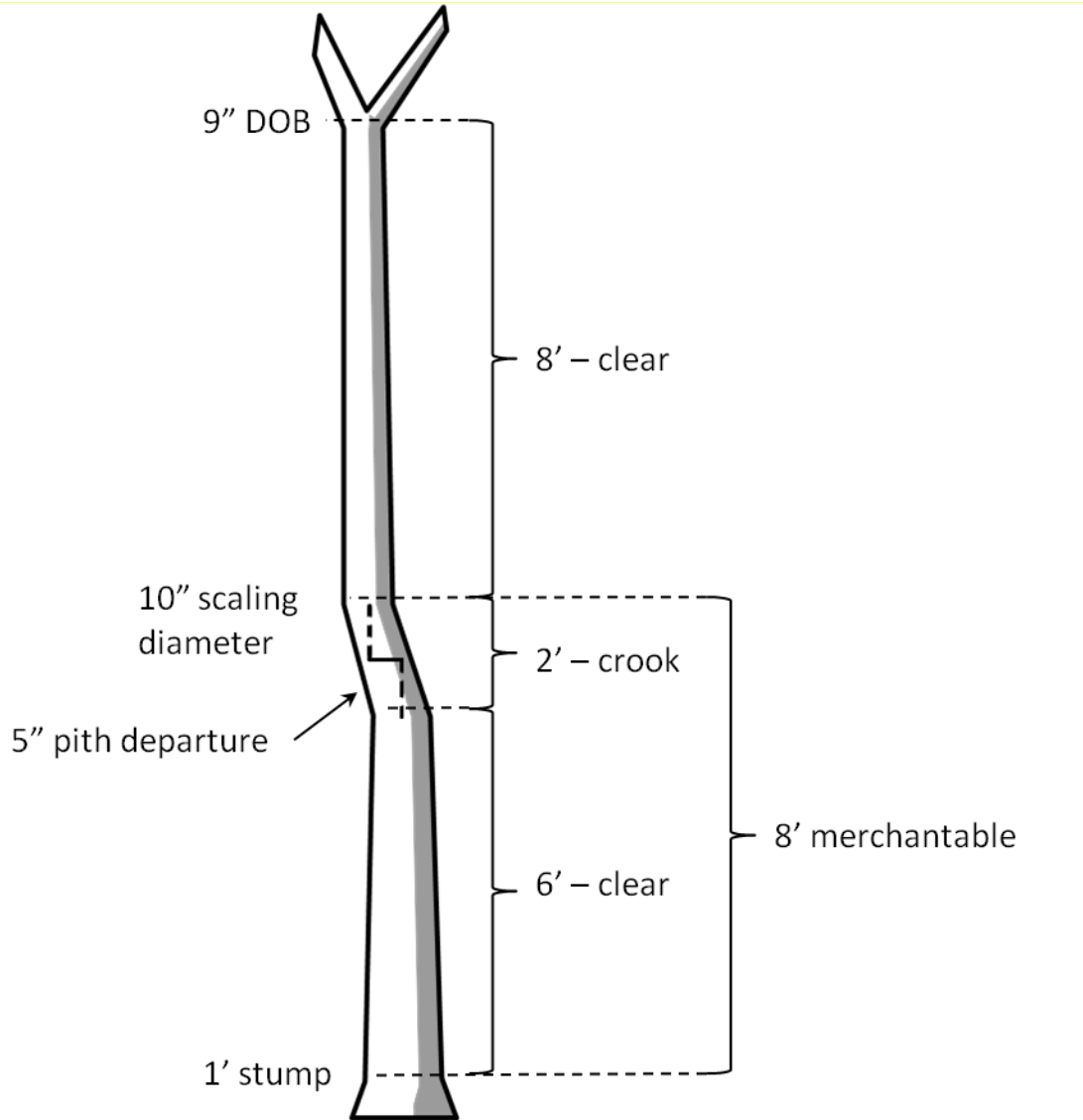


Figure 76N. TREE CLASS = 2: For this live sawlog tree, Tree Class depends on whether the crook is considered a stopper. For this determination, refer to the Crook Deduction table in Appendix E. In this case, based on the dimensions given, the crook is not considered a stopper and the entire bottom 8' section is considered merchantable with roughly 13% cull due to the crook.

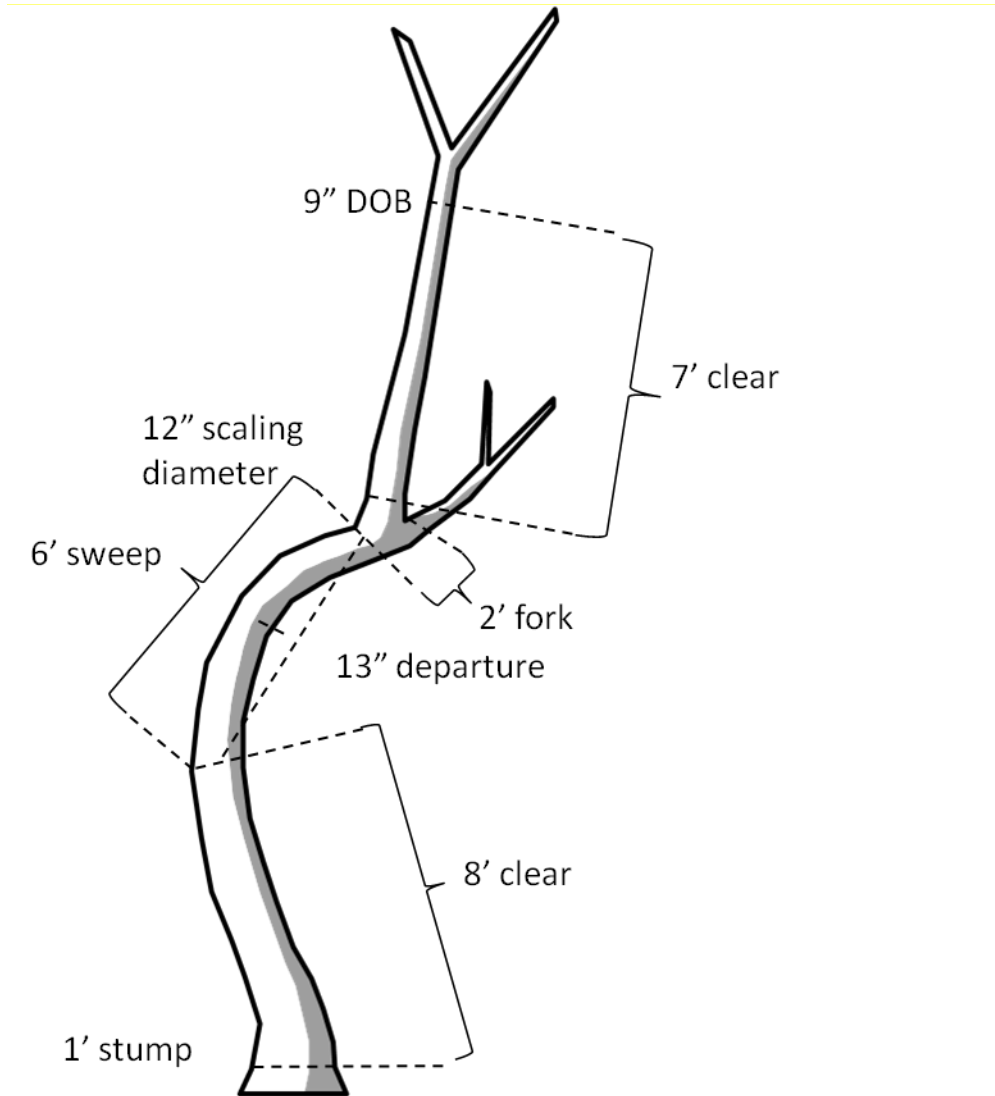


Figure 77N. TREE CLASS = 3: For this live sawlog tree, Tree Class depends on whether the sweep is considered a stopper. For this determination, refer to the Sweep Deduction table in Appendix E. In this case, the sweep is considered a stopper and limits the merchantable length of this sawlog to just the bottom 8' section. Because the tree does not contain two merchantable 8' sections or one merchantable 12' section the entire tree is considered cull.

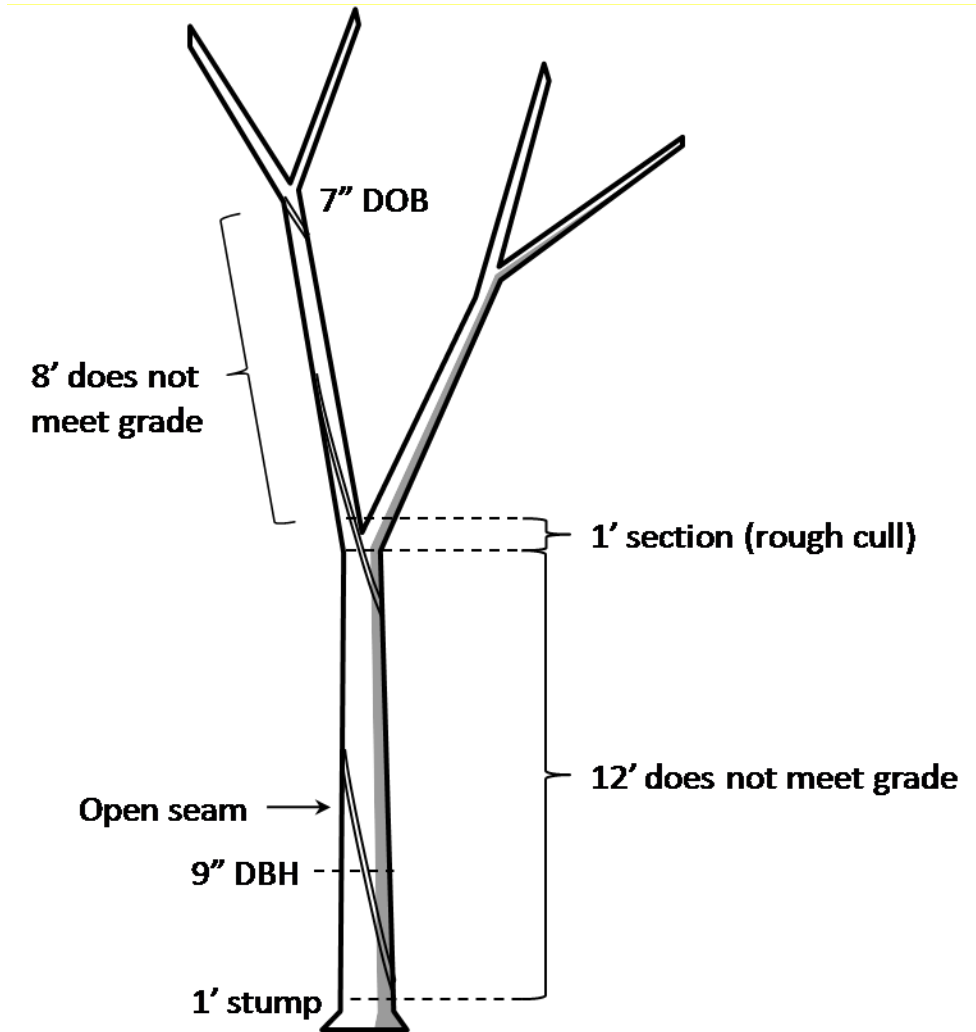


Figure 78N. TREE CLASS = 3: HARDWOOD (projecting tree class on poletimber sized trees) – Although this tree initially appears to be merchantable, consideration must be given to the potential for the stem to meet minimum grading requirements when it reaches minimum sawlog diameter. The open spiral seam eliminates any clear cuttings and the tree cannot meet the requirements for grades 1-3 in either the existing or projected sawlogs. Additionally, the presence of a crack or seam is not permitted in the grading section for construction grade 4. Therefore, none of the existing logs in this tree will meet minimum grade specifications and the tree is considered rough cull.

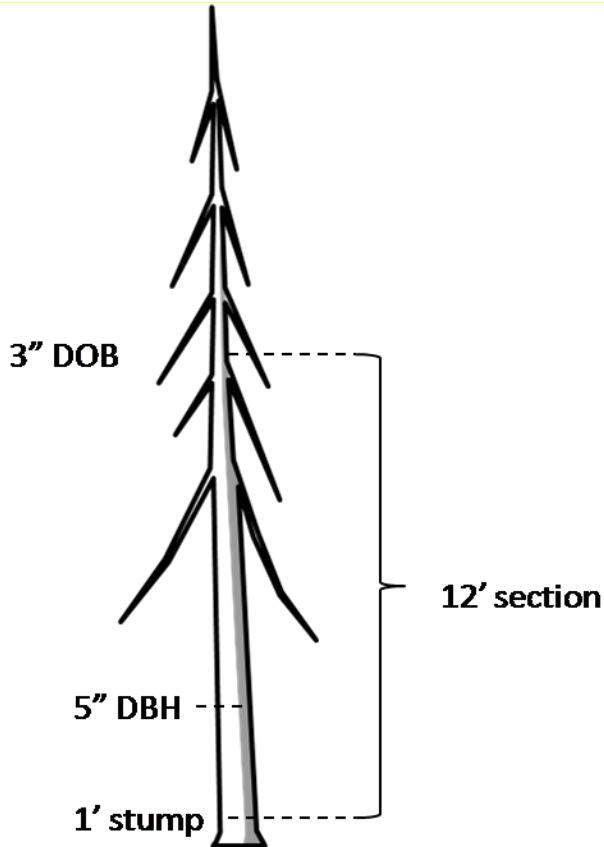


Figure 79N. TREE CLASS = 3: OTHER SOFTWOODS (projecting tree class on poletimber sized trees – There are large branches within the predicted sawlog on this live tree that do not currently exceed grading limits. Although it is difficult to predict whether the branches will exceed these limits when the tree reaches sawlog size, such a determination must be made in order to determine if the tree will be considered growing stock. Assume that branches will grow proportionally to the main stem. Although a reasonably accurate estimate can be made for trees that are currently near sawlog size, a wide degree of latitude should be given to smaller trees where branch growth is more difficult to predict.

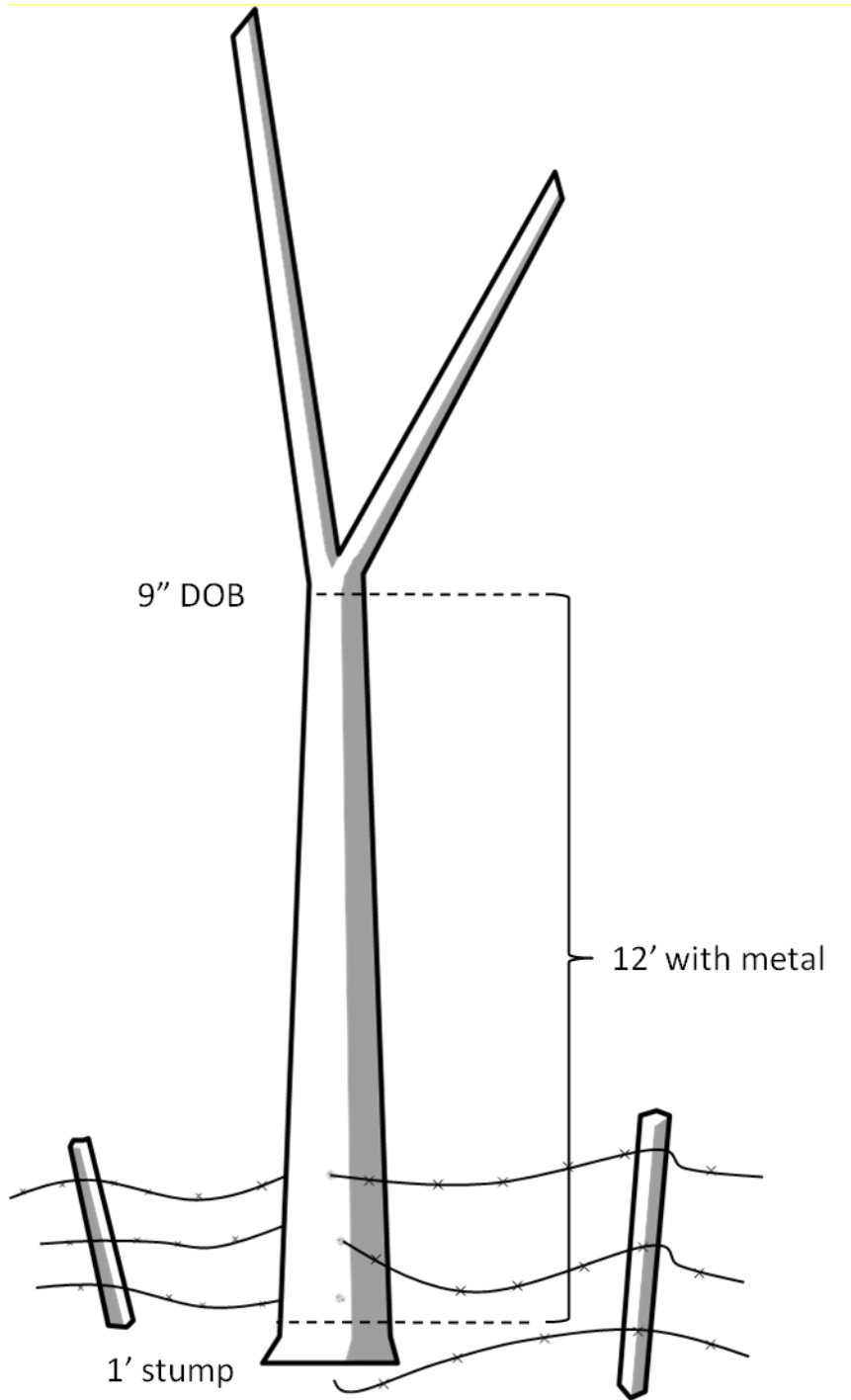


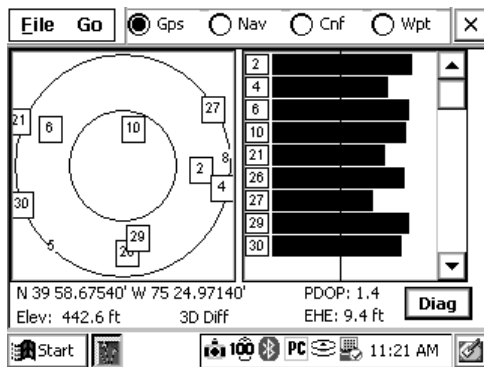
Figure 80N. TREE CLASS = 4: Although this tree has what would otherwise be a clear 12' section, the metal in the log presents a unique situation. When metal is found, the section is determined to be "rotten" cull because like rot, sections with metal cannot be utilized. In this case, the 12' section is the only section in the tree and the Tree Class would be 4.

REGIONAL APPENDIX G. GPS USER'S GUIDE

LandMarkCE GPS NRS Users Guide

LandMarkCE GPS must be installed on the Allegro using ActiveSync. After installation and license registration, the default LandMarkCE GPS Im.ini file must be updated with the appropriate settings. The latest WMM.COF file (currently valid from 2010-2015) must also be present and finally a Bluetooth GPS receiver bonded to the Allegro. Two of the current GPS receivers being used are the EMTAC mini-S3 and RightWay. Both are 20 channel, WAAS enabled GPS receivers.

To begin using LandMarkCE GPS on the Allegro, click the LandMark CE desktop icon once and then press Enter. Turn on the GPS receiver before initiating "GPS Connect" between the GPS and the Allegro. Once the GPS receiver is on, either click on "File" and then "GPS Connect" on the Allegro screen or click the 'Blue' key and then the 'F5/F10' key to connect the two units via Bluetooth. The screen below will appear as satellites are obtained.



Screen Selection

LandMarkCE GPS has four operational screens that are accessed on the top bar. These are the current GPS location screen (Gps), the Navigation Screen (Nav), the Configuration Screen (Cnf), and the Waypoint Screen (Wpt).

Gps Screen

The Gps screen (shown above) displays the current GPS position and other relevant information. In the upper left is a Skyplot, which is a graphical representation of the satellite positions directly overhead. The outer circle represents the horizon and the inner circle is 60° above the horizon. The satellites are displayed by their unique satellite number. Satellites used to compute the current GPS position are shown in a square. When GPS receiver is used, WAAS satellites are tracked but not displayed in the Skyplot. To the right of the Skyplot is the satellite signal strength graph. The vertical bar represents 50% of maximum power. Below the Skyplot are the current coordinates, elevation, GPS Quality (2D, 3D, 2D Diff, 3D Diff, No Fix, No Comm. Act.), the PDOP, and the EHE. The Diag box shows individual satellite details and NMEA string data.

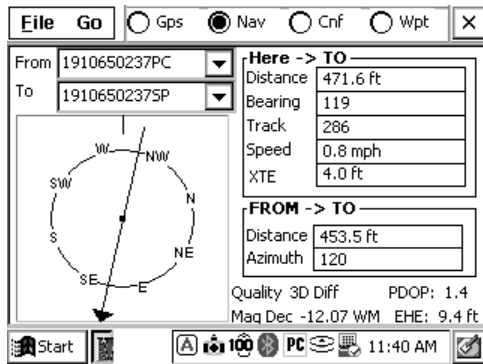
Nav Screen

The Nav screen allows users to calculate distances and azimuth between points and navigate to a location. The upper left portion of the screen contains two drop down lists of saved waypoints or the current "Here" position.

The From and To lists are used to select waypoints from which the calculations will be performed. Below the waypoint drop down lists is the compass.

The compass rotates to show the direction of travel once you start moving. The arrow always points toward the To location. The compass body rotates to show the current direction of travel.

The Here → To section shows calculated values based on the current GPS location and the destination (To) location.



The From → To section displays the calculations based on the From location to the To location. Use this section when calculating course-to-plot distance and azimuth between a saved SP waypoint and a saved PC waypoint.

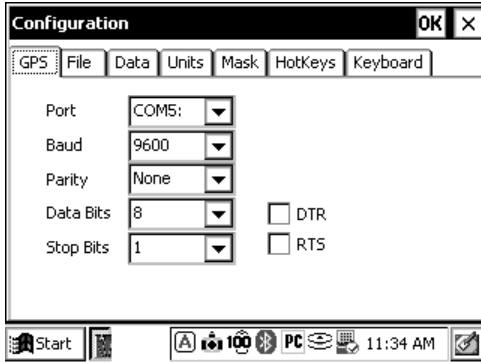
Displayed at the bottom of the Nav screen are the GPS Quality, heading setting, PDOP and EHE values.

Cnf Screens

The Cnf screen allows customization of critical LandMark CE settings.

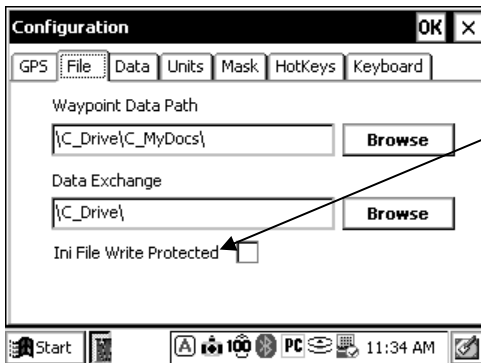
The first screen to appear is the GPS screen. The only option that needs changed here is the Com Port. It must match the Bluetooth Com Port setting when the GPS receiver was bonded to the Allegro. It may vary from unit to unit. When the Com Port is changed, LandMark CE must be shut down and restarted.

The other defaults that never need changed are: Baud=9600, Parity=None, Data Bits=8, Stop Bits=1. DTR and RTS do not need selected when using an EMTAC GPS receiver.



The File tab displays where waypoints and data are stored on the Allegro.

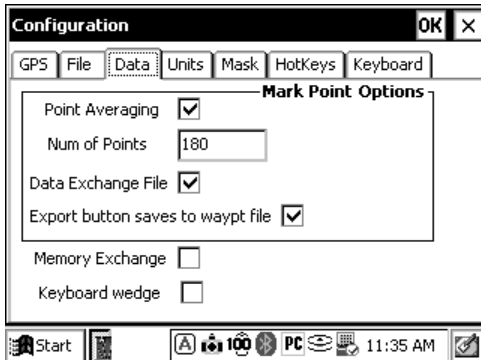
When the Ini File Write Protected box is checked, the critical GPS settings have been locked and cannot be changed by the user. This is a security measure to insure the GPS data is collected with the highest accuracy and confidence.



The Data tab defines how the waypoints are collected and how they are stored.

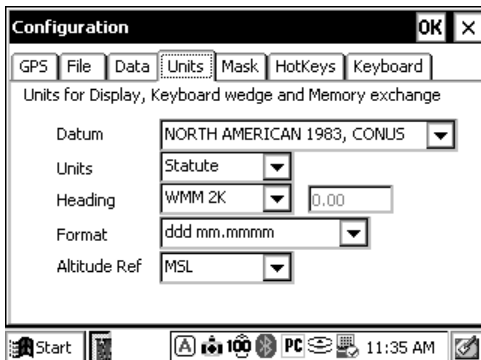
FIA will record data that is the average of 180 individual fixes.

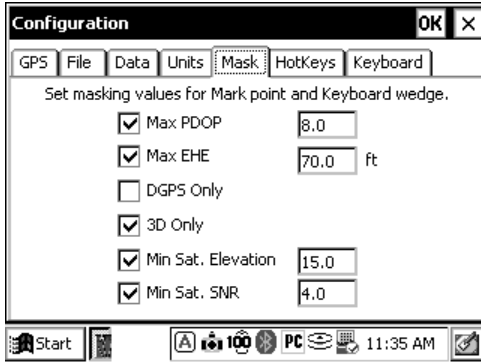
The Data Exchange File, Memory Exchange and Keyboard wedge functions will be implemented at a future date.



The Units tab is used to format the GPS data.

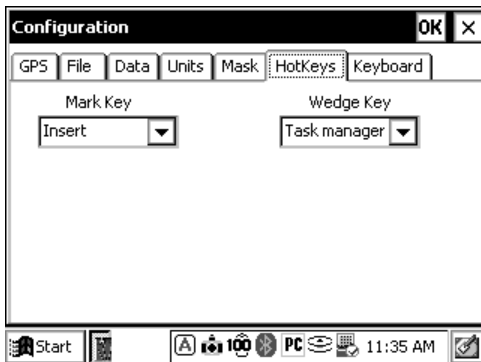
The critical settings that FIA uses for Datum, Units, Heading, Format, and Altitude Ref. are displayed on the graphic to the left.





The Masks tab is used to set GPS signal masking parameters when marking waypoints. Only the GPS signals that meet the specified criteria will be used in the waypoint averaging solution.

The critical settings that FIA uses for Max PDOP, Max EHE, DGPS, 3D Only, Min. Sat. Elevation, and Min. Sat. SNR are displayed on the graphic to the left.



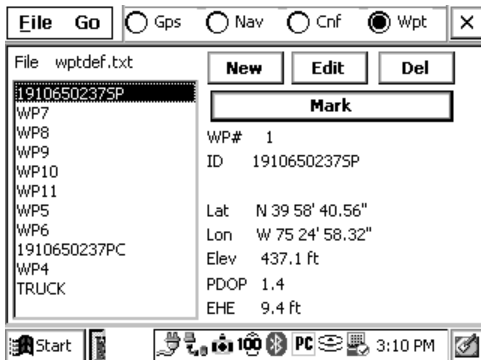
The HotKeys tab is used to assign an automatic function to a specific button on the Allegro.

Insert selected in Mark Key jumps to the collect waypoint screen whenever the “Ins” button on the Allegro keypad is pressed while LandMarkCE is running.

The Wedge Key option is not currently used.

The Keyboard tab is not used.

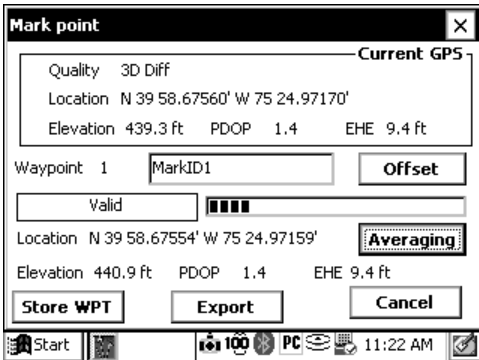
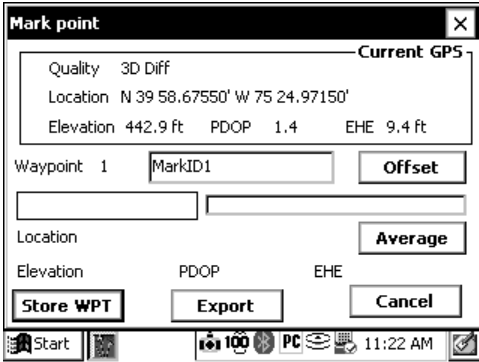
Wpt Screens



The Del button is used to delete a previously select waypoint from the list. Waypoints can only be deleted one at a time.

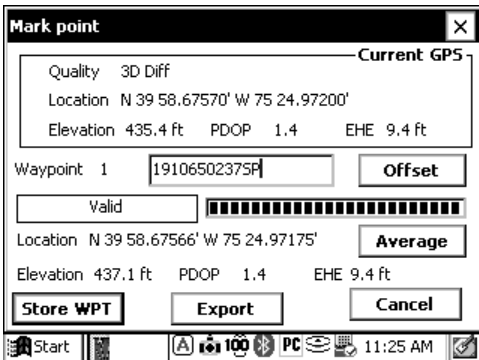
The Mark button is used to open the Mark Waypoint screen to start the averaging waypoint function.

Below the Mark button are the GPS details of the selected waypoint.

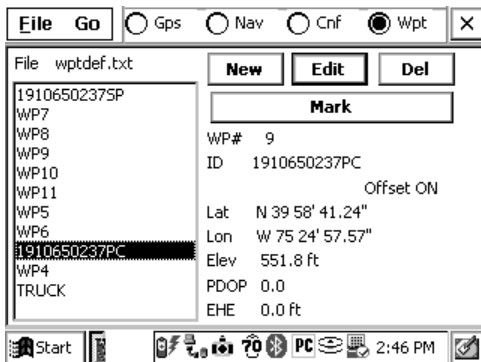
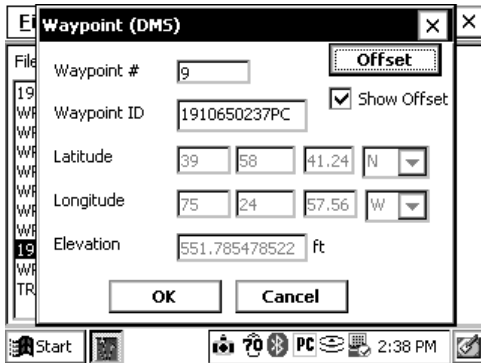
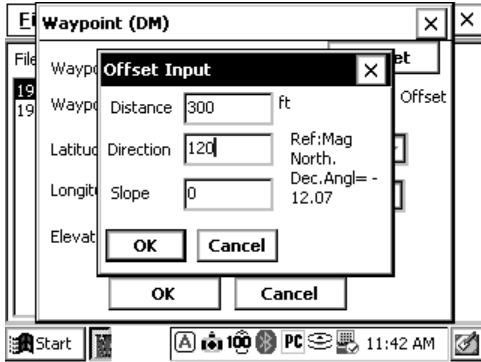


A Progress Bar appears when averaging to show the solution progress based on the number of fixes indicated in the Cnf/Data screen. Below the status bar is the running average section displaying the coordinates, elevation, PDOP and EHE.

To begin averaging, click the Export button. The word “Average” will change to “Averaging”. The status bar will progress as valid fixes are used in the solution. When complete, the word “Averaging” will change back to “Average”. During averaging, hold the GPS receiver stationary over the point until the process is complete.



Computing An Offset



LandMarkCE GPS / GPS Receiver / MIDAS FAQs

- Q. How do my GPS coordinates get saved in a MIDAS plot file?
 A. Within 15 minutes of pressing “Export” in LandMarkCE GPS, open the corresponding plot file in MIDAS and go to the PC GPS screen. On the Allegro, press the CTL button, then the K button. The GPS fields should auto-fill with the last GPS coordinates collected.
- Q. I am getting an error soon after Jan. 1 when pressing the Nav button in LandMarkCE GPS?
 A. The WMM.COF file which models magnetic declination must be updated periodically from the NOAA website. The current version is valid from 2010-2015.
- Q. I just installed LandMarkCE GPS on the Allegro, but the GPS receiver isn’t communicating with the Allegro?

- A. After installing LandMarkCE GPS, the Im.ini file must be updated and the proper BT COM Port set. The GPS receiver must also be turned on before LandMarkCE GPS is started. Make sure both the GPS receiver blue and green lights are flashing.
- Q. My GPS receiver was communicating fine with LandMark CE and then it just stopped and displayed "No Comm. Act."?
- A. There has been some type of interruption in the Bluetooth signal between the GPS receiver and Allegro. On the Allegro, press the blue button and the F10 key to reconnect. Make sure both GPS receiver blue and green lights are flashing.
- A. If trying to reconnect is not successful, close all programs that are running on the Allegro and remove the battery for at least 15 minutes. When the battery is replaced, this should reset the Bluetooth signal.
- Q. The blue or green lights on my GPS receiver quit working?
- A. Switch the GPS receiver unit on and off until both lights are on.
- Q. LandMarkCE GPS doesn't always display that I am getting a "3D Diff" fix?
- A. The GPS receiver is capable of picking up two geostationary FAA satellites (WAAS) that broadcast real-time, differential GPS corrections. The two WAAS satellites are positioned near the equator over the Atlantic and Pacific Oceans. Based on your Latitude and view of the sky, the GPS receiver may be able to "see" these satellites. GPS fixes that are differentially corrected are more accurate than a "3D Only" fix. The WAAS satellites are not displayed on the Skyplot when using the EMTAC or RightWay receivers.
- Q. I can't change the critical settings in the Cnf screens?
- A. The critical settings are locked to prevent the field user from changing them.
- Q. I pressed the Insert key (Ins) on the Allegro, but LandMarkCE GPS won't start Averaging?
- A. The Ins key switches to the Mark Screen, but you must click the box that shows "Export" to begin averaging.
- Q. How do I calculate the coordinates of PC when using an offset from another location?
- A. Before averaging at the offset location, click Offset on the Mark Screen. Enter the distance, direction and slope (+ or -) to PC. Click OK. Click Export and the position will be saved with the offset calculation applied. In the Wpt screen, the words "Offset ON" will be displayed when viewing the waypoint details.
- Q. How do I minimize LandMarkCE GPS when it is open?
- A. Tap the LandMarkCE GPS icon on the bottom taskbar. You may need to make the taskbar visible first.

REGIONAL APPENDIX H. TALLY ITEM GUIDES

		<i>Data Element</i>	<i>PDR Prompt</i>	<i>Data Required</i>					
Plot Level Data	State	ST		X	X	X			
	County	CNTY		X	X	X			
	Plot Number	PLT#		X	X	X			
	Plot Status	STAT		1	2	3			
	Plot Nonsampled Reason	REAS					X		
	Subplots Examined	EXAM		X	X	X			
	Sample Kind	SK		X	X	X			
	Field Guide Version			D	D	D			
	Year	YEAR		X	X	X			
	Month	MONT		X	X	X			
	Day	DAY		X	X	X			
	Horizontal Distance to Road	RDIS		X	X				
	Water on Plot	WTYP		X	X				
	QA Status	QAST		X	X		X		
	Crew Number	CREW		X	X		X		
	GPS Data required for all field visited plots								
			<i>Data Element</i>	<i>PDR Prompt</i>	<i>Data Required</i>				
			GPS Unit	UNIT	0	1	2	3	4
			GPS Serial Number	GPS#		X	X	X	X
			GPS Entry Method			X	X	X	X
		GPS Datum			X	X	X	X	
		Coordinate System			X	X	X	X	
		Latitude Degrees			X				
		Latitude Minutes			X				
		Latitude Seconds			X				
		Longitude Degrees			X				
		Latitude Minutes			X				
		Latitude Seconds			X				
		UTM Zone				X			
		Easting UTM				X			
		Northing UTM				X			
		Azimuth to Plot Center	AZM		X	X	X	X	
		Distance to Plot Center	DIST		X	X	X	X	
		GPS Elevation	ELEV		X	X		X	
		GPS Error	ERRS		X	X			
		GPS PDOP	PDOP		X	X			
		Number of Readings	READ		X	X			
X	Data Required								
D	Down loaded								

	Data Element	PDR Prompt	Data Required				
Condition Data	Condition Class Number	CON#	X	X	X	X	X
	Condition Class Status	CDST	1	2	3	4	5
	Condition Nonsampled Reason	REAS					X
	Reserved Status	RESV	X				
	Owner Group	OWNG	X				
	Forest Type	FTYP	X				
	Stand Size Class	STSZ	X				
	Regeneration Status	SORI	X				
	Tree Density	DENS	X				
	Owner	OWNR	✖				
	Owner Class	OWNC	X				
	Reserved Area Name	RNAM	Xa				
	Artificial Regeneration Species	SOSP	Xb				
	Stand Age	SAGE	X				
	Disturbance 1, 2, and 3	DIS123	X				
	Disturbance Year 1, 2, and 3	DYR123	X				
	Treatment 1, 2, and 3	TRE123	X				
	Treatment Year 1, 2, and 3	TYR123	X				
	Stand Structure	MEST	ME				
	Physiographic Class	PHYS	X				
	Productivity Status	PROD	X				
	Land Cover Class		X	X	X	X	X
	Present Nonforest Land Use	NFLU		X			
	Canopy Cover Sample Method	CCSM	X	X			X
	Live Canopy Cover	LCC	X	X			X
	Live Plus Missing Canopy Cover	LMCC	X	X			X
	Current Afforestation Code	CRAF	X	X			
	Previous Afforestation Code	PRAF	Xc	Xc			
	Total Stems	STEM	Xd	Xd			
	Chaining Code	CHAN	X	X			
X	Data Required						
✖	Data required when Condition Class Status = 1 and Owner Group = 40						
Xa	Data required for all conditions with Reserved Status = 1						
Xb	Data required when Condition Class Status = 1 and Regeneration Status = 1						
ME	Data required in ME only						
Xc	Data required when Sample Kind = 2 and Condition Class = 1 or 2						
Xd	Data required when Current Afforestation Code = 1 or Previous Afforestation Code = 1						

Data Element		PDR Prompt	Data Required				
Subplot Data	Subplot Number		X	X	X	X	
	Subplot Status	STAT	1	2	3	4	
	Subplot Nonsampled Reason	REAS			X		
	Subplot Center Condition	SCEN	X	X	X	X	
	Microplot Center Condition	MCEN	X	X	X	X	
	Subplot Slope	SLOP	X				
	Subplot Aspect	ASP	X				
	Snow /Water Depth	SWD	X				
	Crown Closure	MECC		see Regional Appendix D			
	Subplot Condition List	CLST	X	X	X	X	
Boundary Data	Subplot Number		Y	Y			
	Plot Type	TYPE	Y	Y			
	Boundary Change*	CHNG*	Y	Y			
	Contrasting Condition	CCON	Y	Y			
	Left Azimuth	LAZM	Y	Y			
	Corner Azimuth	CAZM	Y	Y			
	Corner Distance	CDIS	Y	Y			
	Right Azimuth	RAZM	Y	Y			
	Percent Area	%ARE	C	C			
X	Data Required						
ME	Data required in ME only						
Y	Data required if multiple conditions occur on subplot or microplot						
*	Remeasurement (Sample Kind = 2) plot only						
C	Calculated by the MIDAS PDR Application						

		Trees ≥ 1.0 in DBH/DRC to < 5.0 in DBH/DRC						
		PAST >>	Null	1	1	NT	1	1
		TRST >>	1	0	1		2	3
Sapling Data	Data Element	PDR Prompt	Data Required					
	Tree Record Number	TR#	X	D	D	X	D	D
	Condition Class Number	CON#	X	X	X	X	X	X
	Azimuth	AZM	X	D	D	X	D	D
	Horizontal Distance	DIST	X	D	D	X	D	D
	Previous Tree Status*	PAST		D	D		D	D
	Present Tree Status	TRST	X	X	X	X	X	X
	Reconcile	RECO		X		X		
	Species	SPP	X	D	D	X	D	D
	Previous Diameter at Breast Height	DBHO		D	D		D	D
	Diameter at Breast Height	DBH	X		X	X		
	Diameter Check	DCHE			X	X		
	Total Length	THGT	P		P	P		
	Actual Length	ACTU	P		P	P		
	Length Method	METH	P		P	P		
	Crown Class	CCC	X		X	X		
	Compacted Crown Ratio	CRC	X		X	X		
	P3 Crown Class Variables	P3CRN	P		P	P		
	Cause of Death	CAUS					X	X
	Length to Diameter Measurement Point	DIAH	X		X	X		
Null	Microplot previously not installed							
NT	Tree not tallied last cycle							
D	Down loaded							
X	Data required							
	Tree variables for re-measured trees now on nonforest land (PAST = 1 or 2 and TRST = 0, 1, 2, or 3)							

Seed Data	Data Element	PDR Prompt	DR
	Species	SPP	X
	Condition Class Number	CON#	X
	Seedling Count	SED#	X
X	Data required if microplot has accessible forest land		

Site Tree Data	Data Element	PDR Prompt	DR
	Tree Record Number	TR#	X
	Condition Class List	CONL	X
	Species	SPP	X
	Diameter	DBH	X
	Site Tree Length	HGHT	X
	Tree Age Diameter	AGE	X
	Subplot Number	SUB#	X
	Azimuth	AZM	X
	Horizontal Distance	DIST	X
X	Data required for all newly defined conditions that do not have previous SI data		

REGIONAL APPENDIX J+WISCFI. PDR PROMPTS AND PDR PROMPT INDEX

Allegro Hot Keys

Menu and Subplot # Navigation:

F1 - Help
F2 - Next Menu
F3 - Previous Menu
F4 - Main Menu
F5 - Functions

CTRL/ALT+1 - Subplot 1 (Simultaneous CTRL on Allegro does not work)
CTRL/ALT+2 - Subplot 2 (Simultaneous CTRL on Allegro does not work)
CTRL/ALT+3 - Subplot 3 (Simultaneous CTRL on Allegro does not work)
CTRL/ALT+4 - Subplot 4 (Simultaneous CTRL on Allegro does not work)

Data Entry Functions:

Tab Left - Previous Record (only on Allegro)
Tab Right - Next Record/New Record (only on Allegro)

BkSp - Delete Entered Text
ESC - Exit edit mode and restore previously entered value

Blue+BkSP - Toggle between Touchscreen Off and On

Grid Only Operations:

CTRL+Down Arrow - Next Record/New Record
CTRL+Right Arrow - Toggle between Autojump Right (R) and Autojump Down (D)

PageUp - Scroll up through records a page at a time
PageDown - Scroll down through records a page at a time

Blue+Right Arrow - Scroll to the right ignoring conditional shading (only on Allegro)
Blue+Left Arrow - Scroll to the left ignoring conditional shading (only on Allegro)

Alphabetic Hotkeys:

CTRL/ALT+A - Data Entry Options
CTRL/ALT+B - Jump to middle of data fields (for screens with large amounts of data)
CTRL/ALT+E - For alphanumeric data items that require text to be entered in the field. An example would be 2.5.13 RESERVED AREA NAME.

CTRL/ALT+F - First Record
CTRL/ALT+L - Last Record
CTRL/ALT+G - Goto Record

CTRL/ALT+C - Next Tree Number

CTRL/ALT+D - Toggle between single record and grid data entry

CTRL/ALT+H – Home

CTRL/ALT+I - Select Subplot (Simultaneous CTRL on Allegro does not work)

CTRL/ALT+O - Previous Subplot

CTRL/ALT+U - Next Subplot

CTRL/ALT+S - Save Plot

CTRL/ALT+M - Get Slope Correction (Simultaneous CTRL on Allegro does not work)

CTRL/ALT+P - Diameter Root Collar

CTRL/ALT+N - Note

CTRL/ALT+W - Edit Current Record

CTRL/ALT+X - Edit Current Menu

CTRL/ALT+K - Read in GPS File Exchange Folder Coordinates

CTRL/ALT+Q - Sort Trees Ascending Azimuths, Trees then Saplings (Urban sorts Trees then Saplings on Microplot 11, 12, 13, 14. CoreUrban trees will not sort)

GPS Screen:

CTRL/ALT+G - Enter GPS Data Manually

Boundary Screen:

F5 along with selecting Boundary Diagrams will display the Boundary Lines

CTRL/ALT+Z - Boundary Diagram (accessible from all data entry screens) (Clicking on 1,2,3, or 4 will display only Subplot; Clicking on P displays all subplots)

Vegetation Screen:

CTRL/ALT+E - Vegetation Note

CTRL/ALT+V - Vegetation Species List

Canopy Cover Screen:

CTRL/ALT+C - Canopy Cover Calculator

PDR Prompt Index		Abbrev	Page	Abbrev	Page
Abbrev	Page	ELEV	36	SDESC	38
ACTU	157	ERRS	36	SEAS	30
AGE	189	EXAM	25	SED#	184
%ARE	118	FLCCh	65	SK	25
ASP	109	FTYP	75	SLOP	109
AZM	16	GPS	32	SOSP	79
AZM	35	HDIS	17	SPP	131
AZM	123	HGHT	189	SPP	184
AZM	190	HTCD	104	SPP	187
BHAR	181	HTMD	104	ST	22
CAUS	179	LAZM	117	STAT	23
CAZM	117	LCC	100	STAT	107
CCC	158	LCOV	86	STEM	103
CCON	117	LMCC	101	STFORPR	23
CCSM	97	MCEN	108	OP	
CDIF	36	METH	18	STSZ	76
CDIS	117	METH	32	SUB#	190
CDST	65	METH	158	SUBC	22
CHAN	103	MO	15	SWD	110
CHNG	116	MONT	26	TCC	151
CLST	111	MORT	179	THGT	157
CNTY	23	MOTY	15	TR#	122
CON#	64	NDEG	18	TR#	187
CON#	122	NDEG	33	TRAN	30
CON#	184	NFLU	88	TRE1	82
CONL	187	NMIN	19	TRE2	82
COORS	18	NMIN	34	TRE3	83
COORS	33	NSEC	19	TRGD	155
CRAF	102	NSEC	34	TRST	127
CRC	160	PAST	126	TYPE	116
CRSZ	30	PDOP	36	TYR1	83
CRW	29	PHYS	83	TYR2	83
CYCL	22	PLT#	23	TYR3	83
1-3DAM	164	PMON	27	UCRC	160
DATM	18	PRAF	102	UNIT	17
DATM	32	PROD	29	UNIT	22
DAY	27	PROD	85	UNIT	32
DBH	17	PRV#	26	WDEG	19
DBH	134	PYEAR	27	WDEG	34
DBH	189	QASC	29	WMIN	19
DBHO	134	QAST	28	WMIN	34
DCHE	151	RAZM	118	WSEC	19
DEAD	129	RDIS	27	WSEC	35
DECA	179	READ	37	WSPP	16
DENS	78	REAS	24	WTYP	28
DESC	16	REAS	67	WTYPE	16
DIAH	180	REAS	107	YEAR	26
DIS1	80	RECO	128		
DIS2	82	REGN	77		
DIS3	82	RIPA1-2	69		
DIST	35	ROTT	156		
DIST	123	S/M	15		
DYR1	82	SAFE	37		
DYR2	82	SAGE	79		
DYR3	82	SCEN	108		