Wisconsin State Forests
Continuous Forest Inventory

VOLUME II: FIELD DATA COLLECTION PROCEDURES FOR PHASE 3 INDICATORS

Version 5.0

Wisconsin Department of Natural Resources
Division of Forestry

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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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Version History:

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).]
2.0N-WisCFI.	October 2007 (adapted from USFS FIA Northern Region Version 4.0) October 2007 [WisCFI Volume II, Field Data Collection Procedures for Phase 3 Indicators, adapted from USFS FIA National Core Field Guide version 4.0 and FIA National Core Optional Down Woody Materials Lite Protocols Proposal (August, 2006).]
3.0N-WisCFI	October 2011 (adapted from USFS FIA Northern Region Version 5.0)
4.0N-WisCFI.	October 2016 (adapted from USFS FIA Northern Region Version 7.0.1) April 2017 [WisCFI Volume II, Field Data Collection Procedures for Phase 3 Indicators, adapted from USFS FIA National Core Field Guide version 5.1, FIA National Core Optional Down Woody Materials Lite Protocols Proposal (August, 2006), and USFS FIA Northern Region (NRS) Volume I Supplement version 7.1]
5.0N-WisCFI.	September 2021 (adapted from USFS FIA Northern Region Version 7.0.1 and 9.0.1) September 2021 [WisCFI Volume II, Field Data Collection Procedures for Phase 3 Indicators, adapted from USFS FIA National Core Field Guide version 5.1, FIA National Core Optional Down Woody Materials Lite Protocols Proposal (August, 2006), and USFS FIA Northern Region (NRS) Volume I Supplement version 9.0]

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

1.0 PLOT LEVEL DATA

1.26N+WisCFI REGEN BROWSE IMPACT [BRWS] (Plot-level variable)

BROWSE IMPACT refers to the consumption of tender shoots, twigs, and leaves of trees and shrubs used by ungulates for food. Estimate the amount of browsing pressure exerted on regeneration [by deer, elk, feral hogs, livestock, and moose]. The assessment considers the amount of browse pressure, which is a function of ungulate density and available food sources. Evaluation of browse impact requires diligence in considering variables that vary from plot to plot, such as the amount of sunlight reaching the forest floor, food preferences of local ungulate populations, availability of plants that ungulates eat, proximity of other food sources (e.g. cropland), density of competing understory vegetation, disturbance history, and other variables.

Record the browse impact on the area within the accessible forest land portion of the two subplots.

When collected: All plots with at least one accessible forest land condition class (PLOT STATUS = 1).
Field width: 1 digit
Tolerance: +/- 1 class
MQO: At least 90% of the time
Values:

1 Very Low: Plot is inside a well-maintained exclosure.
2 Low: Minimal browsing observed or vigorous seedlings present and of varied height (no well-maintained exclosure present). Herbaceous plants are present and they are able to flower and fruit.
3 Moderate: Browsing evidence observed but not common. Seedlings are common but with limited variability in height. Stump sprouts are heavily browsed or not evident. Herbaceous plants show a lack of or inhibited flowering and fruiting. There is little or no evidence of browsing on non-preferred plants.
4 High: Browsing evidence common on preferred vegetation. Preferred seedlings and herbaceous plants are rare or absent. Non-preferred plants show some evidence of herbivory and browse-resistant vegetation is limited in height growth. A browse line is beginning to be visible.
5 Very High: Browsing evidence is omnipresent. Non-preferred and browse-resistant plants show signs of heavy repeated browsing. A browse line is obvious.

3.0+N+WISCFI SUBPLOT INFORMATION

3.7 MICROPLOT CENTER CONDITION [MCEN]

3.7.5N REGENERATION MICROPLOT STATUS [SEST]

Record the code to indicate whether the microplot was sampled for advance regeneration. If there is any part of an accessible forest land condition present on a portion of the microplot where other subplot measurements are made but advance regeneration variables can't be assessed (e.g., because of snow, water), enter code 3 (Advance Regeneration Nonsampled).

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

1 Advance Regeneration Sampled – accessible forest land condition present on microplot
2 Advance Regeneration Sampled – no accessible forest land condition present on microplot
3 Advance Regeneration Nonsampled – accessible forest land condition present on microplot but advance regeneration variables can't be assessed (Core SEEDLING COUNT is still measured)
4 Advance Regeneration Not Sampled – QA crew did not measure subplot/microplot for Tree/Sapling/Seedling data. For use only on check plots (QA STATUS = 2 - 6). Not a legal entry on production plots (QA STATUS = 1 or 7).
5 Nonsampled (SUBPLOT STATUS = 3)

3.7.6N REGENERATION NONSAMPLED REASON

Record the reason why a microplot cannot be sampled for regeneration.

When collected: On all microplots where REGENERATION MICROPLOT STATUS = 3 or 5
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
Values:

10 Other (for example, snow or water covering vegetation that is supposed to be sampled) (Note Required)

3.7.7N MICROPLOT SITE LIMITATION [MLIM]

Record site limitation code 2, 3, or 4 if the limitation occurs on at least 30 percent of the accessible forest land present on the microplot, otherwise code as 1.

When collected: When at least one accessible forest land condition class (CONDITION CLASS STATUS = 1) is present on a microplot and Advance Regeneration is sampled on the subplot (REGENERATION MICROPLOT STATUS = 1).
Field width: 1 digit
Tolerance: none
MQO: At least 99% of the time
Values:

1 No site limitation
2 Rocky surface with little or no soil
3 Water-saturated soil (during the growing season)
4 Thick duff layer (in excess of two-inches thick)

5.0+N+WISCFI TREE AND SAPLING DATA

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 ≥ 1.0 inch DBH
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) ≥ 1.0 inch DBH
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 ≥ 1.0 inch DBH
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.

6.0+N+WISCFI TREE SEEDLING REGENERATION DATA

The tree seedling sample is designed to inventory and monitor the forest's regenerative capacity. Tree seedling counts are used along with the sapling tally to estimate Tree Seedling Regeneration (Regeneration Indicator). Information for the Regeneration Indicator, specifically lengths, is required for estimating regeneration success.

Regeneration information is obtained by counting established 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. Hardwood and conifer seedlings must be at least 2.0 inches in length (with at least two normal-sized leaves that do not still bear cotyledons) 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 SUBPLOT, SPECIES, CONDITION CLASS, SEEDLING SOURCE, AND LENGTH 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.

For a summary of seedling count criteria, see Figure 1N Tree Seedling Regeneration seedling count flow chart.

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 when Advance Regeneration is not sampled on the subplot (REGENERATION MICROPLOT STATUS = 3)
Field width: 3 digits
Tolerance: No errors for 5 or less per species; +/- 20% over a count of 5
MQO: At least 90% of the time
Values: 001 through 999

6.4.3N+WisCFI REGENERATION SEEDLING COUNT [ARS#]

On each microplot, record the number of established live tally tree seedlings by SPECIES, CONDITION CLASS NUMBER, SEEDLING SOURCE, and LENGTH CLASS. The first five seedlings of each SUBPLOT—SPECIES—CONDITION CLASS—SEEDLING SOURCE—LENGTH CLASS combination must be counted precisely. Counts above five seedlings may be estimates if needed to save time for 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 SUBPLOT--SPECIES--CONDITION CLASS--SEEDLING SOURCE--LENGTH CLASS combination. Established hardwood and conifer seedlings must be at least 2.0 inches in length (with at least two normal-sized leaves that do not still bear cotyledons) 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.

Small oak, hickory, walnut, and butternut seedlings (less than 12.0 inches in length) should be at least 6.0 inches in length or have a root-collar diameter (RCD) of at least 0.25 inches.

For a summary of seedling count criteria, see Figure 1N.

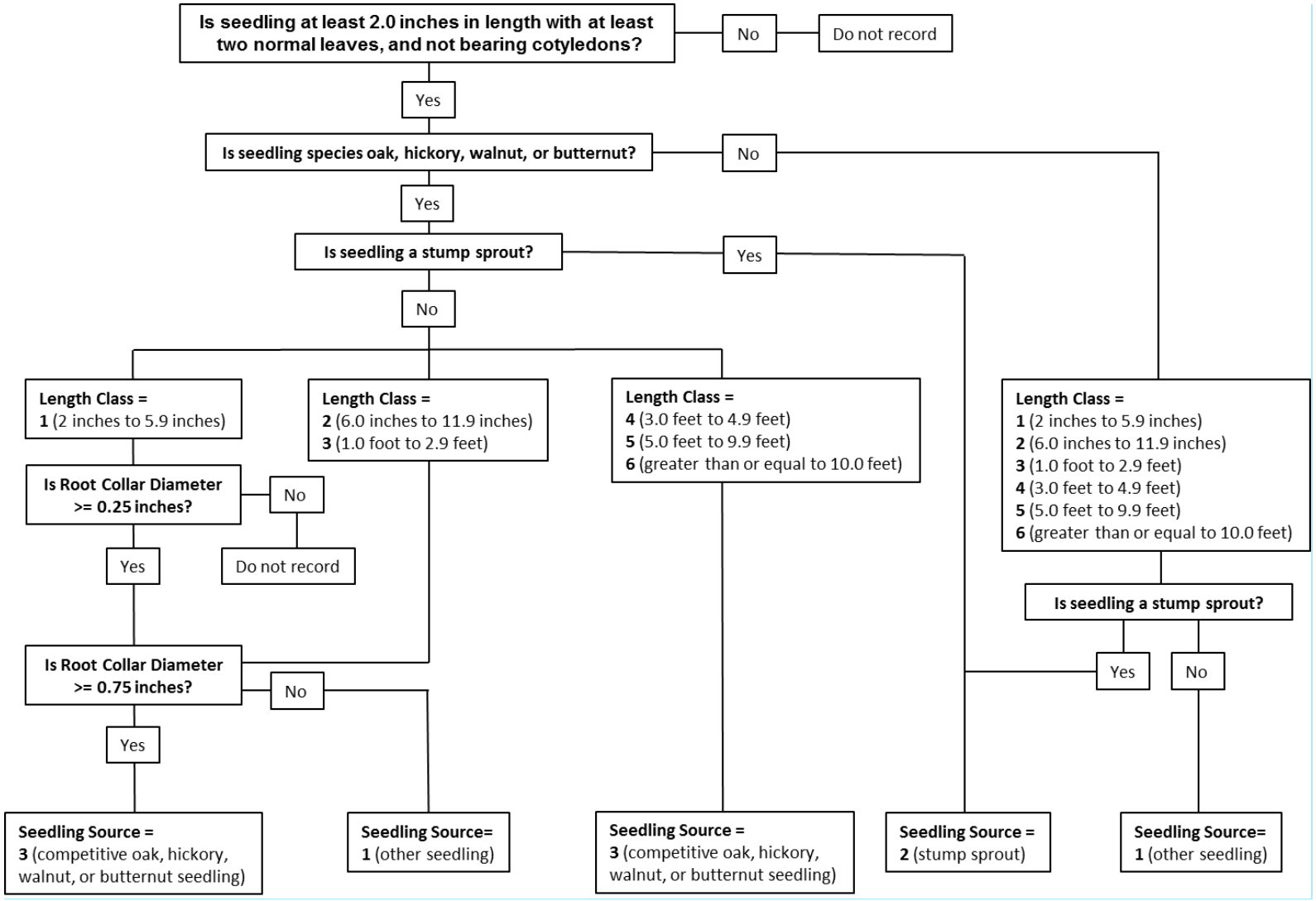

Figure 1N. Tree Seedling Regeneration seedling count flow chart.

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. Tally only the tallest sprout for each stump. 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. Stumps must be at least 2 inches in diameter to qualify as having sprouts.

Accurate tally of all tree seedlings and saplings are required and must be completed during the leaf on window. The opening and closing of this window varies throughout the Region and from year to year, but in general begins as early as the first of May and closes as late as the end of September. The key quality assurance measure is whether the Regeneration Indicator can be repeated and remeasured over a cycle length (generally 5, 7 or 10 years).

When collected: Each accessible forest land condition class on each microplot when Advance Regeneration is sampled on the subplot (REGENERATION MICROPLOT STATUS = 1).
Field width: 3 digits
Tolerance: No errors for 5 or less per species SUBPLOT—SPECIES—CONDITION CLASS—SEEDLING SOURCE—LENGTH CLASS combination; +/- 20% over a count of 5
MQO: At least 90% of the time
Values: 001 through 999

6.4.4N SEEDLING SOURCE [SRCE]

Discriminate between stump sprouts and other seedlings.

A special code (3) is used for oak, hickory, walnut, and butternut that are classified as “competitive.” Research indicates that competitive seedlings are highly likely to become dominant or codominant stems in the next stand during forest succession. To be classified as competitive, stems must have a root collar diameter (RCD) > 0.75 inches or have a length of at least 3 feet. In situations with relatively high tally, it should only be necessary to check at least 10% of RCD’s.

When collected: All counts of seedlings when Advance Regeneration is sampled on the subplot (REGENERATION MICROPLOT STATUS = 1).
Field width: 1 digit
Tolerance: none
MQO: At least 99% of the time
Values:

1 other seedling
2 stump sprout
3 Competitive oak, hickory, walnut, or butternut seedling

6.4.5N LENGTH CLASS [LNGC]

Each seedling is assigned a length class.

When collected: All counts of seedlings when Advance Regeneration is sampled on the subplot (REGENERATION MICROPLOT STATUS = 1).
Field width: 1 digit
Tolerance: none
MQO: At least 99% of the time
Values:

1	2 inches to < 6 inches	4	3 feet to < 5 feet
2	6 inches to < 1 foot	5	5 feet to < 10 feet
3	1 foot to < 3 feet	6	Greater than or = 10 feet

Note: when using the data recorder the seedling source and the length class are combined in a table for ease of use.

9.0+N INVASIVE PLANTS

The objectives of the Phase 2 (P2) invasive plants protocol are to document abundance and monitor changes in abundance of selected species over time. Combined with other plot data and other datasets, these data can be used to predict the future spread of selected species. Invasive plant species are having tremendous economic and ecological impacts on our nation's forests, and the impacts are increasing over time. Providing accurate, statistically valid estimates of the distribution and abundance of some of the most damaging species will give managers and policy-makers a better understanding of the problem than they would otherwise have.

Data will be collected by crew members who have been certified in the Invasive plants protocol methods. These crew members are expected to have field guides that allow for unambiguous identification of the plant species on the list they are to use, and certification in field identification and cover estimation of those species under different conditions.

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

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.

9.1+N Invasive Species Sample Design

Phase 2 sampling of invasive species is most often focused on accessible forest condition classes within the 24.0 -foot radius subplot. If the total area of all accessible forest land condition classes is less than 100 percent on a subplot, invasive species measurements are done only on the portion that is in accessible forest land condition classes. If multiple accessible forested condition classes are present on the subplot, separate estimates are made for each condition class on the subplot. Canopy cover estimates are only made for the area within accessible forest condition(s)—for example, vegetation cover over-hanging a nonforest road condition is not included in the estimate.

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

Canopy cover is estimated for any listed invasive species (Appendix 9+N) present on the measured condition(s) of a subplot, regardless of abundance (i.e., there is no minimum cover threshold for sampling). When crews are not sure about the identification of a plant that might be a listed invasive, they are encouraged to collect specimens for later identification (Appendix 10+N). Rules and expectations for plant collection and identification are specified by individual units.

NRS CORE Note: NRS will complete P2 Invasive Plants (NRS manual section 9.0) protocols during the window of May 1st through September 30th.

9.2+N Species Records

The invasive plant recorder does a search of each measured condition on the subplot. Only listed species rooted in or overhanging (and rooted out of) this condition are included. For tree species, there are no minimum (or maximum) length limits as are required for seedling counts. All foliage that is or was alive during the current growing season is included in the cover estimates (e.g., brown Canada thistle in late summer is counted, live buds on Russian olive in late fall are used to estimate canopy cover).

Total cover is estimated on measured conditions on each 24.0 foot radius subplot for every species on the invasive plant list found. If multiple conditions are being sampled on the same subplot, separate cover estimates for every species must be made.

9.3+WisCFI SUBPLOT NUMBER

Record the code corresponding to the number of the subplot.

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

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

9.4 CONDITION CLASS NUMBER [CON#]

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

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

9.5+WisCFI SPECIES CODE [ISPP]

Record the code for any species listed in your region's invasive plant species list (Appendix 9+N) that is found rooted in or overhanging (and rooted out of) the measured condition within the subplot. Species codes must be the standardized codes in the Natural Resource Conservation Service (NRCS) PLANTS database September 15, 2017 version maintained by the FIA IM group (USDA, NRCS. 2017. The PLANTS database [http://plants.usda.gov/plants]. National Plant Data Center, Baton Rouge, LA 70874-4490).

If a species is suspected of being a listed invasive but cannot be identified quickly and confidently, and the unit's protocols require specimen collection, assign a NRCS PLANTS unknown code. A subset of acceptable unknown codes that can be used is listed below. Collect a specimen unless the species is locally sparse. A species is "locally sparse" if five or fewer plants are present in the entire plot (2 subplots) and immediate surrounding area.

Unknown Code	Common Name
2FERN	Fern or Fern Ally
2FORB	Forb (herbaceous, not grass nor grasslike)
2GRAM	Graminoid (grass or grasslike)
2PLANT	Plant
2SHRUB	Shrub (>.5m)
2SUBS	Subshrub (<.5m)
2TREE	Tree
2VH	Vine, herbaceous
2VW	Vine, woody

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

9.5.1N Unknown Plants and Voucher Specimen Collection

Collection of a plant specimen is required if:

1. You cannot quickly and confidently ID a plant that you think is on our invasive plants list.
2. You find one of the invasive plants on our list, but it has not been found in the State in which the plot is located. Use the field ID guide, A Guide to Nonnative Invasive Plants Inventoried in the North by Forest Inventory and Analysis, by Cassandra Olson and Anita F. Cholewa, to determine which states the invasive has not been recorded. The distribution maps in these guides are from the NRCS Plants Database.

Follow these Basic Steps:

1. Assign a valid NRCS PLANTS genus (listed in Appendix 9+N) or unknown code (listed in 9.5) and assign a unique species number (see 9.6)
2. Record if a specimen was collected or not in INVASIVE SPECIMEN COLLECTED (see 9.8).
3. When a specimen is collected, enter a SPECIMEN LABEL NUMBER (see 9.9). Place the pre-printed label with the corresponding label number in the bag with the specimen.
4. If no specimen is collected, record in INVASIVE PLANT NOTES why (see 9.10).
5. Describe the unknown species in INVASIVE PLANT NOTES (see 9.10).
6. Record the canopy cover estimates for the sample units where the plant was encountered, as for any identified species.

SPECIAL SAFETY NOTE FOR NRS: Please do not collect known hazardous plants, such as Ailanthus altissima or Heracleum mantegazzianum (Giant hogweed). These plants are known to cause blisters and/or rashes.

9.6 UNIQUE SPECIES NUMBER [UNQ#]

When any species code is entered for the first time on a plot, the UNIQUE SPECIES NUMBER assigned is “1”. If more than one unidentified species is recorded that is described by the same unknown code, the next sequential number is assigned. If a previously-recorded unidentified

species is encountered again elsewhere on the plot, the UNIQUE SPECIES NUMBER that corresponds to the earlier encountered specimen must be entered. For example, an unknown thistle and unknown hawkweed would both be given a species code of “2FORB” but would need to be given different UNIQUE SPECIES NUMBERs when measured.

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

9.7+N SPECIES CANOPY COVER [Cx%]

A rapid canopy cover estimate, to the nearest percent cover, is made for each species for all foliage across all layer heights. Canopy cover is based on a vertically-projected polygon described by the outline of the foliage, ignoring (i.e. without subtracting) any normal spaces occurring between the leaves of plants (Daubenmire 1959), and ignoring overlap among multiple layers of a species [i.e. overlapping crowns are not double-counted (visualize the canopy cover collapsed into a 2-dimensional space)]. For each species, cover can never exceed 100 percent; the maximum possible canopy cover is the percentage of the subplot area within the accessible forested condition. Cover is estimated for each measured condition on the subplot separately. However, the foliage cover is always estimated as a percent of an entire subplot. For example, on a subplot with two sampled conditions, a species occurs with a cover equal to a circle with a radius of 7.6 feet on the full subplot, or 10 percent cover. On condition class #1 it covers an area equal to a circle of 2.4 feet radius and is recorded as 1 percent cover. The remainder, 9 percent cover, is recorded for condition #2. If the species is only present on condition class #1 with an area equal to a circle of 2.4 - feet radius it is recorded as 1 percent. The proportion of the subplot in each condition does not matter.

NRS CORE Note: The SPECIES CANOPY COVER percent cannot exceed the percent area represented for the forested condition

If cover is greater than 0 but less than 1.5 percent, record as 1 percent cover. For species of moderate cover, it may be easiest to divide the subplots into quarters, estimate canopy cover of each quarter separately, and then add them together. The following area-cover sizes may be useful in developing estimates for an entirely forested subplot:

Subplot radius = 24.0 feet, Subplot area = 1809 ft2			
Cover	Area (ft2)	Length of a side of a square(ft)	Radius of circular area(ft)
1%	18	4.3	2.4
3%	54	7.4	4.1
5%	90	9.5	5.3
10%	181	13.4	7.6
20%	362	19	10.7

Table 1. Area-cover sizes useful in developing estimates for an entirely forested subplot.

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

9.8 INVASIVE SPECIMEN COLLECTED [VOUC]

Record a code to indicate whether or not a specimen was collected for each species genus or unknown code entered as a new unique species. If the record is an unknown code, your unit requires specimen collection, and a plant specimen is not collected, describe the reason it was not collected in 9.10, INVASIVE PLANT NOTES.

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

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

9.9+N SPECIMEN LABEL NUMBER [LABL]

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

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

NRS CORE PDR Note: MIDAS will auto populate the SPECIMEN LABEL NUMBER with a unique code, when INVASIVE SPECIMEN COLLECTED = 1.

9.9.1N Field Specimen Label

Revised data collection software auto-generates a SPECIMEN LABEL NUMBER when a specimen is collected. Write out the generated SPECIMEN LABEL NUMBER on a small piece of paper and include it in the bag with the specimen.

9.9.2N Official Specimen Label

Official specimen labels are printed from plot data and accompany the specimen as it is pressed, dried, and submitted for further identification. Labels will not include sensitive plot identification data – the unique specimen label number is sufficient identification for each specimen.

Specimen Voucher Label Number:	Resolved Species Code:
Resolved scientific name:	
Resolved by (name):	
Date Collected:	
Unknown Code:	Unique Species Nbr:
Field collected scientific name:	
Collected by:	
State:	County:
Community type(s) where found:	
Species Notes:	

9.10+N INVASIVE PLANT NOTES

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

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

NRS Note: Record this note while in the invasive species record. Press the “Ctrl”+“N”.

Listed are reasons why a specimen was not collected:

- Species is locally sparse
- Species has less than 1% canopy cover on the subplot and no mature foliage or reproductive parts are present
- Hazardous situation
- Time limitation
- Already collected with previous entry of genus or unknown code with the same unique species number
- Specimen collected for immediate/local identification only
- Other (explain in notes)

9.11 References

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

13.0N-WISCFI EARTHWORM PRESENCE

There are no native earthworms in much of North America; and the presence of earthworms within a forest ecosystem is enormous as they actively consume leaf litter fundamentally changing how the microbial community is decomposing. Soils which have been invaded by earthworms can be recognized by an absence of leaf litter. For example, in a sugar maple - white ash - beech - northern red oak association, only the oak leaves will be seen on the forest floor until late spring / early summer as they fall later and are less palatable then maple, ash, and beech.

In contrast, sites that have no earthworms have several years of accumulated leaf litter and organic matter above the soil. This has implications for plant seed germination, water holding capacity and infiltration among other things.

The impact of earthworms is estimated by evaluating the appearance of soil within the microplot and subplot. While it is assumed there will be earthworms within a subplot there are several indicator factors that will allow you to determine this with certainty. The presence/absence of leaf litter should be measured as well as the appearance of middens and Pennsylvania sedge “Carex pennsylvanica”. Additional indicators include compacted soil, exposure of tree roots, invasive plant species, and evident erosion.

There are three main species of exotic earthworms:

Surface dwelling	(Epigeic)	“Red wiggler”	Dendrobaena veneta or Eisenia fetida
Topsoil dwelling	(Endogeic)	“Red or Leaf worms”	Lumbricus rebellus
Soil dwelling	(Anecic)	“Nightcrawlers”	Lumbricus terrestris

Any worm damage coded will be assumed to be from the genus Lumbricus. Species identification is not required.

Estimates of earthworm presence and their impact will be collected on all forested conditions.

13.1N-WisCFI CONDITION NUMBER [CON#]

Use the same procedure outlined in Section 2.0

When collected: All assessments of earthworm presence and impact.

13.2N-WisCFI WORM IMPACT ESTIMATE [WIE1, WIE2]

Assuming there will be earthworms within all subplots visually assess the subplot, by condition class, determining; low, moderate, and heavy infestation for the presence of earthworms and their impact.

When collected: All forested condition classes on each subplot.
Field Width: 1 digit
Tolerance: One class
MQO: At least 90% of the time
Values:

0 Intact leaf litter, native plant regeneration, no appearance of middens
1 Low - <50% diminished leaf litter but healthy understory, wide species diversity, sporadic middens
2 Moderate - >50%+ Intermittent patches of Carex pennsylvanica, remnant leaf litter, moderate regeneration, middens not uncommon, invasive plants
3 Heavy – Infestation apparent through bare soil, middens, exposed tree roots, low to no regeneration of trees.
4 Diminished leaf litter with no regeneration
5 Intact leaf litter with no regeneration, no appearance of middens
6 Condition not present on this subplot

22.0+N SOIL MEASUREMENTS AND SAMPLING

The objective of the Phase 3 (P3) Soils Indicator is to assess forest ecosystem health in terms of the physical and chemical properties of the soils. The soil resource is a primary component of all terrestrial ecosystems, and any environmental stressor that alters the natural function of the soil has the potential to influence the vitality, species composition, and hydrology of forest ecosystems.

Specifically, soils data are collected on P3 plots to assess:

- the potential for erosion of nutrient-rich top soils and forest floors.
- factors relating to the storage and cycling of nutrients and water.
- the availability of nutrients and water to plants (dependent upon soil structure and texture).

Nutrient and water availability to forest vegetation is also dependent on the physical capacity of roots to grow and access nutrients, water, and oxygen from the soil. In addition to playing an important role in plant nutrition, the physical properties of the soil largely determine forest hydrology, particularly with regards to surface and ground water flow. Human activities that result in the destruction of soil aggregates, loss of pore space (compaction), and erosion may increase rates of surface runoff and alter historic patterns of stream flow. In some areas, these changes may result in flooding and/or dewatered streams and can reflect on both the health of aquatic ecosystems and the management and conservation of associated forest and agricultural areas.

22.1+N Summary Of Method

The soil measurement and sampling procedures are divided into soil erosion, soil compaction. Data collection for soil erosion assessment consists of estimating the percent of bare soil in each subplot. These measurements are combined with data from other sources and used to parameterize established models for erosion potential (RUSLE – Revised Universal Soil Loss Equation, WEPP – Water Erosion Prediction Project). Soil compaction measurements consist of an estimate of the percentage of soil compaction on each subplot along with a description of the type of compaction. Data are recorded using a handheld computer (PDR) with a preloaded data input program.

22.2 Definitions

Cryptobiotic crusts: A layer of symbiotic lichens and algae on the soil surface (common in arid regions)

Duff (Humus): A soil layer dominated by organic material derived from the decomposition of plant and animal litter and deposited on either an organic or a mineral surface. This layer is distinguished from the litter layer in that the original organic material has undergone sufficient decomposition that the source of this material (e.g., individual plant parts) can no longer be identified.

Forest floor: The entire thickness of organic material overlying the mineral soil consisting of the litter and the duff (humus).

Litter: Undecomposed or only partially decomposed organic material that can be readily identified (e.g., plant leaves, twigs, etc.)

Loam: The textural class name for a soil having a moderate amount of sand, silt, and clay.

Mineral soil: A soil consisting predominantly of products derived from the weathering of rocks (e.g., sands, silts, and clays).

Soil erosion: The wearing away of the land surface by running water, wind, ice or other geological agents.

Texture: The relative proportion of sand, silt, and clay in a soil.

22.3 Equipment And Supplies
Minimum required equipment is listed below. Field personnel may add equipment as needed to improve efficiency in some areas.

22.3.1 Field Gear Unique to the Soil Indicator

- Retractable measuring tape or ruler graduated in tenths of an inch for measuring soil layer depths.
- Garden trowel or hand shovel for sampling forest floor and excavating soil sample hole where soil core sampler cannot be used.
- Small knife with sharp blade for sampling the forest floor layers.
- Pruning shears (very useful in cutting through roots and litter).
- Plastic water bottle for use in hand-texturing soil.
- Small plastic tarp (1 yd x 1 yd) to use as a working surface.
- Cleaning cloths or tissues.

22.3.2 Optional Soils Equipment

- Garden gloves.

22.3.3 Required Equipment not Unique to the Soil Indicator:

- Compass for locating sampling points.
- Measuring tape -100 ft loggers tape for measuring distance to sampling locations.

22.4 Laboratory Analyses Not Collected in WisCFI

22.5 Quality Assurance (QA) Not Collected in WisCFI

22.6 Plot Information

22.6.1 CURRENT DATE
Record the year, month, and day that the current plot visit was completed as described in 22.6.1.1 – 22.6.1.3.

22.6.1.1 YEAR
Record the year that the plot was completed.

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

22.6.1.2 MONTH

Record the month that the plot was completed.

When collected: All soils 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

22.6.1.3 DAY

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

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

22.6.2 CREW NUMBER

Record the code to indicate the number assigned to the crew member who collected soils on this plot. The first 2 digits are for the responsible unit's station number (NRS – 24xxxx, SRS – 33xxxx, RMRS – 22xxxx, and PNW – 26xxxx)

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

NRS	240001 – 249999

22.6.3 QA STATUS

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

When collected: All soils 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)

22.6.4 NOTES

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

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

22.7+N+WisCFI Soil Erosion And Compaction

Erosion is defined as the wearing away of the land surface by running water, wind, or ice. Erosion is a natural process that occurs on all non-flat areas of the landscape. However, human activity (such as timber removal or road-building) can result in accelerated rates of erosion that degrade the soil and reduce the productivity of land. Extensive areas of soil erosion can have a major effect on the aquatic ecosystems associated with forests, recreational opportunities, potable water supplies and the life span of river infrastructure (e.g., dams, levees).

On average, the U. S. loses about 5 billion tons of soil annually to water and wind erosion. As this soil is removed from the landscape, it carries with it all of the nutrients and organic matter that took decades to centuries (or longer) to build up. On human time scales, fertile topsoil is not a renewable resource.

On WisCFI plots, soil erosion potential is estimated using published models, such as the Revised Universal Soil Loss Equation (RUSLE) and the Water Erosion Prediction Project (WEPP). These models are based on factors that represent how climate, soil, topography, and land use affect soil erosion and surface runoff. Generally, these models require the following factors for analysis: percent slope, slope length, precipitation factor, vegetation cover, and litter cover. Some of these factors are collected as part of the P2 mensuration data and other P3 indicators (percent slope and vegetation cover), one factor is obtained from outside sources (precipitation factor), and the remaining factors (% cover, which is given by 100 minus % BARE SOIL) are measured on each subplot as part of the soil indicator.

Estimates of bare soil are made on all two subplots.

Compaction refers to a reduction in soil pore space and can be caused by heavy equipment or by repeated passes of light equipment that compress the soil and break down soil aggregates. This compression increases the bulk density and reduces the ability of air and water to move through the soil. These conditions also make it more difficult for plant roots to penetrate the soil and obtain necessary nutrients, oxygen, and water.

In general, compaction tends to be a greater problem on moist soils and on fine-textured soils (clays). These effects can persist for long periods of time and may result in stunted tree growth.

Information about compaction is collected on all subplots that are in a forested condition. Compaction data collected as part of the soil indicator include an estimate of the percent of each subplot affected by compaction and the type(s) of compaction present.

22.7.1 PERCENT COVER OF BARE SOIL

Record a two-digit code indicating the percentage of the subplot that is covered by bare soil (mineral or organic). Fine gravel [0.08-0.20 inch (2-5 mm)] should be considered part of the bare soil. However, do not include large rocks protruding through the soil (e.g., bedrock outcrops) in this category because these are not erodible surfaces. For the purposes of the soil indicator, cryptobiotic crusts are not considered bare soil.

If the subplot includes nonforested areas, multiply the % COVER OF BARE SOIL in the forested part of the subplot by the % of the subplot that is in forested area. For example, if 50% of the

subplot is forested and the % COVER OF BARE SOIL of the forested part is 30%, then the % COVER OF BARE SOIL for the entire subplot is 15%.

When collected: When any portion of the subplot contains at least one accessible forested condition class
Field Width: 2 digits
Tolerance: +/- 10%
MQO: 75% of the time
Values:

00	Absent	35	31-35%	75	71-75%
01	Trace	40	36-40%	80	76-80%
05	1 to 5%	45	41-45%	85	81-85%
10	6-10%	50	46-50%	90	86-90%
15	11-15%	55	51-55%	95	91-95%
20	16-20%	60	56-60%	99	96-100%
25	21-25%	65	61-65%		
30	26-30%	70	66-70%		

22.7.2+N PERCENT COMPACTED AREA ON THE SUBPLOT

Record a two-digit code indicating the percentage of the subplot that exhibits evidence of compaction. Soil compaction is assessed relative to the conditions of adjacent undisturbed soil. Do not include improved roads in your evaluation.

NRS Note: In strip mines areas, if available use undisturbed forest adjacent to the strip mine and compare the two soils to make the determination if compaction is present. If no undisturbed forest in near, consider the area uncompacted relative to its surrounding.

When collected: When any portion of the subplot contains at least one accessible forested condition class
Field Width: 2 digits
Tolerance: +/- 15%
MQO: 75% of the time
Values:

00	Absent	35	31-35%	75	71-75%
01	Trace	40	36-40%	80	76-80%
05	1 to 5%	45	41-45%	85	81-85%
10	6-10%	50	46-50%	90	86-90%
15	11-15%	55	51-55%	95	91-95%
20	16-20%	60	56-60%	99	96-100%
25	21-25%	65	61-65%		
30	26-30%	70	66-70%		

22.7.3 TYPE OF COMPACTION - RUTTED TRAIL

Type of compaction is a rutted trail. Ruts must be at least 2 inches deep into mineral soil or 6 inches deep from the undisturbed forest litter surface. Record a “1” if this type of compaction is present; record a “0” if it is not present.

When collected: When PERCENT COMPACTED AREA ON THE SUBPLOT > 00
Field Width: 1 digit
Tolerance: No errors
MQO: 75% of the time
Values:

1	Present
0	Not present

22.7.3.1N-WisCFI NUMBER OF RUTS ON SUBPLOT

Record a two-digit code indicating the number of ruts on subplot. One rut is equal to one wheel track. A rut an elongated depression in a trail or roadway caused by dragged logs or by wheels or tracks of harvesting machinery and is often exacerbated by erosion from uncontrolled storm water runoff. Do not record ruts that are less than 6 inches deep in their entirety (from the original soil surface) or ruts that are less than 5 feet long.

When collected:
Field Width: 2 digits
Tolerance:
MQO:
Values: 00 to 99

22.7.3.2N-WisCFI LONGEST RUT ON SUBPLOT: TOTAL LENGTH

Record a two-digit code indicating the length (in feet) of the longest rut on subplot.

When collected:
Field Width: 2 digits
Tolerance:
MQO:
Values: 00 to 99 feet

22.7.3.3N-WisCFI LONGEST RUT ON SUBPLOT: LENGTH THAT EXCEEDS 6 INCHES IN DEPTH

Record a two-digit code indicating the length (in feet) of the portion of the longest rut that exceeds a depth of 6 inches on subplot. The depth should be measured from the original soil surface. If individual lug impressions are visible, measure to the “top” of the lug impression.

When collected:
Field Width: 2 digits
Tolerance:
MQO:
Values: 00 to 99 feet

22.7.3.4N-WisCFI LONGEST RUT ON SUBPLOT: LENGTH THAT EXCEEDS 10 INCHES IN DEPTH

Record a two-digit code indicating the length (in feet) of the portion of the longest rut that exceeds a depth of 10 inches on subplot. The depth should be measured from the original soil surface. If individual lug impressions are visible, measure to the “top” of the lug impression.

When collected:
Field Width: 2 digits
Tolerance:
MQO:
Values: 00 to 99 feet

22.7.3.5N-WisCFI LONGEST RUT ON SUBPLOT: MAXIMUM DEPTH FROM ORIGINAL SOIL SURFACE

Record a three-digit code indicating the maximum depth of the longest rut on the subplot. The depth should be measured from the original soil surface. If individual lug impressions are visible, measure to the “top” of the lug impression. Measure the depth in inches.

When collected:
Field Width: 3 digits
Tolerance:
MQO:
Values: 000 to 999 inches

22.7.3.6N-WisCFI LONGEST RUT ON SUBPLOT: MAXIMUM DEPTH FROM THE TOP OF THE RUT

Record a three-digit code indicating the maximum depth of the longest rut on the subplot. The depth should be measured from the top of the rut. If individual lug impressions are visible, measure to the “top” of the lug impression. Measure the depth in inches.

When collected:
Field Width: 3 digits
Tolerance:
MQO:
Values: 000 to 999 inches

22.7.3.7N-WisCFI LONGEST RUT ON SUBPLOT: EXTENSION OF RUT BEYOND SUBPLOT

Record a one-digit code indicating whether the longest rut extends beyond the subplot.

When collected:
Field Width: 1 digit
Tolerance:
MQO:
Values:

1 Yes (Rut extends beyond subplot)
0 No (Rut does not extend beyond subplot)

22.7.3.8N-WisCFI LONGEST RUT ON SUBPLOT: TYPE OF INFRASTRUCTURE

Record a one-digit code indicating on what part of the infrastructure the rut occurred.

When collected:
Field Width: 1 digit
Tolerance:
MQO:
Values:

0 Absent
1 Road
2 Landing
3 Primary Skid Trail (3 or more passes of equipment)
4 Secondary Skid Trail (1 or 2 passes of equipment)
5 General Harvest Area
6 Multiple Areas
7 Recreational Trail/Other (explain in plot notes)

22.7.3.9N-WisCFI LOCATION OF LONGEST RUT ON SUBPLOT: LOCATION

Record a one-digit code indicating where the rut occurred.

When collected:
Field Width: 1 digit
Tolerance:
MQO:
Values:

0 Absent
1 Upland Area (outside of RMZ)
2 Wetland Area (outside of RMZ)
3 Riparian Management Zone (within 100 feet of lakes and perennial streams or within 35 feet of intermittent streams)
4 Multiple Areas

22.7.3.10N-WisCFI LONGEST RUT ON SUBPLOT: SLOPE ORIENTATION

Record a one-digit code indicating the orientation of the slope where the rut occurred.

When collected:
Field Width: 1 digit
Tolerance:
MQO:
Values:

0 Absent
1 Rut runs up/down the slope
2 Ruts runs across the slope
3 Ruts is on a flat area (slope equals 5% or less)
4 Multiple Areas

22.7.3.11N-WisCFI LONGEST RUT ON SUBPLOT: ACTIVE EROSION

Record a one-digit code indicating whether there is active erosion occurring at the rut.

When collected:
Field Width: 1 digit
Tolerance:
MQO:
Values:

1 Yes (There is active erosion occurring.)
0 No (There is not active erosion occurring.)

22.7.3.12N-WisCFI LONGEST RUT ON SUBPLOT: ALTERED DRAINAGE

Record a one-digit code indicating whether the drainage patterns were altered as a result of the rut.

When collected:
Field Width: 1 digit
Tolerance:
MQO:
Values:

1 Yes (The drainage was altered.)
0 No (The drainage was not altered.)

22.7.3.13N-WisCFI LONGEST RUT ON SUBPLOT: CAUSE

Record a one-digit code indicating the apparent cause of the rut.

When collected:
Field Width: 1 digit
Tolerance:
MQO:
Values:

0 Absent
1 Harvesting equipment
2 ATVs or other off-road vehicles
3 Undetermined cause
4 Multiple causes

22.7.3.14N-WisCFI LONGEST RUT ON SUBPLOT: AGE

Record a one-digit code indicating the approximate age of the rut.

When collected:
Field Width: 1 digit
Tolerance:
MQO:
Values:

0 Absent
1 Less than 1 week
2 Less than 1 month
3 Less than 3 months
4 More than 3 months
5 Undetermined age

22.7.4 TYPE OF COMPACTION – COMPACTED TRAIL

Type of compaction is a compacted trail (usually the result of many passes of heavy machinery, vehicles, or large animals). Record a “1” if this type of compaction is present; record a “0” if it is not present.

When collected: When PERCENT COMPACTED AREA ON THE SUBPLOT > 00
Field Width: 1 digit
Tolerance: No errors
MQO: 75% of the time
Values:

1 Present
0 Not present

22.7.5 TYPE OF COMPACTION – COMPACTED AREA

Type of compaction is a compacted area. Examples include the junction areas of skid trails, landing areas, work areas, animal bedding areas, heavily grazed areas, etc. Record a “1” if this type of compaction is present; record a “0” if it is not present.

When collected: When PERCENT COMPACTED AREA ON THE SUBPLOT > 00
Field Width: 1 digit
Tolerance: No errors
MQO: 75% of the time
Values:

1 Present
0 Not present

22.7.6+N TYPE OF COMPACTION – OTHER

Type of compaction is some other form. Record a “1” if this type of compaction is present; record a “0” if it is not present. (An explanation must be entered in the plot notes).

When collected: When PERCENT COMPACTED AREA ON THE SUBPLOT > 00
Field Width: 1 digit
Tolerance: No errors
MQO: 75% of the time
Values:

1	Present
0	Not present

NRS Note: Multiple types for Compaction can be coded if present on a subplot.

22.8+N Soil Sample Collection Not Collected in WisCFI

22.9 Sample Labels Not Collected in WisCFI

22.10 Sample Shipping Not Collected in WisCFI

22.11 Tasks That Can Be Performed By Other Crew Members Not Collected in WisCFI

22.12 References

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23.0+N CROWNS MEASUREMENTS AND SAMPLING

23.1+N Overview

Crown indicators are designed to be used together. Each indicator comprises a piece of information that can be used individually or as a factor in combination with other indicators. Each variable, alone or in combination with others, adds to the overall rating given each tree. It is important to realize that models are designed to rate trees on how they look, from thriving to almost dead and to help predict future conditions of trees and forest ecosystems.

Crown evaluations, including DIEBACK, and TRANSPARENCY are made on all trees with DBH/DRC 5.0 inches or larger.

It is preferred that two persons make all crown measurements, but this is not a requirement and is not always possible. If two people are evaluating crowns, individuals should be ½ to 1 tree length from the base of the tree to obtain a good view of the crown. Move away from each other at least 10 feet to take these measurements. A position of 90 degrees to each other from the tree base is ideal (Figure 4). When estimates made by two individuals disagree, they should discuss the reasons for their ratings until an agreement is reached, or use the methods below to resolve the situation.

NRS Note: If a plot is completed by one individual, the person should view the tree from two different locations similar to the instructions explained above.

If the numbers for a crown measurement estimated by two crew members, or the individual's two measurements, do not match, arrive at the final value by: (1) taking an average, if the numbers differ by 10 percent (2 classes) or less; (2) changing positions, if the numbers differ by 15 percent or more and attempting to narrow the range to 10 percent or less if crew members cannot agree; or (3) averaging the two estimates for those trees that actually have different ratings from the two viewing areas (ratings of 30 and 70 would be recorded as 50).

23.2 Crown Definitions

Crown Shape: Crown shape is the silhouette of a tree, drawn from branch tip to branch tip, which contains all of a tree's foliage as it grows in a stand. Exclude abnormally long branches beyond the edge of the crown for this silhouette. Normally, silhouettes are derived from vigorous, open grown trees and tend to be species-specific. Silhouettes vary with age and spacing. Tree crowns tend to flatten out with age and be more slender when growing in crowded conditions. Crown shape is used as an outline for the sides of the tree.

Crown Top: The crown top is the highest point of a standing tree. Young trees usually have more conical-shaped crowns and the main terminal is the top. Older trees and many hardwoods have globose and flat-topped crowns, where a lateral branch is the highest point. For some measurements the highest live foliage is considered the live crown top. Other measurements include a dead top. Some crown measurements assess how much of the expected crown is present and include broken or missing tops.

Dieback: This is recent mortality of branches with fine twigs, which begins at the terminal portion of a branch and proceeds toward the trunk. Dieback is only considered when it occurs in the upper and outer portions of the tree. When whole branches are dead in the upper crown, without obvious signs of damage such as breaks or animal injury, assume that the branches died from the terminal portion of the branch. Dead branches in the lower portion of the live crown are assumed to have died from competition and shading. Dead branches in the lower live crown are not considered as part of crown dieback, unless there is continuous dieback from the upper and outer crown down to those branches.

Epicormic: Shoot growth, from latent or suppressed buds, that arises from old branches, from the trunk or near large branch wounds or breaks. Epicormics remain epicormics until they regain the size of previous branches for trees with no branches 1.0 inch or larger in diameter at the base above the swelling. For trees that had 1.0 inch or larger branches when the epicormics formed, epicormics become branches once they reach 1.0 inch in diameter.

Live Branch: A live branch is any woody lateral growth supporting foliage, and is 1.0 inch or larger in diameter at the base above the swelling where it joins a main stem or larger branch. Small trees or certain tree species greater than 5.0 inches DBH/DRC may have only live twigs which have not yet reached 1.0 inch or larger at the point of attachment. If the death of larger branches is not the cause of these twigs, the twigs are considered branches for these smaller branched trees until the tree matures to a point where twigs have attained 1.0 inch or larger in diameter at the base above the swelling where it joins a main stem or larger branch.

Live Crown Base: The live crown base is an imaginary horizontal line drawn across the trunk from the bottom of the lowest live foliage of the "obvious live crown" for trees and from the lowest live foliage of the lowest twig for saplings. The "obvious live crown" is described as the point on the tree where most live branches/twigs above that point are continuous and typical for a tree species (and/or tree size) on a particular site. Include most crown branches/twigs, but exclude epicormic twigs/sprigs and straggler branches that usually do not contribute much to the tree's growth. The base of the live branch/twig bearing the lowest foliage may be above or below this line.

For trees 5.0 inches DBH/DRC or greater, if any live branch is within 5 feet below this "obvious live crown" line, a new horizontal line is established. Create the new line at the base of live foliage on that branch. Continue this evaluation process until no live branches are found within 5 feet of the foliage of the lowest qualifying branch (Figure 2).

Occasionally, all original major crown branches/twigs are dead or broken and many new twigs/sprigs develop. These situations are likely to occur in areas of heavy thinning, commercial clearcuts and severe weather damage:

- Trees that had an "obvious live crown" with live branches now have no crown to measure until the new live twigs become live branches. When these new live branches appear, draw the new live crown base to the live foliage of the lowest live branch that now meets the 5-foot rule.
- Saplings and small trees that had only live twigs should establish the crown base at the base of the live foliage on the new lowest live twig. If no live twigs are present, there is no crown to measure.

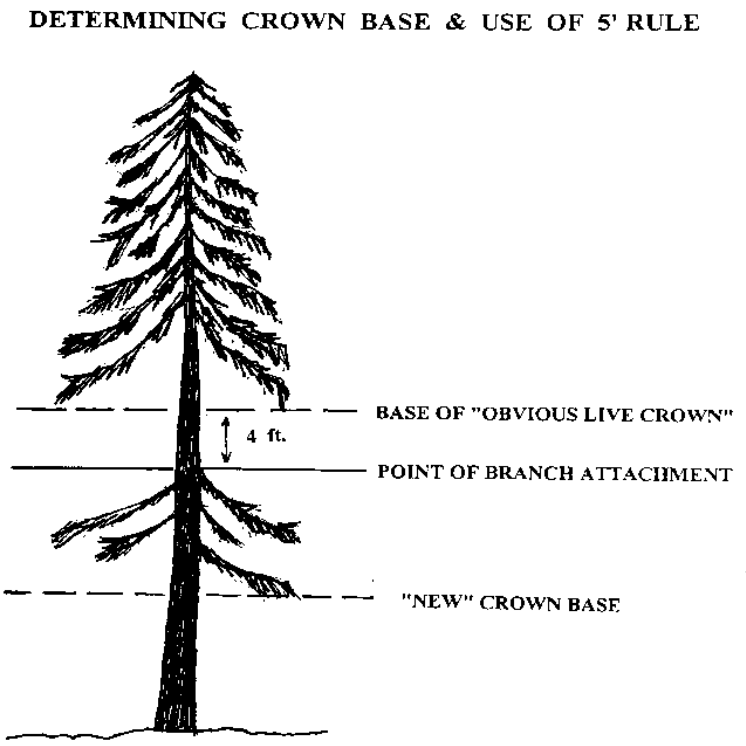


Figure 2. Determining the base of the live crown.

Overstory Canopy Zone: The area delineated by the average live crown height determined from the UNCOMPACTED LIVE CROWN RATIO of overstory trees. The bottom of the overstory canopy zone is the average height of the live crown bases. The top of the zone is the average height for the live crown tops.

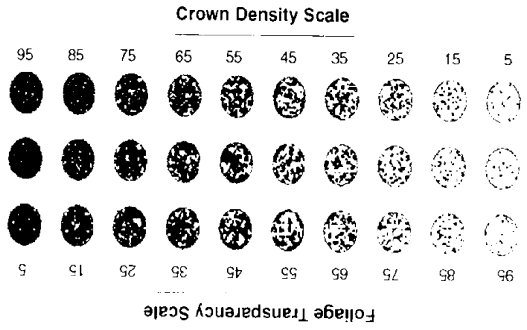
Snag Branch: A dead upper crown branch without twigs or sprigs attached to it. A lower branch on woodland trees such as juniper is not considered a snag branch unless the branch reaches into the upper crown, or reached into the upper crown when the branch was alive. A branch that died due to shading in any crown is not a snag branch.

Sprig: Any woody or non-woody lateral growth, without secondary branching, less than 1.0 inch in diameter at the base above the swelling at the point of attachment to a branch or crown stem.

Twig: Any woody lateral growth, with secondary branching, less than 1.0 inch in diameter at the base above the swelling at the point of attachment to a branch or crown stem.

23.3 Crown Density-Foliage Transparency Card

Front



Back

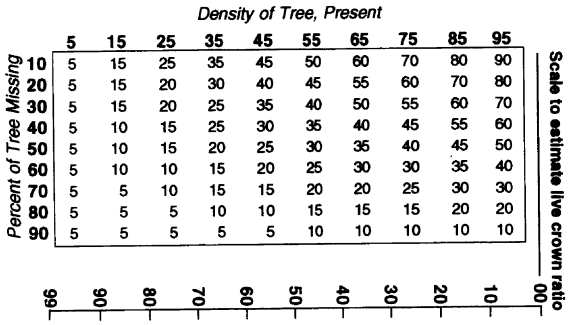


Figure 3. Density-Transparency card

The crown density - foliage transparency card (Figure 3) should be used as a certification aid until crew personnel are comfortable with all ratings. White areas of the card represent skylight visible through the crown area and black areas represent a portion of the tree that is blocking skylight. After certification, use the card to calibrate your eyes at the start of each day and rate those trees that do not fit into an obvious class. For FOLIAGE TRANSPARENCY, make sure that "Foliage Transparency" is right-side up. Crews should refer to specific CROWN DENSITY or FOLIAGE TRANSPARENCY sections for a definition of aspects that are included in the crown rating.

The back of the crown density - foliage transparency card has a general scale for estimating UNCOMPACTED LIVE CROWN RATIO.

23.4+N Crown Rating Precautions

Crews must be especially careful when making evaluations, and pay special attention to certain factors that may affect measurements in the field. These factors include:

- Distance and slope from the tree
- View of the crown
- Climatic conditions
- Heavy defoliation
- Leaning trees
- Trees with no “crown” by definition

Distance and slope from the tree: Crews must attempt to stay at least 1/2 to 1 tree length from the tree being evaluated. Some ratings change with proximity to the tree. In some situations, it is impossible to satisfy this step, but the crew should do the best it can in each case. All evaluations are made at grade (same elevation as base of the tree) or up slope from the tree. This may not be possible in all cases but evaluating trees from the down slope side should be avoided.

View of the crown: If two people are evaluating tree crowns, crew members should evaluate trees when standing at an angle to each other, striving to obtain the best view of the crown. The ideal positions are at 90 degrees to each other on flat terrain (Figure 4). If possible, never evaluate the tree from the same position or at 180 degrees. In a thick canopy forest, getting a good perspective of the crown becomes difficult. Overlapping branches, background trees and lack of a good viewing area can cause problems when rating some trees. Crews need to move laterally to search for a good view. Take special care when rating such trees.

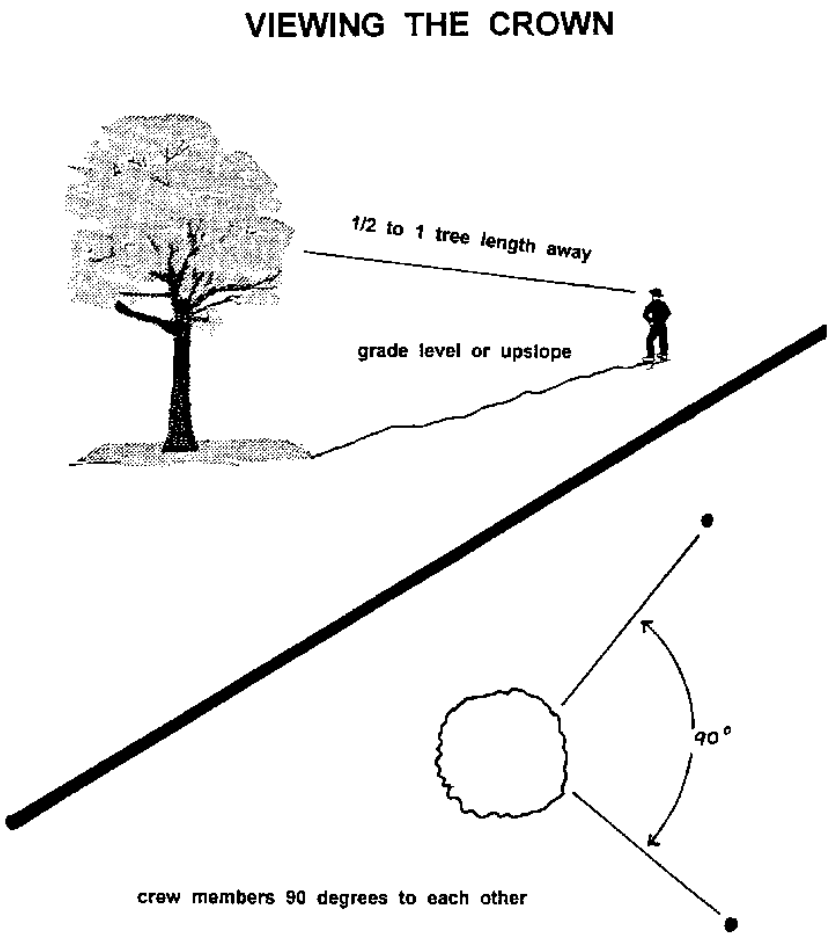


Figure 4. Crew positions for viewing crowns.

NRS Note: If a plot is completed by one individual, the person should view the tree from two different locations, similar to the instructions explained above.

Climatic conditions: Cloudy or overcast skies, fog, rain and poor sun angles may affect the accuracy of crown estimates. Crews need to be especially careful during poor lighting conditions to obtain the best possible view of the crown for the given climate conditions.

Heavy defoliation: During heavy defoliation, CROWN DIEBACK may be overestimated and FOLIAGE TRANSPARENCY may be underestimated due to the difficulty in differentiating dead twigs from defoliated twigs. The use of binoculars may help in separating dead twigs from defoliated twigs.

Leaning trees: So that crown dimensions are measured consistently on both leaning and upright trees, UNCOMPACTED LIVE CROWN RATIO for leaning and down trees must be rated in relation to the actual length of the tree bole (as opposed to height above the ground). FOLIAGE TRANSPARENCY will rarely be affected by lean angle. Place a note in the PDR TREE NOTES field that the tree is leaning if it is leaning more than 45 degrees from vertical.

Trees with no “crown” by definition (epicormics or sprigs only): After a sudden release or damage, a tree may have very dense foliage, but no crown. The following combination of codes is a flag for trees with no crowns:

- UNCOMPACTED LIVE CROWN RATIO = 00
- CROWN LIGHT EXPOSURE = 0
- CROWN POSITION = 3
- CROWN DENSITY = 00
- CROWN DIEBACK = 99
- FOLIAGE TRANSPARENCY = 99

After a sudden release or damage, a sapling may have very dense foliage, but no crown as it only has sprigs. The following combination of codes is a flag for saplings with no crowns:

- UNCOMPACTED LIVE CROWN RATIO = 00
- CROWN LIGHT EXPOSURE = 0
- CROWN POSITION = 3
- VIGOR = 3

23.5 UNCOMPACTED LIVE CROWN RATIO

UNCOMPACTED LIVE CROWN RATIO is a percentage determined by dividing the live crown length by the ACTUAL LENGTH (Figure 5). UNCOMPACTED LIVE CROWN RATIO for leaning and down trees must be rated in relation to the actual length of the tree bole (as opposed to height above the ground.) Record the UNCOMPACTED LIVE CROWN RATIO to the nearest 1%.

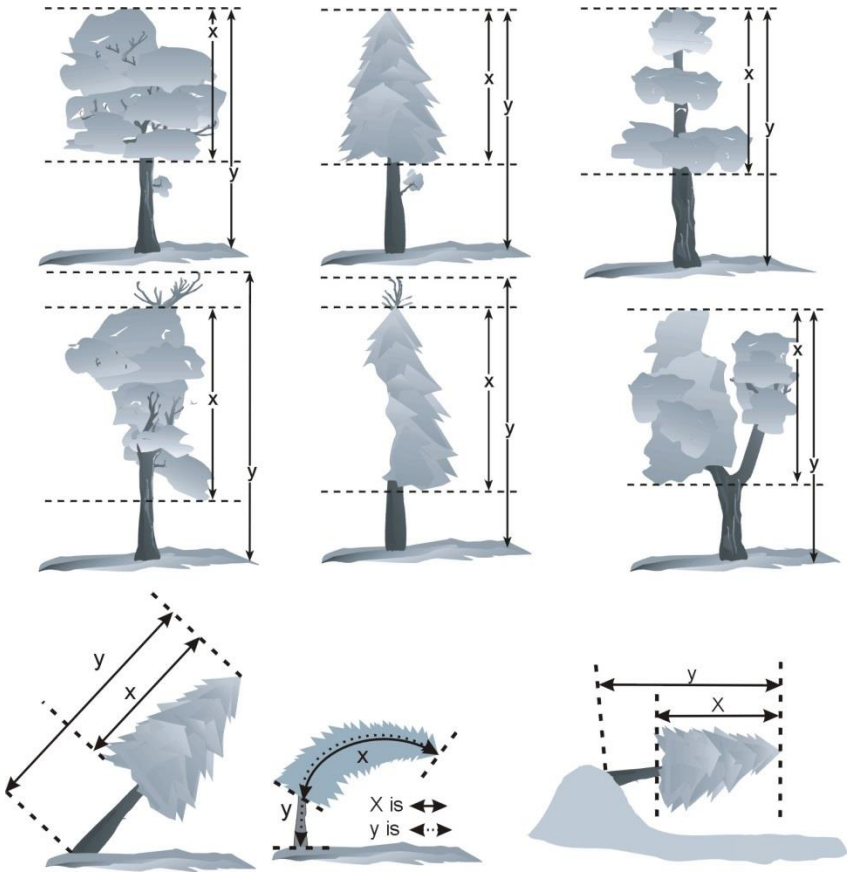


Figure 5. UNCOMPACTED LIVE CROWN RATIO examples.

Saplings

Determine sapling UNCOMPACTED LIVE CROWN RATIO by dividing the live crown length by actual tree length, then enter the appropriate code into the PDR. Live crown length is the distance between the top live foliage (dieback and dead branches are not included) and the lowest live foliage on the lowest live twig for saplings. Be sure to eliminate vine foliage as best you can when determining the live crown. The live crown base for saplings is different from trees 5.0 inches DBH/DRC and larger. The 5-foot/1-inch rule does not apply in this case. Do not include sprigs or leaves on the main stem below the lowest live twig (Figure 6).

When the two estimates do not agree, follow the guidelines listed at the end of section 23.1 Overview.

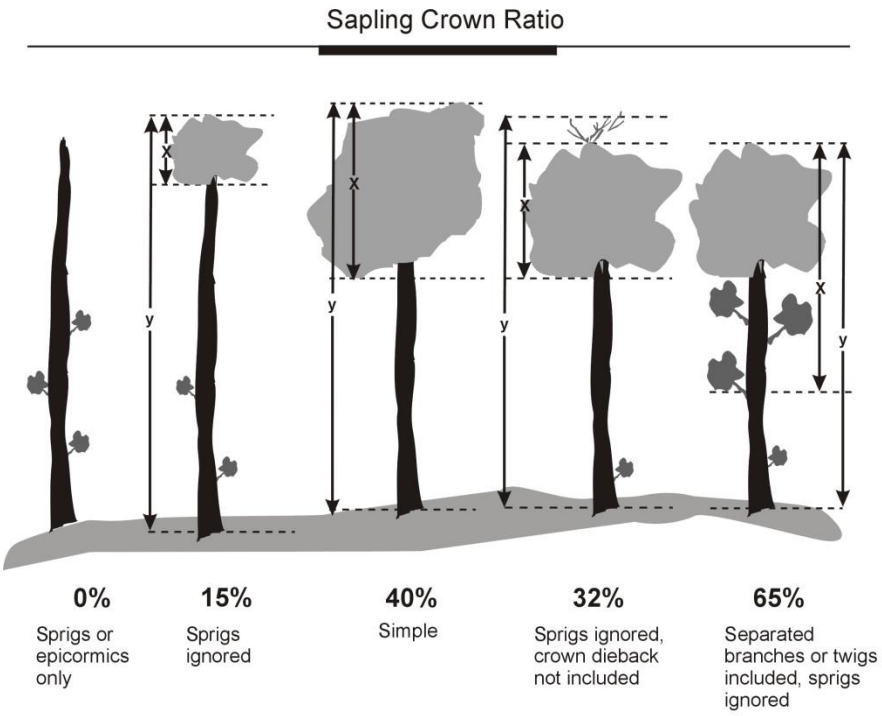


Figure 6. Sapling UNCOMPACTED LIVE CROWN RATIO determination examples.

Trees

Live crown length is the distance from the live crown top (dieback in the upper portion of the crown is not part of the live crown) to the "obvious live crown" base (Figure 7). Many times there are additional live branches below the "obvious live crown". These branches are only included if they have a basal diameter greater than 1.0 inch and are within 5.0 feet of the base of the obvious live crown (Figure 2). The live crown base becomes that point on the main bole perpendicular to the lowest live foliage on the last branch that is included in the live crown. The live crown base is determined by the live foliage and not by the point where a branch intersects with the main bole. Occasionally, small trees or certain species may not have 1.0-inch diameter branches. If this occurs, use the 5.0-foot rule, and apply it to branches that you feel contribute significantly to tree growth. Note that if a tree with a broken top has new growth that is too small to qualify as a new leader, then the new growth is NOT counted as part of the live crown length or ACTUAL LENGTH and is thus not included in UNCOMPACTED LIVE CROWN RATIO. A live crown top may not extend beyond the upper bound that defines a tree's ACTUAL LENGTH.

An individual can use the UNCOMPACTED LIVE CROWN RATIO scale on the back of the crown density - foliage transparency card to help estimate ratios (Figure 3). Hold the card in one hand, parallel to the trunk of the tree being evaluated and move the card closer or farther from your eye until the 0 is at the live crown top and the 99 is at the base of the tree where it meets the ground. Then place your finger at the live crown base. A clinometer can also be used to verify the UNCOMPACTED LIVE CROWN RATIO by determining the values of both lengths and determining the ratio of the two values.

When estimates between crew members do not agree, follow the guidelines listed at the end of Section 23.1 Overview.

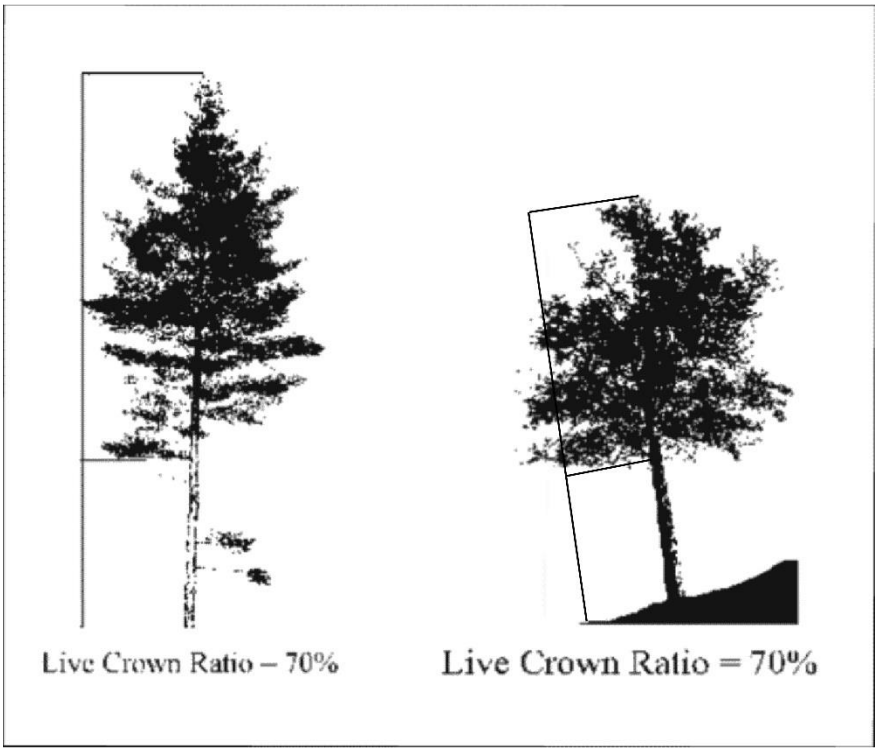


Figure 7. UNCOMPACTED LIVE CROWN RATIO outline and rating examples

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

23.6 CROWN LIGHT EXPOSURE [CRLE] Not Collected in WisCFI

23.7 CROWN POSITION Not Collected in WisCFI

23.8 CROWN VIGOR CLASS Not Collected in WisCFI

23.9 CROWN DENSITY Not Collected in WisCFI

23.10 CROWN DIEBACK [CRDB]
CROWN DIEBACK estimates reflect the severity of recent stresses on a tree. Estimate CROWN DIEBACK as a percentage of the live crown area, including the dieback area. The crown base should be the same as that used for the UNCOMPACTED LIVE CROWN RATIO estimate. Assume the perimeter of the crown is a two-dimensional outline from branch-tip to branch-tip, excluding snag branches and large holes or gaps in the crown (Figure 8 and Figure 9).

Project a two-dimensional crown outline, block in the dieback and estimate the dieback area. When two individuals disagree with their estimates, follow the guidelines listed at the end of section 23.1 Overview. The estimate is placed into one of 21 percentage classes.

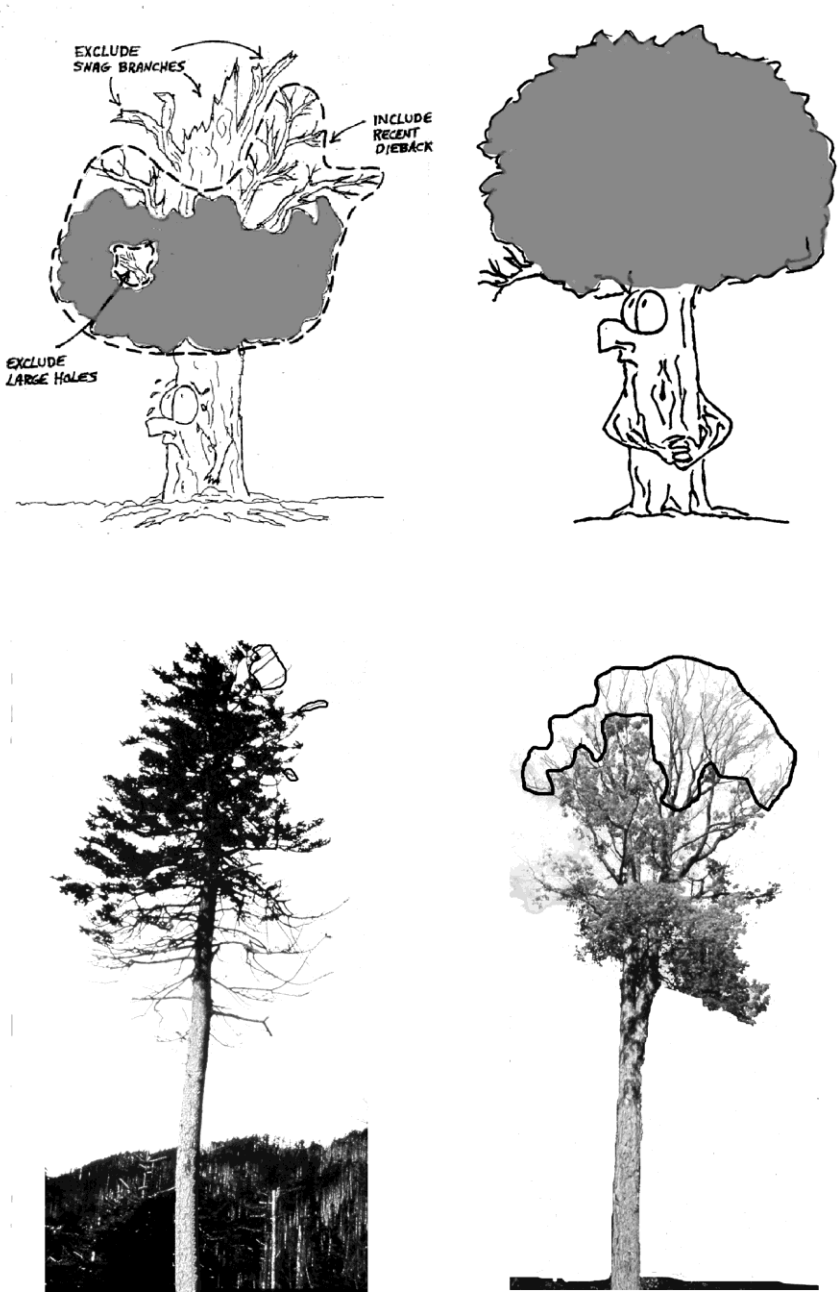


Figure 8. CROWN DIEBACK rating outline examples.

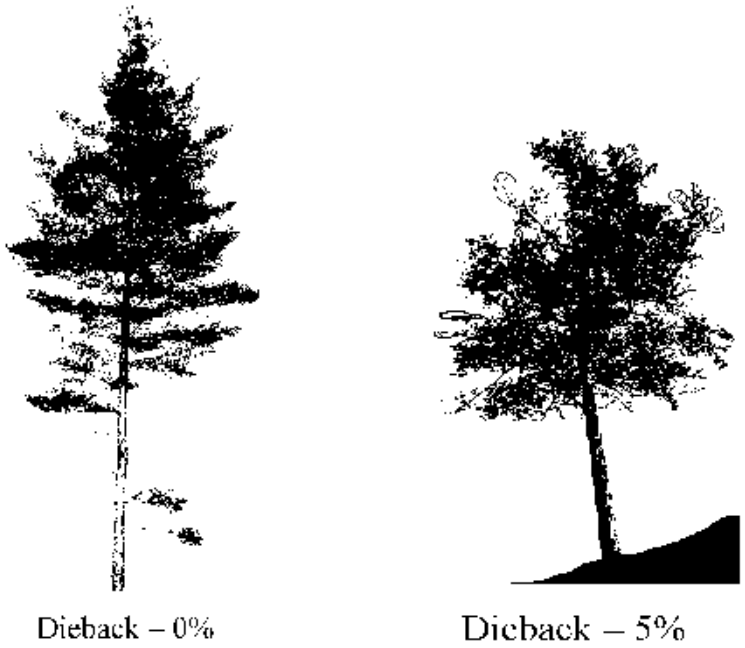


Figure 9. Dieback outline and rating examples.

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

00	0%	35	31-35%	70	66-70%
05	1-5%	40	36-40%	75	71-75%
10	6-10%	45	41-45%	80	76-80%
15	11-15%	50	46-50%	85	81-85%
20	16-20%	55	51-55%	90	86-90%
25	21-25%	60	56-60%	95	91-95%
30	26-30%	65	61-65%	99	96-100%

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

23.11 FOLIAGE TRANSPARENCY

Foliage transparency is the amount of skylight visible through the live, normally foliated portion (where you see foliage, normal or damaged, or remnants of its recent presence) of the crown. A recently defoliated tree except for one or two live leaves should have a transparency rating of 99 not 0!! (See coding for 'Trees with no crown by definition…' in section 23.4.) Check with binoculars to assess which branches are alive and should have foliage.

Different tree species have a normal range of foliage transparency, which may be more or less than that of other species. Changes in foliage transparency can also occur because of current defoliation or stresses during the current or preceding years.

Estimate FOLIAGE TRANSPARENCY using the crown density - foliage transparency card (Figure 3). Exclude vine foliage from the transparency estimate as best you can. Dead branches in the lower live crown, snag branches, crown dieback and missing branches or areas where foliage is expected to be missing are deleted from the estimate (Figure 10).

When defoliation is severe, branches alone will screen the light, but you should exclude the branches from the foliage outline and rate the area as if the light was penetrating those branches. For example, an almost completely defoliated dense spruce may have less than 20 percent skylight coming through the crown, but it will be rated as highly transparent because of the missing foliage. Old trees and some hardwood species, have crowns with densely foliated branches that are widely spaced. These spaces between branches should not be included in the FOLIAGE TRANSPARENCY rating. When FOLIAGE TRANSPARENCY in one part of the crown differs from another part, the average FOLIAGE TRANSPARENCY is estimated.

Project a two-dimensional crown outline. Determine the foliated area within the crown outline and estimate the transparency of the normally foliated area.

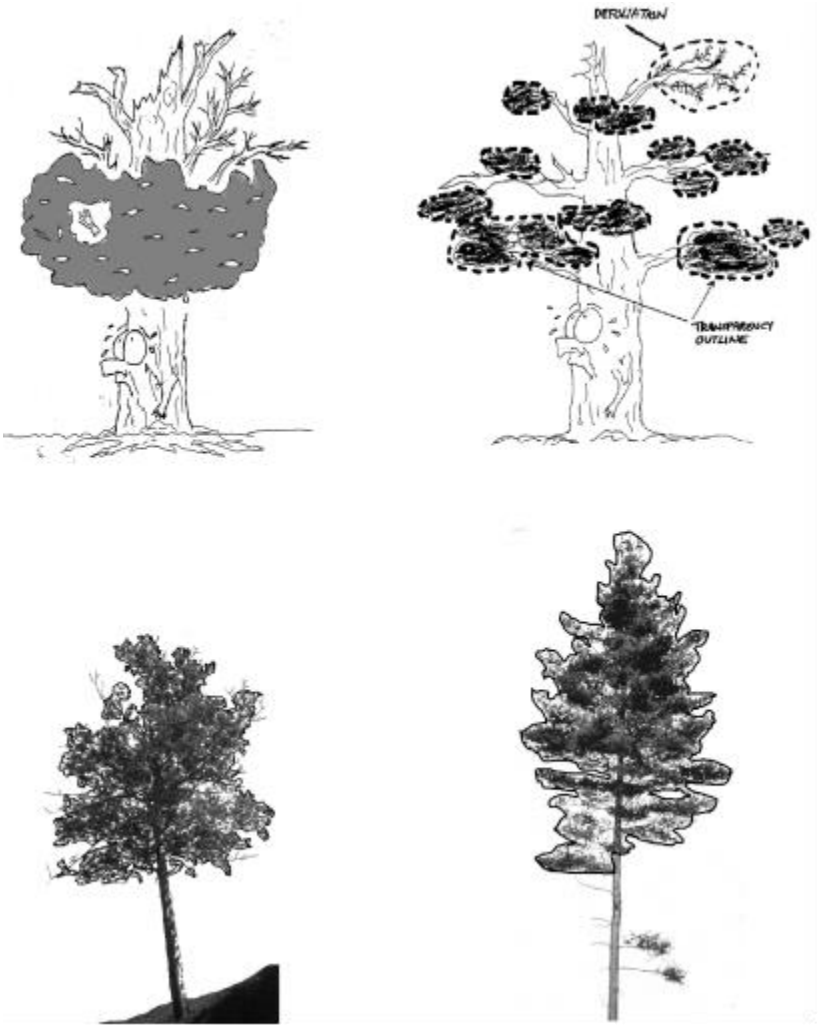


Figure 10. FOLIAGE TRANSPARENCY rating outline examples.

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

00	0%	35	31-35%	70	66-70%
05	1-5%	40	36-40%	75	71-75%
10	6-10%	45	41-45%	80	76-80%
15	11-15%	50	46-50%	85	81-85%
20	16-20%	55	51-55%	90	86-90%
25	21-25%	60	56-60%	95	91-95%
30	26-30%	65	61-65%	99	96-100%

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

25.0 DOWN WOODY MATERIALS

25.0 Introduction

Down woody materials (DWM) are an important component of forest ecosystems across the country. DWM is dead material on the ground in various stages of decay. Wildlife biologists, ecologists, mycologists, foresters, and fuels specialists are some of the people interested in DWM because it helps describe the:

- Quality and status of wildlife habitats.
- Structural diversity within a forest.
- Fuel loading and fire behavior.
- Carbon sequestration – the amount of carbon tied up in dead wood.
- Storage and cycling of nutrients and water – important for site productivity.

Down woody components and fuels estimated by the WisCFI program are: coarse woody, litter, duff depth.

DWM is only sampled in accessible forest conditions intersected by the transect. If a transect crosses a nonforest condition, the boundaries of the condition are recorded (see Section 25.4) but no DWM measurements are taken along this portion of the transect. The majority of DWM in the inventory is sampled using the line intersect sampling method (also called planar intercept method). In this method, transects are established, and individual pieces of CWD are tallied if the central axis of the piece is intersected by the plane of the transect. In addition, each piece must meet specified dimensions and other criteria before being selected for tally. Special procedures apply when a CWD piece lays across a condition class boundary (section 25.2). Transects will be used to sample CWD when crews are able to see and measure individual pieces.

The line intersect method is not practical for sampling CWD when it is part of machine-piled windrows or slash piles, or part of log "jumbles" at the bottom of steep-sided ravines. In these situations, individual pieces are impractical to tally separately and are labeled as “residue piles”. A different sampling method is used to tally and measure CWD residue piles (see Section 25.9, Sampling Residue Piles).

25.1 Definition Of Down Woody Materials

CWD – In this inventory, CWD includes downed, dead tree and shrub boles, large limbs, and other woody pieces that are severed from their original source of growth and on the ground. CWD also includes dead trees (either self-supported by roots, severed from roots, or uprooted) that are leaning > 45 degrees from vertical. Also included are non-machine processed round wood such as fence posts and cabin logs. For multi-stemmed woodland trees such as juniper, only tally stems that are dead, detached, and on the ground; or dead and leaning > 45 degrees from vertical.

CWD does not include:

1. Woody pieces < 3.0 inches in diameter at the point of intersection with the transect.
2. Dead trees leaning 0 to 45 degrees from vertical.
3. Dead shrubs, self-supported by their roots.
4. Trees showing any sign of life.
5. Stumps that are rooted in the ground (i.e., not uprooted).

6. Dead foliage, bark or other non-woody pieces that are not an integral part of a bole or limb. (Bark attached to a portion of a piece is an integral part).
7. Roots or main bole below the root collar.

25.2 Locating And Establishing Line Transects

Transects are established on each subplot if the subplot center is accessible (i.e., not census water, access denied, or hazardous), and there is at least one forest land condition class mapped within the 24.0-foot radius subplot (CONDITION CLASS STATUS = 1). Transects begin at the subplot center and extend 24.0 feet to the edge of the subplot. The location of condition class boundaries are recorded along the transect. It is extremely important to lay out the transect in a straight line to avoid biasing the selection of pieces and to allow the remeasurement of transect lines and tally pieces for future change detection.

Transect lines should be marked with a pin or small piece of flagging at the end of the line (24.0 feet, horizontal distance) to help the QA staff identify the path of the transect during the check-plot procedure. Because the tolerance for the transect azimuth is +/- 2 degrees, the line might have been laid down in a slightly different direction from the check-plot crew. This could affect the location of diameter measurements for CWD pieces as well as identifying whether a CWD piece is a valid tally piece.

25.2.1 CWD transects

Three transects are established that originate at the subplot center and extend out 24.0 feet horizontal distance (the radius of the subplot) at azimuths of 30, 150, 270 degrees (fig. 25-1). This transect configuration was chosen to avoid sampling bias on sloped land, where it is possible that CWD may be oriented in one direction. This configuration of transects should pick up CWD logs that are lying parallel to the slope, perpendicular to the slope, and across slope.

25.2.2 FWD transects Not Collected in WisCFI

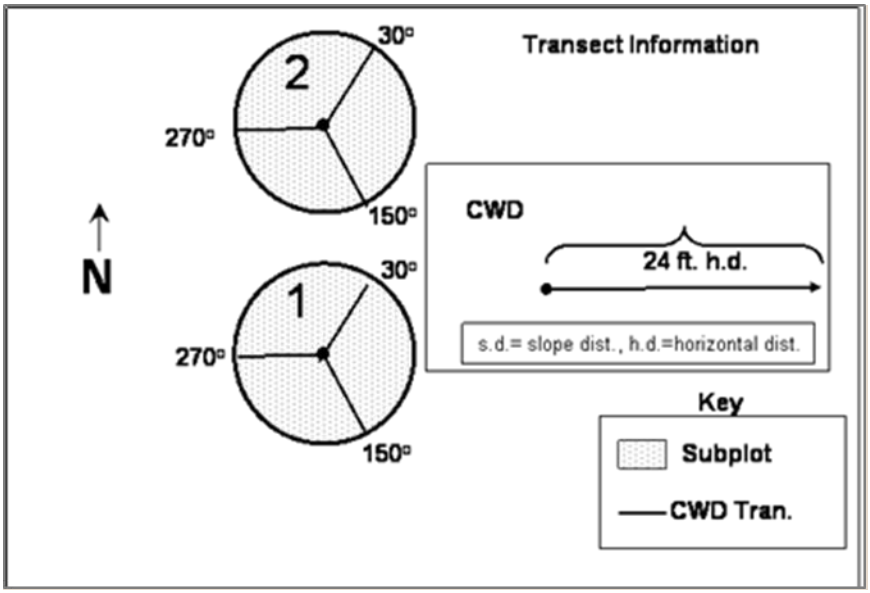


Figure 11+WisCFI. Plot layout for sampling CWD.

25.3 Plot Information

25.3.1 CURRENT DATE

Record the year, month, and day that the current plot visit was completed as described in 25.3.1.1 – 25.3.1.3.

25.3.1.1 YEAR

Record the year that the plot was completed.

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

25.3.1.2 MONTH

Record the month that the plot was completed.

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

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

25.3.1.3 DAY

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

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

25.3.2 CREW NUMBER

Record the code to indicate the number assigned to the crew member who collected down woody materials on this plot. The first 2 digits are for the responsible unit's station number (NRS – 24xxxx, SRS – 33xxxx, RMRS – 22xxxx, and PNW – 26xxxx).

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

NRS	240001 – 249999

25.3.3 QA STATUS

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

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

1 Standard production plot
2 Cold check
6 Blind check
7 Hot check (production plot)

25.3.4 NOTES

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

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

25.4 Transect Line Segmenting

Transect lines are segmented to determine the length of transect that occurs within each mapped condition class intersecting the line. A segment is a length of transect that is in one condition. Segments are identified by recording the BEGINNING DISTANCE and ENDING DISTANCE of the slope from subplot center out to the end of the subplot. In the office, the segmenting data will be combined with CWD distances to determine which condition class each piece falls in (condition classes are not assigned to CWD pieces in the field).

Starting at the subplot center and working towards the fixed radius plot boundary, each segment of transect line in a different condition class is delineated and recorded as a separate record. On each record, the BEGINNING DISTANCE and ENDING DISTANCE of the slope are recorded for each condition class encountered. The first record for each transect will have a BEGINNING DISTANCE of 0 feet. If only one condition class occurs on the transect line, only one segment is recorded. The transect must extend a total of 24.0 feet horizontal distance. If the entire 24.0-foot subplot is nonforest, enter codes for SUBPLOT NUMBER, TRANSECT, CONDITION CLASS NUMBER, followed by zeros in the remaining fields.

On subplots where a transect intersects a boundary between condition classes, the transect continues across the boundary into the adjacent class (fig. 25-2). Although DWM is only sampled in accessible forest conditions, all CONDITION CLASS BOUNDARIES (BEGINNING DISTANCE and ENDING DISTANCE) are recorded on each transect.

Individual pieces of DWM intersected by a transect are tallied or counted if they meet the tally rules for CWD specified in the sections that follow.

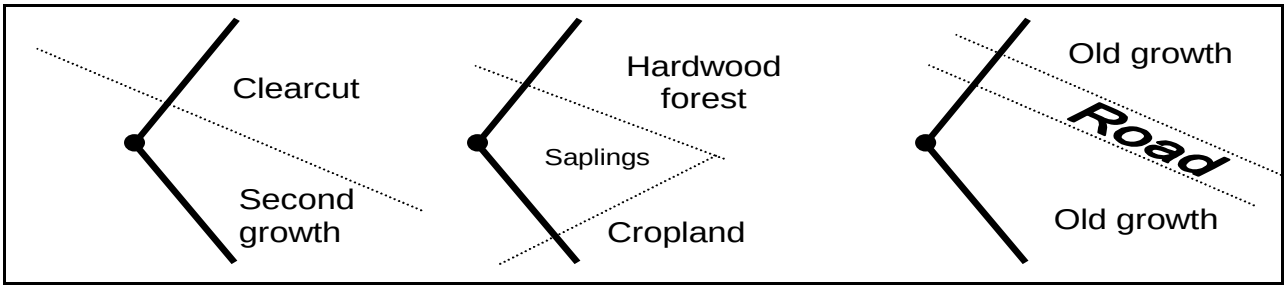


Figure 12. Transects are installed across condition class boundaries.

25.4.1+WisCFI SUBPLOT NUMBER

Record the code indicating the subplot center from which the transect originates.

When collected: All tally segments
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values: 1 to 2

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

25.4.2 TRANSECT

Record the code indicating the transect on which a condition class is being delineated. The three transects used are 30 degrees, 150 degrees, and 270 degrees. These transects, when being installed, have a tolerance of +/- 2 degrees.

When collected: All tally segments
Field width: 3 digits
Tolerance: No errors
MQO: At least 99% of the time
Values:

030	Transect extends 30 degrees from subplot center
150	Transect extends 150 degrees from subplot center
270	Transect extends 270 degrees from subplot center

25.4.3 CONDITION CLASS NUMBER

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

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

25.4.4+WisCFI BEGINNING DISTANCE

Record the location (using horizontal distance) on the transect line where the transect intersects the boundary with the adjacent condition class nearer to the subplot center. The first record for

each transect will have a BEGINNING DISTANCE of 00.0 ft. Each subsequent record will have a BEGINNING DISTANCE equal to the ENDING DISTANCE of the previous record. Measure to the nearest 0.1 ft.

When collected: All tally segments
Field width: 3 digits
Tolerance: +/- 1.0 ft
MQO: At least 95% of the time
Values: 00.0 to 99.9

25.4.5 SLOPE PERCENT

Record the code indicating the average slope percent along the transect within the condition class being segmented. When only one condition class is present on a transect, slope percent is the average slope percent along the entire transect. Measure to the nearest 5%.

When collected: All tally segments
Field width: 3 digits
Tolerance: +/- 10%
MQO: At least 90% of the time
Values: 005 to 155

25.4.6+WisCFI ENDING DISTANCE

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

When collected: All tally segments
Field width: 3 digits
Tolerance: +/- 1.0 ft
MQO: At least 95% of the time
Values: 00.1 to 99.9

25.5 Sampling Methods For Coarse Woody Debris (CWD)

25.5.1 Tally Rules for Coarse Woody Debris (CWD)

1. Coarse woody debris (CWD) is sampled in accessible forest land conditions only. Tally a piece if its central longitudinal axis intersects the transect, and the condition class is accessible forest land at the point of intersection (Figure 13). The entire piece is assigned to this condition.

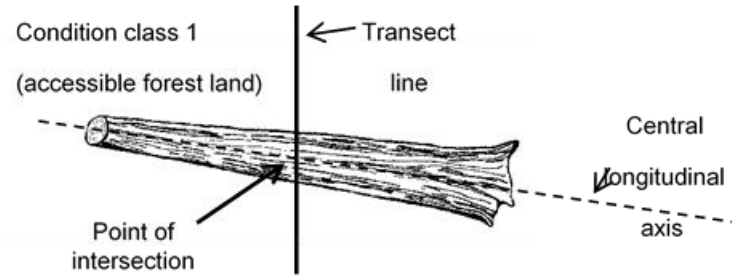


Figure 13. Tally rules for CWD.

2. Tally dead trees and tall stumps that are leaning > 45 degrees from vertical. Do not tally live trees or standing dead trees and stumps that are still upright and leaning < 45 degrees from vertical. Follow the same rules for down trees as outlined in section 5.0 ‘Tree and Sapling Data’ from the P2 field guide. Most CWD will be laying on the ground.
3. The minimum length of any tally piece is 3.0 feet. When CWD pieces are close to 3 feet total length measure the length to the nearest 0.1 foot to determine if it is ≥ 3.0 feet.

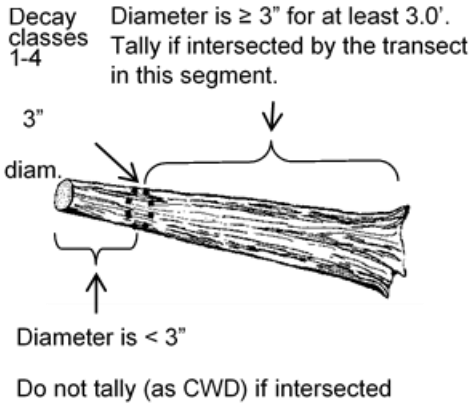


Figure 14. CWD tally rules for decay classes 1-4.

4. Decay class of the piece determines whether or not the piece is tallied (see Section 25.5.3.4).

For decay classes 1 to 4: tally a piece if it is ≥ 3.0 inches in diameter at the point of intersection with the transect. The piece must be ≥ 3.0 feet in length and ≥ 3.0 inches or more in diameter along that length. If the intersect diameter is close to 3.0 inches, measure the diameter to the nearest 0.1 inch to determine if the piece qualifies (Figure 14).

For decay class 5: tally a piece if it is ≥ 5.0 inches in diameter at the point of intersection and ≥ 5.0 inches high from the ground. The piece must be ≥ 3.0 feet in length and ≥ 5.0 inches or more in diameter along that length. The reason for treating decay class 5 pieces differently is because they are difficult to identify, especially when heavily decomposed. Only pieces that still have some shape and log form are tallied—humps of decomposed wood that are becoming part of the duff layer are not tallied.

5. Tally pieces created by natural causes (examples: natural breakage or uprooting) or by human activities such as cutting only if not systematically machine-piled. Do not record pieces that are part of machine-piled slash piles or windrows, or that are part of a log "jumble" at the bottom of a steep-sided ravine in which individual pieces are impractical to tally separately. Instead, sample these piles according to instructions in section 25.9 ‘Sampling Residue Piles’. A slash pile or windrow consists of broken logs, limbs, and other vegetative debris.
6. Tally a piece only if the point of intersection occurs above the ground. If one end of a piece is buried in the litter, duff, or mineral soil, the piece ends at the point where it is no longer visible. Measure the diameter and length at this point.
7. If the central longitudinal axis of a piece is intersected more than once on a transect line or if it is intersected by two transect lines, tally the piece each time it is intersected (uncommon situation, see Figure 15).

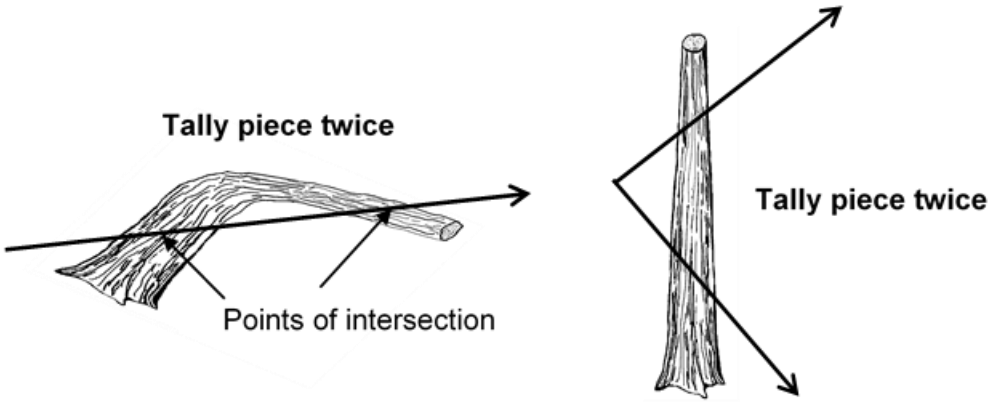


Figure 15. CWD tally rules: intersections.

8. Tally a piece only once if the subplot center falls directly on the central longitudinal axis of the piece. Tally the piece on the 30 degree transect and record the CWD Distance as 001.
9. If a piece is fractured across its diameter or length, and would pull apart at the fracture if pulled from either end or sides, treat it as two separate pieces. If judged that it would not pull apart, tally as one piece. Tally only the piece intersected by the transect line.
10. Do not tally a piece if it intersects the transect on the root side of the root collar. Do not tally roots.
11. When the transect crosses a forked down tree bole or large branch connected to a down tree, tally each qualifying piece separately. To be tallied, each individual piece must meet the minimum diameter and length requirements.
12. In the case of forked trees, consider the "main bole" to be the piece with the largest diameter at the fork. Variables for this fork such as DECAY CLASS should pertain to the entire main bole. For smaller forks or branches connected to a main bole (even if the main bole is not a tally piece), variables pertain only to that portion of the piece up to the point where it attaches to the main bole (see Figure 16).
13. If a transect intersects a nonforest condition (e.g., a road), CWD is not tallied in the nonforest condition.

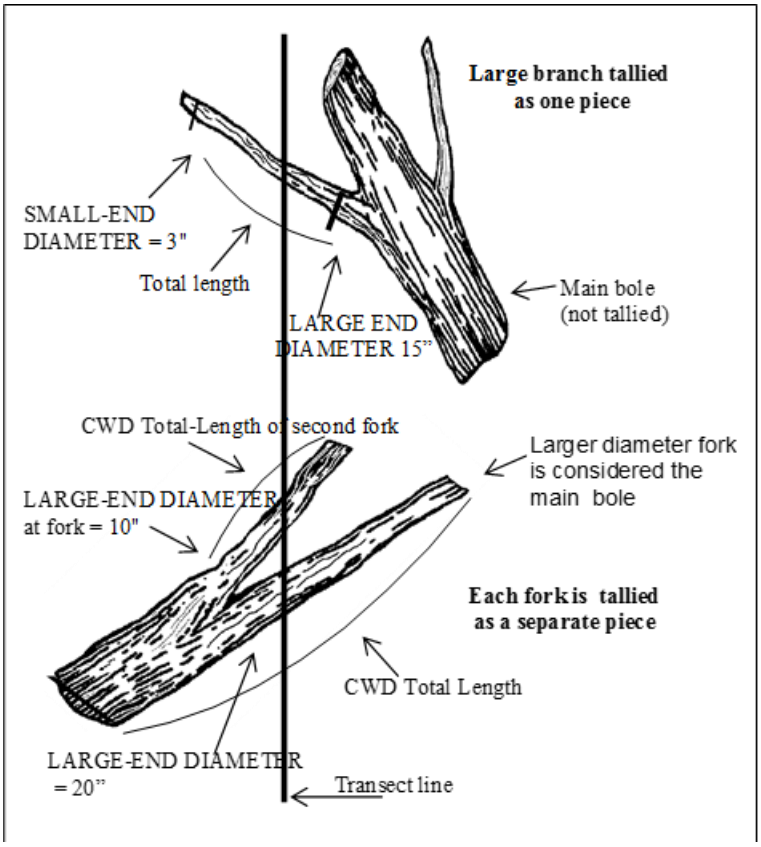


Figure 16. CWD tally rules for forked trees.

25.5.2 Marking CWD

Marking CWD is optional. Marked CWD is an aid to future crews returning to the plot for a QA check or to remeasure the plot at the next remeasurement period. Nails can be used to mark the location of the point of intersection, if the piece is in decay class 1, 2, or 3. Position the nail on top of the piece, and if possible, drive the nail into the piece so that about 1 inch of the nail is left exposed. Stop driving the nail if the next blow means breaking the piece or seriously disturbing the location of the piece. Please see Section 25.4 Transect Line Segmenting, for information on the required marking of the transect line.

25.5.3 Recording Procedures for CWD

The tolerance for the total number of pieces (≥ 3 inches, transect diameter) tallied across all transects on the plot is : +/- 2 piece or +/- 5%, whichever is greater for the plot. Note: always round up to a whole piece count when using the 5% option.

25.5.3.1+WisCFI SUBPLOT NUMBER

Record the code indicating the number of the subplot center from which the transect originates.

When collected: All tally pieces
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values: 1 to 2

1	Center subplot
2	North subplot

3 Southeast subplot Not Collected in WisCFI
4 Southwest subplot Not Collected in WisCFI

25.5.3.2 TRANSECT

Record the code indicating the azimuth of the transect on which the piece is sampled.

When collected: All tally pieces
Field width: 3 digits
Tolerance: No errors
MQO: At least 99% of the time
Values:

030 Transect extends 30 degrees from subplot center
150 Transect extends 150 degrees from subplot center
270 Transect extends 270 degrees from subplot center

25.5.3.3+WisCFI CWD HORIZONTAL DISTANCE

Record the code indicating the horizontal distance from the subplot center to the point where the transect intersects the longitudinal center of the piece. If two or more pieces have the same horizontal distances, record the top piece first. Measure and record to the nearest 0.1 feet. CWD HORIZONTAL DISTANCE is an important item because it will be used to assign the CWD piece to a condition class by comparing the recorded distance to the piece with the recorded BEGINNING DISTANCE and ENDING DISTANCE to the condition class boundary. CWD HORIZONTAL DISTANCE is also used to locate the piece for QA and remeasurement in future inventories.

When collected: All tally pieces
Field width: 3 digits
Tolerance: +/- 1.0 ft
MQO: At least 90% of the time
Values: 00.1 to 99.9

25.5.3.4 CWD DECAY CLASS

Record a 1-digit code indicating the decay class of the piece. Code the decay class which predominates along the CWD TOTAL LENGTH (25.5.3.7) of the piece. Use the guide below to determine CWD DECAY CLASS.

When collected: All tally pieces
Field width: 1 digit
Tolerance: +/- 1 class
MQO: At least 90% of the time
Values: 1 to 5

Decay Class	Structural Integrity	Texture of Rotten Portions	Color of Wood	Invading Roots	Branches and Twigs
1	Sound, freshly fallen, intact logs	Intact, no rot; conks of stem decay absent	Original color	Absent	If branches are present, fine twigs are still attached and have tight bark

Decay Class	Structural Integrity	Texture of Rotten Portions	Color of Wood	Invading Roots	Branches and Twigs
2	Sound	Mostly intact; sapwood partly soft (starting to decay) but can't be pulled apart by hand	Original color	Absent	If branches are present, many fine twigs are gone and remaining fine twigs have peeling bark
3	Heartwood sound; piece supports its own weight	Hard, large pieces; sapwood can be pulled apart by hand or sapwood absent	Reddish-brown or original color	Sapwood only	Branch stubs will not pull out
4	Heartwood rotten; piece does not support its own weight, but maintains its shape	Soft, small blocky pieces; a metal pin can be pushed into heartwood	Reddish or light brown	Through-out	Branch stubs pull out
5	None, piece no longer maintains its shape, it spreads out on ground	Soft; powdery when dry	Red-brown to dark brown	Through-out	Branch stubs and pitch pockets have usually rotted down

Note: CWD DECAY CLASS 5 pieces can be difficult to identify because they often blend into the duff and litter layers. They must still resemble a log, therefore, the first tally rule is that they must be ≥ 5.0 inches in diameter, ≥ 5.0 inches from the surface of the ground, and at least 3.0 feet long. Decomposed logs that are slightly elevated 'humps' on the ground are not tallied.

CWD DECAY CLASS: The chart above was developed primarily for Douglas-fir in the Pacific Northwest. At the present time, there are no other charts available to use to describe decay classes for other species or locations. Concentrate on the structural integrity and texture when estimating a decay class for CWD logs.

If a log is case hardened (hard, intact outer sapwood shell) but the heartwood is rotten, code this log as a CWD DECAY CLASS 2 with a HOLLOW PIECE code of 1. CWD DECAY CLASS 1 should be reserved for 'freshly fallen' logs that are completely intact (i.e., recent windfalls, or harvest).

25.5.3.5 SPECIES

Record the code indicating the species of the piece. Species codes are the same as those used in P2 (see Appendix 3 of the P2 field guide). Because CWD includes the tally of large shrub boles and woody vines, enter a code of '0001' for SPECIES if the tally piece is a shrub or vine.

Species identification may be uncertain for some pieces. The piece's bark (either attached or sloughed and laying beside the piece), branching pattern (if the branches are still present), or heartwood smell (particularly if cedars, Douglas-fir, or western hemlock) may provide clues. On

remeasurement plots, see what tree species were tallied in past inventories. One way to distinguish hardwoods from softwoods is by the type of decay present. Hardwoods usually have a white or grayish stringy rot, while softwoods usually have a reddish-brown blocky rot. If it is not possible to identify the species, attempt to estimate if it is softwood or hardwood. Enter code 0299 for unknown dead conifer or 0998 for unknown dead hardwood. If all else fails, enter the unknown SPECIES code (0999).

When collected: CWD DECAY CLASS = 1 to 4
Field width: 4 digits
Tolerance: No errors
MQO: At least 80% of the time
Values: See species codes in Appendix 3 of the P2 field guide.

25.5.3.6 Diameters

The diameter is most commonly measured by holding a tape above the log, at a position perpendicular to the length (Figure 17). It is useful to carry a steel carpenters retracting tape to measure diameters. Other methods include wrapping a tape around the bole if possible, holding a straight-edge ruler above the piece, or using calipers.

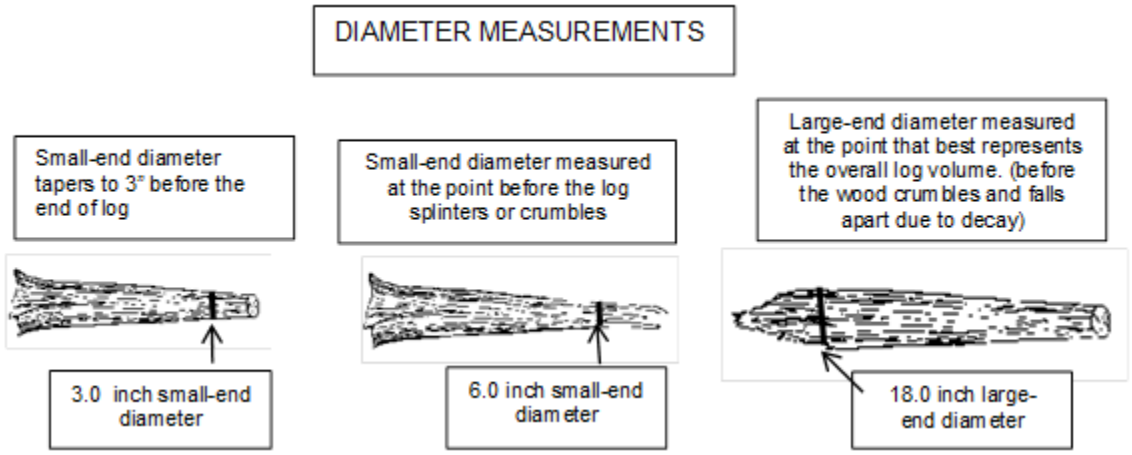


Figure 17. Diameter measurements.

For pieces that are not round in cross-section because of missing chunks of wood or "settling" due to decay, measure the diameter in two directions and take an average. Estimate the longest and shortest axis of the cross-section ("A" and "B" in Figure 18), and enter the average in the diameter field. This technique applies to intersect, small-end, and large-end diameters.

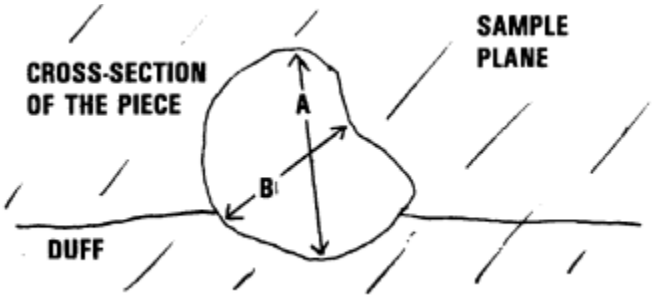


Figure 18. Estimating the diameter of pieces that are not round in cross-section.

If the transect intersects the log at the decayed or splintered end (Figure 19) (i.e., the portion where we do not consider it part of the log because it is falling apart), record the diameter at this location as the intersect diameter. If the splintered end appears to be two separate pieces (i.e., a major split located just at the end) – in this situation treat it as one log and take a diameter around the end (take two measurements if it is odd shaped).

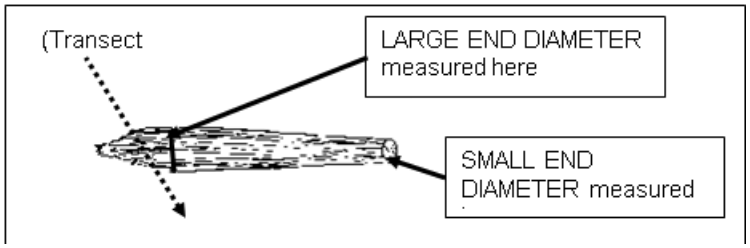


Figure 19. Example of decayed end intersecting transect.

25.5.3.6.1 DIAMETER AT POINT OF INTERSECTION

Record the code indicating the piece's diameter at the point where the transect intersects the longitudinal center of the piece. If the diameter is close to 3 inches, measure the diameter to the nearest 0.1 inch to determine if the piece is actually ≥ 3.0 inches and a valid tally piece. The diameter is recorded to the nearest inch.

When collected: All tally pieces
Field width: 3 digits
Tolerance: Pieces < 20.0 in diameter: +/- 3 in
Pieces ≥ 20.0 in diameter: +/- 20%
MQO: At least 90% of the time
Values: 003 to 200

25.5.3.6.2 DIAMETER AT THE SMALL END Not Collected in WisCFI

Record the code indicating the diameter at the piece's small end. The diameter is recorded to the nearest inch. The DIAMETER AT THE SMALL END occurs either at (1) the actual end of the piece, if the end has a diameter ≥ 3.0 inches, or (2) at the point where the piece tapers down to 3.0 inches in diameter. If the end is splintered or decomposing (sloughing off), measure the diameter at the point where it best represents the overall log volume. Use the same measuring procedures described in 25.5.3.6.1 (see Figure 19).

25.5.3.6.3 DIAMETER AT THE LARGE END Not Collected in WisCFI

Record the code indicating the diameter at the piece's large end. The diameter is recorded to the nearest inch. The large end will occur either at a broken or sawn end, at a fracture, or at the root collar. If the end is splintered or decomposing (sloughing off), measure the diameter at the point where it best represents the overall log volume. Use the same measuring procedures used for 25.5.3.6.1.

25.5.3.7 CWD TOTAL LENGTH Not Collected in WisCFI

Record the code indicating the total length of the piece. CWD TOTAL LENGTH is the length of the piece that lies between the piece's recorded DIAMETER AT THE SMALL END and DIAMETER AT THE LARGE END (25.5.3.6.2 and 25.5.3.6.3). For DECAY CLASS = 5, DIAMETER AT THE SMALL END and DIAMETER AT THE LARGE END are not recorded for a log, therefore the length is measured between the two physical ends of the log. For curved logs, measure along the curve. The minimum log length is 3.0 feet before it is a valid tally log. When the length is close to 3.0 feet, measure the length to determine if the piece is actually ≥ 3.0 feet. CWD TOTAL LENGTH is recorded to the nearest foot.

25.5.3.8 IS THE PIECE HOLLOW?

Record the code indicating whether or not the piece is hollow (see Figure 20).

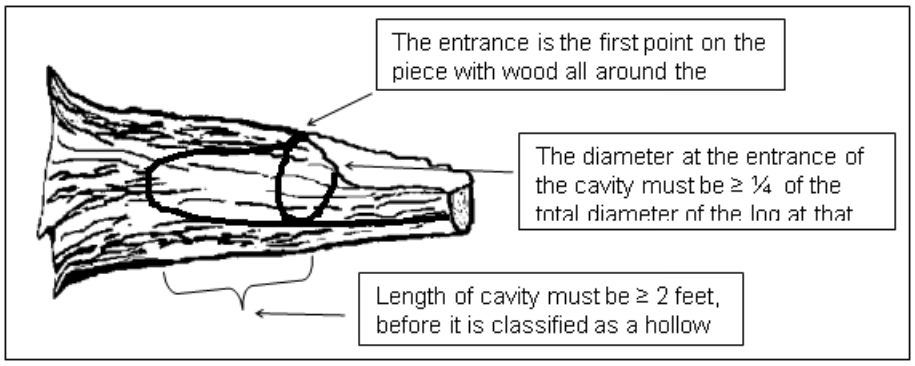


Figure 20. Determining if the piece is hollow.

When collected: CWD DECAY CLASS = 1 to 4
Field width: 1 digit
Tolerance: No errors
MQO: At least 90% of the time
Values:

- Y A piece is considered hollow if a cavity extends at least 2 feet along the central longitudinal axis of the piece, and the diameter of the entrance to the cavity is at least 1/4 of the diameter of the piece where the entrance occurs. The entrance occurs at the point where the circumference of the cavity is whole -- the point where wood is present completely around the circumference of the cavity. The length of the cavity begins at this point.
- N Does not meet criteria for being a hollow log

25.5.3.9 CWD HISTORY

Record the code that indicates whether or not the piece of CWD is on the ground as a result of harvesting operations or as a result of natural circumstances. One objective of this item is to identify those pieces that are considered logging residue. If the piece appears to have fallen to the ground as a result of natural causes such as decomposition or windfall, enter a code of 1. This category would include blown out tops, snapped off boles, wind-fallen trees on clearcut edges, and trees that basically collapsed and fell over due to decomposition.

If the piece is on the ground as a result of recent (since last annual remeasurement; if the plot is new, the time between the panel remeasurements) harvesting activity, either because the tree was cut down with a chainsaw (or other device) or pushed over by harvesting equipment (bulldozer), enter a code of 2. A code of 2 would be considered logging residue (usually you are in the middle of a recent clearcut).

If the piece is on the ground as a result of older (more than 15 years) harvesting activity, enter a code of 3. This would be a situation where you tally an old decomposing log that has a sawn end – if it appears that the log was cut and left on site, then enter a code of “3”.

If a piece is on the ground as a result of incidental harvest (such as a standing tree was cut for firewood or small clearing), enter a code of “4”. Incidental harvest involves a few trees and is not a part of a major organized harvesting operation.

If the crew cannot decide the history of the CWD log, classify it as “unknown”, and give it a code of “5”.

When collected: CWD DECAY CLASS = 1 to 4
Field width: 1 digit
Tolerance: No errors
MQO: At least 90% of the time
Values: 1 to 5

1 CWD piece is on the ground as a result of natural causes
2 CWD piece is on the ground as a result of major recent harvest activity (<= 15 yrs old)
3 CWD piece is on the ground as a result of older harvest activity (> 15 yrs old)
4 CWD piece is on the ground as a result of an incidental harvest (such as firewood cutting)
5 Exact Reason Unknown

25.6 Sampling Methods For Fine Woody Debris (FWD) Not Collected in WisCFI

25.7 Duff, Litter Depth Measurements

Depth measurements are sampled in accessible forest land conditions. The depth of the duff layer, litter layer are important components of fire models used to estimate fire behavior, fire spread, fire effects, and smoke production. These measurements are taken at the 24-foot location on each transect. An average depth will be calculated in the office and stored with other information about the condition class on the plot. If a residue pile, log, rock, or other obstruction intersects the transect at the 24-ft location, do not measure the duff or litter depth.

25.7.1 Definitions

1. Litter is the layer of freshly fallen leaves, needles, twigs (< 0.25 inch in diameter), cones, detached bark chunks, dead moss, dead lichens, detached small chunks of rotted wood, dead herbaceous stems, and flower parts (detached and not upright). Litter is the loose plant material found on the top surface of the forest floor. Little decomposition has begun in this layer.

Litter is flash fuel – so think about it as the loose material that is exposed to the air, capable of igniting quickly and carrying a fire across the surface of the forest floor.

Litter does not include bark that is still attached to a down log, or rotten chunks of wood that are still inside a decaying log or log end (i.e., if a decayed log end has a lot of rotten cubes or pieces laying on a log surface and exposed to air, they are considered part of the log and not litter – fire would burn differently if it hit a pile of rotten punky wood chips, cradled by the unrotted sapwood shell). If these rotten chunks have spilled out to the ground and are actually on the ground surface, then they would be included in the litter layer.

Litter does not include animal manure.

2. Duff is the layer just below litter. It consists of decomposing leaves and other organic material. You should see no recognizable plant parts, the duff layer is usually dark decomposed organic matter. When moss is present, the top of the duff layer is just below the green portion of the moss. The bottom of this layer is the point where mineral soil (A horizon) begins.

25.7.2+WisCFI Overview of Measurements

Depth measurements will be taken at the 24-foot (horizontal distance) location on each transect. If a log, rock or other obstruction occurs at the sample location, do not measure duff or litter depth, regardless of what is on top of the obstruction.

The DUFF, LITTER variable has options for indicating if duff, litter were measured at each sample location. The default value for this variable is 1, indicating that all variables were measured (duff, litter). A value of 2 is entered if none (duff, litter) were sampled (i.e., submerged part of plot).

25.7.2.1 Duff and Litter

The duff layer is the organic material layer between the A-horizon (or uppermost soil mineral horizon) and the litter layer. The duff is a soil layer dominated by organic material derived from the decomposition of plant and animal litter (pine straw, leaves, twigs, etc) and deposited on either an organic or a mineral surface. This layer is distinguished from the litter layer in that the original organic material has undergone sufficient decomposition that the source of this material (e.g., individual plant parts) can no longer be identified. Litter is defined as undecomposed or only partially decomposed organic material that can be readily identified (e.g., plant leaves, twigs, etc.). As a general rule, duff depth should rarely exceed a few inches. Crews should be absolutely sure they are measuring deep duff depths, instead of mineral soil layers or parts of the litter layer. Duff can easily weigh more than 6 times that of litter. If unsure of the bottom of the duff layer, crews should feel the texture of the suspect material in their hand. Rub the soil between your fingers. Does it crumble (duff) or feel more like modeling clay (mineral).

Carefully expose a shallow profile of the forest floor by digging out an area at the sample point using a knife, hatchet, or other tool. Estimate the depth of each layer with a ruler to the nearest 0.1 inch. If there is a log, rock, or other obstruction on the surface at the sample point, do not measure the litter or duff depth (record DUFF, LITTER SAMPLE = 2); a value of 99.9 will be entered by the TALLY program for each depth.

As you dig the hole for this measurement, if you encounter a rock, root, or buried log – stop the depth measurement at this point.

The height of the litter should be measured at the top of the loose material located at the sample point on the transect. Try to preserve the conditions of this location by walking around this point, so the QA staff will measure the same height as the original crew.

25.7.2.2 Fuelbed Not Collected in WisCFI

25.7.3+WisCFI SUBPLOT NUMBER

Record the code indicating the number of the subplot center from which the transect originates.

When collected: All tally segments
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values: 1 to 2

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

25.7.4 TRANSECT

Record the code indicating the azimuth of the transect.

When collected: All tally segments
Field width: 3 digits
Tolerance: No errors
MQO: At least 99% of the time
Values:

030	Transect extends 30 degrees from subplot center
150	Transect extends 150 degrees from subplot center
270	Transect extends 270 degrees from subplot center

25.7.5 DUFF, LITTER SAMPLE

Record the code indicating if the depth of the duff and litter layer was measured.

When collected: At 24.0 ft on each transect
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values: 0 to 2

1	All sampled: Duff, litter
2	Nothing sampled; Duff, litter are not sampled

25.7.6 DUFF DEPTH

Record the code indicating the depth of the duff layer to the nearest 0.1 inch.

When collected: At 24.0 ft on each transect
Field width: 3 digits
Tolerance: +/- 0.5 inch
MQO: At least 90% of the time
Values: 00.0 to 99.9

25.7.7 LITTER DEPTH

Record the code indicating the depth of the litter layer to the nearest 0.1 inch.

When collected: At 24.0 ft on each transect
Field width: 3 digits
Tolerance: +/- 0.5 inch
MQO: At least 90% of the time
Values: 00.0 to 99.9

25.7.8 FUELBED DEPTH Not Collected in WisCFI

25.8 Fuel Loading On The Microplot Not Collected in WisCFI

25.9 Sampling Residue Piles

The line transect method is not practical when sampling CWD within piles and windrows. Piles and windrows will be located and sampled on the subplot plot, regardless of whether they intersect a transect.

Piles and windrows created directly by human activity and log piles at the bottom of steep-sided ravines in which individual pieces are impossible to tally separately, are more efficiently sampled by using the following instructions. However, loose CWD in piles created by wind throw, landslides, fires, and other natural causes should be tallied using line transects unless it is physically impossible to measure the pieces in the natural pile.

For a pile to be tallied on a subplot that contains forest land, all of the following criteria must be met (Figure 21):

- The pile's center must be within 24.0 horizontal feet of subplot center,
- The pile's center must be in an accessible forest land condition class, and
- The pile contains pieces of CWD ≥ 3 inches diameter that would be impossible to tally separately.

Use the PILE DENSITY variable to estimate the percent of the pile that contains woody material ≥ 3 inches.

The pile is assigned to the condition class in which the pile center lies.

Apply the following steps to determine the center of a pile or windrow:

1. Determine the longest axis of a pile.
2. Determine the midpoint of this axis.
3. Project a line through this midpoint that is perpendicular to the axis determined in step 1.
4. Determine the midpoint of the segment of this projected line that crosses the pile.
5. This is the center of the pile.

Piles that cross the 24.0-foot fixed-radius subplot boundary: If the center of a pile is within 24.0 horizontal feet of subplot center, tally the pile, recording the dimensions of the entire pile even if part of the pile is beyond 24.0 feet. If the center of a pile is more than 24.0 horizontal feet of subplot center, do not tally the pile or any portion of the pile.

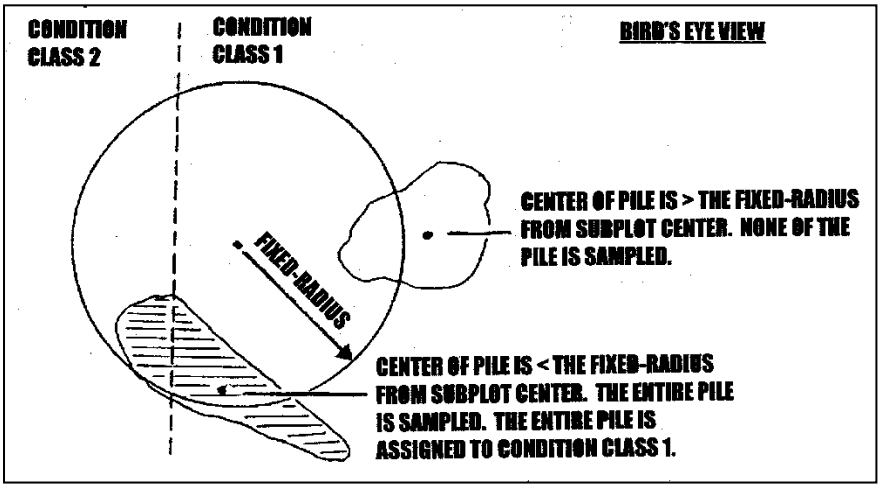


Figure 21. Residue pile selection examples.

25.9.1+WisCFI SUBPLOT NUMBER
Record the code indicating the subplot number.

When collected: Record for all sampled residue piles
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values: 1 to 2

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

25.9.2 CONDITION CLASS

Record the code indicating the number of the condition class to which the pile is assigned.

When collected: Record for all sampled residue piles
Field Width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values: 1 to 9

25.9.3 PILE AZIMUTH

Record the code indicating the azimuth from the subplot center to the pile. This azimuth centers on the pile so that it can be relocated. Use 360 for north.

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

25.9.4 PILE SHAPE

Record the code indicating the shape of the pile. Determine which of the four shapes diagrammed in Figure 22 most resembles the pile and record the dimensions. Pile dimensions should be ocularly smoothed out when making estimates. Average the unevenness of protruding pieces.

When collected: All sampled residue piles
Field width: 1 digit
Tolerance: No errors
MQO: At least 90% of the time
Values: 1 to 4

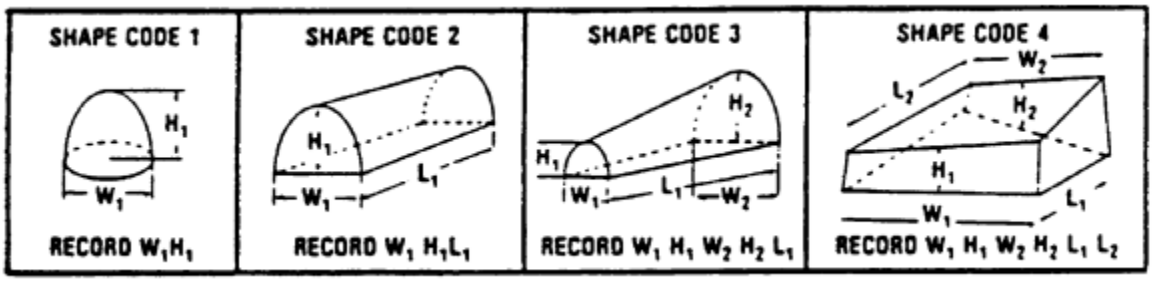


Figure 22. PILE SHAPE codes (Hardy 1996).

25.9.5 PILE LENGTH 1

Record the code indicating the length of the sides of the pile. Estimate to the nearest foot. PILE LENGTH 1 may often equal PILE LENGTH 2.

When collected: All sampled residue piles and PILE SHAPE = 2, 3, 4
Field width: 2 digits
Tolerance: +/- 10%
MQO: At least 90% of the time
Values: 01 to 99

25.9.6 PILE LENGTH 2

Record the code indicating the length of the sides of the pile. Estimate to the nearest foot. PILE LENGTH 1 may often equal PILE LENGTH 2.

When collected: All sampled residue piles and PILE SHAPE = 4
Field width: 2 digits
Tolerance: +/- 10%
MQO: At least 90% of the time
Values: 01 to 99

25.9.7 PILE WIDTH 1

Record the code indicating the width of the sides of the pile. Estimate to the nearest foot. PILE WIDTH 1 may often equal PILE WIDTH 2.

When collected: All sampled residue piles, and PILE SHAPE = 1, 2, 3, 4
Field width: 2 digits
Tolerance: +/- 10%
MQO: At least 90% of the time
Values: 01 to 99

25.9.8 PILE WIDTH 2

Record the code indicating the width of the sides of the pile. Estimate to the nearest foot. PILE WIDTH 1 may often equal PILE WIDTH 2.

When collected: All sampled residue piles, and PILE SHAPE = 3, 4
Field width: 2 digits
Tolerance: +/- 10%
MQO: At least 90% of the time
Values: 01 to 99

25.9.9 PILE HEIGHT 1

Record the code indicating the height of either end of the pile. Estimate to the nearest foot. PILE HEIGHT 1 may often equal PILE HEIGHT 2.

When collected: All sampled residue piles, and PILE SHAPE = 1, 2, 3, 4
Field width: 2 digits
Tolerance: +/- 10%
MQO: At least 90% of the time
Values: 01 to 99

25.9.10 PILE HEIGHT 2

Record the code indicating the height of either end of the pile. Estimate to the nearest foot. PILE HEIGHT 1 may often equal PILE HEIGHT 2.

When collected: All sampled residue piles, and PILE SHAPE = 3, 4
Field width: 2 digits
Tolerance: +/- 10%
MQO: At least 90% of the time
Values: 01 to 99

25.9.11 PILE DENSITY

Record the code estimating the percent of the pile that consists of wood. Use the PILE DENSITY variable to estimate the percent of the pile that contains woody material ≥ 3 inches. Air, soil, rock, plants, etc, should be factored out of the estimate. Estimate to the nearest 10 percent.

When collected: All sampled residue piles
Field width: 2 digits
Tolerance: +/- 20%
MQO: At least 75% of the time
Values:

00	Absent
01	Trace (< 1% cover)
10	1 – 10%
20	11-20%
30	21-30%
….	
90	81-90%
99	91-100%

25.10 Literature Cited

Hardy, C.C. 1996. Guidelines for estimating volume, biomass, and smoke production for piled slash. Gen. Tech. Rep. PNW-364. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 21 p.

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

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

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	Caribbean	Woodland	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	lyallii
X		W			0073	LAOC	western larch	Larix	occidentalis
X		W			0081	CADE27	incense-cedar	Calocedrus	decurrens
	E	W			0090	PICEA	spruce spp.	Picea	spp.
X	E				0091	PIAB	Norway spruce	Picea	abies
X		W			0092	PIBR	Brewer spruce	Picea	breweriana
X		W			0093	PIEN	Engelmann spruce	Picea	engelmannii
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	Caribbean	Woodland	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	PIVI2	Virginia pine	Pinus	virginiana
X		W		w	0133	PIMO	singleleaf pinyon	Pinus	monophylla
X		W		w	0134	PIDI3	border pinyon	Pinus	discolor
X		W			0135	PIAR5	Arizona pine	Pinus	arizonica
X	E				0136	PINI	Austrian pine	Pinus	nigra
X		W			0137	PIWA	Washoe pine	Pinus	washoensis
X		W		w	0138	PIQU	four-leaf pine, Parry pinyon pine	Pinus	quadrifolia
X		W			0139	PITO	Torrey pine	Pinus	torreyana

Core	East	West	Caribbean	Woodland	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	Caribbean	Woodland	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	Caribbean	Woodland	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	illinoinensis
X	E				0405	CALA21	shellbark hickory	Carya	laciniosa
X	E				0406	CAMY	nutmeg hickory	Carya	myristiciformis
X	E				0407	CAOV2	shagbark hickory	Carya	ovata
X	E				0408	CATE9	black hickory	Carya	texana
X	E				0409	CAAL27	mockernut hickory	Carya	alba
X	E				0410	CAPA24	sand hickory	Carya	pallida
X	E				0411	CAFL6	scrub hickory	Carya	floridana
X	E				0412	CAOV3	red hickory	Carya	ovalis
X	E				0413	CACA38	southern shagbark hickory	Carya	carolinae-septentrionalis
	E	W			0420	CASTA	chestnut spp.	Castanea	spp.
	E				0421	CADE12	American chestnut	Castanea	dentata
X	E				0422	CAPU9	Allegheny chinkapin	Castanea	pumila
	E				0423	CAPUO	Ozark chinkapin	Castanea	pumila var. ozarkensis
X	E	W			0424	CAMO83	Chinese chestnut	Castanea	mollissima
		W			0431	CHCHC4	giant chinkapin, golden chinkapin	Chrysolepis	chrysophylla var. chrysophylla
	E		C		0450	CATAL	catalpa spp.	Catalpa	spp.
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	Caribbean	Woodland	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	chrysocarpa
	E				0506	CRDI	broadleaf hawthorn	Crataegus	dilatata
	E				0507	CRFL	fanleaf hawthorn	Crataegus	flabellata
	E				0508	CRMO3	oneseed hawthorn	Crataegus	monogyna
	E				0509	CRPE	scarlet hawthorn	Crataegus	pedicellata
	E				5091	CRPH	Washington hawthorn	Crataegus	phaenopyrum
	E				5092	CRSU5	fleshy hawthorn	Crataegus	succulenta
	E				5093	CRUN	dwarf hawthorn	Crataegus	uniflora
	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	Caribbean	Woodland	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	Caribbean	Woodland	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	Caribbean	Woodland	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	Caribbean	Woodland	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	Caribbean	Woodland	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	Caribbean	Woodland	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	Acoelorraphe	wrightii
	E				0907	COAR	silver palm	Coccothrinax	argentata
	E		C		0908	CONU	coconut palm	Cocos	nucifera
	E		C		0909	ROYST	royal palm spp.	Roystonea	spp.
	E				0911	SAME8	Mexican palmetto	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	Caribbean	Woodland	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 9+N. INVASIVE PLANT LIST

PLANTS Code	Scientific name	Common name
ACPL	Acer platanoides	Norway maple
AIAL	Ailanthus altissima	tree of heaven (341)
ALJU	Albizia julibrissin	silktree (345)
ALPE4	Alliaria petiolata	garlic mustard
BETH	Berberis thunbergii	Japanese barberry
BEVU	Berberis vulgaris	common barberry
CEOR7	Celastrus orbiculatus	oriental bittersweet
CESTM	Centaurea stoebe ssp. micranthos	spotted knapweed
CIAR4	Cirsium arvense	Canada thistle
CIVU	Cirsium vulgare	bull thistle
CYLO11	Cynanchum louiseae	Louis' swallow-wort
CYRO8	Cynanchum rossicum	European swallow-wort
ELAN	Elaeagnus angustifolia	Russian olive
ELUM	Elaeagnus umbellata	autumn olive
EUES	Euphorbia esula	leafy spurge
FRAL4	Frangula alnus	glossy buckthorn
HEHE	Hedera helix	English ivy
HEMA3	Hesperis matronalis	dames rocket
LIVU	Ligustrum vulgare	common privet European privet
LONIC	Lonicera	Non-native bush honeysuckles
LOJA	Lonicera japonica	Japanese honeysuckle
LOMA6	Lonicera maackii	Amur honeysuckle
LOMO2	Lonicera morrowii	Morrow's honeysuckle
LOTA	Lonicera tatarica	Tatarian honeysuckle
LOBE	Lonicera x bella	Showy fly honeysuckle
LYNU	Lysimachia nummularia	creeping jenny
LYSA2	Lythrum salicaria	purple loosestrife
MEQU	Melaleuca quinquenervia	punktree (992)
MEAZ	Melia azedarach	Chinaberrytree (993)
MIVI	Microstegium vimineum	Nepalese browntop Japanese stiltgrass
PATO2	Paulownia tomentosa	princesstree (712)
PHAR3	Phalaris arundinacea	reed canarygrass
PHAU7	Phragmites australis	common reed
POCU6	Polygonum cuspidatum	Japanese knotweed
POSA4	Polygonum sachalinense	giant knotweed
POBO10	Polygonum x. bohemicum	Japanese/giant knotweed hybrid
RHCA3	Rhamnus cathartica	common buckthorn
ROPS	Robinia pseudoacacia	black locust
ROMU	Rosa multiflora	multiflora rose
SPJA	Spiraea japonica	Japanese meadowsweet
TARA	Tamarix ramosissima	Saltcedar (991)
TRSE6	Triadica sebifera	tallowtree (994)
ULPU	Ulmus pumila	Siberian elm (974)
VIOP	Viburnum opulus	European cranberrybush

Unknown Code	Common Name
2FERN	Fern or Fern Ally
2FORB	Forb (herbaceous, not grass nor grasslike)
2GRAM	Graminoid (grass or grasslike)
2PLANT	Plant
2SHRUB	Shrub (>.5m)
2SUBS	Subshrub (<.5m)
2TREE	Tree
2VH	Vine, herbaceous
2VW	Vine, woody

APPENDIX 10+N. UNKNOWN PLANT SPECIMEN COLLECTION

The following information describes some useful procedures and examples of data-collection aids for collecting plant specimens. The preferred option is to use procedures developed for the P3 Vegetation Indicator protocol which relies on automated data-recorder and database tracking of plant specimens. This protocol also automates the creation of labels for specimens that can be downloaded and printed.

If your unit requires collection of plant specimens for species that:

1. you cannot identify quickly and confidently using field guides but are potentially identifiable, or
2. are a new record for the state

follow these basic steps:

1. Assign a valid SPECIES code.
2. Record whether or not a specimen was collected in the appropriate SPECIMEN COLLECTED variable.
3. When a specimen is collected, enter a SPECIMEN LABEL NUMBER. Place a label with the corresponding label number in the bag with the specimen.
4. Describe any newly encountered unknown species in the appropriate NOTES variable.
5. Record the canopy cover estimates of the SPECIES CODE on the condition on the subplot where encountered.

Example Specimen Label

Official specimen labels are printed from plot data collected in the data-recorder (PDR) and accompany the unknown specimen as it is pressed, dried and submitted for further identification. Labels will not include sensitive plot identification data – the unique specimen label number is sufficient identification for each specimen.

Specimen Label
State: County:
Plot:
Label Number: Resolved Species Code:
Resolved scientific name:
Resolved by (name):
Date Collected:
Unknown Code: Unique Species Nbr:
Field collected scientific name:
Collected by:
Community type(s) where found:

Collecting and pressing plants

If fewer than 5 individuals of an unknown herbaceous plant species are present do not collect.

Use a digging tool to extract the entire plant, including any underground portions, flowers, fruits, and leaves. If the plant is abundant, collection of two samples will increase the likelihood of a good specimen.

Collected unknown specimens should be transported in the field and from the field in the 1 and/or 2 gallon zip-lock bags provided. Only one species and label may be placed in a single bag. Acceptable methods of transporting collected specimens include:

- Use a 3-hole-punch to punch holes in the bottom of your bags prior to traveling in the field. Place the punched bags into a 2-inch 3-ring binder with the zip-lock portion facing outward. Plants can then be placed with labels into the bag directly in the binder. This method prevents crumpling, tearing, and destroying the specimen during transportation.
- Use a 1-hole-punch to punch a hole in the one upper corner of each bag. The hole should be placed in such a manner that it cannot easily be torn. Place the bags on an aluminum carabineer (available at drug stores) or on heavy twine and fasten to your field vest or backpack. Be careful to seal the plants and labels securely inside the bags to prevent accidental loss.

Press and label the plant if not identified by the end of the day:

- After returning to the field office print all of the labels associated with the collected unknown specimens. The printed labels should now have all of the plot information (plot number, state, notes, unknown code, etc.) in addition to the original label number, make sure that the printed information is correct and matches the unknown specimen before including it in the press.
- Each specimen representing a unique species should be placed individually inside a single layer of folded newsprint. Each specimen is to be accompanied by its corresponding unknown specimen label. Small plant specimens are to be pressed individually. Large plant specimens may be folded in a “v”, “z”, or “w” arrangement to fit on a single newsprint page. Arrange the specimen so that at least one upper and one lower leaf surface is exposed. Plants may be trimmed to reduce bulk, so long as all diagnostic parts are included. Diagnostic portions include stem sections, petioles, leaves, roots, flowers, and fruits. Bulky fruits or nuts may be stored separately in a paper envelope that is taped to the newsprint and is accompanied by an identical copy of the specimen’s unknown label. Unknown codes can be written on the outside of the folded newspaper to aid sorting as specimens are processed.
- Stack the specimens in their individual newsprint sleeves between two pieces of cardboard. Bind the cardboard and plants together using a piece of twine or flat cloth ribbon wrapped around the length and width of the cardboard bundle. For mailing numerous specimens, several bundles may be used. Place all bundles inside a cardboard box for shipping.

Package and submit specimens as dictated by your unit or lab. It is suggested that Unknown specimens be packaged and shipped at the end of every work week. Exceptions will be made when extended field excursions prevent the vegetation specialist from reaching a post office.

All packaged specimens are to be accompanied by a legible completed label. Unknown Spreadsheets tracking collected unknown plants are generated from the PDR plot file.