# Volume III of Field Guide

# Forest Inventory and Analysis National Core Prefield Guide 6.0p

## INTRODUCTION

This document describes the standards, codes, methods, and definitions for Forest Inventory and Analysis (FIA) prefield data items. The term prefield refers to the data collection items listed within this guide and to the procedures used to measure those items. The objective is to describe CORE FIA prefield procedures that are consistent and uniform across all FIA units. **This CORE is the framework for regional FIA prefield programs; individual prefield programs may add variables, but may not change the CORE requirements.** Unless otherwise noted, the items in this prefield guide are considered CORE; that is, the information will be collected by all FIA units as specified. Items or codes specified as CORE OPTIONAL are not required by individual units; however, if the item is collected or coded, it will be done as specified in this prefield guide. **This document is not meant to stand alone. It is meant to be used by Prefield Interpreters along with the National Core Field Guide.**

### Prefield Guide Layout

The prefield guide is arranged in the following sections:

| | |
|---|---|
| Section 0 | General Description |
| Section 1 | Prefield Data Items |
| Section 2 | Quality Assurance (In draft, ETA FY2015) |

Descriptions of data items follow in this format:

**DATA ITEM NAME [NIMS variable name] -- <brief variable description>**

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

Data items, descriptions of when to collect the data items, field width, tolerances, MQO's, and values apply to all plots unless specifically noted. Field width designates the number of digits (or spaces) needed to properly record the data item.

Tolerances may be stated in +/- terms or number of classes for ordered categorical data items (e.g., +/- 2 classes); in absolute terms for some continuous variables (e.g., +/- 0.2 inches); or in terms of percent of the value of the data item (e.g., +/- 10 percent of the value). For some data items, no errors are tolerated (e.g., PLOT NUMBER).

MQO's state the percentage of time that the collected data are required to be within tolerance. Percentage of time within tolerance is generally expressed as "at least X percent of the time," meaning that data are expected to be within tolerance at least X percent of the time.

## 0.0 GENERAL DESCRIPTION

The primary purposes of the prefield plot review process are to: 1) determine which Phase 2 plots need to be sent to the field for measurement; and 2) gather information describing the condition, land cover, land use, and tree canopy cover on plots that are not sent to the field.

Prefield data represent the entire prefield plot unless it is otherwise stated. The CORE prefield plot is a 144ft. radius circle which encompasses the four field subplots. 'Plot center' is defined as the center of subplot 1. As a CORE OPTION, the prefield plot may be expanded to a 178.9ft. radius circle in order to include the four field macroplots.

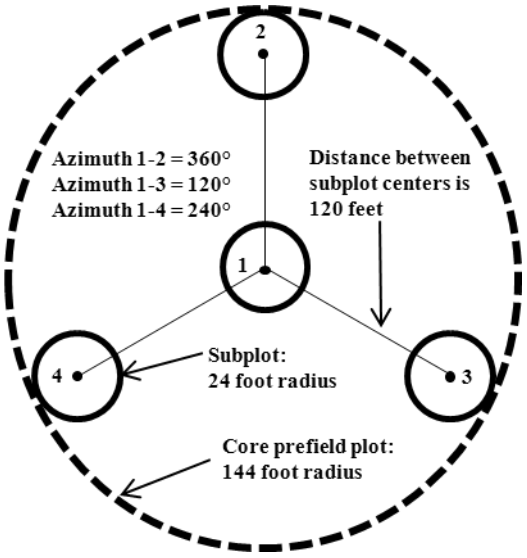


**Figure 1. Prefield plot layout and relationship to the field plot.** The prefield plot is a 144 foot radius circle that completely encompasses the four field subplots; the prefield plot is centered on subplot one ("plot center").

Any plot that includes, or potentially intersects, a forested condition will be sent to the field for measurement. Programs can also opt to send plots with nonforest land conditions to the field as a CORE OPTION if conducting a nonforest inventory or special study. Definitions and minimum size requirements for conditions in this prefield guide follow those described in the field guide (Refer to Chapter 2, Condition Class, of the current version of the National Core Field Guide). Estimates of condition class status, land cover class, non-forest land use, and tree canopy cover are made on plots that are not sent to the field. As a CORE OPTIONAL item, regions may choose to use prefield procedures to evaluate land cover class and tree canopy cover on plots returning from the field as nonsampled.

Remotely sensed image data is the primary source of information for prefield data collection. Photo interpreters *must* be familiar with the environment that will be analyzed for successful interpretation of the imagery. Field experience, data from previous plot visits, and image training aids are some of the sources of information that can be used to aid in image interpretation. Photo interpreters *must* also be familiar with the many factors that affect image data interpretation, including image resolution, shadows, clouds, image angle (nadir), and time of year. The imagery that is used must be a combination of the highest quality and most recent source available. The image source code and the corresponding date the image was taken are recorded as part of prefield data collection.

Caution *must* be practiced, if using public image products such as Google Earth, Flash Earth and similar products which may record coordinates that users enter into the system. It is against FIA policy to enter plot coordinates into image products that have the potential to disclose the plot location. Use extreme caution when using these products to view FIA plot locations. Accepted policy includes: navigation by general zoom or pan functions, entering fuzzed or swapped coordinates, or entering coordinates approximately a 1/2 mile from actual coordinates. FIA plot locations are confidential and protected as a result of the privacy policy adopted by the Forest Service (Forest Service Handbook Directive 4809.11-2005-1) which aims to protect land owners in accordance with the Department of the interior and Related Agencies Appropriations Act (H.R. 3423) which amended the Food Security Act of 1985 (H.R. 2100).

## 1.0 PREFIELD DATA ITEMS

### 1.1 STATE [statecd]

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

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

### 1.2 COUNTY [countycd]

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

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

### 1.3 PLOT NUMBER [plot]

Record the identification number, unique within a county, parish, or borough for each plot.
When collected: All plots
Field width: 5 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: 00001 to 99999

### 1.4 PI ANALYST [pi_analyst]

Record the US Forest Service Active Directory shortname for the analyst measuring the prefield data items. If the analyst does not have an Active Directory shortname, record a one word name for the analyst.

When collected: All plots
Field width: 30 character alphanumeric character field
Tolerance: No errors
MQO: At least 99% of the time
Values: Active directory short names and one word names

### 1.5 FOREST [forest]

Record Y for the plots that have, or potentially have, a forested condition on one of the subplots (or macroplots). Record N for the plots that definitely do not have a forested condition on any of the subplots (or macroplots). Regions may choose to record a null value if forest is not assessed in prefield. If it is uncertain if a forested condition is present, the plot must be sent to the field for verification and possible measurement. Refer to section 2.2, Condition Class Status Definitions of the current version of the National Core Field Guide for the definition of forest land.

When collected: All plots
Field width: 1 character
Tolerance: No errors
MQO: At least 99% of the time
Values: Y Potentially has a forested condition present
N No forested condition present
Null Prefield assessment not completed

### 1.6 FIELD PLOT [field_plot]

Record Y for a plot that will be sent to the field (data for these plots may come from the previous field visit record). FIELD PLOT will be set to Y for all plots where FOREST = Y (regardless of whether it is known in the office that the plot is hazardous, access denied, or nonsampled for any other reason). Record N for plots that will not be sent to the field but will be measured in the office (data for these plots will come from the Prefield Table). FIELD PLOT is equivalent to FOREST in most instances; as such the value may be derived from FOREST. Exceptions may include: established forest plots scheduled for re-visit, special study plots (i.e. non-forest field inventories on National

Forest and Grassland), or non-visit plots selected for field visit to verify prefield data collection.

When collected: All plots
Field width: 1 character
Tolerance: No errors
MQO: At least 99% of the time
Values: Y Plot sent to the field
N Plot not sent to the field

### 1.7 MIDAS OFFICE PLOT (CORE OPTIONAL) [midas_office_plot]

Record Y for plots that are known to be hazardous, access denied, or nonsampled for any other reason (these plots will have MIDAS records created but will not be sent to field crews for measurement). Record N for plots that are not known to be hazardous, access denied, or nonsampled for any other reason, and therefore require measurement in the field.

When collected: FIELD PLOT = Y
Field width: 1 character
Tolerance: No errors
MQO: At least 99% of the time
Values: Y Plot is known in the office to be hazardous, access denied, or nonsampled for any other reason
N Plot requires field visit
Null Variable is not collected in the region

### 1.8 CONDITION CLASS STATUS [pc_condition_status_cd]

Record the code that describes the sampling status of the condition at plot center when FIELD PLOT = N. Definitions for values 2-4 can be found in section 2.2, Condition Class Status Definitions of the current version of the National Core Field Guide.

When collected: FIELD PLOT = N
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:
2 Nonforest land
3 Noncensus water
4 Census water

### 1.9 LAND COVER CLASS [land_cover_class]

Record this attribute when FIELD PLOT = N. Define the LAND COVER CLASS that plot center falls within. LAND COVER CLASSes must meet the minimum area and width requirements defined in Chapter 2, Condition Class, as well as the developed land use exceptions in section 2.4.2 CONDITION CLASS STATUS of the National Core Field Guide.

If the LAND COVER CLASS at point center does not meet the FIA minimum forest acre area definition of 1 acre or qualify as a developed land use exception. Choose one of the following:

1. If the area is less than 1 acre and it does not qualify as a developed land use exception, it is considered an inclusion within the condition. Inclusions should be ignored when assigning the LAND COVER CLASS. In this case apply the key as a guide and/or to verify the LAND COVER CLASS selection.
2. Or if there are multiple adjacent LAND COVER CLASSes, apply the key to the 144' radius prefield plot area and treat all the aggregate LAND COVER CLASSes as a whole.

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

**Full Land Cover Class Definitions**

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

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

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

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

- **Natural vegetation** is defined as vegetation where ecological processes primarily determine species and site characteristics; that is, vegetation comprised of a largely spontaneously growing set of plant species that are shaped by both site and biotic processes. Human activities influence these interactions to varying degrees (e.g.,

logging, livestock grazing, fire, introduced pathogens), but do not eliminate or dominate the spontaneous processes. Wherever doubt exists as to the naturalness of a vegetation type (e.g., old fields, various forest plantations), it is classified as part of the natural / semi-natural vegetation (NVCS 2008)**.**

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

- **Anthropic Vegetation** is defined as vegetation with a distinctive structure, composition, and development determined by regular human activity. Developed vegetation has typically been planted or treated, and has relatively distinctive growth form, floristic, or site features when compared to natural vegetation. Distinctive growth form and structural attributes typically include one or more of the following:
    a. Dominant herbaceous vegetation that is regularly-spaced and/or growing in rows, often in areas with substantial cover of bare soil for significant periods of the year, usually determined by tillage or chemical treatment.

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

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

**Land Cover Classification Key**

**(For Photo Interpreters Only:** In cases where no imagery is available or suitable for interpretation Land Cover Class = **12 No Photo Available)**

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

1. ≥10% vegetative Cover = **Vegetated**, else 2.
   1.1. Areas where the majority of vegetation (≥50% relative cover) has been highly-manipulated = **Anthropic Vegetation**, else 1.2
      1.1.1. Areas that are predominantly covered by vegetation grown for the production of food, non-woody fiber, and/or ornamental horticulture, including land in any stage of annual crop production, and land being regularly cultivated for production of crops from perennial plants = **06 Agricultural Vegetation**
      1.1.2. Other areas predominantly covered by vegetation with highly-manipulated growth forms = **07 Developed, Vegetated**
   1.2. Areas where majority of vegetation (≥50% relative cover) is natural or semi-natural = **Natural/Semi-natural Vegetation**
      1.2.1. Areas on which trees provide 10% or greater canopy cover and are part of the dominant (uppermost) vegetation layer, including areas that have been planted to produce woody crops = **01 Treeland**
      1.2.2. Areas on which shrubs provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer = **02 Shrubland**
      1.2.3. Areas on which herbaceous vegetation provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer = **03 Grassland**
      1.2.4. **For Photo Interpreters Only**: Areas where differentiation between Shrubland and Grassland is not possible with the current imagery = **11 Shrub-Grassland**
      1.2.5. Areas on which non-vascular vegetation provide 10% or greater cover and are part of the dominant vegetation layer = **04 Non-vascular Vegetation**
      1.2.6. Areas with 10% or greater vegetative cover but no one life form has 10% or more cover = **05 Mixed Vegetation**
2. <10% vegetative cover = **Sparsely Vegetated**
   2.1. Areas persistently and predominantly covered by water (census and noncensus water, permanent snow and ice) and with less that 10% cover of emergent vegetation. = **10 Water**
   2.2. Areas predominantly covered with constructed materials with limited plant life = **09 Developed**
   **2.3.** Natural areas with limited vegetation. Areas predominantly covered by bare rock, gravel, sand, silt, clay, or other earthen material, with little (<10% cover) or no "green" vegetation present regardless of its inherent ability to support life = **08 Barren**

When collected: FIELD PLOT = N *and* CONDITION CLASS STATUS = 2, 3, 4
Field width: 2 digits
Tolerance: No errors
MQO: At least 95% of the time
Values:

| **Codes are >10% vegetative cover:** | |
|---|---|
| 01 | **Treeland**: Areas on which trees provide 10% or greater canopy cover and are part of the dominant (uppermost) vegetation layer, including areas that have been planted to produce woody crops. Only include tree species that can be tallied in the region, i.e., that are on the regional species list. Example areas include forests, forest plantations, reverting fields with ≥10% tree canopy cover, clearcuts with ≥10% tree canopy cover. This category includes cypress swamps and mangroves (not to be confused with aquatic vegetation). |
| 02 | **Shrubland:** Areas on which shrubs or subshrubs provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer, provided these areas do not qualify as Treeland. **Shrub/Subshrub** — a woody plant that generally has several erect, spreading, or prostrate stems which give it a bushy appearance. This includes dwarf shrubs, and low or short woody vines (NVCS 2008) and excludes any species on FIA's tree list. Examples include cranberry bogs and other shrub-dominated wetlands, chaparral, and sagebrush. |
| 03 | **Grassland:** Areas on which herbaceous vegetation provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer, provided these areas do not qualify as Treeland or Shrubland. This includes herbs, forbs, and graminoid species. Examples include meadows and prairies. Grazed land is also included, but not if the pasture is improved to such an extent that it meets the requirements for Agricultural Vegetation. This category also includes emergent wetland vegetation like seasonally flooded grasslands, cattail marshes, etc. |
| 04 | **Non-vascular Vegetation:** Areas on which non-vascular vegetation provide 10% or greater cover and are part of the dominant vegetation layer, provided these areas do not qualify as Treeland, Shrubland, or Grassland. Examples include mosses, sphagnum moss bogs, liverworts, hornworts, lichens, and algae. |
| 05 | **Mixed Vegetation:** Areas with 10% or greater vegetative cover but no one life form has 10% or more cover. That is, these areas do not qualify as Treeland, Shrubland, Grassland, or Non-vascular Vegetation, and thus are a mixture of plant life forms. Examples can include early stages of reverting fields and high deserts, |
| 06 | **Agricultural Vegetation:** Areas that are dominated by vegetation grown for the production of crops (food, non-woody fiber and/or ornamental horticulture), including land in any stage of annual crop production, and land being regularly cultivated for production of crops from perennial |

| | |
|---|---|
| | plants. Agricultural vegetation shows a) rapid turnover in structure, typically at least on an annual basis, either through harvesting and/or planting, or by continual removal of above ground structure (e.g., cutting, haying, or intensive grazing), or b) showing strong linear (planted) features. The herbaceous layer may be bare at various times of the year (NVCS 2008). Examples include row crops and closely sown crops; sod farms, hay and silage crops; orchards (tree fruits and nuts, Christmas trees, nurseries of trees and shrubs), small fruits, and berries; vegetables and melons; unharvested crops; cultivated or improved pasture; idle cropland (can include land in cover and soil-improvement crops and cropland on which no crops were planted) (NRI Field guide). When idle or fallow land ceases to be predominantly covered with manipulated vegetation, then it is no longer Agricultural Vegetation. |
| 07 | **Developed, Vegetated:** Areas predominantly covered by vegetation with highly-manipulated growth forms (usually by mechanical pruning, mowing, clipping, etc.), but are not Agricultural. This vegetation type typically contains an almost continuous herbaceous (typically grass) layer, with a closely cropped physiognomy, typically through continual removal of above ground structure (e.g., cutting, mowing), and where tree cover is highly variable, or other highly manipulated planted gardens (NVCS 2008). Examples can include lawns, maintained utility rights-of-way, office parks, and cemeteries. |
| **Codes are < 10% cover** | |
| 08 | **Barren:** Natural areas of limited plant life (< 10%). Areas generally characterized by bare rock, gravel, sand, silt, clay, or other earthen material, with little or no "green" vegetation present regardless of its inherent ability to support life. Examples include naturally barren areas such as lava fields, gravel bars and sand dunes, as well as areas where land clearance has removed the vegetative cover. Can include the natural material portions of quarries, mines, gravel pits, and cut or burned land <10% vegetation. |
| 09 | **Developed:** Areas predominantly covered with constructed materials with limited plant life (< 10%). Examples include completely paved surfaces like roads, parking lots and densely developed urban areas. |
| 10 | **Water**: Areas persistently covered and predominated by water and have <10% emergent vegetative cover. Examples include census and noncensus water and permanent snow and ice. For example, only the open water portion of a bog is to be included. |
| **Codes are for photo interpreters only** | |
| 11 | **Shrub-Grassland: For Photo Interpreters Only**: Shrub-Grassland (unable to differentiate classes 02 and 03) |
| 12 | **No Photo Available: For Photo Interpreters Only:** No Available Photo Coverage |

## 1.10 LAND COVER CLASS (CORE OPTIONAL)

Regions may choose to record NIMS PREFIELD LAND COVER CLASS for field visit plots with a PLOT STATUS = 3, nonsampled and a PLOT NONSAMPLED REASON CODE of 2, denied access or 3, hazardous. For example; if there are a high percent of plots which are denied access or hazardous the land cover class could be assessed remotely using prefield procedures. This data would not replace the field collected data. It would re-side in the NIMS PREFIELD TABLE. Refer to section 1.9 LAND COVER CLASS for procedures and definitions.

| | |
|---|---|
| When collected: | PLOT STATUS = 3 and PLOT NONSAMPLED REASON CODE = 2 or 3 |
| Field width: | 2 digits |
| Tolerance: | No errors |
| MQO: | At least 95% of the time |
| Values: | Refer to values listed in section 1.9 LAND COVER CLASS |

### 1.11 PRESENT NONFOREST LAND USE [pi_land_use]

Record this attribute when FIELD PLOT = N and CONDITION CLASS STATUS = 2. Define the PRESENT NONFOREST LAND USE plot center falls within. PRESENT NONFOREST LAND USE areas must meet the minimum area and width requirements defined in Chapter 2, Condition Class, as well as the developed land use exceptions in section 2.4.2 CONDITION CLASS STATUS of the National Core Field Guide.

If the PRESENT NONFOREST LAND USE at plot center is less than 1 acre and it does not meet the above requirements choose one of the following:

1. Treat the area as an inclusion and assess the surrounding PRESENT NONFOREST LAND USE which meets the minimum area and width requirements (except in those cases where the condition has been solely defined due to developed land uses, such as roads and rights-of-ways).
2. Or if the there are multiple adjacent PRESENT NONFOREST LAND USE areas present, record the one that dominates the 144’ radius prefield plot.

Recognizing multiple nonforest conditions on a plot is not required in prefield. This variable is used to track land use change for those areas that have changed from forest to nonforest, for areas that have changed from one nonforest land use to another, and for estimation of areas covered by various nonforest land uses. Land use code definitions are known to vary somewhat from region to region, as such interpreters should refer to their most current regional field guide for specific definitions.

| | |
|---|---|
| When collected: | FIELD PLOT = N and CONDITION CLASS STATUS = 2 |
| Field width: | 2 digits |
| Tolerance: | No errors |
| MQO: | At least 95% of the time |
| Values: | |

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

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

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

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

- 31 Cultural: business (industrial/commercial), residential, and other places of intense human activity.
- 32 Rights-of-way: improved roads, railway, power lines, maintained canal
- 33 Recreation: parks, skiing, golf courses
- 34 Mining

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

- 41 Nonvegetated
- 42 Wetland
- 43 Beach
- 45 Nonforest-Chaparral

## 1.12 CANOPY COVER

Estimate the percent canopy cover for the prefield plot area by completing the following canopy cover data items: CANOPY COVER SAMPLE METHOD; LIVE CANOPY COVER PERCENT; CANOPY COVER CONFIDENCE; and, when required, LOW CONFIDENCE REASON.

**CANOPY COVER (CORE)**
All regions will evaluate CANOPY COVER using prefield procedures for plots where FIELD PLOT = N.

**CANOPY COVER (CORE OPTIONAL)**
Regions may choose to record CANOPY COVER for field visit plots with a PLOT STATUS = 3, nonsampled and a PLOT NONSAMPLED REASON CODE of 2, denied access or 3, hazardous. For example; if there are a high percent of plots which are denied access or hazardous the canopy cover could be assessed remotely using prefield procedures. This data would not replace the field collected data. It would re-side in the NIMS PREFIELD TABLE.

**Note:** The canopy cover estimate made during prefield is for the 144 foot radius prefield plot and is not necessarily related to whether a condition on the plot meets (or possibly meets) the FIA definition of forest land.

### 1.12.1 CANOPY COVER SAMPLE METHOD [pi_canopy_cvr_sample_method_cd]

Record the CANOPY COVER SAMPLE METHOD used to determine LIVE CANOPY COVER PERCENT for the prefield plot.

| | |
|---|---|
| When collected: | CORE: FIELD PLOT = N<br>CORE OPTIONAL: PLOT STATUS = 3 and PLOT NONSAMPLED REASON CODE = 2 or 3 |
| Field width: | 2 digits |
| Tolerance: | No Errors |
| MQO: | At least 95% of the time |
| Values: | |

11 **Dot grid method –** The dot grid method is the preferred method for estimating LIVE CANOPY COVER PERCENT. 109 dots are systematically arranged within the 144 foot radius prefield plot and LIVE CANOPY COVER PERCENT is calculated based on the proportion of dots that fall on a tree crown. Currently, the dot grid method is implemented in ArcGIS using an add-in tool.

12 **Ocular image-based assessment** – This method is only to be used as a last resort. Ocular based estimations tend to be inaccurate and inconsistent. If the dot-grid tool is not functioning properly, it is best to wait until it is functioning properly or if necessary have it repaired.

13 **Other image-based assessment –** This code was developed for use when the codes 11 and 12 do not apply. A note should be made in NOTES.

14 **No canopy cover estimate possible –** Record this code when an estimate of CANOPY COVER is not made because of lacking or poor-quality imagery.

### 1.12.2 LIVE CANOPY COVER PERCENT [pi_canopy_cvr_percent]

Record the percent live canopy cover for all plots where FIELD_PLOT = N and/or for CORE OPTIONAL, PLOT STATUS = 3 and PLOT NONSAMPLED REASON CODE = 2 or 3. Live canopy cover is the percentage of the 144 foot radius prefield plot ground surface that is covered by a vertical projection of live tree crowns; overlapping crowns are not double-counted and live canopy cover cannot exceed 100 percent. Trees that are rooted outside of the plot radius are included in the canopy cover estimate if any live portion of the canopy extends into the plot. A plant's crown is considered a tree crown if it is an FIA tally tree species of any size; any tree that is visible on the imagery will be included. All trees meeting these criteria are included in LIVE CANOPY COVER PERCENT, including trees in orchards, Christmas tree plantations, and urban areas. Non-tally tree species are not included in LIVE CANOPY COVER PERCENT; if unable to distinguish tally vs. non-tally species record a CANOPY COVER CONFIDENCE of LOW and LOW CONFIDENCE REASON = 7 – tally/non-tally tree question.

LIVE CANOPY COVER PERCENT is calculated by using the ArcGIS add-in tool when CANOPY COVER SAMPLE METHOD CODE = 11.
It is acceptable to use professional experience to assist with estimates of canopy cover in the following situations:

1. Areas with poor imagery in which trees would be indiscernible, but it is certain that canopy cover = 0 percent (e.g., high elevation areas above tree line).
2. Nonforest areas where part of the 144 foot radius prefield plot is obscured (e.g., by a cloud) or unclear for some reason, but it is certain that the obscured area is similar to the surrounding area.
3. The choice of imagery is poor, but it can be discerned that no change has occurred since previous imagery acquisition, and the dot count can be performed on the older imagery with high confidence, regardless of total canopy cover.

In the above situations, CANOPY COVER PERCENT can be performed using the Dot grid method and it is acceptable to record CANOPY COVER CONFIDENCE as HIGH. A NOTE should be made to describe the situation.

| | |
|---|---|
| When collected: | CORE: FIELD PLOT = N<br>CORE OPTIONAL: PLOT STATUS = 3, PLOT NONSAMPLED REASON CODE = 2 or 3 |
| Tolerance: | +/- 4% |
| Field width: | 4 digits |
| MQO: | At least 90% of the time |
| Values: | 0.0-100.0% |

### 1.12.3 CANOPY COVER CONFIDENCE [pi_canopy_cvr_confidence]

Record a code to indicate the PI Analyst's confidence in the cover determination. "HIGH" confidence is the default. Record low confidence any time one of the low confidence reasons applies to >25% of the plot area.

| | | |
|---|---|---|
| When collected: | CORE: FIELD PLOT = N<br>CORE OPTIONAL: PLOT STATUS = 3, PLOT NONSAMPLED REASON CODE = 2 or 3 | |
| Tolerance: | No errors | |
| Field width: | Alphanumeric character field | |
| MQO: | At least 95% of the time | |
| Values: | HIGH | High confidence in cover determination |
| | LOW | Low confidence in cover determination |

### 1.12.4 LOW CONFIDENCE REASON [pi_canopy_cnf_reason]

Record the reason for low confidence when CANOPY COVER CONFIDENCE = LOW. If code 8 (Other) is recorded, a NOTE should be recorded to describe the situation.

| | |
|---|---|
| When collected: | CANOPY COVER CONFIDENCE=LOW |
| Tolerance: | No errors |
| Field width: | 1 digit |
| MQO: | At least 95% of the time |
| Values: | |

| | |
|---|---|
| 1 | Overall poor photo quality |
| 2 | Clouds |
| 3 | Shadows |
| 4 | Disturbance (as defined in P2 Field Guide) |
| 5 | Phenology (leaf-on/leaf-off/foliage changing) |
| 6 | Shrub/tree question |
| 7 | Tally/non tally tree question |
| 8 | Other (e.g., regeneration) |

## 1.13 IMAGE SOURCE [image_source]

Record the source of the imagery used to assess the prefield data items. When multiple images are used, record the IMAGE SOURCE that was used to measure LIVE CANOPY COVER PERCENT, LAND COVER CLASS, and PRESENT NONFOREST LAND USE. The IMAGE SOURCE codes should refer to the name of the entity that acquires or maintains the imagery. This information can typically be found in the metadata. It is the responsibility of each region to document the various image sources used and the associated codes recorded in NIMS.

If no imagery exists for a plot location, record "No Imagery Available."

| | |
|---|---|
| When collected: | All plots |
| Field width: | 30 characters |
| Tolerance: | No errors |
| MQO: | 99% |
| Values: | English language words, phrases, and numbers |

### 1.14 IMAGE DATE [image_date]

Record the date of the imagery recorded in IMAGE SOURCE was acquired.

It is highly desirable to record IMAGE DATEs to the nearest month if possible to indicate the season in which the image was acquired. Even when the month is not specified, one can usually determine within 3 months when the imagery was acquired from the metadata. When the day is unknown 01 will be recorded as the day. In some instances (e.g., for poorly documented images or for image mosaics comprised of multiple images acquired over a range of dates), it might not be possible to accurately record the IMAGE DATE. In these instances, estimate the month and year the imagery was acquired and provide details in the notes.

| | |
|---|---|
| When collected: | When IMAGE SOURCE ≠ "No Imagery Available" |
| Field width: | 17 characters |
| Tolerance: | Exact time stamp, when available<br>+/- 1 month for imagery acquired in the last 10 years;<br>+/- 3 years for imagery that is older than 10 years |
| MQO: | 95% |
| Values: | Date and military time |

### 1.15 NOTES [notes]

Use this field to record any pertinent notes about the prefield plot.

| | |
|---|---|
| When collected: | All plots |
| Field width: | 2000 character alphanumeric character field |
| Tolerance: | N/A |
| MQO: | N/A |
| Values: | English language words, phrases, and numbers |

## 2.0 QUALITY ASSURANCE (In draft, ETA FY2015)