The Forest Inventory and Analysis Database: Database Description and Users Manual Version 4.0 for Phase 2

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Abstract

This document is based on previous documentation of the nationally standardized Forest Inventory and Analysis database (Hansen and others 1992; Woudenberg and Farrenkopf 1995; Miles and others 2001). Documentation of the structure of the Forest Inventory and Analysis database (FIADB) for Phase 2 data, as well as codes and definitions, is provided. Examples for producing population level estimates are also presented. This database provides a consistent framework for storing forest inventory data across all ownerships for the entire United States. These data are available to the public.

Keywords: Forest Inventory and Analysis, inventory database, users manual, monitoring

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Preface

Forest Inventory and Analysis (FIA) is a continuing endeavor mandated by Congress in the Forest and Rangeland Renewable Resources Planning Act of 1974 and the McSweeney-McNary Forest Research Act of 1928. FIA’s primary objective is to determine the extent, condition, volume, growth, and depletion of timber on the Nation’s forest land. Before 1999, all inventories were conducted on a periodic basis. The passage of the 1998 Farm Bill requires FIA to collect data annually on plots within each State. This kind of up-to-date information is essential to frame realistic forest policies and programs. USDA Forest Service regional research stations are responsible for conducting these inventories and publishing summary reports for individual States.

In addition to published reports, the Forest Service provides data collected in each inventory to those interested in further analysis. This report describes a standard format in which data can be obtained. This standard format, referred to as the Forest Inventory and Analysis Database (FIADB) structure, was developed to provide users with as much data as possible in a consistent manner among States. A number of inventories conducted prior to the implementation of the annual inventory are available in the FIADB. However, various data attributes may be empty or the items may have been collected or computed differently. Annual inventories use a common plot design and common data collection procedures nationwide, resulting in greater consistency among FIA work units than earlier inventories. Data field definitions note inconsistencies caused by different sampling designs and processing methods.

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Chapter 1 -- Introduction

Purpose of This Manual

This manual is the definitive guide to the Forest Inventory and Analysis database (FIADB). This document replaces General Technical Report NC-218 (Miles and others 2001), which covered version 1.0 of the FIADB, and subsequent updates that appeared as online documentation to the FIADB through version 3.0. Although it is used widely within the Forest Inventory and Analysis (FIA) program, a substantial part, if not the majority, of the intended audience includes those outside FIA who are interested in using FIA data for their own analyses. Awareness of the potential uses of FIA data by users outside the FIA community is growing, and the data become increasingly useful as additional attributes are collected. However, as is the case with any data source, it is incumbent upon the user to understand not only the data definitions and acquisition methods, but also the context in which the data were collected. This manual is intended to help current and potential users understand the necessary details of the FIADB.

This manual has four chapters. The remainder of chapter 1 includes general introductions to the FIA program and the FIA database, including brief histories of both. It provides a convenient overview for those who have an interest in using FIA data, but have not yet become familiar with the FIA program. Chapter 2 provides descriptions of FIA sampling methods, including plot location and design, data measurement and computation, and general estimation procedures. Chapter 3 describes the tables that comprise the database, the attributes stored in each table, and the linkages between tables. Descriptions of the attributes, their data format, valid values, and other important details are given, but the appropriate field manuals should be consulted for exact specifications regarding data collection methods. Users with a good understanding of chapter 3 and fundamental database management skills should be able to conduct a wide range of analyses. Chapter 4 explains the standard methods used to compile population-level estimates from FIADB, and applies the new estimation procedures documented by Bechtold and Patterson (2005). These procedures are based on adoption of the annual inventory system and the mapped plot design, and constitute a major change when compared to previous compilation procedures. However, the new compilation procedures should allow more flexible analyses, especially as additional panels are completed under the annual inventory system.

There are several conventions used in this manual. The names of attributes (i.e., columns within tables) and table names appear in capital letters (e.g., PLOT table). Some attribute names appear in two or more tables. In most cases, such as the State code (STATECD), the attribute has the same definition in all tables. However, there are situations where attributes with the same name are defined differently in each table. One such example is the VALUE attribute in the REF_FOREST_TYPE table, which is used to identify the forest type and refers to appendix D. However, the VALUE attribute in the REF_UNIT table is used to indicate the FIA survey unit identification number from appendix C. In most cases, such as in the table descriptions in chapter 3, the attribute name will be used alone and the affiliation with a particular table is implied by the context. In cases where an attribute name has a different meaning in two or more tables, a compound naming convention, using the table name followed by the attribute name, will be used. In the VALUE attribute example, the name REF_FOREST_TYPE.VALUE refers to the VALUE
attribute in the REF_FOREST_TYPE table, while REF_UNIT.VALUE refers to the VALUE attribute in the REF_UNIT table.

The FIA Program

The FIA program is mandated by Congress in the Forest and Rangeland Renewable Resources Planning Act of 1974 and the McSweeney-McNary Forest Research Act of 1928. The mission of FIA is to determine the extent, condition, volume, growth, and depletions of timber on the Nation's forest land. FIA is the only program that collects, publishes, and analyzes data from all ownerships of forest land in the United States (Smith 2002). Throughout the 80-year history of the program, inventories have been conducted by a number of geographically dispersed FIA work units. Currently, the national FIA program is implemented by four regionally distributed work units that are coordinated by a National Office in Washington, DC (see figure 1). The four FIA work units are named by the Research Station in which they reside. Station abbreviations are used within this document and they are defined as Pacific Northwest Research Station (PNWRS), Northern Research Station (NRS), Rocky Mountain Research Station (RMRS), and Southern Research Station (SRS). NRS was recently formed from the merger of North Central Research Station (NCRS) and Northeastern Research Station (NERS). Some data items still retain these designations.

Starting in 1929, FIA accomplished its mission by conducting periodic forest inventories on a State-by-State basis. With the completion of Arizona, New Mexico, and Nevada in 1962, all 48 coterminous States had at least one periodic inventory (Van Hooser and others 1993). Repeat intervals for inventorying individual States have varied widely. By the late 1990s, most States had been inventoried more than once under the periodic inventory system; however, not all periodic data are available in electronic form (appendix I lists all periodic data available in the FIADB and the year in which annual inventory began).

Figure 1. Boundaries of the four regionally distributed FIA work units and locations of program offices.
With the passage of the 1998 Farm Bill, the FIA program was required to move from a periodic inventory to an annualized system, with a portion of all plots within a State measured each year (Gillespie 1999). Starting in 1999, States were phased into the annual inventory system (appendix I). At the time of publication of this document, annual inventory has not yet been started in Wyoming and Interior Alaska. Although the 1998 Farm Bill specified that 20 percent of the plots within each State would be visited annually, funding limitations have resulted in the actual portion of plots measured annually ranging between 10 and 20 percent, depending on the State.

Periodic and annual data are analyzed to produce reports at State, regional, and national levels. In addition to published reports, data are made available to the public for those who are interested in conducting their own analyses. Downloadable data, available online at http://fia.fs.fed.us/tools-data/, follow the format described in this document. Also available at this site are tools to make population estimates. The web-based EVALIDator tool or the Forest Inventory Data Online (FIDO) tool provide interactive access to the FIADB.

The FIA Database

The Forest Inventory and Analysis Database (FIADB) was developed to provide users with data in a consistent format, spanning all States and inventories. The first version of FIADB replaced two FIA regional databases; the Eastern States (Eastwide database) documented by Hansen and others (1992), and Western States (Westwide database) documented by Woudenberg and Farrenkopf (1995). A new national plot design (see chapter 2) provided the impetus for replacing these two databases, and FIA work units adopted the new design in all State inventories initiated after 1998. The FIADB table structure is currently derived from the National Information Management System (NIMS), which was designed to process and store annual inventory data. This is the fourth version of the single national FIA database to be released. A number of changes in the FIADB structure have been made to accommodate the data processing and storage requirements of NIMS. As a result, data from periodic inventories are stored in a format consistent with annual inventory data.

FIADB files are available for periodic inventory data collected as early as 1977 (see appendix I). A wide variety of plot designs and regionally defined attributes were used in periodic inventories, often differing by State. Because of this, some data attributes may not be populated or certain data may have been collected or computed differently. During some periodic inventories, ground plot data were collected on nonreserved timberland only. Low productivity forest land, reserved (areas reserved from timber harvesting), and nonforested areas usually were not ground sampled. To account for the total area of a State, “place holder” plots were created to represent these nonsampled areas, which are identified by plot design code 999 in FIADB (PLOT.DESIGNCD = 999). For these plots, many attributes that are normally populated for forested plots will be blank. Users should be aware that while place holder plots account for the area of nonsampled forest land, they do not account for the corresponding forest attributes (such as volume, growth, or mortality) that may exist in those areas.

Annual inventories, initiated sometime after 1999 depending on the State, use a nationally standardized plot design and common data collection procedures resulting in greater consistency among FIA work units than earlier inventories. However, as part of a continuing effort to improve the inventory, some changes in methodology and attribute definitions have been implemented after the new design was put into practice. Beginning in 1998, FIA started using a National Field Guide referenced as Field Guide 1.0. The database contains an attribute labeled MANUAL that stores the
version number of the field guide under which the data were collected. When both the plot design is coded as being the national design (PLOT.DESIGNCD = 1) and the field guide is coded with a number greater than or equal to 1, certain attributes are defined as being “core” while others are allowed to be “core optional.” Core attributes must be collected by every FIA work unit, using the same definition and set of codes. In contrast, collection of core optional attributes are decided upon by individual FIA work units, using the same national protocol, predefined definition, and set of codes. Many attributes, regardless of whether or not they are core or core optional, are only populated for forested conditions, and are blank for other conditions (such as nonforest or water). Attributes described in chapter 3 are noted if they are core optional.

Users who wish to analyze data using aggregations of multiple State inventories or multiple inventories within States should become familiar with changes in methodology and attribute definitions (see chapters 2 and 3). For each attribute in the current version of FIADB, an effort has been made to provide the current definition of the attribute, as well as any variations in definition that may have been used among various FIA work units. In other words, although inventory data have been made available in a common data format, users should be aware of differences that might affect their analyses.

**Changes From the Previous Database Version**

Database users should also be aware that changes are made for each version of FIADB. Sometimes the changes are minimal, such as simply rewriting explanatory text for clarification or adding new codes to a particular attribute. Database tables and/or attributes may be added or removed. In this release (4.0), a number of reference tables have been added. Also, two tables were added to modify the way population estimates are handled. Another important table addition is the Subplot Condition Change Matrix table that tracks changes in any condition class attribute between two visits to a plot. In appendix F, several changes were made in the SPGRPCD column. Tables 1-5 summarize the major modifications to FIADB Version 4.0.

| Name of table added | Table description |
|---------------------|-------------------|
| SUBP_COND_CHNG_MTRX | Subplot Condition Change Matrix |
| TREE_REGIONAL_BIOMASS | Tree Regional Biomass |
| POP_EVAL_TYP | Population Evaluation Type |
| REF_POP_EVAL_TYP_DESCR | Reference Population Evaluation Type Description |
| REF_FOREST_TYPE | Reference Forest Type |
| REF_SPECIES | Reference Species |
| REF_SPECIES_GROUP | Reference Species Group |
| REF_HABTYP_DESCRIPTION | Reference Habitat Type Description |
| REF_HABTYP_PUBLICATION | Reference Habitat Type Publication |
| REF_CITATION | Reference Citation |
| REF_FIADB_VERSION | Reference Forest Inventory and Analysis Database Version |
| REF_STATE_ELEV | Reference State Elevation |
| REF_UNIT | Reference Unit |
## Table 2. Database table attribute additions in FIADB V4.0

| Name of table affected | Name of column added to table |
|------------------------|-------------------------------|
| SURVEY                 | RSCD                          |
| SURVEY                 | ANN_INVENTORY                 |
| PLOT                   | INTENSITY                     |
| PLOT                   | NF_SAMPLING_STATUS_CD         |
| PLOT                   | NF_PLOT_STATUS_CD             |
| PLOT                   | NF_PLOT_NONSAMPLE_REASN_CD    |
| PLOT                   | P2VEG_SAMPLING_STATUS_CD      |
| PLOT                   | P2VEG_SAMPLING_LEVEL_DETAIL_CD|
| PLOT                   | INVASIVE_SAMPLING_STATUS_CD   |
| PLOT                   | INVASIVE_SPECIMEN_RULE_CD     |
| COND                   | CARBON_DOWN_DEAD              |
| COND                   | CARBON_LITTER                 |
| COND                   | CARBON_SOIL_ORG               |
| COND                   | CARBON_STANDING_DEAD          |
| COND                   | CARBON_UNDERSTORY_AG          |
| COND                   | CARBON_UNDERSTORY_BG          |
| COND                   | HARVEST_TYPE1_SRS             |
| COND                   | HARVEST_TYPE2_SRS             |
| COND                   | HARVEST_TYPE3_SRS             |
| COND                   | NF_COND_STATUS_CD             |
| COND                   | NF_COND_NONSAMPLE_REASN_CD    |
| COND                   | CANOPY_CVR_SAMPLE_METHOD_CD   |
| COND                   | LIVE_CANOPY_CVR_PCT           |
| COND                   | LIVE_MISSING_CANOPY_CVR_PCT   |
| COND                   | NBR_LIVE_STEMS                |
| SUBPLOT                | NF_SUBP_STATUS_CD             |
| SUBPLOT                | NF_SUBP_NONSAMPLE_REASN_CD    |
| SUBPLOT                | P2VEG_SUBP_STATUS_CD          |
| SUBPLOT                | P2VEG_SUBP_NONSAMPLE_REASN_CD |
| SUBPLOT                | INVASIVE_SUBP_STATUS_CD       |
| SUBPLOT                | INVASIVE_NONSAMPLE_REASN_CD   |
| TREE                   | DRYBIO_BOLE                   |
| TREE                   | DRYBIO_TOP                    |
| TREE                   | DRYBIO_STUMP                  |
| TREE                   | DRYBIO_SAPLING                |
| TREE                   | DRYBIO_WDLD_SPP               |
| TREE                   | DRYBIO_BG                     |
| TREE                   | CARBON_AG                     |
| TREE                   | CARBON_BG                     |
| TREE                   | PREV_PNTN_SRS                 |
| POP_ESTN_UNIT          | P1SOURCE                      |
Table 3. Database table attribute deletions in FIADB V4.0

| Name of table affected | Name of column deleted |
|------------------------|------------------------|
| PLOT                   | CREW_TYPE              |
| PLOT                   | MANUAL_DB              |
| PLOT                   | REPLACED_PLOT_NBR      |
| PLOT                   | LAST_INVYR_MEASURED    |
| COND                   | TRTOPCD                |
| COND                   | PASTNFCD               |
| COND                   | DISTANCE_WATER_SRS     |
| TREE                   | PREVSUBC               |
| SITETREE               | SITREE_EQU_NO_PNWRS    |

Table 4. Database table attributes renamed in FIADB V4.0

| Name of table affected | Old attribute name     | New attribute name  |
|------------------------|------------------------|---------------------|
| PLOT                   | GROWCD                 | GROW_TYP_CD         |
| PLOT                   | MORTCD                 | MORT_TYP_CD         |
| COND                   | TRTCD1_SRS            | HARVEST_TYPE1_SRS   |
| COND                   | TRTCD2_SRS            | HARVEST_TYPE2_SRS   |
| COND                   | TRTCD3_SRS            | HARVEST_TYPE3_SRS   |
| SUBPLOT                | STATUSCD               | SUBP_STATUS_CD      |
| SITETREE               | COND_CLASS_LIST        | CONDLIST             |

Table 5. Database table attributes moved to another table in FIADB V4.0

| Original table | New table              | Column moved and renamed |
|----------------|------------------------|--------------------------|
| TREE           | TREE_REGIONAL_BIOMASS  | REGIONAL_DRYBIOM         |
| TREE           | TREE_REGIONAL_BIOMASS  | REGIONAL_DRYBIOM         |

A change was made in the stocking equation assignment for various tree species and was applied to all annual inventory plot data. This change can result in a different computed forest type for a given plot. Several new forest types have been added and some changes were made in the way forest types are grouped.
Another significant change relates to biomass and carbon. FIA adopted a standard methodology to compute biomass of various tree components, which are used to convert biomass to carbon estimates. Previous biomass estimates, which were derived using a variety of equations, have been moved to a new table called TREE_REGIONAL_BIOMASS. Users can choose which attribute to summarize and can make comparisons between the estimates derived from the different methodologies.

Modeled condition level carbon attributes have been added to the FIADB and can be used to obtain results similar to those found in the U.S. Environmental Protection Agency’s (EPA’s) Greenhouse Gas Inventory (http://epa.gov/climatechange/emissions/).
Chapter 2 -- FIA Sampling and Estimation Procedures

To use the FIADB effectively, users should acquire a basic understanding of FIA sampling and estimation procedures. Generally described, FIA uses what may be characterized as a three-phase sampling scheme. Phase 1 (P1) is used for stratification, while Phase 2 (P2) consists of plots that are visited or photo-interpreted. A subset of Phase 2 plots are designated as Phase 3 (P3) plots (formerly known as Forest Health Monitoring (FHM) plots) where additional health indicator attributes are collected. Phases 1 and 2 are described in this chapter, but Phase 3 is described in a separate user’s manual (Woodall and others 2010). The exception is P3 crown attributes, which are described in the TREE table of this document.

Sampling and Stratification Methodology

Remote Sensing (P1)
The basic level of inventory in the FIA program is the State, which begins with the interpretation of a remotely sensed sample, referred to as Phase 1 (P1). The intent of P1 is to classify the land into various remote sensing classes for the purpose of developing meaningful strata. A stratum is a group of plots that have the same or similar remote sensing classifications. Stratification is a statistical technique used by FIA to aggregate Phase 2 ground samples into groups to reduce variance when stratified estimation methods are used. The total area of the estimation unit is assumed to be known.

Each Phase 2 ground plot is assigned to a stratum and the weight of the stratum is based on the proportion of the stratum within the estimation unit. Estimates of population totals are then based on the sum of the product of the known total area, the stratum weight, and the mean of the plot level attribute of interest for each stratum. The expansion factor for each stratum within the estimation unit is the product of the known total area and the stratum weight divided by the number of Phase 2 plots in the stratum.

Selection criteria for remote sensing classes and computation of area expansion factors differ from State to State. Users interested in the details of how these expansion factors are assigned to ground plots for a particular State should contact the appropriate FIA work unit (see table 6).

Ground Sampling (P2)
FIA ground plots, or Phase 2 plots, are designed to cover a 1-acre sample area; however, not all trees on the acre are measured. Ground plots may be new plots that have never been measured, or re-measurement plots that were measured during one or more previous inventories. Recent inventories use a nationally standard, fixed-radius plot layout for sample tree selection (see figure 2). Various arrangements of fixed-radius and variable-radius (prism) subplots were used to select sample trees in older inventories.

Plot Location

The FIADB includes coordinates for every plot location in the database, whether it is forested or not, but these are not the precise locations of the plot centers. In an amendment to the Food Security Act of 1985 (reference 7 USC 2276 § 1770), Congress directed FIA to ensure the privacy of private landowners. Exact plot coordinates could be used in conjunction with other publicly available data to link plot data to specific landowners, in violation of requirements set by Congress. In addition to
the issue of private landowner privacy, the FIA program had concerns about plot integrity and vandalism of plot locations on public lands. A revised policy has been implemented and methods for making approximate coordinates available for all plots have been developed. These methods are collectively known as “fuzzing and swapping” (Lister and others 2005).

In the past, FIA provided approximate coordinates for its periodic data in the FIADB. These coordinates were within 1.0 mile of the exact plot location (this is called fuzzing). However, because some private individuals own extensive amounts of land in certain counties, the data could still be linked to these owners. In order to maintain the privacy requirements specified in the amendments to the Food Security Act of 1985, up to 20 percent of the private plot coordinates are swapped with another similar private plot within the same county (this is called swapping). This method creates sufficient uncertainty at the scale of the individual landowner such that privacy requirements are met. It also ensures that county summaries and any breakdowns by categories, such as ownership class, will be the same as when using the true plot locations. This is because only the coordinates of the plot are swapped – all the other plot characteristics remain the same. The only difference will occur when users want to subdivide a county using a polygon. Even then, results will be similar because swapped plots are chosen to be similar based on attributes such as forest type, stand-size class, latitude, and longitude (each FIA work unit has chosen its own attributes for defining similarity).

For plot data collected under the current plot design, plot numbers are reassigned to sever the link to other coordinates stored in the FIADB prior to the change in the law. Private plots are also swapped using the method described above; remeasured plots are swapped independent of the periodic data. All plot coordinates are fuzzed, but less than before – within 0.5 mile for most plots and up to 1.0 mile on a small subset of them. This was done to make it difficult to locate the plot on the ground, while maintaining a good correlation between the plot data and map-based characteristics.
For most user applications, such as woodbasket analyses and estimates of other large areas, fuzzed and swapped coordinates provide a sufficient level of accuracy. However, some FIA customers require more precision of plot locations in order to perform analyses by user-defined polygons and for relating FIA plot data to other map-based information, such as soils maps and satellite imagery. In order to accommodate this need, FIA provides spatial data services that allow most of the desired analyses while meeting privacy requirements. The possibilities and limitations for these types of analyses are case-specific, so interested users should contact their local FIA work unit for more information.

**Plot Design, Condition Delineation, and Types of Data Attributes**

*Plot Designs*

The current national standard FIA plot design was originally developed for the Forest Health Monitoring program (Scott and others 1993). It was adopted by FIA in the mid-1990s and used for the last few periodic inventories and all annual inventories. The standard plot consists of four 24.0-foot radius subplots (approximately 0.0415 or 1/24 acre) (see figure 2), on which trees 5.0 inches and greater in diameter are measured. Within each of these subplots is nested a 6.8-foot radius microplot (approximately 1/300th acre) on which trees smaller than 5.0 inches in diameter are measured. A core optional variant of the standard design includes four “macroplots,” each with a radius of 58.9 feet (approximately 1/4 acre) that originate at the centers of the 24.0-foot radius subplots. Breakpoint diameters between the 24-foot radius subplots and the macroplots vary and are specified in the macroplot breakpoint diameter attribute (PLOT.MACRO_BREAKPOINT_DIA).

Prior to adoption of the current plot design, a wide variety of plot designs were used. Periodic inventories might include a mixture of designs, based on forest type, ownership, or time of plot measurement. In addition, similar plot designs (e.g., 20 BAF variable-radius plots) might have been used with different minimum diameter specifications (e.g., 1-inch versus 5-inch). Details on these designs are included in appendix B (plot design codes).

*Conditions*

An important distinguishing feature between the current plot design and previous designs is that different conditions are “mapped” on the current design (see figure 3). In older plot designs, adjustments were made to the location of the plot center or the subplots were rearranged such that the entire plot sampled a single condition. In the new design, the plot location and orientation remains fixed, but boundaries between conditions are mapped and recorded. Conditions are defined by changes in land use or changes in vegetation that occur along more-or-less distinct boundaries. Reserved status, owner group, forest type, stand-size class, regeneration status, and stand density are used to define forest conditions. For example, the subplots may cover forest and nonforest areas, or it may cover a single forested area that can be partitioned into two or more distinct stands. Although mapping is used to separate forest and nonforest conditions, different nonforest conditions occurring on a plot are not mapped during initial plot establishment. Each condition occurring on the plot is assigned a condition proportion, and all conditions on a plot add up to 1.0. For plot designs other than the mapped design, condition proportion is always equal to 1.0 in FIADB.
Types of Attributes

Measured, Assigned, and Computed Attributes

In addition to attributes that are collected in the field, FIADB includes attributes that are populated in the office. Examples of field attributes include tree diameter and height, and slope and aspect of the plot and subplot. Attributes that are populated in the office include assigned attributes, such as county and owner group codes, or computed attributes, such as tree and area expansion factors, and tree volumes.

For measured attributes, this document provides only basic information on the methodology used in the field. The authoritative source for methodology is the Forest Inventory and Analysis National Core Field Guide used during the inventory in which the data were collected (see http://www.fia.fs.fed.us/library/field-guides-methods-poc/). The MANUAL attribute in the PLOT table documents the version number where data collection protocols can be found.

Values of attributes that are assigned in the office are determined in several ways, depending on the attribute. For example, ownership may be determined using geographic data or local government records. Other attributes, such as Congressional District and Ecological Subsection are assigned values based on data management needs.

Some computed attributes in the database are derived using other attributes in the database. Ordinarily, such attributes would not be included in a database table because they could be
computed using the supplied attributes. However, some data compilation routines are complex or vary within or among FIA work units, so these computed attributes are populated for the convenience of database users.

One example of a computed attribute is site index, which is computed at the condition level. Site index is generally a function of height and age, although other attributes may be used in conjunction. In addition, several different site index equations may be available for a species within its range. Height and age data are included in the TREE table, but only certain trees (see SITETREE table) are included in the site index attribute that is reported for the condition. As a result, it would be time-consuming for users to replicate the process required to calculate site index at the condition level. For convenience, the condition (COND) table includes site index (SICOND), the species for which it is calculated (SISP), and the site index base age (SIBASE).

In most cases computed attributes should be sufficient for users’ needs, because the equations and algorithms used to compute them have been determined by the FIA program to be the best available for the plot location. However, for most computed attributes the relevant tree and plot level attributes used to compute them are included in the database, so users may do their own calculations if desired.

Regional Attributes
A number of regionally specific attributes are available in FIADB. These regional attributes are identified by FIA work unit, both in the table structure description (e.g., the attribute is named with an extension such as NERS) and in the attribute description (e.g., the attribute description text contains the phrase “Only collected by…”). For specific questions about the data from a particular FIA work unit, please contact the individuals listed in table 6.

Table 6. Contacts at individual FIA work units

| FIA Work Unit         | RSCD | States                                                                 | Database Contact   | Phone      | Analyst Contact | Phone   |
|-----------------------|------|------------------------------------------------------------------------|--------------------|------------|-----------------|---------|
| Rocky Mountain        | 22   | AZ,CO,ID,MT,NV, NM,UT,WY                                               | Mark Rubey         | 801-625-5647 | John Shaw       | 801-625-5673 |
| (RMRS)                |      |                                                                        |                    |            |                 |         |
| North Central         | 23   | IL,IN,IA,KS,MI,MN, MO,NE,ND,SD,WI                                     | Carol Alerich      | 610-557-4068 | Will McWilliams | 610-557-4050 |
| (NCRS)*               |      |                                                                        |                    |            |                 |         |
| Northeastern          | 24   | CT,DE,ME,MD,MA, NH,NJ,NY,OH,PA, RI, VT,WV                             | Carol Alerich      | 610-557-4068 | Will McWilliams | 610-557-4050 |
| (NERS)*               |      |                                                                        |                    |            |                 |         |
| Pacific Northwest     | 26,27| AK,CA,HI,OR,WA                                                        | Ron Wanek          | 503-808-2048 | Karen Waddell   | 503-808-2046 |
| (PNWRS)               |      |                                                                        |                    |            |                 |         |
| Southern (SRS)        | 33   | AL,AR,FL,GA, KY, LA,MS,NC,OK,SC, TN,TX,VA, PR, VI                    | Jeff Turner        | 865-862-2053 | Tom Brandeis    | 865-862-2030 |

*The North Central Research Station (NCRS) and the Northeastern Research Station (NERS) have merged to become one research station, the Northern Research Station. The former regional designations are kept to accommodate the data.

More information on attribute types is included in chapter 3.
Expansion Factors

Tree Expansion Factors
The expansion factor(s) used to scale each tree on a plot to a per-acre basis is dependent on the plot design. For fixed-plot designs, scaling is straightforward, with the number of trees per acre (TPA) represented by one tree equal to the inverse of the plot area in acres. The general formula is shown by equation [1]:

\[ TP_A = \frac{1}{(N \times A)} \]

Where \( N \) is the number of subplots, and \( A \) is the area of each subplot.

For example, the TPA of each tree \( \geq 5.0 \) inches in diameter occurring on the current plot design would be calculated using equation [2]:

\[ TP_A = \frac{1}{(4 \times 0.04154172)} = 6.018046 \]

This expansion factor can be found in the TPA_UNADJ attribute in the TREE table (see chapter 3) for plots measured with the annual plot design. In variable-radius plot designs, the per-acre expansion factor is determined by the diameter of the tree, the basal area factor (BAF), and the number of subplots used in the plot design. The general formula is shown by equation [3]:

\[ TP_A = (\frac{BAF}{0.005454 \times DIA^2})/N \]

Where \( BAF \) is the variable-radius basal area factor in square feet, \( DIA \) is diameter of the tally tree in inches, and \( N \) is the number of subplots in the plot design.

For example, if a 11.5-inch tree is tallied using a 10 BAF prism on a variable-radius design plot that uses five subplots, the calculation is:

\[ TP_A = (10 / 0.005454 \times 11.5^2)/5 = 2.773 \]

A 5.2-inch tree will have a greater expansion factor:

\[ TP_A = (10 / 0.005454 \times 5.2^2)/5 = 13.562 \]

Although it is not necessary to calculate expansion factors for different plot designs because they are stored in TPA_UNADJ, information on plot design can be found by using the code from the DESIGNCD attribute in the PLOT table to look up the plot design specifications in appendix B.

Plot Area Expansion Factors
Some previous versions of FIADB have included area expansion factors in the PLOT table that were used to scale plot-level data to population-level estimates (see EXPCURR and related attributes in Miles and others 2001). In this version of FIADB, area expansion factors have been removed from the PLOT table. Instead, there is one area expansion factor (EXPNS) stored in the POP_STRATUM table. This change is needed because of the way annual inventory data are compiled. Under the annual inventory system, new plots are added each year. Adjustment factors that are used to compensate for denied access, inaccessible, and other reasons for not sampling may
differ each time new data replaces older data. Both the number of acres each plot represents and the adjustments for the proportion of plots not sampled may change each year. In order to allow users to obtain population estimates for any grouping of data, an adjustment factor has been calculated and stored for each set of data being compiled. There is a separate adjustment factor for each fixed plot size: microplot, subplot, and macroplot. These attributes are also stored in the POP_STRATUM table. Each time the data are stratified differently, the adjustments and expansion factor may change. Therefore, FIA provides a different expansion factor every time the data are restratified.

FIA has chosen the term ‘evaluation’ to describe this process of storing different stratifications of data either for an individual set of data or for the changing sets of data through time. Each aggregation of data is given an evaluation identifier (EVALID). The user can select population estimates for the most current set of data or for previous sets of data. In addition to being able to calculate population estimates, users can now calculate sampling error information because FIA is storing all of the Phase 1 information used for the stratification. That information is stored for each estimation unit, which is usually a geographic subset of the State (see the POP_ESTN_UNIT table). For more information about evaluations and calculation of area expansion factors, see chapter 4.

A different method of population estimation is being implemented in this version of FIADB. In FIADB 3.0, users would select the appropriate evaluation sequence number (EVAL_CN_FOR_xxx) from the POP_EVAL_GRP table. This evaluation sequence number allowed them to select the appropriate plots and associated expansions. The newly added POP_EVAL_TYP table allows users to perform the similar queries, retrieving the same information, and will allow for a variety of evaluations to be added in the future. The previous method will continue to work in version 4.0.

Accuracy Standards

Forest inventory plans are designed to meet sampling error standards for area, volume, growth, and removals provided in the Forest Service directive (FSH 4809.11) known as the Forest Survey Handbook (U.S. Department of Agriculture 2008). These standards, along with other guidelines, are aimed at obtaining comprehensive and comparable information on timber resources for all parts of the country. FIA inventories are commonly designed to meet the specified sampling errors at the State level at the 67 percent confidence limit (one standard error). The Forest Survey Handbook mandates that the sampling error for area cannot exceed 3 percent error per 1 million acres of timberland. A 5 percent (Eastern United States) or 10 percent (Western United States) error per 1 billion cubic feet of growing-stock on timberland is applied to volume, removals, and net annual growth. Unlike the mandated sampling error for area, sampling errors for volume, removals, and growth are only targets.

FIA inventories are extensive inventories that provide reliable estimates for large areas. As data are subdivided into smaller and smaller areas, such as a geographic unit or a county, the sampling errors increase and the reliability of the estimates goes down.

- A State with 5 million acres of timberland would have a maximum allowable sampling error of 1.3 percent \((3\% \times (1,000,000)^{0.5} / (5,000,000)^{0.5})\).
- A geographic unit within that State with 1 million acres of timberland would have a 3.0 percent maximum allowable sampling error \((3\% \times (1,000,000)^{0.5} / (1,000,000)^{0.5})\).
- A county within that State with 100 thousand acres would have a 9.5 percent maximum allowable sampling error \((3\% \times (1,000,000)^{0.5} / (100,000)^{0.5})\) at the 67 percent confidence level.
The greater allowance for sampling error in smaller areas reflects the decrease in sample size as estimation area decreases.

Estimation procedures and the calculation of confidence intervals for typical FIA tables are discussed in chapter 4. Additional information on estimation and confidence intervals can be found in Bechtold and Patterson (2005).
Chapter 3 -- Database Structure

This chapter provides information about the database tables, including detailed descriptions of all attributes within the tables. Each column or attribute in a table is listed with its unabbreviated name, followed by a description of the attribute. Attributes that are coded include a list of the codes and their meanings. Appendix A is an index of the attributes, sorted alphabetically by column name, showing the table where the column is found including the attribute number in the table. Some overview information is presented below, followed by a section with complete information about all tables and attributes.

**Table Descriptions**

There are nineteen data tables and eleven reference tables in the Phase 1 and Phase 2 portions of the FIA Database.

- **SURVEY table** – Contains one record for each year an inventory is conducted in a State for annual inventory or one record for each periodic inventory.
  - SURVEY.CN = PLOT.SRV_CN links the unique inventory record for a State and year to the plot records.
- **COUNTY table** – Reference table for the county codes and names. This table also includes survey unit codes.
  - COUNTY.CN = PLOT.CTY_CN links the unique county record to the plot record.
- **PLOT table** – Provides information relevant to the entire 1-acre field plot. This table links to most other tables, and the linkage is made using PLOT.CN = TABLE_NAME.PLT_CN (TABLE_NAME is the name of any table containing the column name PLT_CN). Below are some examples of linking PLOT to other tables.
  - PLOT.CN = COND.PLT_CN links the unique plot record to the condition class record(s).
  - PLOT.CN = SUBPLOT.PLT_CN links the unique plot record to the subplot records.
  - PLOT.CN = TREE.PLT_CN links the unique plot record to the tree records.
  - PLOT.CN = SEEDLING.PLT_CN links the unique plot record to the seedling records.
- **COND table** – Provides information on the discrete combination of landscape attributes that define the condition (a condition will have the same land class, reserved status, owner group, forest type, stand-size class, regeneration status, and stand density).
  - PLOT.CN = COND.PLT_CN links the condition class record (s) to the plot table.
  - COND.PLT_CN = SITETREE.PLT_CN and COND.CONDID = SITETREE.CONDID links the condition class record to the site tree data.
  - COND.PLT_CN = TREE.PLT_CN and COND.CONDID = TREE.CONDID links the condition class record to the tree data.
- **SUBPLOT table** – Describes the features of a single subplot. There are multiple subplots per 1-acre field plot and there can be multiple conditions sampled on each subplot.
  - PLOT.CN = SUBPLOT.PLT_CN links the unique plot record to the subplot records.
  - SUBPLOT.PLT_CN = COND.PLT_CN and SUBPLOT.MACRCOND = COND.CONDID links the macroplot conditions to the condition class record.
  - SUBPLOT.PLT_CN = COND.PLT_CN and SUBPLOT.SUBPCOND = COND.CONDID links the subplot conditions to the condition class record.
  - SUBPLOT.PLT_CN = COND.PLT_CN and SUBPLOT.MICRCOND = COND.CONDID links the microplot conditions to the condition class record.
• **SUBP_COND** table – Contains information about the proportion of a subplot in a condition.
  - PLOT.CN = SUBP_COND.PLT_CN links the subplot condition class record to the plot table.
  - SUBP_COND.PLT_CN = COND.PLT_CN and SUBP_COND.CONDID = COND.CONDID links the condition class records found on the four subplots to the subplot description.
• **TREE** table – Provides information for each tree 1 inch in diameter and larger found on a microplot, subplot, or core optional macroplot.
  - PLOT.CN = TREE.PLT_CN links the tree records to the unique plot record.
  - COND.PLT_CN = TREE.PLT_CN and COND.CONDID = TREE.CONDID links the tree records to the unique condition record.
• **SEEDLING** table – Provides a count of the number of live trees of a species found on a microplot that are less than 1 inch in diameter but at least 6 inches in length for conifer species or at least 12 inches in length for hardwood species.
  - PLOT.CN = SEEDLING.PLT_CN links the seedling records to the unique plot record.
• **SITETREE** table – Provides information on the site tree(s) collected in order to calculate site index and/or site productivity information for a condition.
  - PLOT.CN = SITETREE.PLT_CN links the site tree records to the unique plot record.
  - SITETREE.PLT_CN = COND.PLT_CN and SITETREE.CONDID = COND.CONDID links the site tree record(s) to the unique condition class record.
• **BOUNDARY** table – Provides a description of the demarcation line between two conditions that occur on a single subplot.
  - PLOT.CN = BOUNDARY.PLT_CN links the boundary records to the unique plot record.
• **SUBP_COND_CHNG_MTRX** table – Contains information about the mix of current and previous conditions that occupy the same area on the subplot.
  - PLOT.CN = SUBP_COND_CHNG_MTRX.PLT_CN links the subplot condition change matrix records to the unique plot record.
  - PLOT.PREV_PLOT_CN = SUBP_COND_CHNG_MTRX.PREV_PLOT_CN links the subplot condition change matrix records to the unique previous plot record.
• **TREE_REGIONAL_BIOMASS** table – Contains biomass estimates computed using equations and methodology that varies by FIA work unit. This table retains valuable information for generating biomass estimates that match earlier published reports.
  - TREE.CN = TREE_REGIONAL_BIOMASS.TRE_CN links a tree regional biomass record to the corresponding unique tree.
• **POP_ESTN_UNIT** table – An estimation unit is a geographic area that can be drawn on a map. It has known area and the sampling intensity must be the same within a stratum within an estimation unit. Generally estimation units are contiguous areas, but exceptions are made when certain ownerships, usually National Forests, are sampled at different intensities. One record in the POP_ESTN_UNIT table corresponds to a single estimation unit.
  - POP_ESTN_UNIT.CN = POP_STRATUM.ESTN_UNIT_CN links the unique stratified geographical area (ESTN_UNIT) to the strata (STRATUMCD) that are assigned to each ESTN_UNIT.
• **POP_EVAL** table – An evaluation is the combination of a set of plots (the sample) and a set of Phase 1 data (obtained through remote sensing, called a stratification) that can be used to produce population estimates for a State (an evaluation may be created to produce population estimates for a region other than a State, such as the Black Hills National Forest).
A record in the POP_EVAL table identifies one evaluation and provides some descriptive information about how the evaluation may be used.

- POP_ESTN_UNIT.EVAL_CN = POP_EVAL.CN links the unique evaluation identifier (EVALID) in the POP_EVAL table to the unique geographical areas (ESTN_UNIT) that are stratified. Within a population evaluation (EVALID) there can be multiple population estimation units, or geographic areas across which there are a number of values being estimated (e.g., estimation of volume across counties for a given State.)

- POP_EVAL_ATTRIBUTE table – Provides information as to which population estimates can be provided by an evaluation. If an evaluation can produce 22 of the 92 currently supported population estimates, there will be 22 records in the POP_EVAL_ATTRIBUTE table (one per population estimate) for that evaluation.
  - POP_EVAL.CN = POP_EVAL_ATTRIBUTE.EVAL_CN links the unique evaluation identifier to the list of population estimates that can be derived for that evaluation.

- POP_EVAL_GRP table – Provides information on the suite of evaluations that were used to generate a complete set of reports for an inventory. In a typical State inventory report, one evaluation is used to generate an estimate of the total land area; a second evaluation is used to generate current estimates of volume, numbers of trees and biomass; and a third evaluation is used for estimating growth, removals and mortality. One record in the POP_EVAL_GRP record identifies all the evaluations that were used in generating estimates for a State inventory report. Each record in the POP_EVAL table corresponds to an EVAL_CN_FOR_XX column in the POP_EVAL_GRP table, (XX is one of the following: Expall, Expcurr, Expvol, Expgrow, Expmort, or Expremv). Similar information is contained in the POP_EVAL_TYP table, which has been added to this version of the database.
  - POP_EVAL_TYP.EVAL_GRP_CN = POP_EVAL_GRP.CN links the evaluation type record to the evaluation group record.
  - POP_EVAL.CN = POP_EVAL_GRP.EVAL_CN_FOR_EXPALL links the evaluation for all land to the evaluation identifier that includes all plots used to make the estimate.
  - POP_EVAL.CN = POP_EVAL_GRP.EVAL_CN_FOR_EXPCURR links the evaluation for sampled land to the evaluation identifier that includes all sampled plots used to make the estimate.
  - POP_EVAL.CN = POP_EVAL_GRP.EVAL_CN_FOR_EXPVOL links the evaluation for tree volume, biomass, or number of trees to the evaluation identifier that includes all plots used to make these estimates.
  - POP_EVAL.CN = POP_EVAL_GRP.EVAL_CN_FOR_EXPGROW links the evaluation for average annual tree growth to the evaluation identifier that includes all remeasured plots used to make the estimate.
  - POP_EVAL.CN = POP_EVAL_GRP.EVAL_CN_FOR_EXPMORT links the evaluation for average annual tree mortality to the evaluation identifier that includes all remeasured plots used to make the estimate.
  - POP_EVAL.CN = POP_EVAL_GRP.EVAL_CN_FOR_EXPREMV links the evaluation for average annual tree removals to the evaluation identifier that includes all remeasured plots used to make the estimate.

- POP_EVAL_TYP table – Provides information on the type of evaluations that were used to generate a set of tables for an inventory report. In a typical State inventory report, one evaluation is used to generate an estimate of the total land area; a second evaluation is used to generate current estimates of volume, numbers of trees and biomass; and a third evaluation is used for estimating growth, removals and mortality.
• POP_EVAL_TYP.EVAL_CN = POP_EVAL_CN links the evaluation type record to the evaluation record.
• POP_EVAL_TYP.EVAL_GRP_CN = POP_EVAL_GRP_CN links the evaluation type record to the evaluation group record.
• POP_EVAL_TYP.EVAL_TYP = REF_POP_EVAL_TYP_DESCR.EVAL_TYP links an evaluation type record to an evaluation type description reference record.

• POP_PLOT_STRATUM_ASSGN table – Stratum information is assigned to a plot by overlaying the plot’s location on the Phase 1 imagery. Plots are linked to their appropriate stratum for an evaluation via the POP_PLOT_STRATUM_ASSGN table.
  o POP_PLOT_STRATUM_ASSGN.PLT_CN = PLOT.CN links the stratum assigned to the plot record.

• POP_STRATUM table – The area within an estimation unit is divided into strata. The area for each stratum can be calculated by determining the proportion of Phase 1 pixels/plots in each stratum and multiplying that proportion by the total area in the estimation unit. Information for a single stratum is stored in a single record of the POP_STRATUM table.
  o POP_STRATUM.CN = POP_PLOT_STRATUM_ASSGN.STRATUM_CN links the defined stratum to each plot.

• REF_CITATION table – Identifies the published source for information on specific gravities, moisture content, and bark as a percent of wood volume that is provided in the REF_SPECIES table.
  o REF_SPECIES.WOOD_SPGR_GREENVOL_DRYWT_CIT = REF_CITATION.CITATION_NBR
  o REF_SPECIES.BARK_SPGR_GREENVOL_DRYWT_CIT = REF_CITATION.CITATION_NBR
  o REF_SPECIES.MC_PCT_GREEN_WOOD_CIT = REF_CITATION.CITATION_NBR
  o REF_SPECIES.MC_PCT_GREEN_BARK_CIT = REF_CITATION.CITATION_NBR
  o REF_SPECIES.WOOD_SPGR_MC12VOL_DRYWT_CIT = REF_CITATION.CITATION_NBR
  o REF_SPECIES.BARK_VOL_PCT_CIT = REF_CITATION.CITATION_NBR

• REF_FIADB_VERSION table – Contains information identifying the format of the currently available FIADB.

• REF_FOREST_TYPE table – A reference table containing forest type codes, descriptive names, forest type group codes and other information. Data users should link codes as shown below and then obtain the information stored in MEANING to convert the code to a name.
  o REF_FOREST_TYPE.VALUE = COND.FORTYPCD links the forest type reference record to the condition forest code used for reporting and analysis purposes.
  o REF_FOREST_TYPE.VALUE = COND.FLDTYPCD links the forest type reference record to the condition forest type code recorded by field crews.
  o REF_FOREST_TYPE.VALUE = COND.FORTYPCDCALC links the forest type reference record to the condition forest type code calculated by an algorithm.

• REF_POP_ATTRIBUTE table – Identifies all of the population estimates that are currently supported, and provides information useful to the estimation procedure. There are currently 92 records in the REF_POP_ATTRIBUTE table providing information ranging from how to calculate forest area to average annual net growth on forestland.
REF_POP_ATTRIBUTE.ATTRIBUTE_NBR = POP_EVAL_ATTRIBUTE.ATTRIBUTE_NBR links the description of the unique population estimate to the records of evaluations that can be used to make those estimates.

• REF_POP_EVAL_TYP_DESCR table – A reference table containing the description for each evaluation type.
  o REF_POP_EVAL_TYP_DESCR.EVAL_TYP = POP_EVAL_TYP.EVAL_TYP links an evaluation type description reference record to an evaluation type record.

• REF_SPECIES table – A reference table containing the species code, descriptive common name, scientific name, and many other attributes for each species. For example, data users who want to convert the species code to the associated common name should link codes as shown below and then obtain the information stored in COMMON_NAME.
  o REF_SPECIES.SPCD = TREE.SPCD links the species reference table record to the tree species code.
  o REF_SPECIES.SPCD = SEEDLING.SPCD links the species reference table record to the seedling species code.
  o REF_SPECIES.SPCD = SITETREE.SPCD links the species reference table record to the site tree species code.

• REF_SPECIES_GROUP table – A reference table containing the species group code, descriptive name, and several other attributes for each species group. Data users should link codes as shown below and then obtain the information stored in NAME to convert the code to a descriptive name.
  o REF_SPECIES_GROUP.SPGRPCD = TREE.SPGRPCD links the species group reference table to the tree species group code.
  o REF_SPECIES_GROUP.SPGRPCD = SEEDLING.SPGRPCD links the species reference table record to the seedling species group code.
  o REF_SPECIES_GROUP.SPGRPCD = SITETREE.SPGRPCD links the species reference table record to the site tree species group code.

• REF_STATE_ELEV – Reference table containing information about minimum and maximum elevation found within a State.
  o REF_STATE_ELEV.STATECD = SURVEY.STATECD links the State elevation reference record to the survey record.

• REF_UNIT table – The description for each survey unit in a State.
  o REF_UNIT.STATECD = PLOT.STATECD and REF_UNIT.VALUE = PLOT_UNITCD links the survey unit description (MEANING) to the PLOT record.

Figure 4 helps to illustrate how the Phase 1 and other population estimation tables relate to one another and to the PLOT table.
Figure 4. Relationships among Phase 1 and population estimation tables to the Phase 2 plot and other frequently used tables.
Keys Presented with the Tables

Each summarized table in chapter 3 has a list of keys just below the bottom of the table. These keys are used to join data from different tables. The following provides a general definition of each kind of key.

**Primary key**

A single column in a table whose values uniquely identify each row in an Oracle table. The primary key in each FIADB 4.0 table is the CN column.

The name of the primary key for each table is listed in the table description. It follows the nomenclature of ‘TABLEABBREVIATION’_PK. The table abbreviations are:

| Table name                                      | Table abbreviation |
|------------------------------------------------|--------------------|
| SURVEY                                         | SRV                |
| COUNTY                                         | CTY                |
| PLOT                                           | PLT                |
| COND                                           | CND                |
| SUBPLOT                                        | SBP                |
| SUBP_COND                                      | SCD                |
| TREE                                           | TRE                |
| SEEDLING                                       | SDL                |
| SITETREE                                       | SIT                |
| BOUNDARY                                       | BND                |
| SUBP_COND_CHNG_MTRX                            | CMX                |
| TREE_REGIONAL_BIOMASS                          | TRB                |
| POP_ESTN_UNIT                                  | PEU                |
| POP_EVAL                                       | PEV                |
| POP_EVAL_ATTRIBUTE                             | PEA                |
| POP_EVAL_GRP                                   | PEG                |
| POP_EVAL_TYP                                   | PET                |
| POP_PLOT_STRATUM_ASSGN                         | PPSA               |
| POP_STRATUM                                    | PSM                |
| REF_POP_ATTRIBUTE                              | PAE                |
| REF_POP_EVAL_TYP_DESCR                         | PED                |
| REF_FOREST_TYPE                                | RFT                |
| REF_SPECIES                                    | SPC                |
| REF_SPECIES_GROUP                              | SPG                |
| REF_HABTYP_DESCRIPTION                         | RHN                |
| REF_HABTYP_PUBLICATION                         | RPN                |
| REF_CITATION                                   | CIT                |
| REF_FIADB_VERSION                              | RFN                |
| REF_STATE_ELEV                                 | RSE                |
| REF_UNIT                                       | UNT                |

1 The use of trade or firm names in this publication is for reader information only and does not imply endorsement by the U.S. Department of Agriculture of any product or service.
Unique key
Multiple columns in a table whose values uniquely identify each row in an Oracle table. There can be one and only one row for each unique key value.

The unique key varies for each FIADB 4.0 table. The unique key for the PLOT table is STATECD, INVYR, UNITCD, COUNTYCD, and PLOT. The unique key for the COND table is PLT_CN and CONDID.

The name of the unique key for each table is listed in the table description. It follows the nomenclature of ‘TABLEABBREVIATION’_UK.

Natural key
A type of unique key made from existing attributes in the table. It is stored as an index in this database.

Not all FIADB 4.0 tables have a natural key. For example, there is no natural key in the PLOT table, rather the natural key and the unique key are the same. The natural key for the COND table is STATECD, INVYR, UNITCD, COUNTYCD, PLOT, and CONDID.

The name of the natural key for each table is listed in the table description. It follows the nomenclature of ‘TABLEABBREVIATION’_NAT_I.

Foreign key
A column in a table that is used as a link to a matching column in another Oracle table.

A foreign key connects a record in one table to one and only one record in another table. Foreign keys are used both to link records between data tables and as a check (or constraint) to prevent “unrepresented data.” For example, if there are rows of data in the TREE table for a specific plot, there needs to be a corresponding data row for that same plot in the PLOT table. The foreign key in the TREE table is the attribute PLT_CN, which links specific rows in the TREE table to one record in the PLOT table using the plot attribute CN.

The foreign key for the COND table is PLT_CN. There is always a match of the PLT_CN value to the CN value in the PLOT table.

The name of the foreign key for each table is listed in the table description. It follows the nomenclature of ‘SOURCETABLEABBREVIATION’_‘MATCHINGTABLEABBREVIATION’_FK, where the source table is the table containing the foreign key and the matching table is the table the foreign key matches. The foreign key usually matches the CN column of the matching table. Most tables in FIADB 4.0 have only one foreign key, but tables can have multiple foreign keys.
Survey Table (Oracle table name is SURVEY)

| Column name | Descriptive name                        | Oracle data type |
|-------------|-----------------------------------------|------------------|
| 1           | CN                                      | VARCHAR2(34)     |
| 2           | INVYR                                   | NUMBER(4)        |
| 3           | P3_OZONE_IND                            | VARCHAR2(1)      |
| 4           | STATECD                                 | NUMBER(4)        |
| 5           | STATEAB                                 | VARCHAR2(2)      |
| 6           | STATENM                                 | VARCHAR2(28)     |
| 7           | RSCD                                    | NUMBER(2)        |
| 8           | ANN_INVENTORY                           | VARCHAR2(1)      |
| 9           | NOTES                                   | VARCHAR2(2000)   |
| 10          | CREATED_BY                              | VARCHAR2(30)     |
| 11          | CREATED_DATE                            | DATE             |
| 12          | CREATED_IN_INSTANCE                     | VARCHAR2(6)      |
| 13          | MODIFIED_BY                             | VARCHAR2(30)     |
| 14          | MODIFIED_DATE                           | DATE             |
| 15          | MODIFIED_IN_INSTANCE                    | VARCHAR2(6)      |
| 16          | CYCLE                                   | NUMBER(2)        |
| 17          | SUBCYCLE                                | NUMBER(2)        |

| Type of Key | Column(s) order | Tables to link | Abbreviated notation |
|-------------|-----------------|----------------|----------------------|
| Primary     | (CN)            | N/A            | SRV_PK               |
| Unique      | (STATECD, INVYR, P3_OZONE_IND, CYCLE) | N/A            | SRV_UK               |

1. CN  Sequence number. A unique sequence number used to identify a survey record.

2. INVYR  Inventory year. The year that best represents when the inventory data were collected. Under the annual inventory system, a group of plots is selected each year for sampling. The selection is based on a panel system. INVYR is the year in which the majority of plots in that group were collected (plots in the group have the same panel and, if applicable, subpanel). Under periodic inventory, a reporting inventory year was selected, usually based on the year in which the majority of the plots were collected or the mid-point of the years over which the inventory spanned. For either annual or periodic inventory, INVYR is not necessarily the same as MEASYEAR.

Exceptions:
INVYR = 9999. INVYR is set to 9999 to distinguish Phase 3 plots taken by the western FIA work units that are “off subpanel.” This is due to differences in measurement intervals between Phase 3 (measurement interval = 5 years) and Phase 2 (measurement interval = 10 years) plots. Only users interested in performing certain Phase 3 data analyses should access plots with this anomalous value in INVYR.
INVYR <100. INVYR <100 indicates that population estimates were derived from a pre-NIMS regional processing system and the same plot either has been or may soon be re-processed in NIMS as part of a separate evaluation. The NIMS processed copy of the plot follows the standard INVYR format. This only applies to plots collected in the South (SURVEY.RSCD = 33) with the national design or a similar regional design (PLOT.DESIGNCD = 1 or 220-233) that were collected when the inventory year was 1998 through 2005.

INVYR = 98 is equivalent to 1998 but processed through regional system
INVYR = 99 is equivalent to 1999 but processed through regional system
INVYR = 0 is equivalent to 2000 but processed through regional system
INVYR = 1 is equivalent to 2001 but processed through regional system
INVYR = 2 is equivalent to 2002 but processed through regional system
INVYR = 3 is equivalent to 2003 but processed through regional system
INVYR = 4 is equivalent to 2004 but processed through regional system
INVYR = 5 is equivalent to 2005 but processed through regional system

3. P3_OZONE_IND

Phase 3 ozone indicator. Values are Y (yes) and N (no). If Y, then the Survey is for a P3 ozone inventory. If N, then the Survey is not for a P3 ozone inventory. Note that P3_OZONE_IND is part of the unique key because ozone data are stored as a separate inventory (survey); therefore, combinations of STATECD and INVYR may occur more than one time.

4. STATECD State code. Bureau of the Census Federal Information Processing Standards (FIPS) two-digit code for each State. Refer to appendix C.

5. STATEAB State abbreviation. The two-character State abbreviation. Refer to appendix C.

6. STATENM State name. Refer to appendix C.

7. RSCD Region or Station Code. Identification number of the Forest Service National Forest System Region or Station (FIA work unit) that provided the inventory data (see appendix C for more information).

| Code | Description |
|------|-------------|
| 22   | Rocky Mountain Research Station (RMRS) |
| 23   | North Central Research Station (NCRS) |
| 24   | Northeastern Research Station (NERS) |
| 26   | Pacific Northwest Research Station (PNWRS) |
| 27   | Pacific Northwest Research Station (PNWRS)-Alaska |
| 33   | Southern Research Station (SRS) |
8. **ANN_INVENTORY**

Annual Inventory. An indicator to show if a particular inventory was collected as an annual inventory or a periodic inventory. Values are Y or N, and Y means that the inventory is annual.

9. **NOTES**

Notes. An optional item where notes about the inventory may be stored.

10. **CREATED_BY**

Created by. The employee who created the record. This attribute is intentionally left blank in download files.

11. **CREATED_DATE**

Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

12. **CREATED_IN_INSTANCE**

Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

13. **MODIFIED_BY**

Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

14. **MODIFIED_DATE**

Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

15. **MODIFIED_IN_INSTANCE**

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.

16. **CYCLE**

Inventory cycle number. A number assigned to a set of plots, measured over a particular period of time from which a State estimate using all possible plots is obtained. A cycle number >1 does not necessarily mean that information for previous cycles resides in the database. A cycle is relevant for periodic and annual inventories.

17. **SUBCYCLE**

Inventory subcycle number. For an annual inventory that takes n years to measure all plots, subcycle shows in which of the n years of the cycle the
data were measured. Subcycle is 0 for a periodic inventory. Subcycle 99 may be used for plots that are not included in the estimation process.
### County Table (Oracle table name is COUNTY)

| Column name | Descriptive name | Oracle data type |
|-------------|------------------|------------------|
| 1 STATECD   | State code       | NUMBER(4)        |
| 2 UNITCD    | Survey unit code | NUMBER(2)        |
| 3 COUNTYCD  | County code      | NUMBER(3)        |
| 4 COUNTYNM  | County name      | VARCHAR2(50)     |
| 5 CN        | Sequence number  | VARCHAR2(34)     |
| 6 CREATED_BY| Created by       | VARCHAR2(30)     |
| 7 CREATED_DATE| Created date    | DATE             |
| 8 CREATED_IN_INSTANCE| Created in instance | VARCHAR2(6) |
| 9 MODIFIED_BY| Modified by      | VARCHAR2(30)     |
| 10 MODIFIED_DATE| Modified date    | DATE             |
| 11 MODIFIED_IN_INSTANCE| Modified in instance | VARCHAR2(6) |

| Type of key | Column(s) order | Tables to link | Abbreviated notation |
|-------------|-----------------|----------------|----------------------|
| Primary     | (CN)            | N/A            | CTY_PK               |
| Unique      | (STATECD, UNITCD, COUNTYCD) | N/A         | CTY_UK               |

1. **STATECD**  
   State code. Bureau of the Census Federal Information Processing Standards (FIPS) two-digit code for each State. Refer to appendix C.

2. **UNITCD**  
   Survey unit code. Forest Inventory and Analysis survey unit identification number. Survey units are usually groups of counties within each State. For periodic inventories, Survey units may be made up of lands of particular owners. Refer to appendix C for codes.

3. **COUNTYCD**  
   County code. The identification number for a county, parish, watershed, borough, or similar governmental unit in a State. FIPS codes from the Bureau of the Census are used. Refer to appendix C for codes.

4. **COUNTYNM**  
   County name. County name as recorded by the Bureau of the Census for individual counties, or the name given to a similar governmental unit by the FIA program. Only the first 50 characters of the name are used. Refer to appendix C for names.

5. **CN**  
   Sequence number. A unique sequence number used to identify a county record.

6. **CREATED_BY**  
   Created by. The employee who created the record. This attribute is intentionally left blank in download files.

7. **CREATED_DATE**  
   Created date. The date the record was created. Date will be in the form DD-MON-YYYY.
8. **CREATED_IN_INSTANCE**

Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

9. **MODIFIED_BY**

Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

10. **MODIFIED_DATE**

Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

11. **MODIFIED_IN_INSTANCE**

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.
**Plot Table (Oracle table name is PLOT)**

| Column name            | Descriptive name                   | Oracle data type     |
|------------------------|------------------------------------|----------------------|
| 1  CN                  | Sequence number                    | VARCHAR2(34)         |
| 2  SRV_CN              | Survey sequence number             | VARCHAR2(34)         |
| 3  CTY_CN              | County sequence number             | VARCHAR2(34)         |
| 4  PREV_PLT_CN         | Previous plot sequence number      | VARCHAR2(34)         |
| 5  INVYR               | Inventory year                     | NUMBER(4)            |
| 6  STATECD             | State code                         | NUMBER(4)            |
| 7  UNITCD              | Survey unit code                   | NUMBER(2)            |
| 8  COUNTYCD            | County code                        | NUMBER(3)            |
| 9  PLOT                | Phase 2 plot number                | NUMBER(5)            |
| 10 PLOT_STATUS_CD      | Plot status code                   | NUMBER(1)            |
| 11 PLOT_NONSAMPLE_REASN_CD | Plot nonsampled reason code   | NUMBER(2)            |
| 12 MEASYEAR            | Measurement year                   | NUMBER(4)            |
| 13 MEASMON             | Measurement month                  | NUMBER(2)            |
| 14 MEASDAY             | Measurement day                    | NUMBER(2)            |
| 15 REMPER              | Remeasurement period               | NUMBER(3,1)          |
| 16 KINDCD              | Sample kind code                   | NUMBER(2)            |
| 17 DESIGNCD            | Plot design code                   | NUMBER(4)            |
| 18 RDDISTCD            | Horizontal distance to improved road code | NUMBER(2) |
| 19 WATERCD             | Water on plot code                 | NUMBER(2)            |
| 20 LAT                 | Latitude                            | NUMBER(8,6)          |
| 21 LON                 | Longitude                           | NUMBER(9,6)          |
| 22 ELEV                | Elevation                           | NUMBER(5)            |
| 23 GROW_TYP_CD         | Type of annual volume growth code  | NUMBER(2)            |
| 24 MORT_TYP_CD         | Type of annual mortality volume code | NUMBER(2) |
| 25 P2PANEL             | Phase 2 panel number               | NUMBER(2)            |
| 26 P3PANEL             | Phase 3 panel number               | NUMBER(2)            |
| 27 ECOSUBCD            | Ecological subsection code         | VARCHAR2(7)          |
| 28 CONGCDC             | Congressional district code        | NUMBER(4)            |
| 29 MANUAL              | Manual (field guide) version number | NUMBER(3,1)          |
| 30 SUBPANEL            | Subpanel                            | NUMBER(2)            |
| 31 KINDCD_NC           | Sample kind code, North Central    | NUMBER(2)            |
| 32 QA_STATUS           | Quality assurance status           | NUMBER(1)            |
| 33 CREATED_BY          | Created by                          | VARCHAR2(30)         |
| 34 CREATED_DATE        | Created date                        | DATE                 |
| 35 CREATED_IN_INSTANCE | Created in instance                 | VARCHAR2(6)          |
| 36 MODIFIED_BY         | Modified by                         | VARCHAR2(30)         |
| Column name                | Descriptive name            | Oracle data type     |
|---------------------------|----------------------------|----------------------|
| 37 MODIFIED_DATE          | Modified date               | DATE                 |
| 38 MODIFIED_IN_INSTANCE   | Modified in instance        | VARCHAR2(6)          |
| 39 MICROPLOT_LOC          | Microplot location          | VARCHAR2(12)         |
| 40 DECLINATION            | Declination                 | NUMBER(4,1)          |
| 41 EMAP_HEX                | EMAP hexagon                | NUMBER(7)            |
| 42 SAMP_METHOD_CD         | Sample method code          | NUMBER(1)            |
| 43 SUBP_EXAMINE_CD        | Subplots examined code      | NUMBER(1)            |
| 44 MACRO_BREAKPOINT_DIA   | Macroplot breakpoint diameter | NUMBER(2)           |
| 45 INTENSITY              | Intensity                   | VARCHAR2(2)          |
| 46 CYCLE                  | Inventory cycle number      | NUMBER(2)            |
| 47 SUBCYCLE               | Inventory subcycle number   | NUMBER(2)            |
| 48 ECO_UNIT_PNW           | Ecological unit, Pacific Northwest Research Station | VARCHAR2(10) |
| 49 TOPO_POSITION_PNW      | Topographic position, Pacific Northwest Research Station | VARCHAR2(2) |
| 50 NF_SAMPLING_STATUS_CD  | Nonforest sampling status code | NUMBER(1)          |
| 51 NF_PLOT_STATUS_CD      | Nonforest plot status cd    | NUMBER(1)            |
| 52 NF_PLOT_NONSAMPLE_REASN_CD | Nonforest plot nonsampled reason code | NUMBER(1) |
| 53 P2VEG_SAMPLING_STATUS_CD | P2 vegetation sampling status code | NUMBER(1) |
| 54 P2VEG_SAMPLING_LEVEL_DETAIL_CD | P2 vegetation sampling level detail code | NUMBER(1) |
| 55 INVASIVE_SAMPLING_STATUS_CD | Invasive sampling status code | NUMBER(1) |
| 56 INVASIVE_SPECIMEN_RULE_CD | Invasive specimen rule code  | NUMBER(1)           |

| Type of Key   | Column(s) order | Tables to link          | Abbreviated notation |
|---------------|-----------------|-------------------------|----------------------|
| Primary       | (CN)            | N/A                     | PLT_PK               |
| Unique        | (STATECD, INVYR, UNITCD, COUNTYCD, PLOT) | N/A                  | PLT_UK               |
| Foreign       | (CTY_CN)        | PLOT to COUNTY          | PLT_CTY_FK           |
|               | (SRV_CN)        | PLOT to SURVEY          | PLT_SRV_FK           |

1. **CN** Sequence number. A unique sequence number used to identify a plot record.
2. **SRV_CN** Survey sequence number. Foreign key linking the plot record to the survey record.
3. **CTY_CN** County sequence number. Foreign key linking the plot record to the county record.
4. **PREV_PLT_CN**

Previous plot sequence number. Foreign key linking the plot record to the previous inventory’s plot record for this location. Only populated on remeasurement plots.

5. **INVYR**

Inventory year. The year that best represents when the inventory data were collected. Under the annual inventory system, a group of plots is selected each year for sampling. The selection is based on a panel system. INVYR is the year in which the majority of plots in that group were collected (plots in the group have the same panel and, if applicable, subpanel). Under periodic inventory, a reporting inventory year was selected, usually based on the year in which the majority of the plots were collected or the mid-point of the years over which the inventory spanned. For either annual or periodic inventory, INVYR is not necessarily the same as MEASYEAR.

Exceptions:

INVYR = 9999. INVYR is set to 9999 to distinguish Phase 3 plots taken by the western FIA work units that are “off subpanel.” This is due to differences in measurement intervals between Phase 3 (measurement interval = 5 years) and Phase 2 (measurement interval = 10 years) plots. Only users interested in performing certain Phase 3 data analyses should access plots with this anomalous value in INVYR.

INVYR < 100. INVYR < 100 indicates that population estimates were derived from a pre-NIMS regional processing system and the same plot either has been or may soon be re-processed in NIMS as part of a separate evaluation. The NIMS processed copy of the plot follows the standard INVYR format. This only applies to plots collected in the South (SURVEY.RSCD = 33) with the national design or a similar regional design (DESIGNCD = 1 or 220-233) that were collected when the inventory year was 1998 through 2005.

INVYR = 98 is equivalent to 1998 but processed through regional system
INVYR = 99 is equivalent to 1999 but processed through regional system
INVYR = 0 is equivalent to 2000 but processed through regional system
INVYR = 1 is equivalent to 2001 but processed through regional system
INVYR = 2 is equivalent to 2002 but processed through regional system
INVYR = 3 is equivalent to 2003 but processed through regional system
INVYR = 4 is equivalent to 2004 but processed through regional system
INVYR = 5 is equivalent to 2005 but processed through regional system

6. **STATECD**

State code. Bureau of the Census Federal Information Processing Standards (FIPS) two-digit code for each State. Refer to appendix C.

7. **UNITCD**

Survey unit code. Forest Inventory and Analysis survey unit identification number. Survey units are usually groups of counties within each State. For periodic inventories, Survey units may be made up of lands of particular owners. Refer to appendix C for codes.
8. **COUNTYCD**  County code. The identification number for a county, parish, watershed, borough, or similar governmental unit in a State. FIPS codes from the Bureau of the Census are used. Refer to appendix C for codes.

9. **PLOT**  Phase 2 plot number. An identifier for a plot. Along with STATECD, INVYR, UNITCD, COUNTYCD and/or some other combinations of variables, PLOT may be used to uniquely identify a plot.

10. **PLOT_STATUS_CD**  

Plot status code. A code that describes the sampling status of the plot. Blank (null) values may be present for periodic inventories.

| Code | Description |
|------|-------------|
| 1    | Sampled – at least one accessible forest land condition present on plot |
| 2    | Sampled – no accessible forest land condition present on plot |
| 3    | Nonsampled |

11. **PLOT_NONSAMPLE_REASN_CD**  

Plot nonsampled reason code. For entire plots that cannot be sampled, one of the following reasons is recorded.

| Code | Description |
|------|-------------|
| 01   | Outside U.S. boundary – Entire plot is outside of the U.S. border. |
| 02   | Denied access area – Access to the entire plot is denied by the legal owner, or by the owner of the only reasonable route to the plot. |
| 03   | Hazardous – Entire plot cannot be accessed because of a hazard or danger, for example cliffs, quarries, strip mines, illegal substance plantations, high water, etc. |
| 05   | Lost data – Plot data file was discovered to be corrupt after a panel was completed and submitted for processing. |
| 06   | Lost plot – Entire plot cannot be found. |
| 07   | Wrong location – Previous plot can be found, but its placement is beyond the tolerance limits for plot location. |
| 08   | Skipped visit – Entire plot skipped. Used for plots that are not completed prior to the time a panel is finished and submitted for processing. This code is for office use only. |
| 09   | Dropped intensified plot – Intensified plot dropped due to a change in grid density. This code used only by units engaged in intensification. This code is for office use only. |
| 10   | Other – Entire plot not sampled due to a reason other than one of the specific reasons already listed. |
| 11   | Ocean – Plot falls in ocean water below mean high tide line. |

12. **MEASYEAR**  Measurement year. The year in which the plot was completed. MEASYEAR may differ from INVYR.
13. **MEASMON**  Measurement month. The month in which the plot was completed. May be blank (null) for periodic inventory.

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

14. **MEASDAY**  Measurement day. The day of the month in which the plot was completed. May be blank (null) for periodic inventory.

15. **REMPER**  Remeasurement period. The number of years between measurements for remeasured plots. This attribute is null (blank) for new plots or remeasured plots that are not used for growth, removals, or mortality estimates. For data processed with NIMS, REMPER is the number of years between measurements (to the nearest 0.1 year). For data processed with systems other than NIMS, remeasurement period is based on the number of growing seasons between measurements. Allocation of parts of the growing season by month is different for each FIA work unit. Contact the appropriate FIA work unit for information on how this is done for a particular State. NOTE: it is not valid to use REMPER to estimate periodic change.

16. **KINDCD**  Sample kind code. A code indicating the type of plot installation. Database users may also want to examine DESIGNCD to obtain additional information about the kind of plot being selected.

| Code | Description                        |
|------|------------------------------------|
| 0    | Periodic inventory plot            |
| 1    | Initial installation of a National design plot |
| 2    | Remeasurement of previously installed National design plot |
| 3    | Replacement of previously installed National design plot |
| 4    | Modeled periodic inventory plot (Northeastern and North Central only) |

17. **DESIGNCD**  Plot design code. A code indicating the type of plot design used to collect the data. Refer to appendix B for a list of codes and descriptions.

18. **RDDISTCD**  Horizontal distance to improved road code. The straight-line distance from plot center to the nearest improved road, which is a road of any width that is maintained as evidenced by pavement, gravel, grading, ditching, and/or other improvements. Populated for all forested plots using the National Field Guide protocols (MANUAL ≥ 1.0) and populated by some FIA work units for inventory plots collected where MANUAL < 1.0.
19. WATERCD  Water on plot code. Water body <1 acre in size or a stream <30 feet wide that has the greatest impact on the area within the forest land portion of the four subplots. The coding hierarchy is listed in order from large permanent water to temporary water. Populated for all forested plots using the National Field Guide protocols (MANUAL ≥1.0) and populated by some FIA work units for inventory plots collected where MANUAL <1.0.

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

20. LAT  Latitude. The approximate latitude of the plot in decimal degrees using NAD 83 datum. Actual plot coordinates cannot be released because of a Privacy provision enacted by Congress in the Food Security Act of 1985. Therefore, this attribute is approximately +/- 1 mile and, for annual inventory data, most plots are within +/- ½ mile. Annual data have additional uncertainty for private plots caused by swapping plot coordinates for up to 20 percent of the plots. In some cases, the county centroid is used when the actual coordinate is not available.

21. LON  Longitude. The approximate longitude of the plot in decimal degrees using NAD 83 datum. Actual plot coordinates cannot be released because of a Privacy provision enacted by Congress in the Food Security Act of 1985. Therefore, this attribute is approximately +/- 1 mile and, for annual inventory data, most plots are within +/- ½ mile. Annual data have additional uncertainty for private plots caused by swapping plot coordinates for up to 20 percent of the plots. In some cases, the county centroid is used when the actual coordinate is not available.

22. ELEV  Elevation. The distance the plot is located above sea level, recorded in feet (NAD 83 datum). Negative values indicate distance below sea level.
23. **GROW_TYP_CD**

Type of annual volume growth code. A code indicating how volume growth is estimated. Current annual growth is an estimate of the amount of volume that was added to a tree in the year before the tree was sampled, and is based on the measured diameter increment recorded when the tree was sampled or on a modeled diameter for the previous year. Periodic annual growth is an estimate of the average annual change in volume occurring between two measurements, usually the current inventory and the previous inventory, where the same plot is evaluated twice. Periodic annual growth is the increase in volume between inventories divided by the number of years between each inventory. This attribute is blank (null) if the plot does not contribute to the growth estimate.

| Code | Description       |
|------|-------------------|
| 1    | Current annual    |
| 2    | Periodic annual   |

24. **MORT_TYP_CD**

Type of annual mortality volume code. A code indicating how mortality volume is estimated. Current annual mortality is an estimate of the volume of trees dying in the year before the plot was measured, and is based on the year of death or on a modeled estimate. Periodic annual mortality is an estimate of the average annual volume of trees dying between two measurements, usually the current inventory and previous inventory, where the same plot is evaluated twice. Periodic annual mortality is the loss of volume between inventories divided by the number of years between each inventory. Periodic average annual mortality is the most common type of annual mortality estimated. This attribute is blank (null) if the plot does not contribute to the mortality estimate.

| Code | Description       |
|------|-------------------|
| 1    | Current annual    |
| 2    | Periodic annual   |

25. **P2PANEL**

Phase 2 panel number. The value for P2PANEL ranges from 1 to 7 for annual inventories and is blank (null) for periodic inventories. A panel is a sample in which the same elements are measured on two or more occasions. FIA divides the plots in each State into 5 or 7 panels that can be used to independently sample the population.

26. **P3PANEL**

Phase 3 panel number. A panel is a sample in which the same elements are measured on two or more occasions. FIA divides the plots in each State into 5 or 7 panels that can be used to independently sample the population. The value for P3PANEL ranges from 1 to 7 for those plots where Phase 3 data were collected. If the plot is not a Phase 3 plot, then this attribute is left blank (null).
|   |   |
|---|---|
| 27. | **ECOSUBCD** | Ecological subsection code. An area of similar surficial geology, lithology, geomorphic process, soil groups, subregional climate, and potential natural communities. Subsection boundaries usually correspond with discrete changes in geomorphology. Subsection information is used for broad planning and assessment. Subsection codes for the coterminous United States were developed as part of the “Forest Service Map of Provinces, Sections, and Subsections of the United States (Cleland and others 2007) (visit http://fsgeodata.fs.fed.us/other_resources/ecosubregions.html). For southeast and south coastal Alaska, the subsection codes are based on the ecological sections as designated in the “Ecoregions and Subregions of Alaska, EcoMap version 2.0” (Nowacki and Brock 1995) (visit http://agdcftp1.wr.usgs.gov/pub/projects/fhm/ecomap.gif). The ECOSUBCD is based on fuzzed and swapped plot coordinates. This attribute is coded for the coterminous United States, southeast and south coastal Alaska, and is left blank (null) in all other instances. |
| 28. | **CONGCD** | Congressional district code. A territorial division of a State from which a member of the U.S. House of Representatives is elected. The congressional district code assigned to a plot (regardless of when it was measured) is for the current Congress; the assignment is made based on the plot’s approximate coordinates. CONGCD is a four-digit number. The first two digits are the State FIPS code and the last two digits are the congressional district number. If a State has only one congressional district, the congressional district number is 00. If a plot’s congressional district assignment falls in a State other than the plot’s actual State due to using the approximate coordinates, the congressional district code will be for the nearest congressional district in the correct State. This attribute is coded for the coterminous States and Alaska, and is left blank (null) in all other instances. For more information about the coverage used to assign this attribute, see National Atlas of the United States (2007). |
| 29. | **MANUAL** | Manual (field guide) version number. Version number of the Field Guide used to describe procedures for collecting data on the plot. The National FIA Field Guide began with version 1.0; therefore data taken using the National Field procedures will have PLOT.MANUAL ≥1.0. Data taken according to field instructions prior to the use of the National Field Guide have PLOT.MANUAL <1.0. |
| 30. | **SUBPANEL** | Subpanel. Subpanel assignment for the plot for those FIA work units using subpaneling. FIA uses a 5-panel system (see P2PANEL) to divide plot sampling over a 5-year period. Funding for western FIA work units is only sufficient to allow plot sampling over a 10-year period. Therefore, panels are further divided into subpanels. This attribute is left blank (null) if subpaneling is not used. In some States, seven panels are used and SUBPANEL is blank (null). |
31. KINDCD_NC  Sample kind code, North Central. This attribute is populated through 2005 for the former North Central work unit (SURVEY.RSCD = 23) and is blank (null) for all other FIA work units.

| Code | Description                           |
|------|---------------------------------------|
| 0    | New/lost                              |
| 6    | Remeasured                            |
| 8    | Old location but not remeasured       |
| 20   | Skipped                               |
| 33   | Replacement of lost plot              |

32. QA_STATUS  Quality assurance status. A code indicating the type of plot data collected. Populated for all forested subplots using the National Field Guide protocols (MANUAL ≥1.0).

| Code | Description                                      |
|------|--------------------------------------------------|
| 1    | Standard production plot                         |
| 2    | Cold check                                       |
| 3    | Reference plot (off grid)                        |
| 4    | Training/practice plot (off grid)                |
| 5    | Botched plot file (disregard during data processing) |
| 6    | Blind check                                      |
| 7    | Production plot (hot check)                      |

33. CREATED_BY  Created by. The employee who created the record. This attribute is intentionally left blank in download files.

34. CREATED_DATE  Created date. The date the record was created. Date will be in the form DD-MON-YYYYY.

35. CREATED_IN_INSTANCE  Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

36. MODIFIED_BY  Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

37. MODIFIED_DATE  Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYYY.
38. MODIFIED_IN_INSTANCE

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.

39. MICROPLOT_LOC

Microplot location. Values are 'OFFSET' or 'CENTER.' The offset microplot center is located 12 feet due east (90 degrees) of subplot center. The current standard is that the microplot is located in the ‘OFFSET’ location, but some earlier inventories, including some early panels of the annual inventory, may contain data where the microplot was located at the ‘CENTER’ location. Populated for annual inventory and may be populated for periodic inventory.

40. DECLINATION

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

\[ \text{DECLINATION} = (\text{TRUE NORTH} - \text{MAGNETIC NORTH}) \]

41. EMAP_HEX

EMAP hexagon. The identifier for the approximately 160,000 acre Environmental Monitoring and Assessment Program (EMAP) hexagon in which the plot is located. EMAP hexagons are available to the public, cover the coterminous United States, and have been used in summarizing and aggregating data about numerous natural resources. Populated for annual inventory and may be populated for periodic inventory.

42. SAMP_METHOD_CD

Sample method code. A code indicating if the plot was observed in the field or remotely sensed in the office.

| Code | Description |
|------|-------------|
| 1    | Field visited, meaning a field crew physically examined the plot and recorded information at least about subplot 1 center condition (see SUBP_EXAMINE_CD below). |
| 2    | Remotely sensed, meaning a determination was made using some type of imagery that a field visit was not necessary. When the plot is sampled remotely, the number of subplots examined (SUBP_EXAMINE_CD) usually equals 1. |
43. **SUBP_EXAMINE_CD**

Subplots examined code. A code indicating the number of subplots examined. By default, PLOT_STATUS_CD = 1 plots have all 4 subplots examined.

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

44. **MACRO_BREAKPOINT_DIA**

Macroplot breakpoint diameter. *(Core optional.)* A macroplot breakpoint diameter is the diameter (either DBH or DRC) above which trees are measured on the plot extending from 0.01 to 58.9 feet horizontal distance from the center of each subplot. Examples of different breakpoint diameters used by western FIA work units are 24 inches or 30 inches (Pacific Northwest), or 21 inches (Interior West). Installation of macroplots is core optional and is used to have a larger plot size in order to more adequately sample large trees. If macroplots are not being installed, this item will be left blank (null).

45. **INTENSITY**

Intensity. A code used to identify federal base grid annual inventory plots and plots that have been added to intensify a particular sample. Under the federal base grid, one plot is collected in each theoretical hexagonal polygon, which is slightly more than 5,900 acres in size. Plots with INTENSITY = 1 are part of the federal base grid. In some instances, States and/or agencies have provided additional support to increase the sampling intensity for an area. Supplemental plots have INTENSITY set to higher numbers depending on the amount of plot intensification chosen for the particular estimation unit. Populated for annual inventory data only.

46. **CYCLE**

Inventory cycle number. A number assigned to a set of plots, measured over a particular period of time from which a State estimate using all possible plots is obtained. A cycle number >1 does not necessarily mean that information for previous cycles resides in the database. A cycle is relevant for periodic and annual inventories.

47. **SUBCYCLE**

Inventory subcycle number. For an annual inventory that takes n years to measure all plots, subcycle shows in which of the n years of the cycle the data were measured. Subcycle is 0 for a periodic inventory. Subcycle 99 may be used for plots that are not included in the estimation process.

48. **ECO_UNIT_PNW**

Ecological unit, Pacific Northwest Research Station. Plots taken by PNW FIA are assigned to the ecological unit in which they are located. Certain units have stocking adjustments made to the plots that occur on very low productivity lands, which thereby reduces the estimated potential
productivity of the plot. More information can be found in MacLean (1973). Only collected by certain FIA work units (SURVEY.RSCD = 26 or 27).

49. **TOPO_POSITION_PNW**

Topographic position, Pacific Northwest Research Station. The topographic position that describes the plot area. Illustrations available in Plot section of PNW field guide located at: http://www.fs.fed.us/pnw/fia/publications/fieldmanuals.shtml. Adapted from information found in Wilson (1900). Only collected by certain FIA work units (SURVEY.RSCD = 26).

| Code | Topographic position                                      | Common shape of slope |
|------|-----------------------------------------------------------|-----------------------|
| 1    | Ridge top or mountain peak over 130 feet                  | Flat                  |
| 2    | Narrow ridge top or mountain peak over 130 feet wide      | Convex                |
| 3    | Side hill – upper 1/3                                    | Convex                |
| 4    | Side hill – middle 1/3                                   | No rounding           |
| 5    | Side hill – lower 1/3                                    | Concave               |
| 6    | Canyon bottom less than 660 feet wide                    | Concave               |
| 7    | Bench, terrace or dry flat                               | Flat                  |
| 8    | Broad alluvial flat over 660 feet wide                    | Flat                  |
| 9    | Swamp or wet flat                                        | Flat                  |

50. **NF_SAMPLING_STATUS_CD**

Nonforest sampling status code. Intentionally left blank. Will be populated in version 5.0.

51. **NF_PLOT_STATUS_CD**

Nonforest plot status code. Intentionally left blank. Will be populated in version 5.0.

52. **NF_PLOT_NONSAMPLE_REASN_CD**

Nonforest plot nonsampled reason code. Intentionally left blank. Will be populated in version 5.0.

53. **P2VEG_SAMPLING_STATUS_CD**

P2 vegetation sampling status code. Intentionally left blank. Will be populated in version 5.0.

54. **P2VEG_SAMPLING_LEVEL_DETAIL_CD**

P2 vegetation sampling level detail code. Intentionally left blank. Will be populated in version 5.0.

55. **INVASIVE_SAMPLING_STATUS_CD**

Invasive sampling status code. Intentionally left blank. Will be populated in version 5.0.
56. INVASIVE SPECIMEN RULE CD

Invasive specimen rule code. Intentionally left blank. Will be populated in version 5.0.
### Condition Table (Oracle table name is COND)

| Column name               | Descriptive name                  | Oracle data type    |
|---------------------------|------------------------------------|---------------------|
| 1  CN                      | Sequence number                    | VARCHAR2(34)        |
| 2  PLT_CN                  | Plot sequence number               | VARCHAR2(34)        |
| 3  INVYR                   | Inventory year                     | NUMBER(4)           |
| 4  STATECD                 | State code                         | NUMBER(4)           |
| 5  UNITCD                  | Survey unit code                   | NUMBER(2)           |
| 6  COUNTYCD                | County code                        | NUMBER(3)           |
| 7  PLOT                    | Phase 2 plot number                | NUMBER(5)           |
| 8  CONDID                  | Condition class number             | NUMBER(1)           |
| 9  COND_STATUS_CD          | Condition status code              | NUMBER(1)           |
| 10 COND_NONSAMPLE_REASN_CD | Condition nonsampled reason code   | NUMBER(2)           |
| 11 RESERVCD                | Reserved status code               | NUMBER(2)           |
| 12 OWNCD                   | Owner class code                   | NUMBER(2)           |
| 13 OWNGRPCD                | Owner group code                   | NUMBER(2)           |
| 14 FORINDCD                | Private owner industrial status code| NUMBER(2)           |
| 15 ADFORCD                 | Administrative forest code         | NUMBER(4)           |
| 16 FORTYPCD                | Forest type code, derived by algorithm | NUMBER(3)       |
| 17 FLDTYPCD                | Field forest type code             | NUMBER(3)           |
| 18 MAPDEN                  | Mapping density                    | NUMBER(1)           |
| 19 STDAGE                  | Stand age                          | NUMBER(4)           |
| 20 STDSZCD                 | Stand-size class code derived by algorithm | NUMBER(2)    |
| 21 FLDSZCD                 | Field stand-size class code        | NUMBER(2)           |
| 22 SITECLCD                | Site productivity class code       | NUMBER(2)           |
| 23 SICOND                  | Site index for the condition       | NUMBER(3)           |
| 24 SIBASE                  | Site index base age                | NUMBER(3)           |
| 25 SISP                    | Site index species code            | NUMBER(4)           |
| 26 STDORGCD                | Stand origin code                  | NUMBER(2)           |
| 27 STDORGSP                | Stand origin species code          | NUMBER              |
| 28 PROP_BASIS              | Proportion basis                   | VARCHAR2(12)        |
| 29 CONDPROP_UNADJ          | Condition proportion unadjusted    | NUMBER(5,4)         |
| 30 MICRPROP_UNADJ          | Microplot proportion unadjusted    | NUMBER(5,4)         |
| 31 SUBPPROP_UNADJ          | Subplot proportion unadjusted      | NUMBER(5,4)         |
| 32 MACRPROP_UNADJ          | Macroplot proportion unadjusted    | NUMBER(5,4)         |
| 33 SLOPE                   | Slope                              | NUMBER(3)           |
| 34 ASPECT                  | Aspect                             | NUMBER(3)           |
| 35 PHYSCLCD                | Physiographic class code           | NUMBER(2)           |
| 36 GSSTKCD                 | Growing-stock stocking code        | NUMBER(2)           |
| 37 ALSTKCD                 | All live stocking code             | NUMBER(2)           |
| 38 DSTRBCD1                | Disturbance 1 code                 | NUMBER(2)           |
| Column name     | Descriptive name                        | Oracle data type |
|----------------|----------------------------------------|-----------------|
| 39 DSTRBYR1    | Disturbance year 1                     | NUMBER(4)       |
| 40 DSTRBCD2    | Disturbance 2 code                     | NUMBER(2)       |
| 41 DSTRBYR2    | Disturbance year 2                     | NUMBER(4)       |
| 42 DSTRBCD3    | Disturbance 3 code                     | NUMBER(2)       |
| 43 DSTRBYR3    | Disturbance year 3                     | NUMBER(4)       |
| 44 TRTCD1      | Stand treatment 1 code                 | NUMBER(2)       |
| 45 TRTYR1      | Treatment year 1                       | NUMBER(4)       |
| 46 TRTCD2      | Stand treatment 2 code                 | NUMBER(2)       |
| 47 TRTYR2      | Treatment year 2                       | NUMBER(4)       |
| 48 TRTCD3      | Stand treatment 3 code                 | NUMBER(2)       |
| 49 TRTYR3      | Treatment year 3                       | NUMBER(4)       |
| 50 PRESNFCD    | Present nonforest code                 | NUMBER(2)       |
| 51 BALIVE      | Basal area of live trees               | NUMBER(9,4)     |
| 52 FLDAGE      | Field-recorded stand age               | NUMBER(4)       |
| 53 ALSTK       | All-live-tree stocking percent         | NUMBER(7,4)     |
| 54 GSSTK       | Growing-stock stocking percent         | NUMBER(7,4)     |
| 55 FORTYPDCALC | Forest type code calculated            | NUMBER(3)       |
| 56 HABTPYCD1   | Habitat type code 1                    | VARCHAR2(10)    |
| 57 HABTPYCD1_PUB_CD | Habitat type code 1 publication code | VARCHAR2(10) |
| 58 HABTPYCD1_DESCR_PUB_CD | Habitat type code 1 description publication code | VARCHAR2(10) |
| 59 HABTPYCD2   | Habitat type code 2                    | VARCHAR2(10)    |
| 60 HABTPYCD2_PUB_CD | Habitat type code 2 publication code | VARCHAR2(10) |
| 61 HABTPYCD2_DESCR_PUB_CD | Habitat type code 2 description publication code | VARCHAR2(10) |
| 62 MIXEDCONFCD | Mixed conifer code                     | VARCHAR2(1)     |
| 63 VOL_LOC_GRP | Volume location group                  | VARCHAR2(200)   |
| 64 SITECLCDEST | Site productivity class code estimated | NUMBER(2) |
| 65 SITETREE_TREE | Site tree tree number                 | NUMBER(4)       |
| 66 SITECL_METHOD | Site class method                    | NUMBER(2)       |
| 67 CARBON_DOWN DEAD | Carbon in down dead                | NUMBER(13,6)    |
| 68 CARBON_LITTER | Carbon in litter                  | NUMBER(13,6)    |
| 69 CARBON_SOIL_ORG | Carbon in soil organic material       | NUMBER(13,6)    |
| 70 CARBON_STANDING DEAD | Carbon in standing dead trees         | NUMBER(13,6)    |
| 71 CARBON_UNDERSTORY_AG | Carbon in the understory aboveground | NUMBER(13,6)    |
| 72 CARBON_UNDERSTORY_BG | Carbon in the understory belowground  | NUMBER(13,6)    |
| 73 CREATED_BY  | Created by                             | VARCHAR2(30)    |
| 74 CREATED_DATE | Created date                           | DATE            |
| 75 CREATED_IN_INSTANCE | Created in instance                | VARCHAR2(6)     |
| 76 MODIFIED_BY | Modified by                            | VARCHAR2(30)    |
| Column name               | Descriptive name                                      | Oracle data type     |
|--------------------------|-------------------------------------------------------|----------------------|
| 77 MODIFIED_DATE         | Modified date                                         | DATE                 |
| 78 MODIFIED_IN_INSTANCE  | Modified in instance                                  | VARCHAR2(6)          |
| 79 CYCLE                 | Inventory cycle number                                | NUMBER(2)            |
| 80 SUBCYCLE              | Inventory subcycle number                             | NUMBER(2)            |
| 81 SOIL_ROOTING_DEPTH_PNW| Soil rooting depth, Pacific Northwest Research Station| VARCHAR2(1)          |
| 82 GROUND_LAND_CLASS_PNW | Present ground land class, Pacific Northwest Research Station| VARCHAR2(3) |
| 83 PLANT_STOCKABILITY_FACTOR_PNW | Plant stockability factor, Pacific Northwest Research Station| NUMBER |
| 84 STND_COND_CD_PNWRS    | Stand condition code, Pacific Northwest Research Station| NUMBER(1)           |
| 85 STND_STRUCT_CD_PNWRS  | Stand structure code, Pacific Northwest Research Station| NUMBER(1)           |
| 86 STUMP_CD_PNWRS        | Stump code, Pacific Northwest Research Station        | VARCHAR2(1)          |
| 87 FIRE_SRS              | Fire, Southern Research Station                       | NUMBER(1)            |
| 88 GRAZING_SRS           | Grazing, Southern Research Station                    | NUMBER(1)            |
| 89 HARVEST_TYPE1_SRS    | Harvest type code 1, Southern Research Station        | NUMBER(2)            |
| 90 HARVEST_TYPE2_SRS     | Harvest type code 2, Southern Research Station        | NUMBER(2)            |
| 91 HARVEST_TYPE3_SRS     | Harvest type code 3, Southern Research Station        | NUMBER(2)            |
| 92 LAND_USE_SRS          | Land use, Southern Research Station                   | NUMBER(2)            |
| 93 OPERABILITY_SRS       | Operability, Southern Research Station                | NUMBER(2)            |
| 94 STAND_STRUCTURE_SRS   | Stand structure, Southern Research Station            | NUMBER(2)            |
| 95 NF_COND_STATUS_CD     | Nonforest condition status code                       | NUMBER(1)            |
| 96 NF_COND_NONSAMPLE_REASN_CD | Nonforest condition nonsampled reason code          | NUMBER(2)            |
| 97 CANOPY_CVR_SAMPLE_METHOD_CD | Canopy cover sample method code                    | NUMBER(2)            |
| 98 LIVE_CANOPY_CVR_PCT   | Live canopy cover percent                             | NUMBER(3)            |
| 99 LIVE_MISSING_CANOPY_CVR_PCT | Live plus missing canopy cover percent               | NUMBER(3)            |
| 100 NBR_LIVE_STEMS       | Number of live stems                                  | NUMBER(5)            |

| Type of key | Column(s) order | Tables to link | Abbreviated notation |
|-------------|-----------------|----------------|----------------------|
| Primary     | (CN)            | N/A            | CND_PK               |
| Unique      | (PLT_CN, CONDID)| N/A            | CND_UK               |
| Natural     | (STATECD, INVYR, UNITCD, COUNTYCD, PLOT, CONDID) | N/A | CND_NAT_I          |
| Foreign     | (PLT_CN)        | CONDITION to PLOT | CND_PLT_FK          |

1. CN  Sequence number. A unique sequence number used to identify a condition record.
2. **PLT_CN**  
Plot sequence number. Foreign key linking the condition record to the plot record.

3. **INVYR**  
Inventory year. The year that best represents when the inventory data were collected. Under the annual inventory system, a group of plots is selected each year for sampling. The selection is based on a panel system. INVYR is the year in which the majority of plots in that group were collected (plots in the group have the same panel and, if applicable, subpanel). Under periodic inventory, a reporting inventory year was selected, usually based on the year in which the majority of the plots were collected or the mid-point of the years over which the inventory spanned. For either annual or periodic inventory, INVYR is not necessarily the same as MEASYEAR.

**Exceptions:**

INVYR = 9999. INVYR is set to 9999 to distinguish Phase 3 plots taken by the western FIA work units that are “off subpanel.” This is due to differences in measurement intervals between Phase 3 (measurement interval = 5 years) and Phase 2 (measurement interval = 10 years) plots. Only users interested in performing certain Phase 3 data analyses should access plots with this anomalous value in INVYR.

INVYR <100. INVYR <100 indicates that population estimates were derived from a pre-NIMS regional processing system and the same plot either has been or may soon be re-processed in NIMS as part of a separate evaluation. The NIMS processed copy of the plot follows the standard INVYR format. This only applies to plots collected in the South (SURVEY.RSCD = 33) with the national design or a similar regional design (PLOT.DESIGNCD = 1 or 220-233) that were collected when the inventory year was 1998 through 2005.

INVYR = 98 is equivalent to 1998 but processed through regional system
INVYR = 99 is equivalent to 1999 but processed through regional system
INVYR = 0 is equivalent to 2000 but processed through regional system
INVYR = 1 is equivalent to 2001 but processed through regional system
INVYR = 2 is equivalent to 2002 but processed through regional system
INVYR = 3 is equivalent to 2003 but processed through regional system
INVYR = 4 is equivalent to 2004 but processed through regional system
INVYR = 5 is equivalent to 2005 but processed through regional system

4. **STATECD**  
State code. Bureau of the Census Federal Information Processing Standards (FIPS) two-digit code for each State. Refer to appendix C.

5. **UNITCD**  
Survey unit code. Forest Inventory and Analysis survey unit identification number. Survey units are usually groups of counties within each State. For periodic inventories, survey units may be made up of lands of particular owners. Refer to appendix C for codes.
6. COUNTYCD  County code. The identification number for a county, parish, watershed, borough, or similar governmental unit in a State. FIPS codes from the Bureau of the Census are used. Refer to appendix C for codes.

7. PLOT  Phase 2 plot number. An identifier for a plot. Along with STATECD, INVYR, UNITCD, COUNTYCD and/or some other combination of variables, PLOT may be used to uniquely identify a plot.

8. CONDID  Condition class number. Unique identifying number assigned to each condition on a plot. A condition is initially defined by condition class status. Differences in reserved status, owner group, forest type, stand-size class, regeneration status, and stand density further define condition for forest land. Mapped nonforest conditions are also assigned numbers. At the time of the plot establishment, the condition class at plot center (the center of subplot 1) is usually designated as condition class 1. Other condition classes are assigned numbers sequentially at the time each condition class is delineated. On a plot, each sampled condition class must have a unique number that can change at remeasurement to reflect new conditions on the plot.

9. COND_STATUS_CD  Condition status code. A code indicating the basic land cover.

| Code | Description |
|------|-------------|
| 1    | Forest land – Land with at least 10 percent cover (or equivalent stocking) by live trees of any size, including land that formerly had such tree cover and that will be naturally or artificially regenerated. To qualify, the area must be at least 1.0 acre in size and 120.0 feet wide. Forest land includes transition zones, such as areas between forest and nonforest lands that have at least 10 percent cover (or equivalent stocking) with live trees and forest areas adjacent to urban and built-up lands. Roadside, streamside, and shelterbelt strips of trees must have a width of at least 120 feet and continuous length of at least 363 feet to qualify as forest land. Unimproved roads and trails, streams, and clearings in forest areas are classified as forest if they are <120 feet wide or an acre in size. Tree-covered areas in agricultural production settings, such as fruit orchards, or tree-covered areas in urban settings, such as city parks, are not considered forest land. For data collected prior to annual inventory (PLOT.MANUAL <1.0), the definition for forest land may have been slightly different (for example, in the past some FIA work units used 5 percent cover rather than 10 percent.) |
| 2    | Nonforest land – Any land within the sample that does not meet the definition of accessible forest land or any of the other types of basic land covers. To qualify, the area must be at least 1.0 acre in size and 120.0 feet wide, with some exceptions that are described in the document “Forest inventory and analysis national core field guide, volume 1: field data collection procedures for Phase 2 plots, version 4.0.” (http://www.fia.fs.fed.us/library/field-guides-methods-proc/) Evidence of "possible" or future development or conversion is not considered. A nonforest land condition will remain in the sample and will be examined at the next occasion to see if it has become forest land. |
| 3    | Noncensus water – Lakes, reservoirs, ponds, and similar bodies of water 1.0 acre to 4.5 acre in size. Rivers, streams, canals, etc., 30.0 feet to 200 feet wide (1990 U.S. Census definition – U.S. Census Bureau 1994). This definition was used in the 1990 census and applied when the data became available. Earlier inventories defined noncensus water differently. |
| Code | Description                                                                                                                                 |
|------|---------------------------------------------------------------------------------------------------------------------------------------------|
| 4    | Census water – Lakes, reservoirs, ponds, and similar bodies of water 4.5 acre in size and larger; and rivers, streams, canals, etc., more than 200 feet wide (1990 U.S. Census definition; U.S. Census Bureau 1994). |
| 5    | Nonsampled - Any portion of a plot within accessible forest land that cannot be sampled is delineated as a separate condition. There is no minimum size requirement. The reason the condition was not sampled is provided in COND_NONSAMPLE_REASN_CD. |

10. **COND_NONSAMPLE_REASN_CD**

Condition nonsampled reason code. For condition classes that cannot be sampled, one of the following reasons is recorded.

| Code | Description                                                                 |
|------|-----------------------------------------------------------------------------|
| 01   | Outside U.S. boundary – Condition class is outside the U.S. border.         |
| 02   | Denied access area – Access to the condition class is denied by the legal owner, or by the owner of the only reasonable route to the condition class. |
| 03   | Hazardous situation – Condition class cannot be accessed because of a hazard or danger, for example cliffs, quarries, strip mines, illegal substance plantations, temporary high water, etc. |
| 05   | Lost data – The data file was discovered to be corrupt after a panel was completed and submitted for processing. Used for the single condition that is required for this plot. This code is for office use only. |
| 06   | Lost plot – Entire plot cannot be found. Used for the single condition that is required for this plot. |
| 07   | Wrong location – Previous plot can be found, but its placement is beyond the tolerance limits for plot location. Used for the single condition that is required for this plot. |
| 08   | Skipped visit – Entire plot skipped. Used for plots that are not completed prior to the time a panel is finished and submitted for processing. Used for the single condition that is required for this plot. This code is for office use only. |
| 09   | Dropped intensified plot - Expended plot dropped due to a change in grid density. Used for the single condition that is required for this plot. This code used only by units engaged in intensification. This code is for office use only. |
| 10   | Other – Condition class not sampled due to a reason other than one of the specific reasons listed. |
| 11   | Ocean – Condition falls in ocean water below mean high tide line.              |

11. **RESERVCD**

Reserved status code. *(Core for accessible forestland; Core optional for other sampled land.)* Reserved land is land that is withdrawn by law(s) prohibiting the management of the land for the production of wood products.

| Code | Description   |
|------|---------------|
| 0    | Not reserved  |
| 1    | Reserved      |

12. **OWNCD**

Owner class code. *(Core for all accessible forestland; Core optional for other sampled land.)* A code indicating the class in which the landowner (at the time of the inventory) belongs. When PLOT.DESIGNCD = 999, OWNCD may be blank (null).
### Code Description

| Code | Description                                      |
|------|--------------------------------------------------|
| 11   | National Forest System                           |
| 12   | National Grassland                               |
| 13   | Other Forest Service                             |
| 21   | National Park Service                            |
| 22   | Bureau of Land Management                        |
| 23   | Fish and Wildlife Service                        |
| 24   | Department of Defense/Energy                      |
| 25   | Other federal                                    |
| 31   | State                                            |
| 32   | Local (County, Municipal, etc)                   |
| 33   | Other non-federal public                         |
| 46   | Undifferentiated private                         |

The following detailed private owner land codes are not available in this database because of the FIA data confidentiality policy. Users needing this type of information should contact the FIA Spatial Data Services (SDS) group by following the instructions provided at: http://www.fia.fs.fed.us/tools-data/spatial/.

| Code | Description                                           |
|------|-------------------------------------------------------|
| 41   | Corporate                                             |
| 42   | Non-governmental conservation/natural resources org.   |
| 43   | Unincorporated local partnership/association/club     |
| 44   | Native American (Indian)                             |
| 45   | Individual                                            |

#### 13. OWNGRPCD  Owner group code. *(Core for all accessible forestland; Core optional for other sampled land.)* A broader group of landowner classes. When PLOT.DESIGNCD = 999, OWNGRPCD may be blank (null).

| Code | Description                                                                 |
|------|-----------------------------------------------------------------------------|
| 10   | Forest Service (OWNCD 11, 12, 13)                                          |
| 20   | Other federal (OWNCD 21, 22, 23, 24, 25)                                   |
| 30   | State and local government (OWNCD 31, 32, 33)                               |
| 40   | Private (OWNCD 41, 42, 43, 44, 45, 46)                                     |

#### 14. FORINDCD  Private owner industrial status code. *(Core for all accessible forestland where owner group is private; Core optional for other sampled land where owner group is private.)* A code indicating whether the landowner owns and operates a primary wood processing plant. A primary wood processing plant is any commercial operation that originates the primary processing of wood on a regular and continuing basis. Examples include: pulp or paper mill, sawmill, panel board mill, post or pole mill.

This attribute is retained in this database for informational purposes but is intentionally left blank (null) because of the FIA data confidentiality policy. Users needing this type of information should contact the FIA Spatial Data Services (SDS) group by following the instructions provided at: http://www.fia.fs.fed.us/tools-data/spatial/.
| Code | Description |
|------|-------------|
| 0    | Land is not owned by industrial owner with wood processing plant |
| 1    | Land is owned by industrial owner with wood processing plant |

15. **ADFORCD**  
Administrative forest code. Identifies the administrative unit (Forest Service Region and National Forest) in which the condition is located. The first two digits of the four digit code are for the region number and the last two digits are for the Administrative National Forest number. Refer to appendix E for codes. Populated only for U.S. Forest Service lands OWNGRPCD = 10 and blank (null) for all other owners.

16. **FORTYPCD**  
Forest type code. This is the forest type used for reporting purposes. It is primarily derived using a computer algorithm, except when less than 25 percent of the plot samples a particular forest condition.

Usually, FORTYPCD equals FORTYPCDCALC. In certain situations, however, the result from the algorithm (FORTYPCDCALC) is overridden by the field call. The field-recorded forest type code (FLDTYPCD) is stored in this attribute when less than 25 percent of the plot samples the forested condition (CONDPROP_UNADJ <0.25).

In most cases, FORTYPCD is the same as the field-recorded forest type (FLDTYPCD). However, situations of under sampling may cause this attribute to differ from FLDTYPCD.

Nonstocked forest land is land that currently has less than 10 percent stocking but formerly met the definition of forest land. Forest conditions meeting this definition have few, if any, trees sampled. In these instances, the algorithm cannot assign a specific forest type and the resulting forest type code is 999, meaning nonstocked.

Refer to appendix D for the complete list of forest type codes and names.

17. **FLDTYPCD**  
Field forest type code. Forest type, assigned by the field crew, based on the tree species or species groups forming a plurality of all live stocking. The field crew assesses the forest type based on the acre of forestland around the plot, in addition to the species sampled on the condition. Refer to appendix D for a detailed list of forest type codes and names. Nonstocked forest land is land that currently has less than 10 percent stocking but formerly met the definition of forest land. When PLOT.MANUAL <2.0, forest conditions that do not meet this stocking level were coded FLDTYPCD = 999. Beginning with manual version 2.0, the crew no longer recorded nonstocked as 999. Instead, they recorded FLDSZCD = 0 to identify nonstocked conditions and entered an estimated forest type for the condition. The crew determined the estimated forest type by either recording the previous forest type on remeasured plots or, on all other plots, the most appropriate forest type to the condition based on the seedlings present or the forest type of the adjacent forest stands. Periodic inventories will differ in the way FLDTYPCD was recorded – it is best to check with individual FIA work units for details. In general, when FLDTYPCD is used for analysis, it is necessary to examine the
values of both FLDTYPCD and FLDSZCD to identify nonstocked forest land.

18. MAPDEN  
Mapping density. A code indicating the relative tree density of the condition. Codes other than 1 are used as an indication that a significant difference in tree density is the only factor causing another condition to be recognized and mapped on the plot. May be blank (null) for periodic inventories.

| Code | Description |
|------|-------------|
| 1    | Initial tree density class |
| 2    | Density class 2 – density different than density of the condition assigned a tree density class of 1 |
| 3    | Density class 3 – density different than densities of the conditions assigned tree density classes of 1 and 2 |

19. STDAGE  
Stand age. For annual inventories (PLOT.MANUAL ≥1.0), stand age is equal to the field-recorded stand age (FLDAGE) with some exceptions. One exception is if FLDAGE = 999, then stand age is computed. When FLDAGE = 998, STDAGE is blank (null) because no trees were cored in the field. Another exception is that RMRS always computes stand age using field-recorded tree ages from trees in the calculated stand-size class. If no tree ages are available, then RMRS sets this attribute equal to FLDAGE. For all inventories, nonstocked stands have STDAGE set to 0. In periodic inventories, stand age is determined using local procedures. Annual inventory data will contain stand ages assigned to the nearest year. For some older inventories, stand age was set to 10-year classes for stands <100 years old, 20-year age classes for stands between 100 and 200 years, and 100-year age classes if older than 200 years. These classes were converted to store the midpoint of the age class in years. Blank (null) values in the periodic data (PLOT.MANUAL <1.0) indicate that the stand was recorded as mixed age on forested condition classes. Age is difficult to measure and therefore STDAGE may have large measurement errors.

20. STDSZCD  
Stand-size class code. A classification of the predominant (based on stocking) diameter class of live trees within the condition assigned using an algorithm. Large diameter trees are at least 11.0 inches diameter for hardwoods and at least 9.0 inches diameter for softwoods. Medium diameter trees are at least 5.0 inches diameter and smaller than large diameter trees. Small diameter trees are <5.0 inches diameter. When <25 percent of the plot samples the forested condition (CONDPROP_UNADJ <0.25), this attribute is set to the equivalent field-recorded stand-size class (FLDSZCD). Populated for all forest annual plots, all forest periodic plots, and all NCRS periodic plots that were measured as “nonforest with trees” (e.g., wooded pasture, windbreaks).
### Chapter 3. Condition Table

#### Code Description

| Code | Description |
|------|-------------|
| 1    | Large diameter – Stands with an all live stocking of at least 10 (base 100); with more than 50 percent of the stocking in medium and large diameter trees; and with the stocking of large diameter trees equal to or greater than the stocking of medium diameter trees |
| 2    | Medium diameter – Stands with an all live stocking of at least 10 (base 100); with more than 50 percent of the stocking in medium and large diameter trees; and with the stocking of large diameter trees less than the stocking of medium diameter trees |
| 3    | Small diameter – Stands with an all live stocking value of at least 10 (base 100) on which at least 50 percent of the stocking is in small diameter trees |
| 5    | Nonstocked – Forest land with all live stocking <10 |

#### FLDSZCD

Field stand-size class code. Field-assigned classification of the predominant (based on stocking) diameter class of live trees within the condition. Blank (null) values may be present for periodic inventories.

| Code | Description |
|------|-------------|
| 0    | Nonstocked – Meeting the definition of accessible land and one of the following applies (1) <10 percent stocked by trees of any size, and not classified as cover trees (see code 6), or (2) for several western woodland species where stocking standards are not available, <5 percent crown cover of trees of any size. |
| 1    | \( \leq 4.9 \) inches (seedlings / saplings). At least 10 percent stocking (or 5 percent crown cover if stocking standards are not available) in trees of any size; and at least 2/3 of the crown cover is in trees \(<5.0\) inches DBH/DRC. |
| 2    | 5.0 – 8.9 inches (softwoods)/ 5.0 – 10.9 inches (hardwoods). At least 10 percent stocking (or 5 percent crown cover if stocking standards are not available) in trees of any size; and at least one-third of the crown cover is in trees \(\geq 5.0\) inches DBH/DRC and the plurality of the crown cover is in softwoods 5.0 – 8.9 inches diameter and/or hardwoods 5.0 –10.9 inches DBH, and/or for western woodland trees 5.0 – 8.9 inches DRC. |
| 3    | 9.0 – 19.9 inches (softwoods)/ 11.0 – 19.9 inches (hardwoods). At least 10 percent stocking (or 5 percent crown cover if stocking standards are not available) in trees of any size; and at least one-third of the crown cover is in trees \(\geq 5.0\) inches DBH/DRC and the plurality of the crown cover is in softwoods 9.0 – 19.9 inches diameter and/or hardwoods between 11.0 –19.9 inches DBH, and for western woodland trees 9.0 – 19.9 inches DRC. |
| 4    | 20.0 – 39.9 inches. At least 10 percent stocking (or 5 percent crown cover if stocking standards are not available) in trees of any size; and at least one-third of the crown cover is in trees \(\geq 5.0\) inches DBH/DRC and the plurality of the crown cover is in trees 20.0 – 39.9 inches DBH. |
| 5    | 40.0+ inches. At least 10 percent stocking (or 5 percent crown cover if stocking standards are not available) in trees of any size; and at least one-third of the crown cover is in trees \(\geq 5.0\) inches DBH/DRC and the plurality of the crown cover is in trees \(\geq 40.0\) inches DBH. |
| 6    | Cover trees (trees not on species list, used for plots classified as nonforest): <10 percent stocking by trees of any size, and >5 percent crown cover of species that comprise cover trees. |

#### SITECLCD

Site productivity class code. A classification of forest land in terms of inherent capacity to grow crops of industrial wood. Identifies the potential growth in cubic feet/acre/year and is based on the culmination of mean annual increment of fully stocked natural stands. For data stored in the database that were processed outside of NIMS, this variable may be assigned...
based on the site productivity determined with the site trees, or from some other source, but the actual source of the site productivity class code is not known. For data processed with NIMS, this variable may either be assigned based on the site trees available for the plot, or, if no valid site trees are available, this variable is set equal to SITECLCDEST, a default value that is either an estimated or predicted site productivity class. If SITECLCDEST is used to populate SITECLCD, the variable SITECL_METHOD is set to 6.

| Code | Description            |
|------|------------------------|
| 1    | 225+ cubic feet/acre/year |
| 2    | 165-224 cubic feet/acre/year |
| 3    | 120-164 cubic feet/acre/year |
| 4    | 85-119 cubic feet/acre/year |
| 5    | 50-84 cubic feet/acre/year |
| 6    | 20-49 cubic feet/acre/year |
| 7    | 0-19 cubic feet/acre/year |

23. **SICOND**  
Site index for the condition. This represents the average total length in feet that dominant and co-dominant trees are expected to attain in well-stocked, even-aged stands at the specified base age (SIBASE). Site index is estimated for the condition by either using an individual tree or by averaging site index values that have been calculated for individual site trees (see SITETREE.SITREE) of the same species (SISP). As a result, it may be possible to find additional site index values that are not used in the calculation of SICOND in the SITETREE tables when site index has been calculated for more than one species in a condition. This attribute is blank (null) when no site index data are available.

24. **Sibase**  
Site index base age. The base age (sometimes called reference age), in years, of the site index curve used to derive site index. Base age may be breast height age or total age, depending on the specifications of the site index curves being used. This attribute is blank (null) when no site tree data are available.

25. **SISP**  
Site index species code. The species upon which the site index is based. In most cases, the site index species will be one of the species that define the forest type of the condition (FORTYPCD). In cases where there are no suitable site trees of the type species, other suitable species may be used. This attribute is blank (null) when no site tree data are available.

26. **STDORGCd**  
Stand origin code. Method of stand regeneration for the trees in the condition. An artificially regenerated stand is established by planting or artificial seeding. Populated for all forest annual plots, all forest periodic plots, and all NCRS periodic plots that were measured as “nonforest with trees” (e.g., wooded pasture, windbreaks).

| Code | Description                                    |
|------|-----------------------------------------------|
| 0    | Natural stands                                |
| 1    | Clear evidence of artificial regeneration     |
27. **STDORGSP**  Stand origin species code. The species code for the predominant artificially regenerated species (only when STDORGC = 1). See appendix F. May not be populated for some FIA work units when PLOT.MANUAL <1.0.

28. **PROP_BASIS**  Proportion basis. A value indicating what type of fixed-size subplots were installed when this plot was sampled. This information is needed to use the proper adjustment factor for the stratum in which the plot occurs (see POP_STRATUM.ADJ_FACTOR_SUBP and POP_STRATUM.ADJ_FACTOR_MACR.) Usually 24-foot radius subplots are installed and in this case, the value for PROP_BASIS is “SUBP.” However, when 58.9-foot radius macroplots are installed, the value is “MACR.” This attribute is blank (null) for periodic inventories.

29. **CONDPROP_UNADJ**

   Condition proportion unadjusted. The unadjusted proportion of the plot that is in the condition. This variable is retained for ease of area calculations. It is equal to either SUBPPROP_UNADJ or MACRPROP_UNADJ, depending on the value of PROP_BASIS. The sum of all condition proportions for a plot equals 1. When generating population area estimates, this proportion is adjusted by either the POP_STRATUM.ADJ_FACTOR_MACR or the POP_STRATUM.ADJ_FACTOR_SUBP to account for partially nonsampled plots (access denied or hazardous portions).

30. **MICRPROP_UNADJ**

   Microplot proportion unadjusted. The unadjusted proportion of the microplots that are in the condition. The sum of all microplot condition proportions for a plot equals 1.

31. **SUBPPROP_UNADJ**

   Subplot proportion unadjusted. The unadjusted proportion of the subplots that are in the condition. The sum of all subplot condition proportions for a plot equals 1.

32. **MACRPROP_UNADJ**

   Macroplot proportion unadjusted. The unadjusted proportion of the macroplots that are in the condition. When macroplots are installed, the sum of all macroplot condition proportions for a plot equals 1; otherwise this attribute is left blank (null).

33. **SLOPE**

   Slope. The angle of slope, in percent, of the condition. Valid values are 000 through 155 for data collected when PLOT.MANUAL ≥1.0, and 000 through 200 on data collected when PLOT.MANUAL <1.0. When PLOT.MANUAL <1.0, the field crew measured condition slope by sighting along the average incline or decline of the condition. When PLOT.MANUAL ≥1.0, slope is collected on subplots but no longer collected for conditions. When PLOT.MANUAL ≥1.0, the slope from the subplot representing the greatest
percentage of the condition is assigned as a surrogate. In the event that two or more subplots represent the same amount of area in the condition, the slope from the lower numbered subplot is used. Populated for all forest annual plots, all forest periodic plots, and all NCRS periodic plots that were measured as “nonforest with trees” (e.g., wooded pasture, windbreaks).

34. **ASPECT** Aspect. The direction of slope, to the nearest degree, for most of the condition. North is recorded as 360. When slope is <5 percent, there is no aspect and this item is set to zero. When PLOT.MANUAL <1.0, the field crew measured condition aspect. When PLOT.MANUAL ≥1.0, aspect is collected on subplots but no longer collected for conditions. NOTE: for plots measured when PLOT.MANUAL ≥1.0, the aspect from the subplot representing the greatest percentage of the condition is assigned as a surrogate. In the event that two or more subplots represent the same percentage of area in the condition, the slope from the lower numbered subplot is used. Populated for all forest annual plots, all forest periodic plots, and all NCRS periodic plots that were measured as “nonforest with trees” (e.g., wooded pasture, windbreaks).

35. **PHYSCLCD** Physiographic class code. The general effect of land form, topographical position, and soil on moisture available to trees. These codes are new in annual inventory; older inventories have been updated to these codes when possible. Also populated for the NCRS periodic plots that were measured as “nonforest with trees” (e.g., wooded pasture, windbreaks).

| Code | Description |
|------|-------------|
| Xeric sites (normally low or deficient in available moisture) |
| 11   | Dry Tops – Ridge tops with thin rock outcrops and considerable exposure to sun and wind. |
| 12   | Dry Slopes – Slopes with thin rock outcrops and considerable exposure to sun and wind. Includes most mountain/ steep slopes with a southern or western exposure. |
| 13   | Deep Sands – Sites with a deep, sandy surface subject to rapid loss of moisture following precipitation. Typical examples include sand hills, ridges, and flats in the South, sites along the beach and shores of lakes and streams. |
| 19   | Other Xeric – All dry physiographic sites not described above. |
| Mesic sites (normally moderate but adequate available moisture) |
| 21   | Flatwoods – Flat or fairly level sites outside of flood plains. Excludes deep sands and wet, swampy sites. |
| 22   | Rolling Uplands – Hills and gently rolling, undulating terrain and associated small streams. Excludes deep sands, all hydric sites, and streams with associated flood plains. |
| 23   | Moist Slopes and Coves – Moist slopes and coves with relatively deep, fertile soils. Often these sites have a northern or eastern exposure and are partially shielded from wind and sun. Includes moist mountain tops and saddles. |
| 24   | Narrow flood plains/Bottomlands – Flood plains and bottomlands less than 1/4-mile in width along rivers and streams. These sites are normally well drained but are subjected to occasional flooding during periods of heavy or extended precipitation. Includes associated levees, benches, and terraces within a 1/4 mile limit. Excludes swamps, sloughs, and bogs. |
| Code | Description |
|------|-------------|
| 25   | Broad Floodplains/Bottomlands – Floodplains and bottomlands ¼ mile or wider along rivers and streams. These sites are normally well drained but are subjected to occasional flooding during periods of heavy or extended precipitation. Includes associated levees, benches, and terraces. Excludes swamps, sloughs, and bogs with year-round water problems. |
| 29   | Other Mesic – All moderately moist physiographic sites not described above. |
|      | **Hydric** sites (normally abundant or overabundant moisture all year) |
| 31   | Swamps/Bogs – Low, wet, flat, forested areas usually quite extensive that are flooded for long periods except during periods of extreme drought. Excludes cypress ponds and small drains. |
| 32   | Small Drains – Narrow, stream-like, wet strands of forest land often without a well-defined stream channel. These areas are poorly drained or flooded throughout most of the year and drain the adjacent higher ground. |
| 33   | Bays and wet pocosins – Low, wet, boggy sites characterized by peaty or organic soils. May be somewhat dry during periods of extended drought. Examples include sites in the Carolina bays in the Southeast United States. |
| 34   | Beaver ponds. |
| 35   | Cypress ponds. |
| 39   | Other hydric – All other hydric physiographic sites. |

36. **GSSTKCD**

Growing-stock stocking code. A code indicating the stocking of the condition by growing-stock trees, including seedlings. Growing-stock trees are those where tree class (TREE.TREECLCD) equals 2 or, for seedlings that do not have tree class assigned where species group (TREE.SPGRPCD) is not equal to 23 (western woodland softwoods), 43 (eastern noncommercial hardwoods), and 48 (western woodland hardwoods). Populated for all forest annual plots, all forest periodic plots, and all NCRS periodic plots that were measured as “nonforest with trees” (e.g., wooded pasture, windbreaks).

| Code | Description |
|------|-------------|
| 1    | Overstocked (100+ %) |
| 2    | Fully stocked (60 – 99%) |
| 3    | Medium stocked (35 – 59%) |
| 4    | Poorly stocked (10 – 34%) |
| 5    | Nonstocked (0 – 9%) |

37. **ALSTKCD**

All live stocking code. A code indicating the stocking of the condition by live trees, including seedlings. Data are in classes as listed for GSSTKCD above. May not be populated for some FIA work units when PLOT.MANUAL <1.0. Populated for all forest annual plots, all forest periodic plots, and all NCRS periodic plots that were measured as “nonforest with trees” (e.g., wooded pasture, windbreaks).

| Code | Description |
|------|-------------|
| 1    | Overstocked (100+ %) |
| 2    | Fully stocked (60 – 99%) |
| 3    | Medium stocked (35 – 59%) |
| 4    | Poorly stocked (10 – 34%) |
| 5    | Nonstocked (0 – 9%) |

38. **DSTRBCD1**

Disturbance 1 code. A code indicating the kind of disturbance occurring since the last measurement or within the last 5 years for new plots. The area affected by the disturbance must be at least 1 acre in size. A significant level of disturbance (mortality or damage to 25 percent of the trees in the condition) is required. Populated for all forested conditions using the National Field Guide protocols (PLOT.MANUAL ≥1.0) and populated by some FIA work units where PLOT.MANUAL <1.0. Codes 11, 12, 21, and 22 are valid where PLOT. MANUAL ≥2.0.
### Code Description

| Code | Description                                                      |
|------|------------------------------------------------------------------|
| 0    | No visible disturbance                                           |
| 10   | Insect Damage                                                    |
| 11   | Insect damage to understory vegetation                           |
| 12   | Insect damage to trees, including seedlings and saplings        |
| 20   | Disease Damage                                                   |
| 21   | Disease damage to understory vegetation                          |
| 22   | Disease damage to trees, including seedlings and saplings        |
| 30   | Fire damage (from crown and ground fire, either prescribed or natural) |
| 31   | Ground fire damage                                               |
| 32   | Crown fire damage                                                |
| 40   | Animal Damage                                                    |
| 41   | Beaver (includes flooding caused by beaver)                      |
| 42   | Porcupine                                                        |
| 43   | Deer/ungulate                                                    |
| 44   | Bear (CORE OPTIONAL)                                             |
| 45   | Rabbit (CORE OPTIONAL)                                           |
| 46   | Domestic animal/livestock (includes grazing)                     |
| 50   | Weather Damage                                                   |
| 51   | Ice                                                              |
| 52   | Wind (includes hurricane, tornado)                               |
| 53   | Flooding (weather induced)                                       |
| 54   | Drought                                                          |
| 60   | Vegetation (suppression, competition, vines)                      |
| 70   | Unknown / not sure / other (include in NOTES)                     |
| 80   | Human-caused damage – any significant threshold of human-caused damage not described in the DISTURBANCE codes or in the TREATMENT codes. |
| 90   | Geologic disturbances                                            |
| 91   | Landslide                                                        |
| 92   | Avalanche track                                                  |
| 93   | Volcanic blast zone                                              |
| 94   | Other geologic event                                             |
| 95   | Earth movement / avalanches                                      |

39. **DSTRBYR1** Disturbance year 1. Year in which Disturbance 1 is estimated to have occurred. If the disturbance occurs continuously over a period of time, the value 9999 is used. Populated for all forested conditions that have some disturbance using the National Field Guide protocols (PLOT.MANUAL ≥1.0) and populated by some FIA work units where PLOT.MANUAL <1.0. If DISTRBCD1 = 0 then DSTRBYR1 = blank (null) or 0.

40. **DSTRBCD2** Disturbance 2 code. The second disturbance code, if the stand has experienced more than one disturbance. See DSTRBCD1 for more information. This attribute is new in annual inventory.

41. **DSTRBYR2** Disturbance year 2. The year in which Disturbance 2 occurred. See DSTRBYR1 for more information. This attribute is new in annual inventory.

42. **DSTRBCD3** Disturbance 3 code. The third disturbance code, if the stand has experienced more than two disturbances. See DSTRBCD1 for more information. This attribute is new in annual inventory.

43. **DSTRBYR3** Disturbance year 3. The year in which Disturbance 3 occurred. See DSTRBYR1 for more information. This attribute is new in annual inventory.
44. TRTCD1 Treatment code 1. A code indicating the type of stand treatment that has occurred since the last measurement or within the last 5 years for new plots. The area affected by the treatment must be at least 1 acre in size. Populated for all forested conditions using the National Field Guide protocols (PLOT.MANUAL ≥ 1.0) and populated by some FIA work units where PLOT.MANUAL < 1.0. When PLOT.MANUAL < 1.0, inventories may record treatments occurring within the last 20 years for new plots.

| Code | Description |
|------|-------------|
| 00   | No observable treatment. |
| 10   | Cutting – The removal of one or more trees from a stand. |
| 20   | Site preparation – Clearing, slash burning, chopping, diskng, bedding, or other practices clearly intended to prepare a site for either natural or artificial regeneration. |
| 30   | Artificial regeneration – Following a disturbance or treatment (usually cutting), a new stand where at least 50 percent of the live trees present resulted from planting or direct seeding. |
| 40   | Natural regeneration – Following a disturbance or treatment (usually cutting), a new stand where at least 50 percent of the live trees present (of any size) were established through the growth of existing trees and/or natural seeding or sprouting. |
| 50   | Other silvicultural treatment – The use of fertilizers, herbicides, girdling, pruning, or other activities (not covered by codes 10-40) designed to improve the commercial value of the residual stand, or chaining, which is a practice used on western woodlands to encourage wildlife forage. |

45. TRTYR1 Treatment year 1. Year in which Stand Treatment 1 is estimated to have occurred. Populated for all forested conditions that have some treatment using the National Field Guide protocols (PLOT.MANUAL ≥ 1.0) and populated by some FIA work units where PLOT.MANUAL < 1.0. If TRTCD1 = 00 then TRTYR1 = blank (null) or 0.

46. TRTCD2 Treatment code 2. A code indicating the type of stand treatment that has occurred since the last measurement or within the last 5 years for new plots. See TRTCD1 for more information.

47. TRTYR2 Treatment year 2. Year in which Stand Treatment 2 is estimated to have occurred. See TRTYR1 for more information.

48. TRTCD3 Treatment code 3. A code indicating the type of stand treatment that has occurred since the last measurement or within the last 5 years for new plots. See TRTCD1 for more information.

49. TRTYR3 Treatment year 3. Year in which Stand Treatment 3 is estimated to have occurred. See TRTYR1 for more information.

50. PRESNFCO Present nonforest code. (Core for remeasured conditions that were forest before and are now nonforest; Core optional for all conditions where current condition class status is nonforest, regardless of the previous condition.) A code indicating the current nonforest land use for conditions that were previously classified as forest but are now classified as nonforest. This attribute can be optionally recorded for all nonforest conditions, regardless of...
either past land status or whether the condition has a previous measurement. May be populated when PLOT.MANUAL < 1.0.

| Code | Description                                           |
|------|-------------------------------------------------------|
| 10   | Agricultural land                                     |
| 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                                             |
| 30   | Developed                                             |
| 31   | Cultural (business, residential, other intense human activity) |
| 32   | Rights-of-way (improved road, railway, power line)    |
| 33   | Recreation (park, golf course, ski run)               |
| 34   | Mining*                                               |
| 40   | Other (undeveloped beach, marsh, bog, snow, ice)      |
| 41   | Nonvegetated*                                         |
| 42   | Wetland*                                              |
| 43   | Beach*                                                |
| 45   | Nonforest-Chaparral*                                  |

*These codes are currently regional. They will become national in PLOT.MANUAL = 5.0.

51. BALIVE Basal area of live trees. Basal area in square feet per acre of all live trees over 1 inch DBH/DRC sampled in the condition.

52. FLDAGE Field-recorded stand age. The stand age as assigned by the field crew. Based on the average total age, to the nearest year, of the trees in the field-recorded stand-size class of the condition, determined using local procedures. For non-stocked stands, 0 is stored. If all of the trees in a condition class are of a species that by regional standards cannot be bored for age (e.g., mountain mahogany, tupelo), 998 is recorded. If tree cores are not counted in the field, but are collected and sent to the office for the counting of rings, 999 is recorded.

53. ALSTK All-live-tree stocking percent. The sum of stocking percent values of all live trees on the condition. The percent is then assigned to a stocking class, which is found in ALSTKCD. May not be populated for some FIA work units when PLOT.MANUAL < 1.0.

54. GSSTK Growing-stock stocking percent. The sum of stocking percent values of all growing-stock trees on the condition. The percent is then assigned to a stocking class, which is found in GSSTKCD. May not be populated for some FIA work units when PLOT.MANUAL < 1.0.

55. FORTYPCDCALC Forest type code calculated. Forest type is always calculated based on the tree species sampled on the condition. The forest typing algorithm is a hierarchical procedure applied to the tree species sampled on the condition. The algorithm begins by comparing the live tree stocking of softwoods and
hardwoods and continues in a stepwise fashion comparing successively smaller subgroups of the preceding aggregation of initial type groups, selecting the group with the largest aggregate stocking value. The comparison proceeds in most cases until a plurality of a forest type is identified.

Nonstocked forest land is land that currently has less than 10 percent stocking but formerly met the definition of forest land. Forest conditions meeting this definition have few, if any, trees sampled. In these instances, the algorithm cannot assign a specific forest type and the resulting forest type code is 999, meaning nonstocked. See also FORTYP and FLDTYP for other forest type attributes. Refer to appendix D for a complete list of forest type codes and names.

56. HABTYP  Habitat type code 1. A code indicating the primary habitat type (or community type) for this condition. Unique codes are determined by combining both habitat type code and publication code (HABTYP and HABTYP_PUB_CD). Habitat type captures information about both the overstory and understory vegetation and usually describes the vegetation that is predicted to become established after all successional stages of the ecosystem are completed without any disturbance. This code can be translated using the publication in which it was named and described (see HABTYP_PUB_CD and HABTYP_DESCR_PUB_CD). Only collected by certain FIA work units (SURVEY.RSCD = 22, 23, or 26).

57. HABTYP_PUB_CD

Habitat type code 1 publication code. A code indicating the publication that lists the name for the habitat type code (HABTYP). Publication information is documented in the REF_HABTYP PUBLICATION table. Only used by certain FIA work units (SURVEY.RSCD = 22, 23, or 26).

58. HABTYP_DESCR_PUB_CD

Habitat type code 1 description publication code. A code indicating the publication that gives a description for habitat type code 1 (HABTYP). This publication may or may not be the same publication that lists the name of the habitat type (HABTYP_PUB_CD). Publication information is documented in REF_HABTYP PUBLICATION table. Only used by certain FIA work units (SURVEY.RSCD = 22, 23, or 26).

59. HABTYP  Habitat type code 2. A code indicating the secondary habitat type (or community type) for this condition. Unique codes are determined by combining both habitat type code and publication code (HABTYP and HABTYP_PUB_CD). Habitat type captures information about both the overstory and understory vegetation and usually describes the vegetation that is predicted to become established after all successional stages of the ecosystem are completed without any disturbance. This code can be translated using the publication in which it was named and described (see
60. **HABTYPCD2_PUB_CD**

Habitat type code 2 publication code. A code indicating the publication that lists the name for the habitat type code (HABTYPCD2). Publication information is documented in REF_HABTYP_PUBLICATION table. Only used by certain FIA work units (SURVEY.RSCD = 22, 23, or 26).

61. **HABTYPCD2_DESCR_PUB_CD**

Habitat type code 2 description publication code. A code indicating the publication that gives a description for habitat type code 2 (HABTYPCD2). This publication may or may not be the same publication that lists the name of the habitat type (HABTYPCD2_PUB_CD). Publication information is documented in REF_HABTYP_PUBLICATION table. Only used by certain FIA work units (SURVEY.RSCD = 22, 23, or 26).

62. **MIXEDCONFCD**

Mixed conifer site code. An indicator to show that the forest condition is a mixed conifer site in California. These sites are a complex association of ponderosa pine, sugar pine, Douglas-fir, white fir, red fir, and/or incense-cedar. Mixed conifer sites use a specific site index equation. This is a yes/no attribute. This attribute is left blank (null) for all other States. Only collected by certain FIA work units (SURVEY.RSCD = 26).

| Code  | Description                                      |
|-------|--------------------------------------------------|
| Y     | Yes, the condition is a mixed conifer site in California |
| N     | No, the condition is not a mixed conifer site in California |

63. **VOL_LOC_GRP**

Volume location group. An identifier indicating what equations are used for volume, biomass, site index, etc. A volume group is usually designated for a geographic area, such as a State, multiple States, a group of counties, or an ecoregion.

| Code   | Description                           |
|--------|---------------------------------------|
| S22LAZN| Northern Arizona Ecosctions           |
| S22LAZS| Southern Arizona Ecosctions           |
| S22LCOE| Eastern Colorado Ecossections         |
| S22LCOW| Western Colorado Ecossections         |
| S22LID | Idaho Ecossections                    |
| S22LMTE| Eastern Montana Ecossections          |
| S22LMTW| Western Montana Ecossections          |
| S22LNV | Nevada Ecossections                   |
| S22LNMIN| Northern New Mexico Ecossections   |
| S22LNMS| Southern New Mexico Ecossections      |
### Site Productivity Class Code Estimated (SITECLCDEST)

Site productivity class code estimated. This is a field-recorded code that is an estimated or predicted indicator of site productivity. It is used as the value for SITECLCD if no valid site tree is available. When SITECLCDEST is used as SITECLCD, SITECL_METHOD is set to 6. For data stored in the database that were processed prior to the use of NIMS, this variable is blank (null). Only collected by certain FIA work units (SURVEY.RSCD = 24, 26, 27 or 33).

| Code   | Description                                      |
|--------|--------------------------------------------------|
| 1      | 225+ cubic feet/acre/year                       |
| 2      | 165-224 cubic feet/acre/year                    |
| 3      | 120-164 cubic feet/acre/year                    |
| 4      | 85-119 cubic feet/acre/year                     |
| 5      | 50-84 cubic feet/acre/year                      |
| 6      | 20-49 cubic feet/acre/year                      |
| 7      | 0-19 cubic feet/acre/year                       |

### Site Tree Tree Number (SITETREE_TREE)

Site tree tree number. If an individual site index tree is used to calculate SICOND, this is the tree number of the site tree (SITETREE.TREE column) used. Only collected by certain FIA work units (SURVEY.RSCD = 23 or 33).
66. SITECL_METHOD

Site class method. A code identifying the method for determining site index or estimated site productivity class.

| Code | Description                                                                 |
|------|-----------------------------------------------------------------------------|
| 1    | Tree measurement (length, age, etc.) collected during this inventory.        |
| 2    | Tree measurement (length, age, etc.) collected during a previous inventory.  |
| 3    | Site index or site productivity class estimated either in the field or office. |
| 4    | Site index or site productivity class estimated by the height intercept method during this inventory. |
| 5    | Site index or site productivity class estimated using multiple site trees.   |
| 6    | Site index or site productivity class estimated using default values.        |

67. CARBON_DOWN_DEAD

Carbon in down dead. Carbon (tons per acre) of woody material >3 inches in diameter on the ground, and stumps and their roots >3 inches in diameter. Estimated from models based on geographic area, forest type, and live tree carbon density (Smith and Heath 2008). This modeled attribute is a component of the EPA’s Greenhouse Gas Inventory and is not a direct sum of Phase 2 or Phase 3 measurements. This is a per acre estimate and must be multiplied by the appropriate expansion and condition proportion adjustment factor located in the POP_STRATUM table.

68. CARBON_LITTER

Carbon in litter. Carbon (tons per acre) of organic material on the floor of the forest, including fine woody debris, humus, and fine roots in the organic forest floor layer above mineral soil. Estimated from models based on geographic area, forest type, and (except for nonstocked and pinyon-juniper stands) stand age (Smith and Heath 2002). This modeled attribute is a component of the EPA’s Greenhouse Gas Inventory and is not a direct sum of Phase 2 or Phase 3 measurements. This is a per acre estimate and must be multiplied by the appropriate expansion and condition proportion adjustment factor located in the POP_STRATUM table.

69. CARBON_SOIL_ORG

Carbon in organic soil. Carbon (tons per acre) in fine organic material below the soil surface to a depth of 1 meter. Does not include roots. Estimated from models based on geographic area and forest type (Smith and Heath 2008). This modeled attribute is a component of the EPA’s Greenhouse Gas Inventory and is not a direct sum of Phase 2 or Phase 3 measurements. This is a per acre estimate and must be multiplied by the appropriate expansion and condition proportion adjustment factor located in the POP_STRATUM table.

70. CARBON_STANDING_DEAD

Carbon in standing dead. Carbon (tons per acre) in standing dead trees, including coarse roots, is estimated from models based on geographic area,
forest type, and (except for nonstocked stands) growing stock volume (Smith and Heath 2008). This modeled variable is a component of the EPA’s Greenhouse Gas Inventory and is not a direct sum of Phase 2 or Phase 3 measurements. For most users it is preferable to calculate carbon (tons per acre) for annual inventories from the Phase 2 tree data. This is a per acre estimate and must be multiplied by the appropriate expansion and condition proportion adjustment factor located in the POP_STRATUM table.

71. CARBON_UNDERSTORY_AG

Carbon in understory aboveground. Carbon (tons per acre) in the aboveground portions of seedlings, shrubs, and bushes. Estimated from models based on geographic area, forest type, and (except for nonstocked and pinyon-juniper stands) live tree carbon density (Smith and Heath 2008). This modeled attribute is a component of the EPA’s Greenhouse Gas Inventory and is not a direct sum of Phase 2 or Phase 3 measurements. This is a per acre estimate and must be multiplied by the appropriate expansion and condition proportion adjustment factor located in the POP_STRATUM table.

72. CARBON_UNDERSTORY_BG

Carbon in understory belowground. Carbon (tons per acre) in the belowground portions of seedlings, shrubs, and bushes. Estimated from models based on geographic area, forest type, and (except for nonstocked and pinyon-juniper stands) live tree carbon density (Smith and Heath 2008). This modeled attribute is a component of the EPA’s Greenhouse Gas Inventory and is not a direct sum of Phase 2 or Phase 3 measurements. This is a per acre estimate and must be multiplied by the appropriate expansion and condition proportion adjustment factor located in the POP_STRATUM table.

73. CREATED_BY Created by. The employee who created the record. This attribute is intentionally left blank in download files.

74. CREATED_DATE

Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

75. CREATED_IN_INSTANCE

Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

76. MODIFIED_BY

Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.
77. MODIFIED_DATE

Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

78. MODIFIED_IN_INSTANCE

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.

79. CYCLE

Inventory cycle number. A number assigned to a set of plots, measured over a particular period of time from which a State estimate using all possible plots is obtained. A cycle number >1 does not necessarily mean that information for previous cycles resides in the database. A cycle is relevant for periodic and annual inventories.

80. SUBCYCLE

Inventory subcycle number. For an annual inventory that takes n years to measure all plots, subcycle shows in which of the n years of the cycle the data were measured. Subcycle is 0 for a periodic inventory. Subcycle 99 may be used for plots that are not included in the estimation process.

81. SOIL_ROOTING_DEPTH_PNW

Soil rooting depth, Pacific Northwest Research Station. Describes the soil depth (the depth to which tree roots can penetrate) within each forest land condition class. Required for all forest condition classes. This variable is coded 1 when more than half of area in the condition class is estimated to be \( \leq 20 \) inches deep. Ground pumice, decomposed granite, and sand all qualify as types of soil. Only collected by certain FIA work units (SURVEY.RSCD = 26).

| Code | Description |
|------|-------------|
| 1    | \( \leq 20 \) inches |
| 2    | >20 inches |

82. GROUND_LAND_CLASS_PNW

Present ground land class, Pacific Northwest Research Station. A refinement of forest land that distinguishes timberland and a variety of forest land types. Each code, and corresponding ground land class (GLC) name and description are listed. Only collected by certain FIA work units (SURVEY.RSCD = 26).

| Code | Description |
|------|-------------|
| 120  | Timberland – Forest land that is potentially capable of producing at least 20 cubic feet/acre/year at culmination in fully stocked, natural stands (1.4 cubic meters/hectare/year) of continuous crops of trees to industrial roundwood size and quality. Industrial roundwood requires species that grow to size and quality adequate to produce lumber and other manufactured products (exclude fence posts and fuel wood that are not considered manufactured). Timberland is characterized by no severe limitations on artificial or natural restocking with species capable of producing industrial roundwood. |
| Code  | Description                                                                                                                                                                                                                                                                                                                                 |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 141   | Other forest rocky – Other forest land that can produce tree species of industrial roundwood size and quality, but that is unmanageable because the site is steep, hazardous, and rocky, or is predominantly nonstockable rock or bedrock, with trees growing in cracks and pockets. Other forest-rocky sites may be incapable of growing continuous crops due to inability to obtain adequate regeneration success. |
| 142   | Other forest unsuitable site (wetland, subalpine, or coastal conifer scrub; California only) – Other forest land that is unsuited for growing industrial roundwood because of one of the following environment factors: willow bogs, spruce bogs, sites with high water tables or even standing water for a portion of the year, and harsh sites due to extreme climatic and soil conditions. Trees present are often extremely slow growing and deformed. Examples: whitebark pine, lodgepole, or mountain hemlock stands at timberline; shore pine along the sparkling blue Pacific Ocean (Monterey, Bishop, and Douglas-fir); willow wetlands with occasional cottonwoods present; Sitka spruce-shrub communities bordering tidal flats and channels along the coast. Includes aspen stands in high-desert areas or areas where juniper/mountain mahogany are the predominant species. |
| 143   | Other forest pinyon-juniper – Areas currently capable of 10 percent or more tree stocking with forest trees, with juniper species predominating. These areas are not now, and show no evidence of ever having been, 10 percent or more stocked with trees of industrial roundwood form and quality. Stocking capabilities indicated by live juniper trees or juniper stumps and juniper snags less than 25 years dead or cut. Ten percent juniper stocking means 10 percent crown cover at stand maturity. For western woodland juniper species, ten percent stocking means 5 percent crown cover at stand maturity. |
| 144   | Other forest-oak (formally oak woodland) – Areas currently 10 percent or more stocked with forest trees, with low quality forest trees of oak, gray pine, madrone, or other hardwood species predominating, and that are not now, and show no evidence of ever having been, 10 percent or more stocked with trees of industrial roundwood form and quality. Trees on these sites are usually short, slow growing, gnarled, poorly formed, and generally suitable only for fuel wood. The following types are included: blue oak, white oak, live oak, oak-gray pine. |
| 146   | Other forest unsuitable site (Oregon and Washington only) – Other forest land that is unsuited for growing industrial roundwood because of one of the following environment factors: willow bogs, spruce bogs, sites with high water tables or even standing water for a portion of the year, and harsh sites due to climatic conditions. Trees present are often extremely slow growing and deformed. Examples: whitebark pine or mountain hemlock stands at timberline, shore pine along the Pacific Ocean, willow wetlands with occasional cottonwoods present, and Sitka spruce-shrub communities bordering tidal flats and channels along the coast. Aspen stands in high-desert areas or areas where juniper/mountain mahogany are the predominant species are considered other forest-unsuitable site. |
| 148   | Other forest-Cypress (California only) – Forest land with forest trees with cypress predominating. Shows no evidence of having had 10 percent or more cover of trees of industrial roundwood quality and species. |
| 149   | Other forest-Low Productivity (this code is calculated in the office) – Forestland capable of growing crops of trees to industrial roundwood quality, but not able to grow wood at the rate of 20 cubic feet/acre/year. Included are areas of low stocking potential and/or very low site index. |
| 150   | Other forest curlleaf mountain mahogany – Areas currently capable of 10 percent or more tree stocking with forest trees, with curlleaf mountain mahogany species predominating. These areas are not now, and show no evidence of ever having been, 10 percent or more stocked with trees of industrial roundwood form and quality; 10 percent mahogany stocking means 5 percent crown cover at stand maturity. |
83. **PLANT_STOCKABILITY_FACTOR_PNW**

Plant stockability factor, Pacific Northwest Research Station. Some plots in PNWRS have forest land condition classes that are low site, and are incapable of attaining normal yield table levels of stocking. For such classes, potential productivity (mean annual increment at culmination) must be discounted. Most forested conditions have a default value of 1 assigned; those conditions that meet the low site criteria have a value between 0.1 and 1. Key plant indicators and plant communities are used to assign discount factors, using procedures outlined in MacLean and Bolsinger (1974) and Hanson and others (2002). Only collected by certain FIA work units (SURVEY.RSCD = 26).

84. **STND_COND_CD_PNWRS**

Stand condition code, Pacific Northwest Research Station. A code that best describes the condition of the stand within forest condition classes. Stand condition is defined here as “the size, density, and species composition of a plant community following disturbance and at various time intervals after disturbance.” Information on stand condition is used in describing wildlife habitat. Only collected by certain FIA work units (SURVEY.RSCD = 26).

| Code | Stand Condition                  | Definition                                                                 |
|------|---------------------------------|---------------------------------------------------------------------------|
| 0    | Not applicable                  | Condition class is juniper, chaparral, or curlleaf mountain mahogany forest type. |
| 1    | Grass-forb                      | Shrubs <40 percent crown cover and <5 feet tall; plot may range from being largely devoid of vegetation to dominance by herbaceous species (grasses and forbs); tree regeneration generally <5 feet tall and 40 percent cover. |
| 2    | Shrub                           | Shrubs 40 percent crown canopy or greater, of any height; trees <40 percent crown canopy and <1.0 inch DBH/DRC. When average stand diameter exceeds 1.0 inch DBH/DRC, plot is “open sapling” or “closed sapling.” |
| 3    | Open sapling, poletimber        | Average stand diameter 1.0-8.9 inches DBH/DRC, and tree crown canopy poletimber <60 percent. |
| 4    | Closed sapling, pole, sawtimber | Average stand diameter is 1.0-21.0 inches DBH/DRC and crown cover is 60 percent or greater. |
| 5    | Open sawtimber                  | Average stand diameter is 9.0-21.0 inches DBH/DRC, and crown cover is <60 percent. |
| 6    | Large sawtimber                 | Average stand diameter exceeds 21.0 inches DBH/DRC; crown cover may be <100 percent; decay and decadence required for old-growth characteristics is generally lacking, successional trees required by old-growth may be lacking, and dead and down material required by old-growth is lacking. |
| 7    | Old-growth                      | Average stand diameter exceeds 21.0 inches DBH/DRC. Stands over 200 years old with at least two tree layers (overstory and understory), decay in living trees, snags, and down woody material. Some of the overstory layer may be composed of long-lived successional species (i.e., Douglas-fir, western redcedar). |
85. **STND_STRUC_CD_PNWRS**

Stand structure code, Pacific Northwest Research Station. A code indicating the best overall structure of the stand. Only collected by certain FIA work units (SURVEY.RSCD = 26).

| Code | Stand Structure       | Definition                                                                                                                                                                                                 |
|------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Even-aged single-storied | A single even canopy characterizes the stand. The greatest numbers of trees are in a height class represented by the average height of the stand; there are substantially fewer trees in height classes above and below this mean. The smaller trees are usually tall spindly members that have fallen behind their associates. The ages of trees usually do not differ by more than 20 years. |
| 2    | Even-aged two-storied | Stands composed of two distinct canopy layers, such as, an overstory with an understory sapling layer possibly from seed tree and shelterwood operations. This may also be true in older plantations, where shade-tolerant trees may become established. Two relatively even canopy levels can be recognized in the stand. Understory or overtopped trees are common. Neither canopy level is necessarily continuous or closed, but both canopy levels tend to be uniformly distributed across the stand. The average age of each level differs significantly from the other. |
| 3    | Uneven-aged           | Theoretically, these stands contain trees of every age on a continuum from seedlings to mature canopy trees. In practice, uneven-aged stands are characterized by a broken or uneven canopy layer. Usually the largest number of trees is in the smaller diameter classes. As trees increase in diameter, their numbers diminish throughout the stand. Many times, instead of producing a negative exponential distribution of diminishing larger diameters, uneven-aged stands behave irregularly with waves of reproduction and mortality. Consider any stand with three or more structural layers as uneven-aged. Logging disturbances (examples are selection, diameter limit, and salvage cutting) will give a stand an uneven-aged structure. |
| 4    | Mosaic                | At least two distinct size classes are represented and these are not uniformly distributed but are grouped in small repeating aggregations, or occur as stringers <120 feet wide, throughout the stand. Each size class aggregation is too small to be recognized and mapped as an individual stand. The aggregations may or may not be even-aged. |

86. **STUMP_CD_PNWRS**

Stump code, Pacific Northwest Research Station. A yes/no attribute indicating whether or not stumps are present on a condition. Only collected by certain FIA work units (SURVEY.RSCD = 26).

| Code | Description                               |
|------|-------------------------------------------|
| Y    | Yes, evidence of cutting or management exists; stumps are present |
| N    | No, evidence of cutting was not observed; stumps are not present |
87. FIRE_SRS

Fire, Southern Research Station. The presence or absence of fire on the condition since the last survey or within the last 5 years on new/replacement plots. Evidence of fire must occur within the subplot. Only collected by certain FIA work units (SURVEY.RSCD = 33).

| Code | Description                                      |
|------|--------------------------------------------------|
| 0    | No evidence of fire since last survey             |
| 1    | Evidence of burning (either prescribed or wildfire) |

88. GRAZING_SRS

Grazing, Southern Research Station. The presence or absence of domestic animal grazing on the condition since the last survey or within the last 5 years on new/replacement plots. Evidence of grazing must occur within the subplot. Only collected by certain FIA work units (SURVEY.RSCD = 33).

| Code | Description                                      |
|------|--------------------------------------------------|
| 0    | No evidence of livestock use (by domestic animals) |
| 1    | Evidence of grazing (including dung, tracks, trails, etc.) |

89. HARVEST_TYPE1_SRS

Harvest type code 1, Southern Research Station. This variable is populated when the corresponding variable TRTCD = 10. Only collected by certain FIA work units (SURVEY.RSCD = 33).

| Code | Description                                                                 |
|------|-----------------------------------------------------------------------------|
| 11   | Clearcut harvest – The removal of the majority of the merchantable trees in a stand; residual stand stocking is under 50 percent. |
| 12   | Partial harvest – Removal primarily consisting of highest quality trees. Residual consists of lower quality trees because of high grading or selection harvest. (i.e., Uneven aged, group selection, high grading, species selection) |
| 13   | Seed-tree/shelterwood harvest – Crop trees are harvested leaving seed source trees either in a shelterwood or seed tree. Also includes the final harvest of the seed trees. |
| 14   | Commercial thinning – The removal of trees (usually poletimber sized) from poletimber-sized stands leaving sufficient stocking of growing-stock trees to feature in future stand development. Also included are thinning in sawtimber-sized stands where poletimber-sized (or log-sized) trees have been removed to improve quality of those trees featured in a final harvest. |
| 15   | Timber Stand Improvement (cut trees only) – The cleaning, release or other stand improvement involving non-commercial cutting applied to an immature stand that leaves sufficient stocking. |
| 16   | Salvage cutting – The harvesting of dead or damaged trees or of trees in danger of being killed by insects, disease, flooding, or other factors in order to save their economic value. |

90. HARVEST_TYPE2_SRS

Harvest type code 2, Southern Research Station. See HARVEST_TYPE1_SRS.
91. HARVEST_TYPE3_SRS

Harvest type code 3, Southern Research Station. See HARVEST_TYPE1_SRS.

92. LAND_USE_SRS

Land use, Southern Research Station. A classification indicating the present land use of the condition. Collected on all condition records where SURVEY.RSCD = 33 and PLOT.DESIGNCD = 1, 230, 231, 232, or 233, and were processed in NIMS. It may not be populated for other SRS plot designs or for SRS data that have not been processed in NIMS. Only collected by certain FIA work units (SURVEY.RSCD = 33).

| Code | Description |
|------|-------------|
| 01   | Timber land (COND.SITECLCD = 1, 2, 3, 4, 5, or 6) |
| 02   | Other forest land (COND.SITECLCD = 7) |
| 10   | Agricultural land – Land managed for crops, pasture, or other agricultural use and is not better described by one of the following detailed codes. The area must be at least 1.0 acre in size and 120.0 feet wide. NOTE: Codes 14, 15 and 16 are collected only where PLOT.MANUAL ≥1. If PLOT.MANUAL <1, then codes 14 and 15 were coded 11. There was no single rule for coding maintained wildlife openings where PLOT.MANUAL <1, so code 16 may have been coded 10, 11 or 12. |
| 11   | Cropland |
| 12   | Pasture (improved through cultural practices) |
| 13   | Idle farmland |
| 14   | Orchard |
| 15   | Christmas tree plantation |
| 16   | Maintained wildlife openings |
| 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 and is not better described by one of the following detailed codes. NOTE: Code 30 is used to describe all developed land where PLOT.MANUAL <1. The following detailed codes only apply to PLOT.MANUAL ≥1. |
| 31   | Cultural: business, 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 that do not fall into one of the uses described above or below. |
| 41   | Marsh |
| 42   | Wetland |
| 43   | Beach |
| 45   | Nonforest-Chaparral |
| 91   | Census Water – Lakes, reservoirs, ponds, and similar bodies of water 4.5 acres in size and larger; and rivers, streams, canals, etc., 30 to 200 feet wide. |
| 92   | Noncensus water – Lakes, reservoirs, ponds, and similar bodies of water 1.0 acre to 4.5 acres in size. Rivers, streams, canals, etc., more than 200 feet wide. |
| 99   | Nonsampled – Condition not sampled (see COND.COND_NONSAMPLE_REASN_CD for exact reason). |
93. OPERABILITY_SRS

Operability, Southern Research Station. The viability of operating logging equipment in the vicinity of the condition. The code represents the most limiting class code that occurs on each forest condition. Only collected by certain FIA work units (SURVEY.RSCD = 33).

| Code | Description |
|------|-------------|
| 0    | No problems. |
| 1    | Seasonal access due to water conditions in wet weather. |
| 2    | Mixed wet and dry areas typical of multi-channeled streams punctuated with dry islands. |
| 3    | Broken terrain, cliffs, gullies, outcroppings, etc. that would severely limit equipment, access or use. |
| 4    | Year-round water problems (includes islands). |
| 5    | Slopes 20-40 percent. |
| 6    | Slope greater than 40 percent. |

94. STAND_STRUCTURE_SRS

Stand structure, Southern Research Station. The description of the predominant canopy structure for the condition. Only the vertical position of the dominant and codominant trees in the stand are considered. Only collected by certain FIA work units (SURVEY.RSCD = 33).

| Code | Description |
|------|-------------|
| 0    | Non-stocked – The condition is less than 10 percent stocked. |
| 1    | Single-storied – Most of the dominant/codominant tree crowns form a single canopy (i.e., most of the trees are approximately the same height). |
| 2    | Two-storied – The dominant/codominant tree crowns form two distinct canopy layers or stories. |
| 3    | Multi-storied – More than two recognizable levels characterize the crown canopy. Dominant/codominant trees of many sizes (diameters and heights) for a multilevel canopy. |

95. NF_COND_STATUS_CD

Nonforest condition status code. Intentionally left blank. Will be populated in version 5.0.

96. NF_COND_NONSAMPLE_REASN_CD

Nonforest condition nonsampled reason code. Intentionally left blank. Will be populated in version 5.0.

97. CANOPY_CVR_SAMPLE_METHOD_CD

Canopy cover sample method code. Intentionally left blank. Will be populated in version 5.0.

98. LIVE_CANOPY_CVR_PCT

Live canopy cover percent. Intentionally left blank. Will be populated in version 5.0.
99. **LIVE_MISSING_CANOPY_CVR_PCT**

   Live plus missing canopy cover percent. Intentionally left blank. Will be populated in version 5.0.

100. **NBR_LIVE_STEMS**

   Number of live stems. Intentionally left blank. Will be populated in version 5.0.
### Subplot Table (Oracle table name is SUBPLOT)

| Column name          | Descriptive name                                      | Oracle data type       |
|----------------------|-------------------------------------------------------|------------------------|
| 1 CN                 | Sequence number                                       | VARCHAR2(34)           |
| 2 PLT_CN             | Plot sequence number                                  | VARCHAR2(34)           |
| 3 PREV_SBP_CN        | Previous subplot sequence number                      | VARCHAR2(34)           |
| 4 INVYR              | Inventory year                                        | NUMBER(4)              |
| 5 STATECD            | State code                                            | NUMBER(4)              |
| 6 UNITCD             | Survey unit code                                      | NUMBER(2)              |
| 7 COUNTYCD           | County code                                           | NUMBER(3)              |
| 8 PLOT               | Phase 2 plot number                                   | NUMBER(5)              |
| 9 SUBP               | Subplot number                                        | NUMBER(3)              |
| 10 SUBP_STATUS_CD    | Subplot/macroplot status code                         | NUMBER(1)              |
| 11 POINT_NONSAMPLE_REASN_CD | Point nonsampled reason code                        | NUMBER(2)              |
| 12 MICRCOND          | Microplot center condition                            | NUMBER(1)              |
| 13 SUBPCOND          | Subplot center condition                              | NUMBER(1)              |
| 14 MACRCOND          | Macroplot center condition                            | NUMBER(1)              |
| 15 CONDLIST           | Subplot/macroplot condition list                      | NUMBER(4)              |
| 16 SLOPE              | Subplot slope                                         | NUMBER(3)              |
| 17 ASPECT             | Subplot aspect                                        | NUMBER(3)              |
| 18 WATERDEP          | Snow/water depth                                      | NUMBER(2,1)            |
| 19 P2A_GRM_FLG        | Periodic to annual growth, removal, and mortality flag| VARCHAR2(1)            |
| 20 CREATED_BY        | Created by                                            | VARCHAR2(30)           |
| 21 CREATED_DATE      | Created date                                          | DATE                   |
| 22 CREATED_IN_INSTANCE | Created in instance                                  | VARCHAR2(6)            |
| 23 MODIFIED_BY       | Modified by                                           | VARCHAR2(30)           |
| 24 MODIFIED_DATE     | Modified date                                         | DATE                   |
| 25 MODIFIED_IN_INSTANCE | Modified in instance                                | VARCHAR2(6)            |
| 26 CYCLE             | Inventory cycle number                                | NUMBER(2)              |
| 27 SUBCYCLE          | Inventory subcycle number                             | NUMBER(2)              |
| 28 ROOT_DIS_SEV_CD_PNWRS | Root disease severity rating code, Pacific Northwest Research Station | NUMBER(1)              |
| 29 NF_SUBP_STATUS_CD | Nonforest subplot status code                         | NUMBER(1)              |
| 30 NF_SUBP_NONSAMPLE_REASN_CD | Nonforest subplot nonsampled reason code                      | NUMBER(2)              |
| 31 P2VEG_SUBP_STATUS_CD | P2 vegetation subplot status code                    | NUMBER(1)              |
| 32 P2VEG_SUBP_NONSAMPLE_REASN_CD | P2 vegetation subplot nonsampled reason code                      | NUMBER(2)              |
| 33 INVASIVE_SUBP_STATUS_CD | Invasive subplot status code                           | NUMBER(1)              |
| 34 INVASIVE_NONSAMPLE_REASN_CD | Invasive nonsampled reason code                             | NUMBER(2)              |
### Subplot Table

| Type of key | Column(s) order | Tables to link | Abbreviated notation |
|-------------|-----------------|----------------|----------------------|
| Primary     | (CN)            | N/A            | SBP_PK               |
| Unique      | (PLT_CN, SUBP)  | N/A            | SBP_UK               |
| Natural     | (STATECD, INVYR, UNITCD, COUNTYCD, PLOT, SUBP) | N/A | SBP_NAT_I |
| Foreign     | (PLT_CN, MICRCOND) | SUBPLOT to COND | SBP_CND_FK2 |
|             | (PLT_CN, MACRCOND) | SUBPLOT to COND | SBP_CND_FK3 |
|             | (PLT_CN, SUBPCOND) | SUBPLOT to COND | SBP_CND_FK |
|             | (PLT_CN)        | SUBPLOT to PLOT | SBP_PLT_FK |

Note: The SUBPLOT record may not exist for some periodic inventory data.

1. **CN**
   - Sequence number. A unique sequence number used to identify a subplot record.

2. **PLT_CN**
   - Plot sequence number. Foreign key linking the subplot record to the plot record.

3. **PREV_SBP_CN**
   - Previous subplot sequence number. Foreign key linking the subplot record to the previous inventory’s subplot record for this subplot. Only populated on annual remeasured plots.

4. **INVYR**
   - Inventory year. The year that best represents when the inventory data were collected. Under the annual inventory system, a group of plots is selected each year for sampling. The selection is based on a panel system. INVYR is the year in which the majority of plots in that group were collected (plots in the group have the same panel and, if applicable, subpanel). Under periodic inventory, a reporting inventory year was selected, usually based on the year in which the majority of the plots were collected or the mid-point of the years over which the inventory spanned. For either annual or periodic inventory, INVYR is not necessarily the same as MEASYEAR.

   **Exceptions:**
   - **INVYR = 9999.** INVYR is set to 9999 to distinguish Phase 3 plots taken by the western FIA work units that are “off subpanel.” This is due to differences in measurement intervals between Phase 3 (measurement interval = 5 years) and Phase 2 (measurement interval = 10 years) plots. Only users interested in performing certain Phase 3 data analyses should access plots with this anomalous value in INVYR.
   - **INVYR <100.** INVYR <100 indicates that population estimates were derived from a pre-NIMS regional processing system and the same plot either has been or may soon be re-processed in NIMS as part of a separate evaluation. The NIMS processed copy of the plot follows the standard INVYR format. This only applies to plots collected in the South (SURVEY.RSCD = 33) with the national design or a similar regional design (PLOT.DESIGNCD = 1 or
220-233) that were collected when the inventory year was 1998 through 2005.

INVYR = 98 is equivalent to 1998 but processed through regional system
INVYR = 99 is equivalent to 1999 but processed through regional system
INVYR = 0 is equivalent to 2000 but processed through regional system
INVYR = 1 is equivalent to 2001 but processed through regional system
INVYR = 2 is equivalent to 2002 but processed through regional system
INVYR = 3 is equivalent to 2003 but processed through regional system
INVYR = 4 is equivalent to 2004 but processed through regional system
INVYR = 5 is equivalent to 2005 but processed through regional system

5. STATECD State code. Bureau of the Census Federal Information Processing Standards (FIPS) two-digit code for each State. Refer to appendix C.

6. UNITCD Survey unit code. Forest Inventory and Analysis survey unit identification number. Survey units are usually groups of counties within each State. For periodic inventories, survey units may be made up of lands of particular owners. Refer to appendix C for codes.

7. COUNTYCD County code. The identification number for a county, parish, watershed, borough, or similar governmental unit in a State. FIPS codes from the Bureau of the Census are used. Refer to appendix C for codes.

8. PLOT Phase 2 plot number. An identifier for a plot. Along with STATECD, INVYR, UNITCD, COUNTYCD and/or some other combinations of variables, PLOT may be used to uniquely identify a plot.

9. SUBP Subplot number. The number assigned to the subplot. The national plot design (PLOT.DESIGNCD = 1) has subplot number values of 1 through 4. Other plot designs have various subplot number values. See PLOT.DESIGNCD and appendix B for information about plot designs. For more explanation about SUBP, contact the appropriate FIA work unit (table 6).

10. SUBP_STATUS_CD Subplot/macroplot status code. A code indicating whether forest land was sampled on the subplot/macroplot or not. May be blank (null) in periodic inventories.

| Code | Description                                      |
|------|--------------------------------------------------|
| 1    | Sampled – at least one accessible forest land    |
|      | condition present on subplot.                    |
| 2    | Sampled – no accessible forest land condition    |
|      | present on subplot.                              |
| 3    | Nonsampled.                                      |

11. POINT_NONSAMPLE_REASN_CD Point nonsampled reason code. For entire subplots (or macroplots) that cannot be sampled, one of the following reasons is recorded.
| **Code** | **Description** |
|----------|-----------------|
| 01       | Outside U.S. boundary – Entire subplot (or macroplot) is outside of the U.S. border. |
| 02       | Denied access area – Access to the entire subplot (or macroplot) is denied by the legal owner, or by the owner of the only reasonable route to the subplot (or macroplot). |
| 03       | Hazardous situation – Entire subplot (or macroplot) cannot be accessed because of a hazard or danger, for example cliffs, quarries, strip mines, illegal substance plantations, high water, etc. |
| 04       | Time limitation – Entire subplot (or macroplot) cannot be sampled due to a time restriction. This code is reserved for areas with limited access, and in situations where it is imperative for the crew to leave before the plot can be completed (e.g., scheduled helicopter rendezvous). |
| 05       | Lost data – The plot data file was discovered to be corrupt after a panel was completed and submitted for processing. This code is assigned to entire plots or full subplots that could not be processed. |
| 06       | Lost plot – Entire plot cannot be found. Used for the four subplots that are required for this plot. |
| 07       | Wrong location – Previous plot can be found, but its placement is beyond the tolerance limits for plot location. Used for the four subplots that are required for this plot. |
| 08       | Skipped visit – Entire plot skipped. Used for plots that are not completed prior to the time a panel is finished and submitted for processing. Used for the four subplots that are required for this plot. This code is for office use only. |
| 09       | Dropped intensified plot - Intensified plot dropped due to a change in grid density. Used for the four subplots that are required for this plot. This code used only by units engaged in intensification. This code is for office use only. |
| 10       | Other – Entire subplot (or macroplot) not sampled due to a reason other than one of the specific reasons already listed. |
| 11       | Ocean – Subplot/macroplot falls in ocean water below mean high tide line. |

12. **MICRCOND** Microplot center condition. Condition number for the condition at the center of the microplot.

13. **SUBPCOND** Subplot center condition. Condition number for the condition at the center of the subplot.

14. **MACRCOND** Macroplot center condition. Condition number for the condition at the center of the macroplot. Blank (null) if macroplot is not measured.

15. **CONDLIST** Subplot/macroplot condition list. *(Core optional.)* This is a listing of all condition classes located within the 24.0/58.9-foot radius around the subplot/macroplot center. A maximum of four conditions is permitted on any individual subplot/macroplot. For example: 2300 means these conditions (conditions 2 and 3) are on the subplot/macroplot.

16. **SLOPE** Subplot slope. The angle of slope, in percent, of the subplot, determined by sighting along the average incline or decline of the subplot. If the slope changes gradually, an average slope is recorded. If the slope changes across the subplot but is predominantly of one direction, the predominant slope is recorded. Valid values are 0 through 155.

17. **ASPECT** Subplot aspect. The direction of slope, to the nearest degree, of the subplot, determined along the direction of slope. If the aspect changes gradually, an
average aspect is recorded. If the aspect changes across the subplot but is predominantly of one direction, the predominant aspect is recorded. North is recorded as 360. When slope is <5 percent, there is no aspect and it is recorded as 000.

18. WATERDEP  
Snow/water depth. The approximate depth in feet of water or snow covering the subplot. Populated for all forested subplots using the National Field Guide protocols (PLOT.MANUAL ≥1.0) and populated by some FIA work units where PLOT.MANUAL <1.0.

19. P2A_GRM_FLG  
Periodic to annual growth, removal, and mortality flag. A code indicating if this subplot is part of a periodic inventory (usually from a variable-radius plot design) that is only included for the purposes of computing growth, removals and/or mortality estimates. Tree data associated with this subplot does not contribute to current estimates of such attributes as volume, biomass or number of trees. The flag is set to Y for those subplots that are needed for estimation and otherwise is left blank (null).

20. CREATED_BY  
Created by. The employee who created the record. This attribute is intentionally left blank in download files.

21. CREATED_DATE  
Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

22. CREATED_IN_INSTANCE  
Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

23. MODIFIED_BY  
Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

24. MODIFIED_DATE  
Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.
25. MODIFIED_IN_INSTANCE

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.

26. CYCLE

Inventory cycle number. A number assigned to a set of plots, measured over a particular period of time from which a State estimate using all possible plots is obtained. A cycle number >1 does not necessarily mean that information for previous cycles resides in the database. A cycle is relevant for periodic and annual inventories.

27. SUBCYCLE

Inventory subcycle number. For an annual inventory that takes n years to measure all plots, subcycle shows in which of the n years of the cycle the data were measured. Subcycle is 0 for a periodic inventory. Subcycle 99 may be used for plots that are not included in the estimation process.

28. ROOT_DIS_SEV_CD_PNWRS

Root disease severity rating code, Pacific Northwest Research Station. The root disease severity rating that describes the degree of root disease present. Only collected by certain FIA work units (SURVEY.RSCD = 26).

| Code | Description |
|------|-------------|
| 0    | No evidence of root disease visible within 50 feet of the 58.9 foot macroplot. |
| 1    | Root disease present within 50 feet of the macroplot, but no evidence of disease on the macroplot. |
| 2    | Minor evidence of root disease on the macroplot, such as suppressed tree killed by root disease, or a minor part of the overstory showing symptoms of infection. Little or no detectable reduction in canopy closure or volume. |
| 3    | Canopy reduction evident, up to 20 percent; usually as a result of death of 1 codominant tree on an otherwise fully stocked site. In absence of mortality, numerous trees showing symptoms of root disease infection. |
| 4    | Canopy reduction at least 20 percent; up to 30 percent as a result of root disease mortality. Snags and downed trees removed from canopy by disease as well as live trees with advance symptoms of disease contribute to impact. |
| 5    | Canopy reduction 30-50 percent as a result of root disease. At least half of the ground area of macroplot considered infested with evidence of root disease-killed trees. Macroplots representing mature stands with half of their volume in root disease-tolerant species usually do not go much above severity 5 because of the ameliorating effect of the disease-tolerant species occupying infested ground. |
| 6    | 50-75 percent reduction in canopy with most of the ground area considered infested as evidenced by symptomatic trees. Much of the canopy variation in this category is generally a result of root disease-tolerant species occupying infested ground. |
| 7    | At least 75 percent canopy reduction. Macroplots that reach this severity level usually are occupied by only the most susceptible species. There are very few of the original overstory trees remaining although infested ground is often densely stocked with regeneration of susceptible species. |
| 8    | The entire macroplot falls within a definite root disease pocket with only one or very few susceptible overstory trees present. |
| 9    | The entire macroplot falls within a definite root disease pocket with no overstory trees of the susceptible species present. |
29. **NF_SUBP_STATUS_CD**

   Nonforest subplot status code. Intentionally left blank. Will be populated in version 5.0.

30. **NF_SUBP_NONSAMPLE_REASN_CD**

   Nonforest subplot nonsampled reason code. Intentionally left blank. Will be populated in version 5.0.

31. **P2VEG_SUBP_STATUS_CD**

   P2 vegetation subplot status code. Intentionally left blank. Will be populated in version 5.0.

32. **P2VEG_SUBP_NONSAMPLE_REASN_CD**

   P2 vegetation subplot nonsampled reason code. Intentionally left blank. Will be populated in version 5.0.

33. **INVASIVE_SUBP_STATUS_CD**

   Invasive subplot status code. Intentionally left blank. Will be populated in version 5.0.

34. **INVASIVE_NONSAMPLE_REASN_CD**

   Invasive nonsampled reason code. Intentionally left blank. Will be populated in version 5.0.
Subplot Condition Table (Oracle table name is SUBP_COND)

| Column name | Descriptive name                  | Oracle data type |
|-------------|-----------------------------------|------------------|
| 1 CN        | Sequence number                   | VARCHAR2(34)     |
| 2 PLT_CN    | Plot sequence number              | VARCHAR2(34)     |
| 3 INVYR     | Inventory year                    | NUMBER(4)        |
| 4 STATECD   | State code                        | NUMBER(4)        |
| 5 UNITCD    | Survey unit code                  | NUMBER(2)        |
| 6 COUNTYCD  | County code                       | NUMBER(3)        |
| 7 PLOT      | Phase 2 plot number               | NUMBER(5)        |
| 8 SUBP      | Subplot number                    | NUMBER(3)        |
| 9 CONDID    | Condition class number            | NUMBER(1)        |
| 10 CREATED_BY | Created by                      | VARCHAR2(30)     |
| 11 CREATED_DATE | Created date                   | DATE             |
| 12 CREATED_IN_INSTANCE | Created in instance  | VARCHAR2(6)     |
| 13 MODIFIED_BY   | Modified by                     | VARCHAR2(30)     |
| 14 MODIFIED_DATE   | Modified date                    | DATE             |
| 15 MODIFIED_IN_INSTANCE | Modified in instance       | VARCHAR2(6)     |
| 16 MICRCOND_PROP | Microplot-condition proportion | NUMBER(5,4)   |
| 17 SUBP_COND_PROP | Subplot-condition proportion   | NUMBER(5,4)     |
| 18 MACRCOND_PROP | Macroplot-condition proportion | NUMBER(5,4)   |
| 19 NONFR_INCL_PCT_SUBP | Nonforest inclusions percentage of subplot | NUMBER(3) |
| 20 NONFR_INCL_PCT_MACRO | Nonforest inclusions percentage of macroplot | NUMBER(3) |
| 21 CYCLE     | Inventory cycle number            | NUMBER(2)        |
| 22 SUBCYCLE  | Inventory subcycle number         | NUMBER(2)        |

| Type of key | Column(s) order                | Tables to link          | Abbreviated notation |
|-------------|--------------------------------|-------------------------|----------------------|
| Primary     | (CN)                           | N/A                     | SCD_PK               |
| Unique      | (PLT_CN, SUBP, CONDID)         | N/A                     | SCD_UK               |
| Natural     | (STATECD, INVYR, UNITCD, COUNTYCD, PLOT, SUBP, CONDID) | N/A                     | SCD_NAT_1           |
| Foreign     | (PLT_CN, CONDID)               | SUBP_COND to COND       | SCD_CND_FK           |
|             | (PLT_CN)                       | SUBP_COND to PLOT       | SCD_PLT_FK           |
|             | (PLT_CN, SUBP)                 | SUBP_COND to SUBPLOT    | SCD_SBP_FK           |

Note: The SUBP_COND record may not exist for some periodic inventory data.

1. CN  
   Sequence number. A unique sequence number used to identify a subplot condition record.

2. PLT_CN  
   Plot sequence number. Foreign key linking the subplot condition record to the plot record.
3. INVYR

Inventory year. The year that best represents when the inventory data were collected. Under the annual inventory system, a group of plots is selected each year for sampling. The selection is based on a panel system. INVYR is the year in which the majority of plots in that group were collected (plots in the group have the same panel and, if applicable, subpanel). Under periodic inventory, a reporting inventory year was selected, usually based on the year in which the majority of the plots were collected or the mid-point of the years over which the inventory spanned. For either annual or periodic inventory, INVYR is not necessarily the same as MEASYEAR.

Exceptions:
INVYR = 9999. INVYR is set to 9999 to distinguish Phase 3 plots taken by the western FIA work units that are “off subpanel.” This is due to differences in measurement intervals between Phase 3 (measurement interval = 5 years) and Phase 2 (measurement interval = 10 years) plots. Only users interested in performing certain Phase 3 data analyses should access plots with this anomalous value in INVYR.

INVYR <100. INVYR <100 indicates that population estimates were derived from a pre-NIMS regional processing system and the same plot either has been or may soon be re-processed in NIMS as part of a separate evaluation. The NIMS processed copy of the plot follows the standard INVYR format. This only applies to plots collected in the South (SURVEY.RSCD = 33) with the national design or a similar regional design (PLOT.DESIGNCD = 1 or 220-233) that were collected when the inventory year was 1998 through 2005.

INVYR = 98 is equivalent to 1998 but processed through regional system
INVYR = 99 is equivalent to 1999 but processed through regional system
INVYR = 0 is equivalent to 2000 but processed through regional system
INVYR = 1 is equivalent to 2001 but processed through regional system
INVYR = 2 is equivalent to 2002 but processed through regional system
INVYR = 3 is equivalent to 2003 but processed through regional system
INVYR = 4 is equivalent to 2004 but processed through regional system
INVYR = 5 is equivalent to 2005 but processed through regional system

4. STATECD

State code. Bureau of the Census Federal Information Processing Standards (FIPS) two-digit code for each State. Refer to appendix C.

5. UNITCD

Survey unit code. Forest Inventory and Analysis survey unit identification number. Survey units are usually groups of counties within each State. For periodic inventories, Survey units may be made up of lands of particular owners. Refer to appendix C for codes.

6. COUNTYCD

County code. The identification number for a county, parish, watershed, borough, or similar governmental unit in a State. FIPS codes from the Bureau of the Census are used. Refer to appendix C for codes.
7. PLOT  Phase 2 plot number. An identifier for a plot. Along with STATECD, INVYR, UNITCD, COUNTYCD and/or some other combination of variables, PLOT may be used to uniquely identify a plot.

8. SUBP  Subplot number. The number assigned to the subplot. The national plot design (PLOT.DESIGNCD = 1) has subplot number values of 1 through 4. Other plot designs have various subplot number values. See PLOT.DESIGNCD and appendix B for information about plot designs. For more explanation about SUBP, contact the appropriate FIA work unit.

9. CONDID  Condition class number. Unique identifying number assigned to each condition on a plot. A condition is initially defined by condition class status. Differences in reserved status, owner group, forest type, stand-size class, regeneration status, and stand density further define condition for forest land. Mapped nonforest conditions are also assigned numbers. At the time of the plot establishment, the condition class at plot center (the center of subplot 1) is usually designated as condition class 1. Other condition classes are assigned numbers sequentially at the time each condition class is delineated. On a plot, each sampled condition class must have a unique number that can change at remeasurement to reflect new conditions on the plot.

10. CREATED_BY  Created by. The employee who created the record. This attribute is intentionally left blank in download files.

11. CREATED_DATE  Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

12. CREATED_IN_INSTANCE  Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

13. MODIFIED_BY  Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

14. MODIFIED_DATE  Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.
15. **MODIFIED_IN_INSTANCE**

   Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.

16. **MICRCOND_PROP**

   Microplot-condition proportion. Proportion of this microplot in this condition.

17. **SUBPCOND_PROP**

   Subplot-condition proportion. Proportion of this subplot in this condition.

18. **MACRCOND_PROP**

   Macroplot-condition proportion. Proportion of this macroplot in this condition.

19. **NONFR_INCL_PCT_SUBP**

   Nonforest inclusion percentage of subplot. Nonforest area estimate, expressed as a percentage, of the 24.0-foot, fixed-radius subplot present within a mapped, accessible forestland condition class in Oregon, Washington, and California. Only collected by certain FIA work units (SURVEY.RSCD = 26).

20. **NONFR_INCL_PCT_MACRO**

   Nonforest inclusion percentage of macroplot. Nonforest area estimate, expressed as a percentage, of the 58.9-foot, fixed-radius macroplot present within a mapped, accessible forestland condition class in Oregon, Washington, and California. Only collected by certain FIA work units (SURVEY.RSCD = 26).

21. **CYCLE**

   Inventory cycle number. A number assigned to a set of plots, measured over a particular period of time from which a State estimate using all possible plots is obtained. A cycle number >1 does not necessarily mean that information for previous cycles resides in the database. A cycle is relevant for periodic and annual inventories.

22. **SUBCYCLE**

   Inventory subcycle number. For an annual inventory that takes n years to measure all plots, subcycle shows in which of the n years of the cycle the data were measured. Subcycle is 0 for a periodic inventory. Subcycle 99 may be used for plots that are not included in the estimation process.
### Tree Table (Oracle table name is TREE)

| Column name | Descriptive name                  | Oracle data type |
|-------------|-----------------------------------|------------------|
| 1 CN        | Sequence number                   | VARCHAR2(34)     |
| 2 PLT_CN    | Plot sequence number              | VARCHAR2(34)     |
| 3 PREV_TRE_CN | Previous tree sequence number     | VARCHAR2(34)     |
| 4 INVYR     | Inventory year                    | NUMBER(4)        |
| 5 STATECD   | State code                        | NUMBER(4)        |
| 6 UNITCD    | Survey unit code                  | NUMBER(2)        |
| 7 COUNTYCD  | County code                       | NUMBER(3)        |
| 8 PLOT      | Phase 2 plot number               | NUMBER(5)        |
| 9 SUBP      | Subplot number                    | NUMBER(3)        |
| 10 TREE     | Tree record number                | NUMBER(9)        |
| 11 CONDID   | Condition class number            | NUMBER(1)        |
| 12 AZIMUTH  | Azimuth                            | NUMBER(3)        |
| 13 DIST     | Horizontal distance               | NUMBER(4,1)      |
| 14 PREVCOND | Previous condition number         | NUMBER(1)        |
| 15 STATUSCD | Status code                       | NUMBER(1)        |
| 16 SPCD     | Species code                      | NUMBER           |
| 17 SPGRPCD  | Species group code                | NUMBER(2)        |
| 18 DIA      | Current diameter                  | NUMBER(5,2)      |
| 19 DIAHTCD  | Diameter height code              | NUMBER(1)        |
| 20 HT       | Total height                      | NUMBER(3)        |
| 21 HTCD     | Height method code                | NUMBER(2)        |
| 22 ACTUALHT | Actual height                     | NUMBER(3)        |
| 23 TREECLCD | Tree class code                   | NUMBER(2)        |
| 24 CR       | Compacted crown ratio             | NUMBER(3)        |
| 25 CCLCD    | Crown class code                  | NUMBER(2)        |
| 26 TREEGRCD | Tree grade code                   | NUMBER(2)        |
| 27 AGENTCD  | Cause of death (agent) code       | NUMBER(2)        |
| 28 CULL     | Rotten and missing cull           | NUMBER(3)        |
| 29 DAMLOC1  | Damage location 1                 | NUMBER(2)        |
| 30 DAMTYP1  | Damage type 1                     | NUMBER(2)        |
| 31 DAMSEV1  | Damage severity 1                 | NUMBER(1)        |
| 32 DAMLOC2  | Damage location 2                 | NUMBER(2)        |
| 33 DAMTYP2  | Damage type 2                     | NUMBER(2)        |
| 34 DAMSEV2  | Damage severity 2                 | NUMBER(1)        |
| 35 DECAYCD  | Decay class code                  | NUMBER(2)        |
| 36 STOCKING | Tree stocking                     | NUMBER(7,4)      |
| Column name | Descriptive name | Oracle data type |
|-------------|------------------|------------------|
| 37 WLDSTEM   | Woodland tree species stem count | NUMBER(3) |
| 38 VOLCFNET  | Net cubic-foot volume | NUMBER(11,6) |
| 39 VOLCFGFRS | Gross cubic-foot volume | NUMBER(11,6) |
| 40 VOLCNSNET | Net cubic-foot volume in the sawlog portion | NUMBER(11,6) |
| 41 VOLCNSGRS | Gross cubic-foot volume in the sawlog portion | NUMBER(11,6) |
| 42 VOLBNET   | Net board-foot volume in the sawlog portion | NUMBER(11,6) |
| 43 VOLBFGRS  | Gross board-foot volume in the sawlog portion | NUMBER(11,6) |
| 44 VOLCNSND  | Sound cubic-foot volume | NUMBER(11,6) |
| 45 GROWCFGFS | Net annual merchantable cubic-foot growth of a growing-stock tree on timberland | NUMBER(11,6) |
| 46 GROWBFSL  | Net annual merchantable board-foot growth of a sawtimber size tree on timberland | NUMBER(11,6) |
| 47 GROWCFAL  | Net annual sound cubic-foot growth of a live tree on timberland | NUMBER(11,6) |
| 48 MORTCFGFS | Cubic-foot volume of a growing-stock tree on timberland for mortality purposes | NUMBER(11,6) |
| 49 MORTBFSL  | Board-foot volume of a sawtimber size tree on timberland for mortality purposes | NUMBER(11,6) |
| 50 MORTCFAL  | Sound cubic-foot volume of a tree on timberland for mortality purposes | NUMBER(11,6) |
| 51 REMVCFGFS | Cubic-foot volume of a growing-stock tree on timberland for removal purposes | NUMBER(11,6) |
| 52 REMVBFLS  | Board-foot volume of a sawtimber size tree on timberland for removal purposes | NUMBER(11,6) |
| 53 REMVCALF  | Sound cubic-foot volume of a tree on timberland for removal purposes | NUMBER(11,6) |
| 54 DIACHECK  | Diameter check code | NUMBER(2) |
| 55 MORTYR    | Mortality year | NUMBER(4) |
| 56 SALVCD    | Salvable dead code | NUMBER(2) |
| 57 UNCRCD    | Uncompacted live crown ratio | NUMBER(3) |
| 58 CPOSCD    | Crown position code | NUMBER(2) |
| 59 CLIGHTCD  | Crown light exposure code | NUMBER(2) |
| 60 CVIGORCD  | Crown vigor code (sapling) | NUMBER(2) |
| 61 CDNCD     | Crown density code | NUMBER(3) |
| 62 CIDIEBKCD | Crown dieback code | NUMBER(3) |
| 63 TRANSCD   | Foliage transparency code | NUMBER(3) |
| 64 TREEHISTCD | Tree history code | NUMBER(3) |
| Column name          | Descriptive name                                                   | Oracle data type               |
|---------------------|--------------------------------------------------------------------|--------------------------------|
| 65 DIACALC          | Current diameter calculated                                        | NUMBER(5,2)                    |
| 66 BHAGE             | Breast height age                                                  | NUMBER(4)                      |
| 67 TOTAGE            | Total age                                                          | NUMBER(4)                      |
| 68 CULLDEAD          | Dead cull                                                         | NUMBER(3)                      |
| 69 CULLFORM          | Form cull                                                         | NUMBER(3)                      |
| 70 CULLMSTOP         | Missing top cull                                                   | NUMBER(3)                      |
| 71 CULLBF            | Board-foot cull                                                   | NUMBER(3)                      |
| 72 CULLCF            | Cubic-foot cull                                                   | NUMBER(3)                      |
| 73 BFSND             | Board-foot cull soundness                                          | NUMBER(3)                      |
| 74 CFSND             | Cubic-foot-cull soundness                                          | NUMBER(3)                      |
| 75 SAWHT             | Sawlog height                                                     | NUMBER(2)                      |
| 76 BOLEHT            | Bole height                                                       | NUMBER(3)                      |
| 77 FORMCL            | Form class                                                        | NUMBER(1)                      |
| 78 HTCALC            | Current height calculated                                          | NUMBER(3)                      |
| 79 HRDWD_CLUMP_CD    | Hardwood clump code                                               | NUMBER(1)                      |
| 80 SITREE            | Calculated site index                                             | NUMBER(3)                      |
| 81 CREATED_BY        | Created by                                                        | VARCHAR2(30)                   |
| 82 CREATED_DATE      | Created date                                                      | DATE                           |
| 83 CREATED_IN_INSTANCE | Created in instance                      | VARCHAR2(6)                    |
| 84 MODIFIED_BY       | Modified by                                                       | VARCHAR2(30)                   |
| 85 MODIFIED_DATE     | Modified date                                                     | DATE                           |
| 86 MODIFIED_IN_INSTANCE | Modified in instance               | VARCHAR2(6)                    |
| 87 MORTCD            | Mortality code                                                    | NUMBER(1)                      |
| 88 HTDMP             | Height to diameter measurement point                              | NUMBER(3,1)                    |
| 89 ROUGHCULL         | Rough cull                                                        | NUMBER(2)                      |
| 90 MIST_CL_CD        | Mistletoe class code                                              | NUMBER(1)                      |
| 91 CULL_FLD          | Rotten/missing cull, field recorded                               | NUMBER(2)                      |
| 92 RECONCILECD       | Reconcile code                                                    | NUMBER(1)                      |
| 93 PREVDIA           | Previous diameter                                                 | NUMBER(5,2)                    |
| 94 FGROWCFG          | Net annual merchantable cubic-foot growth of a growing-stock tree on forest land | NUMBER(11,6) |
| 95 FGROWBFSL         | Net annual merchantable board-foot growth of a sawtimber tree on forest land | NUMBER(11,6) |
| 96 FGROWCFAL         | Net annual sound cubic-foot growth of a live tree on forest land   | NUMBER(11,6) |
| 97 FMORTCFG          | Cubic-foot volume of a growing-stock tree for mortality purposes on forest land | NUMBER(11,6) |
| Column name | Descriptive name | Oracle data type |
|-------------|------------------|------------------|
| 98          | FMORTBFSL        | Board-foot volume of a sawtimber tree for mortality purposes on forest land NUMBER(11,6) |
| 99          | FMORCTCFAL       | Sound cubic-foot volume of a tree for mortality purposes on forest land NUMBER(11,6) |
| 100         | FREMVCFGFS       | Cubic-foot volume of a growing-stock tree for removal purposes on forest land NUMBER(11,6) |
| 101         | FREMBFSL         | Board-foot volume of a sawtimber size tree for removal purposes on forest land NUMBER(11,6) |
| 102         | FREMCFCAL        | Sound cubic-foot volume of the tree for removal purposes on forest land NUMBER(11,6) |
| 103         | P2A_GRM_FLG      | Periodic to annual growth, removal, and mortality flag VARCHAR2(1) |
| 104         | TREECLCD_NERS    | Tree class code, Northeastern Research Station NUMBER(2) |
| 105         | TREECLCD_SRS     | Tree class code, Southern Research Station NUMBER(2) |
| 106         | TREECLCD_NCRS    | Tree class code, North Central Research Station NUMBER(2) |
| 107         | TREECLCD_RMRS    | Tree class code, Rocky Mountain Research Station NUMBER(2) |
| 108         | STANDING_DEAD_CD | Standing dead code NUMBER(2) |
| 109         | PREV_STATUS_CD   | Previous tree status code NUMBER(1) |
| 110         | PREV_WDLDSTEM    | Previous woodland stem count NUMBER(3) |
| 111         | TPA_UNADJ        | Trees per acre unadjusted NUMBER(11,6) |
| 112         | TPAMORT_UNADJ    | Mortality trees per acre unadjusted NUMBER(11,6) |
| 113         | TPAREMV_UNADJ    | Removal trees per acre unadjusted NUMBER(11,6) |
| 114         | TPAGROW_UNADJ    | Growth trees per acre unadjusted NUMBER(11,6) |
| 115         | DRYBIO_BOLE      | Dry biomass in the merchantable bole NUMBER(13,6) |
| 116         | DRYBIO_TOP       | Dry biomass in the top of the tree NUMBER(13,6) |
| 117         | DRYBIO_STUMP     | Dry biomass in the tree stump NUMBER(13,6) |
| 118         | DRYBIO_SAPLING   | Dry biomass of saplings NUMBER(13,6) |
| 119         | DRYBIO_WDLD_SPP  | Dry biomass of woodland tree species NUMBER(13,6) |
| 120         | DRYBIO_BG        | Dry biomass of the roots NUMBER(13,6) |
| 121         | CARBON_AG        | Carbon in the aboveground portion of the tree NUMBER(13,6) |
| 122         | CARBON_BG        | Carbon in the belowground portion of the tree NUMBER(13,6) |
| 123         | CYCLE            | Inventory cycle number NUMBER(2) |
| 124         | SUBCYCLE         | Inventory subcycle number NUMBER(2) |
| 125         | BORED_CD_PNWRS   | Tree bored code, Pacific Northwest Research Station NUMBER(1) |
| 126         | DAMLOC1_PNWRS    | Damage location 1, Pacific Northwest Research Station NUMBER(2) |
| 127         | DAMLOC2_PNWRS    | Damage location 2, Pacific Northwest Research Station NUMBER(2) |
### Column name | Descriptive name | Oracle data type
--- | --- | ---
128 | DIACHECK_PNWRS | Diameter check, Pacific Northwest Research Station | NUMBER(1)
129 | DMG_AGENT1_CD_PNWRS | Damage agent 1, Pacific Northwest Research Station | NUMBER(2)
130 | DMG_AGENT2_CD_PNWRS | Damage agent 2, Pacific Northwest Research Station | NUMBER(2)
131 | DMG_AGENT3_CD_PNWRS | Damage agent 3, Pacific Northwest Research Station | NUMBER(2)
132 | MIST_CL_CD_PNWRS | Leafy mistletoe class code, Pacific Northwest Research Station | NUMBER(1)
133 | SEVERITY1_CD_PNWRS | Damage severity 1, Pacific Northwest Research Station for years 2001-2004 | NUMBER(1)
134 | SEVERITY1A_CD_PNWRS | Damage severity 1A, Pacific Northwest Research Station | NUMBER(2)
135 | SEVERITY1B_CD_PNWRS | Damage severity 1B, Pacific Northwest Research Station | NUMBER(1)
136 | SEVERITY2_CD_PNWRS | Damage severity 2, Pacific Northwest Research Station for years 2001-2004 | NUMBER(1)
137 | SEVERITY2A_CD_PNWRS | Damage severity 2A, Pacific Northwest Research Station starting in 2005 | NUMBER(2)
138 | SEVERITY2B_CD_PNWRS | Damage severity 2B, Pacific Northwest Research Station starting in 2005 | NUMBER(1)
139 | SEVERITY3_CD_PNWRS | Damage severity 3, Pacific Northwest Research Station for years 2001-2004 | NUMBER(1)
140 | UNKNOWN_DAMTYP1_PNWRS | Unknown damage type 1, Pacific Northwest Research Station | NUMBER(1)
141 | UNKNOWN_DAMTYP2_PNWRS | Unknown damage type 2, Pacific Northwest Research Station | NUMBER(1)
142 | PREV_PNTN_SRS | Previous periodic prism point, tree number, Southern Research Station | NUMBER(4)

### Type of key | Column(s) | Tables to link | Abbreviated notation
--- | --- | --- | ---
Primary | (CN) | N/A | TRE_PK
Unique | (PLT_CN, SUBP, TREE) | N/A | TRE_UK
Natural | (STATECD, INVYR, UNITCD, COUNTYCD, PLOT, SUBP, TREE) | N/A | TRE_NAT_I
Foreign | (PLT_CN) | TREE to PLOT | TRE_PLT_FK

1. **CN**  
   Sequence number. A unique sequence number used to identify a tree record.

2. **PLT_CN**  
   Plot sequence number. Foreign key linking the tree record to the plot record.

3. **PREV_TRE_CN**  
   Previous tree sequence number. Foreign key linking the tree to the previous inventory’s tree record for this tree. Only populated on trees remeasured from a previous annual inventory.

4. **INVYR**  
   Inventory year. The year that best represents when the inventory data were collected. Under the annual inventory system, a group of plots is selected...
each year for sampling. The selection is based on a panel system. INVYR is the year in which the majority of plots in that group were collected (plots in the group have the same panel and, if applicable, subpanel). Under periodic inventory, a reporting inventory year was selected, usually based on the year in which the majority of the plots were collected or the mid-point of the years over which the inventory spanned. For either annual or periodic inventory, INVYR is not necessarily the same as MEASYEAR.

Exceptions:
INVYR = 9999. INVYR is set to 9999 to distinguish Phase 3 plots taken by the western FIA work units that are “off subpanel.” This is due to differences in measurement intervals between Phase 3 (measurement interval = 5 years) and Phase 2 (measurement interval = 10 years) plots. Only users interested in performing certain Phase 3 data analyses should access plots with this anomalous value in INVYR.

INVYR <100. INVYR <100 indicates that population estimates were derived from a pre-NIMS regional processing system and the same plot either has been or may soon be re-processed in NIMS as part of a separate evaluation. The NIMS processed copy of the plot follows the standard INVYR format. This only applies to plots collected in the South (SURVEY.RSCD = 33) with the national design or a similar regional design (PLOT.DESIGNCD = 1 or 220-233) that were collected when the inventory year was 1998 through 2005.

INVYR = 98 is equivalent to 1998 but processed through regional system
INVYR = 99 is equivalent to 1999 but processed through regional system
INVYR = 0 is equivalent to 2000 but processed through regional system
INVYR = 1 is equivalent to 2001 but processed through regional system
INVYR = 2 is equivalent to 2002 but processed through regional system
INVYR = 3 is equivalent to 2003 but processed through regional system
INVYR = 4 is equivalent to 2004 but processed through regional system
INVYR = 5 is equivalent to 2005 but processed through regional system

5. **STATECD**  
State code. Bureau of the Census Federal Information Processing Standards (FIPS) two-digit code for each State. Refer to appendix C.

6. **UNITCD**  
Survey unit code. Forest Inventory and Analysis survey unit identification number. Survey units are usually groups of counties within each State. For periodic inventories, Survey units may be made up of lands of particular owners. Refer to appendix C for codes.

7. **COUNTYCD**  
County code. The identification number for a county, parish, watershed, borough, or similar governmental unit in a State. FIPS codes from the Bureau of the Census are used. Refer to appendix C for codes.

8. **PLOT**  
Phase 2 plot number. An identifier for a plot. Along with STATECD, INVYR, UNITCD, COUNTYCD and/or some other combinations of variables, PLOT may be used to uniquely identify a plot.
9. **SUBP**
   Subplot number. The number assigned to the subplot. The national plot design (PLOT.DESIGNCD = 1) has subplot number values of 1 through 4. Other plot designs have various subplot number values. See PLOT.DESIGNCD and appendix B for information about plot designs. For more explanation about SUBP, contact the appropriate FIA work unit.

10. **TREE**
    Tree record number. A number used to uniquely identify a tree on a subplot. Tree numbers can be used to track trees when PLOT.DESIGNCD is the same between inventories.

11. **CONDID**
    Condition class number. Unique identifying number assigned to each condition on a plot. A condition is initially defined by condition class status. Differences in reserved status, owner group, forest type, stand-size class, regeneration status, and stand density further define condition for forest land. Mapped nonforest conditions are also assigned numbers. At the time of the plot establishment, the condition class at plot center (the center of subplot 1) is usually designated as condition class 1. Other condition classes are assigned numbers sequentially at the time each condition class is delineated. On a plot, each sampled condition class must have a unique number that can change at remeasurement to reflect new conditions on the plot.

12. **AZIMUTH**
    Azimuth. The direction, to the nearest degree, from subplot center (microplot center for saplings) to the center of the base of the tree (geographic center for multi-stemmed woodland species). Due north is represented by 360 degrees. This attribute is populated for live and standing dead trees in a forest condition that were measured on any of the four subplots of the national plot design. It may be populated for other tree records.

13. **DIST**
    Horizontal distance. The horizontal distance in feet from subplot center (microplot center for saplings) to the center of the base of the tree (geographic center for multi-stemmed woodland species). This attribute is populated for live and standing dead trees in a forest condition that were measured on any of the four subplots of the national plot design. It may be populated for other tree records.

14. **PREVCOND**
    Previous condition number. Identifies the condition within the plot on which the tree occurred at the previous inventory.

15. **STATUSCD**
    Status code. A code indicating whether the sample tree is live, cut, or dead at the time of measurement. Includes dead and cut trees, which are required to estimate aboveground biomass and net annual volume for growth, mortality, and removals. This code is not used when querying data for change estimates. Note: New and replacement plots use only codes 1 and 2.
### Code Description

| Code | Description |
|------|-------------|
| 0    | No status – Tree is not presently in the sample (remeasurement plots only). Tree was incorrectly tallied at the previous inventory, currently not tallied due to definition or procedural change, or is not tallied due to natural causes. RECONCILED = 5-9 required for remeasured annual inventory data but not for periodic inventory data. |
| 1    | Live tree |
| 2    | Dead tree |
| 3    | Removed – Cut and removed by direct human activity related to harvesting, silviculture or land clearing. This tree is assumed to be utilized. |

16. **SPCD** Species code. An FIA tree species code. Refer to appendix F for codes.

17. **SPGRPCD** Species group code. A code assigned to each tree species in order to group them for reporting purposes on presentation tables. Codes and their associated names (see REF_SPECIES_GROUP.NAME) are shown in appendix G. Individual tree species and corresponding species group codes are shown in appendix F.

18. **DIA** Current diameter. The current diameter (in inches) of the sample tree at the point of diameter measurement. For additional information about where the tree diameter is measured, see DIAHTCD or HTDMP. DIA for live trees contains the measured value. DIA for cut and dead trees presents problems associated with uncertainty of when the tree was cut or died as well as structural deterioration of dead trees. Consult individual FIA work units for explanations of how DIA is collected for dead and cut trees.

19. **DIAHTCD** Diameter height code. A code indicating the location at which diameter was measured. For trees with code 1 (DBH), the actual measurement point may be found in HTDMP.

| Code | Description |
|------|-------------|
| 1    | Breast height (DBH) |
| 2    | Root collar (DRC) |

20. **HT** Total height. (Core Phase 2: ≥5.0-inch DBH/DRC live trees; Core optional Phase 2: 1.0-4.9-inch DBH/DRC live trees and ≥5.0-inch DBH/DRC standing dead trees. Core Phase 3: ≥1.0-inch DBH/DRC live trees; Core optional Phase 3: ≥5.0 inch DBH/DRC standing dead trees.) The total length (height) of a sample tree (in feet) from the ground to the tip of the apical meristem. The total length of a tree is not always its actual length. If the main stem is broken, the actual length is measured or estimated and the missing piece is added to the actual length to estimate total length. The amount added is determined by measuring the broken piece if it can be located on the ground; otherwise it is estimated. The minimum height for timber species is 5 feet and for woodland species is 1 foot.

21. **HTCD** Height method code. (Core Phase 2: ≥5.0-inch DBH/DRC live trees; Core optional Phase 2: 1.0-4.9-inch DBH/DRC live trees and ≥5.0-inch DBH/DRC standing dead trees. Core Phase 3: ≥1.0-inch DBH/DRC live trees; Core
optional Phase 3: ≥5.0-inch DBH/DRC standing dead trees.) A code indicating how length (height) was determined.

| Code | Description |
|------|-------------|
| 1    | Field measured (total and actual length) |
| 2    | Total length visually estimated in the field, actual length measured |
| 3    | Total and actual lengths are visually estimated |
| 4    | Estimated with a model |

22. ACTUALHT

Actual height. (Core Phase 2: live and standing dead trees with broken or missing tops, ≥5.0-inch DBH/DRC; Core optional Phase 2: live trees 1.0-4.9-inch DBH/DRC with broken or missing tops; Core Phase 3: live trees ≥1.0-inch DBH/DRC (with broken or missing tops and standing dead trees ≥5.0-inch DBH/DRC [with broken or missing tops]) The length (height) of the tree to the nearest foot from ground level to the highest remaining portion of the tree still present and attached to the bole. If ACTUALHT = HT, then the tree does not have a broken top. If ACTUALHT < HT, then the tree does have a broken or missing top. The minimum height for timber species is 5 feet and for woodland species is 1 foot.

23. TREECLCD

Tree class code. A code indicating the general quality of the tree. In annual inventory, this is the tree class for both live and dead trees at the time of current measurement. In periodic inventory, for cut and dead trees, this is the tree class of the tree at the time it died or was cut. Therefore, cut and dead trees collected in periodic inventory can be coded as growing-stock.

| Code | Description |
|------|-------------|
| 2    | Growing-stock – All live trees of commercial species that meet minimum merchantability standards. In general, these trees have at least one solid 8-foot section, are reasonably free of form defect on the merchantable bole, and at least 34 percent or more of the volume is merchantable. For the California, Oregon, and Washington inventories, a 26 percent or more merchantable volume standard is applied, rather than 34 percent or more. Excludes rough or rotten cull trees. |
| 3    | Rough cull – All live trees that do not now, or prospectively, have at least one solid 8-foot section, reasonably free of form defect on the merchantable bole, or have 67 percent or more of the merchantable volume cull; and more than half of this cull is due to sound dead wood cubic-foot loss or severe form defect volume loss. For the California, Oregon, and Washington inventories, 75 percent or more cull, rather than 67 percent or more cull, applies. This class also contains all trees of noncommercial species, or those species where SPGRPCD equals 23 (western woodland softwoods), 43 (eastern noncommercial hardwoods), or 48 (western woodland hardwoods). Refer to appendix F to find the species that have these SPGRPCD codes. For dead trees, this code indicates that the tree is salvable (sound). |
| 4    | Rotten cull – All live trees with 67 percent or more of the merchantable volume cull, and more than half of this cull is due to rotten or missing cubic-foot volume loss. California, Oregon, and Washington inventories use a 75 percent cutoff. For dead trees, this code indicates that the tree is nonsalvable (not sound). |

24. CR

Compacted crown ratio. The percent of the tree bole supporting live, healthy foliage (the crown is ocularly compacted to fill in gaps) when compared to actual length (ACTUALHT). When PLOT.MANUAL <1.0 the variable may
have been a code, which was converted to the midpoint of the ranges represented by the codes, and is stored as a percentage.

25. CCLCD  Crown class code. A code indicating the amount of sunlight received and the crown position within the canopy.

| Code | Description |
|------|-------------|
| 1    | Open grown – Trees with crowns that have received full light from above and from all sides throughout all or most of their life, particularly during early development. |
| 2    | Dominant – Trees with crowns extending above the general level of the canopy and receiving full light from above and partly from the sides; larger than the average trees in the stand, and with crowns well developed, but possibly somewhat crowded on the sides. |
| 3    | Codominant – Trees with crowns forming part of the general level of the crown cover and receiving full light from above, but comparatively little from the side. Usually with medium crowns more or less crowded on the sides. |
| 4    | Intermediate – Trees shorter than those in the preceding two classes, with crowns either below or extending into the canopy formed by the dominant and codominant trees, receiving little direct light from above, and none from the sides; usually with small crowns very crowded on the sides. |
| 5    | Overtopped – Trees with crowns entirely below the general canopy level and receiving no direct light either from above or the sides. |

26. TREEGRCD  Tree grade code. A code indicating the quality of sawtimber-sized trees. This attribute is populated for live, growing-stock, sawtimber size trees on subplots 1-4 on national manual plots that are in a forest condition class. This attribute may be populated for other tree records that do not meet the above criteria. For example, it may be populated with the previous tree grade on dead and cut trees. Standards for tree grading are specific to species and differ slightly by research station. Only collected by certain FIA work units (SURVEY.RSCD = 23, 24, or 33). Tree grade codes range from 1 to 5.

27. AGENTCD  Cause of death (agent) code. (Core: all remeasured plots when the tree was alive at the previous visit and at revisit is dead or removed OR the tree is standing dead in the current inventory and the tree is ingrowth, through growth, or a missed live tree; Core optional: all initial plot visits when tree qualifies as a mortality tree.) When PLOT.MANUAL ≥1.0, this variable was collected on only dead and cut trees. When PLOT.MANUAL <1.0, this variable was collected on all trees (live, dead, and cut). Cause of damage was recorded for live trees if the presence of damage or pathogen activity was serious enough to reduce the quality or vigor of the tree. When a tree was damaged by more than one agent, the most severe damage was coded. When no damage was observed on a live tree, 00 was recorded. Damage recorded for dead trees was the cause of death. When the cause of death could not be determined for a tree, 99 was recorded. Each FIA program records specific codes that may differ from one State to the next. These codes fall within the ranges listed below. For the specific codes used in a particular State, contact the FIA work unit responsible for that State (table 6).
### Code Description
- 00 No agent recorded (only allowed on live trees in data prior to 1999)
- 10 Insect
- 20 Disease
- 30 Fire
- 40 Animal
- 50 Weather
- 60 Vegetation (e.g., suppression, competition, vines/kudzu)
- 70 Unknown/not sure/other – includes death from human activity not related to silvicultural or landclearing activity (accidental, random, etc.) TREE NOTES required.
- 80 Silvicultural or landclearing activity (death caused by harvesting or other silvicultural activity, including girdling, chaining, etc., or to landclearing activity).

28. **CULL**
Rotten and missing cull. The percent of the cubic-foot volume in a live or dead tally tree that is rotten or missing. This is a calculated value that includes field-recorded cull (CULL_FLD) and any additional cull due to broken top.

29. **DAMLOC1**
Damage location 1. (*Core where PLOT.MANUAL = 1.0 through 1.6; Core optional beginning with PLOT.MANUAL = 1.7.*) A code indicating where damage (meeting or exceeding a severity threshold, as defined in the field guide) is present on the tree.

| Code | Description |
|------|-------------|
| 0    | No damage   |
| 1    | Roots (exposed) and stump (up to 12 inches from ground level) |
| 2    | Roots, stump, and lower bole |
| 3    | Lower bole (lower half of bole between stump and base of live crown) |
| 4    | Lower and upper bole |
| 5    | Upper bole (upper half of bole between stump and base of live crown) |
| 6    | Crownstem (main stem within the live crown) |
| 7    | Branches (>1 inch diameter at junction with main stem and within the live crown) |
| 8    | Buds and shoots of current year |
| 9    | Foliage |

30. **DAMTYP1**
Damage type 1. (*Core where PLOT.MANUAL = 1.0 through 1.6; Core optional beginning with PLOT.MANUAL = 1.7.*) A code indicating the kind of damage (meeting or exceeding a severity threshold, as defined in the field guide) present. If DAMLOC1 = 0, then DAMTYP1 = blank (null).

| Code | Description |
|------|-------------|
| 01   | Canker, gall |
| 02   | Conk, fruiting body, or sign of advanced decay |
| 03   | Open wound |
| 04   | Resinosis or gumosis |
| 05   | Crack or seam |
| 11   | Broken bole or broken root within 3 feet of bole |
| 12   | Broom on root or bole |
| 13   | Broken or dead root further than 3 feet from bole |
| 20   | Vines in the crown |
| 21   | Loss of apical dominance, dead terminal |
| 22   | Broken or dead branches |
### Code Description

| Code | Description                                     |
|------|-------------------------------------------------|
| 23   | Excessive branching or brooms within the live crown |
| 24   | Damaged shoots, buds, or foliage                |
| 25   | Discoloration of foliage                        |
| 31   | Other                                           |

31. **DAMSEV1** Damage severity 1. *(Core where PLOT.MANUAL = 1.0 through 1.6; Core optional beginning with PLOT.MANUAL = 1.7.)* A code indicating how much of the tree is affected. Valid severity codes vary by damage type and damage location and must exceed a threshold value, as defined in the field guide. If DAMLOC1 = 0, then DAMSEV1 = blank (null).

| Code | Description                  |
|------|------------------------------|
| 0    | 01 to 09% of location affected |
| 1    | 10 to 19% of location affected |
| 2    | 20 to 29% of location affected |
| 3    | 30 to 39% of location affected |
| 4    | 40 to 49% of location affected |
| 5    | 50 to 59% of location affected |
| 6    | 60 to 69% of location affected |
| 7    | 70 to 79% of location affected |
| 8    | 80 to 89% of location affected |
| 9    | 90 to 99% of location affected |

32. **DAMLOC2** Damage location 2. *(Core where PLOT.MANUAL = 1.0 through 1.6; Core optional beginning with PLOT.MANUAL = 1.7.)* A code indicating where secondary damage (meeting or exceeding a severity threshold, as defined in the field guide) is present. Use same codes as DAMLOC1. If DAMLOC1=0, then DAMLOC2 = blank (null) or 0.

33. **DAMTYP2** Damage type 2. *(Core where PLOT.MANUAL = 1.0 through 1.6; Core optional beginning with PLOT.MANUAL = 1.7.)* A code indicating the kind of secondary damage (meeting or exceeding a severity threshold, as defined in the field guide) present. Use same codes as DAMTYP1. If DAMLOC1=0, then DAMTYP2 = blank (null).

34. **DAMSEV2** Damage severity 2. *(Core where PLOT.MANUAL = 1.0 through 1.6; Core optional beginning with PLOT.MANUAL = 1.7.)* A code indicating how much of the tree is affected by the secondary damage. Valid severity codes vary by damage type and damage location and must exceed a threshold value, as defined in the field guide. Use same codes as DAMSEV1. If DAMLOC1=0, then DAMSEV2 = blank (null).

35. **DECAYCD** Decay class code. A code indicating the stage of decay in a standing dead tree. Populated where PLOT.MANUAL ≥1.0
### Code Description

1. All limbs and branches are present; the top of the crown is still present; all bark remains; sapwood is intact, with minimal decay; heartwood is sound and hard
2. There are few limbs and no fine branches; the top may be broken; a variable amount of bark remains; sapwood is sloughing with advanced decay; heartwood is sound at base but beginning to decay in the outer part of the upper bole
3. Only limb stubs exist; the top is broken; a variable amount of bark remains; sapwood is sloughing; heartwood has advanced decay in upper bole and is beginning at the base
4. Few or no limb stubs remain; the top is broken; a variable amount of bark remains; sapwood is sloughing; heartwood has advanced decay at the base and is sloughing in the upper bole
5. No evidence of branches remains; the top is broken; <20 percent of the bark remains; sapwood is gone; heartwood is sloughing throughout

#### 36. STOCKING
Tree stocking. The stocking value computed for each live tree. Stocking values are computed using several specific species equations that were developed from normal yield tables and stocking charts. Resultant values are a function of diameter. The stocking of individual trees is used to calculate COND.GSSTK, COND.GSSTKCD, COND.ALSTK, and COND.ALSTKCD.

#### 37. WDLDSTEM
Woodland tree species stem count. The number of live and dead stems used to calculate diameter on a woodland tree. Used for tree species where diameter is measured at the root collar. For a stem to be counted, it must have a minimum stem size of 1 inch in diameter and 1 foot in length. Blank (null) if not a woodland species.

#### 38. VOLCFNET
Net cubic-foot volume. For timber species (trees where the diameter is measured at breast height [DBH]), this is the net volume of wood in the central stem of a sample tree ≥5.0 inches in diameter, from a 1-foot stump to a minimum 4-inch top diameter, or to where the central stem breaks into limbs all of which are <4.0 inches in diameter. For woodland species (trees where the diameter is measured at root collar [DRC]), VOLCFNET is the net volume of wood and bark from the DRC measurement point(s) to a 1½ -inch top diameter; includes branches that are at least 1½ inches in diameter along the length of the branch. This is a per tree value and must be multiplied by TPA_UNADJ to obtain per acre information. This attribute is blank (null) for trees with DIA <5.0 inches. All trees measured after 1998 with DIA ≥5.0 inches (including dead and cut trees) will have entries in this field. Does not include rotten, missing, and form cull (volume loss due to rotten, missing, and form cull defect has been deducted).

#### 39. VOLCFGRS
Gross cubic-foot volume. For timber species (trees where the diameter is measured at breast height [DBH]), this is the total volume of wood in the central stem of sample trees ≥5.0 inches in diameter, from a 1-foot stump to a minimum 4-inch top diameter, or to where the central stem breaks into limbs all of which are <4.0 inches in diameter. For woodland species (trees where the diameter is measured at root collar [DRC]), VOLCFGRS is the total...
volume of wood and bark from the DRC measurement point(s) to a 1½ -inch top diameter; includes branches that are at least 1½ inches in diameter along the length of the branch. This is a per tree value and must be multiplied by TPA_UNADJ to obtain per acre information. This attribute is blank (null) for trees with DIA <5.0 inches. All trees measured after 1998 with DIA ≥5.0 inches (including dead and cut trees) have entries in this field. Includes rotten, missing and form cull (volume loss due to rotten, missing, and form cull defect has not been deducted).

40. VOLCSNET Net cubic-foot volume in the sawlog portion. The net volume of wood in the central stem of a timber species tree of sawtimber size (9.0 inches DIA minimum for softwoods, 11.0 inches DIA minimum for hardwoods), from a 1-foot stump to a minimum top diameter, (7.0 inches for softwoods, 9.0 inches for hardwoods) or to where the central stem breaks into limbs, all of which are less than the minimum top diameter. This is a per tree value and must be multiplied by TPA_UNADJ to obtain per acre information. This attribute is blank (null) for softwood trees with DIA <9.0 inches (11.0 inches for hardwoods). All larger trees have entries in this field if they are growing-stock trees (TREECLCD = 2 and STATUSCD = 1). All rough and rotten trees (TREECLCD = 3 or 4) and dead and cut trees (STATUSCD = 2 or 3) are blank (null) in this field.

41. VOLCSGRS Gross cubic-foot volume in the sawlog portion. This is the total volume of wood in the central stem of a timber species tree of sawtimber size (9.0 inches DIA minimum for softwoods, 11.0 inches DIA minimum for hardwoods), from a 1-foot stump to a minimum top diameter (7.0 inches for softwoods, 9.0 inches for hardwoods), or to where the central stem breaks into limbs, all of which are less than the minimum top diameter. This is a per tree value and must be multiplied by TPA_UNADJ to obtain per acre information. This attribute is blank (null) for softwood trees with DIA <9.0 inches (11.0 inches for hardwoods). All larger trees have entries in this field if they are growing-stock trees (TREECLCD = 2 and STATUSCD = 1). All rough and rotten trees (TREECLCD = 3 or 4) and dead and cut trees (STATUSCD = 2 or 3) are blank (null) in this field.

42. VOLBFNET Net board-foot volume in the sawlog portion. This is the net volume (International ¼-inch rule) of wood in the central stem of a timber species tree of sawtimber size (9.0 inches DIA minimum for softwoods, 11.0 inches DIA minimum for hardwoods), from a 1-foot stump to a minimum top diameter (7.0 inches for softwoods, 9.0 inches for hardwoods), or to where the central stem breaks into limbs all of which are less than the minimum top diameter. This is a per tree value and must be multiplied by TPA_UNADJ to obtain per unit area information. This attribute is blank (null) for softwood trees with DIA <9.0 inches (11.0 inches for hardwoods). All larger trees should have entries in this field if they are growing-stock trees (TREECLCD = 2 and STATUSCD = 1). All rough and rotten trees (TREECLCD = 3 or 4) and dead and cut trees (STATUSCD = 2 or 3) are blank (null) in this field.
43. VOLBFGRS  Gross board-foot volume in the sawlog portion. This is the total volume (International ¼-inch rule) of wood in the central stem of a timber species tree of sawtimber size (9.0 inches DIA minimum for softwoods, 11.0 inches DIA minimum for hardwoods), from a 1-foot stump to a minimum top diameter (7.0 inches for softwoods, 9.0 inches for hardwoods), or to where the central stem breaks into limbs all of which are less than the minimum top DIA. This is a per tree value and must be multiplied by TPA_UNADJ to obtain per unit area information. This attribute is blank (null) for softwood trees with DIA <9.0 inches (11.0 inches for hardwoods). All larger trees should have entries in this field if they are growing-stock trees (TREECLCD = 2 and STATUSCD = 1). All rough and rotten trees (TREECLCD = 3 or 4) and dead and cut trees (STATUSCD = 2 or 3) are blank (null) in this field.

44. VOLCFSND  Sound cubic-foot volume. For timber species (trees where the diameter is measured at breast height [DBH]), the volume of sound wood in the central stem of a sample tree ≥5.0 inches in diameter from a 1-foot stump to a minimum 4-inch top diameter or to where the central stem breaks into limbs all of which are <4.0 inches in diameter. For woodland species (trees where the diameter is measured at root collar [DRC]), VOLCFSND is the net volume of wood and bark from the DRC measurement point(s) to a minimum 1½ -inch top diameter; includes branches that are at least 1½ inches in diameter along the length of the branch. This is a per tree value and must be multiplied by TPA_UNADJ to obtain per acre information. This attribute is blank (null) for trees with DIA <5.0 inches. All trees with DIA ≥5.0 inches (including dead trees) have entries in this field. Does not include rotten and missing cull (volume loss due to rotten and missing cull defect has been deducted).

45. GROWCFGS  Net annual merchantable cubic-foot growth of a growing-stock tree on timberland. This is the net change in cubic-foot volume per year of this tree (for remeasured plots, (V₂ - V₁)/(t₂ - t₁); where 1 and 2 denote the past and current measurement, respectively, V is volume, and t indicates year of measurement). Because this value is net growth, it may be a negative number. Negative growth values are usually due to mortality (V₂ = 0) but can also occur on live trees that have a net loss in volume because of damage, rot, broken top, or other causes. To expand to a per acre value, multiply by TPAGROW_UNADJ.

46. GROWBFSL  Net annual merchantable board-foot growth of a sawtimber size tree on timberland. This is the net change in board-foot (International ¼-inch rule) volume per year of this tree (for remeasured plots (V₂ - V₁)/(t₂ - t₁)). Because this value is net growth, it may be a negative number. Negative growth values are usually due to mortality (V₂ = 0) but can also occur on live trees that have a net loss in volume because of damage, rot, broken top, or other causes. To expand to a per acre value, multiply by TPAGROW_UNADJ.

47. GROWCFAL  Net annual sound cubic-foot growth of a live tree on timberland. The net change in cubic-foot volume per year of this tree (for remeasured plots
(V₂ - V₁)/(t₂ - t₁)). Because this value is net growth, it may be a negative number. Negative growth values are usually due to mortality (V₂ = 0) but can also occur on live trees that have a net loss in volume because of damage, rot, broken top, or other causes. To expand to a per acre value, multiply by TPAGROW_UNADJ. GROWCFAL differs from GROWCFGS by including all trees, regardless of tree class.

48. MORTCFGS Cubic-foot volume of a growing-stock tree on timberland for mortality purposes. Represents the cubic-foot volume of a growing-stock tree at time of death. To obtain estimates of annual per acre mortality, multiply by TPAMORT_UNADJ.

49. MORTBFSL Board-foot volume of a sawtimber size tree on timberland for mortality purposes. Represents the board-foot (International ¼-inch rule) volume of a sawtimber tree at time of mortality. To obtain estimates of annual per acre mortality, multiply by TPAMORT_UNADJ.

50. MORTCFAL Sound cubic-foot volume of a tree on timberland for mortality purposes. Represents the cubic-foot volume of the tree at time of mortality. To obtain estimates of annual per acre mortality, multiply by TPAMORT_UNADJ. MORTCFAL differs from MORTCFGS by including all trees, regardless of tree class.

51. REMVCFGS Cubic-foot volume of a growing-stock tree on timberland for removal purposes. Represents the cubic-foot volume of the tree at time of removal. To obtain estimates of annual per acre removals, multiply by TPAREMV_UNADJ.

52. REMVBFSL Board-foot volume of a sawtimber size tree on timberland for removal purposes. Represents the board-foot (International ¼-inch rule) volume of the tree at time of removal. To obtain estimates of annual per acre removals, multiply by TPAREMV_UNADJ.

53. REMVCFAL Sound cubic-foot volume of a tree on timberland for removal purposes. Represents the cubic-foot volume of the tree at time of removal. To obtain estimates of annual per acre removals, multiply by TPAREMV_UNADJ. REMVCFAL differs from REMVCFGS by including all trees, regardless of tree class.

54. DIACHECK Diameter check code. A code indicating the reliability of the diameter measurement.

| Code | Description |
|------|-------------|
| 0    | Diameter accurately measured |
| 1    | Diameter estimated |
| 2    | Diameter measured at different location than previous measurement (remeasurement trees only) |
| 5    | Diameter modeled in the office (used with periodic inventories) |

Note: If both codes 1 and 2 apply, code 2 is used.
55. MORTYR  Mortality year. (*Core optional.*) The estimated year in which a remeasured
tree died or was cut. Populated where PLOT.MANUAL $\geq 1.0$ and populated
by some FIA work units where PLOT.MANUAL $< 1.0$.

56. SALVCD   Salvable dead code. A standing or down dead tree considered merchantable
by regional standards. Contact the appropriate FIA work unit for information
on how this code is assigned for a particular State (table 6).

| Code | Description          |
|------|----------------------|
| 0    | Dead not salvable    |
| 1    | Dead salvable        |

57. UNCRCD  Uncompacted live crown ratio. (*Core optional Phase 2: $\geq 5.0$-inch live trees;
*Core Phase 3: $\geq 1.0$-inch live trees.*) Percentage determined by dividing the
live crown length by the actual tree length. When PLOT.MANUAL $< 3.0$ the
variable was a code, which was converted to the midpoint of the ranges
represented by the codes, and is stored as a percentage.

58. CPOSCD  Crown position code. (*Core on Phase 3 plots only.*) The relative position of
each tree in relation to the overstory canopy.

| Code | Description |
|------|-------------|
| 1    | Superstory  |
| 2    | Overstory   |
| 3    | Understory  |
| 4    | Open canopy |

59. CLIGHTCD Crown light exposure code. (*Core optional on Phase 2 plots; Core on Phase
3 plots only.*) A code indicating the amount of light being received by the tree
crown. Collected for all live trees at least 5 inches DBH/DRC. Trees with
UNCRCD $< 35$ have a maximum CLIGHTCD of 1.

| Code | Description                                                                 |
|------|-----------------------------------------------------------------------------|
| 0    | The tree receives no direct sunlight because it is shaded by adjacent trees or other vegetation |
| 1    | Receives full light from the top or 1 side                                  |
| 2    | Receives full light from the top and 1 side (or 2 sides without the top)    |
| 3    | Receives full light from the top and 2 sides (or 3 sides without the top)   |
| 4    | Receives full light from the top and 3 sides                                |
| 5    | Receives full light from the top and 4 sides                                |

60. CVIGORCD Crown vigor code. (*Core optional on Phase 2 plots; Core on Phase 3 plots only.*) A code indicating the vigor of sapling crowns. Collected for live trees between 1 and 4.9 inches DBH/DRC.
### Code Description

1. **Crown density code.** (Core optional on Phase 2 plots; Core on Phase 3 plots only.) A code indicating how dense the tree crown is, estimated in percent classes. Collected for all live trees at least 5 inches DBH/DRC. Crown density is the amount of crown branches, foliage and reproductive structures that blocks light visibility through the crown.

| Code | Description |
|------|-------------|
| 00   | 0%          |
| 05   | 1-5%        |
| 10   | 6-10%       |
| 15   | 11-15%      |
|      |             |
|      |             |
| 95   | 91-95%      |
| 99   | 96-100%     |

2. **Crown dieback code.** (Core optional on Phase 2 plots; Core on Phase 3 plots only.) A code indicating the amount of recent dead material in the upper and outer portion of the crown, estimated in percent classes. Collected for all live trees at least 5 inches DBH/DRC.

| Code | Description |
|------|-------------|
| 00   | 0%          |
| 05   | 1-5%        |
| 10   | 6-10%       |
| 15   | 11-15%      |
|      |             |
|      |             |
| 95   | 91-95%      |
| 99   | 96-100%     |

3. **Foliage transparency code.** (Core optional on Phase 2 plots; Core on Phase 3 plots only.) A code indicating the amount of light penetrating the foliated portion of the crown, estimated in percent classes. Collected for all live trees at least 5 inches DBH/DRC.
64. **TREEHISTCD** Tree history code. Identifies the tree with detailed information as to whether the tree is live, dead, cut, removed due to land use change, etc. Contact the appropriate FIA work unit for the definitions (table 6). Only collected by certain FIA units (SURVEY.RSCD = 23, 24, or 33).

65. **DIACALC** Current diameter calculated. If the diameter is unmeasurable (i.e., the tree is cut or dead), the diameter is calculated (in inches) and stored in this variable. Only collected by certain FIA work units (SURVEY.RSCD = 23 or 33).

66. **BHAGE** Breast height age. The age of a live tree derived from counting tree rings from an increment core sample extracted at a height of 4.5 feet above ground. Breast height age is collected for a subset of trees and only for trees that the diameter is measured at breast height (DBH). This data item is used to calculate classification variables such as stand age. For PNWRS, one tree is sampled for BHAGE for each species, within each crown class, and for each condition class present on a plot. Age of saplings (<5.0 inches DBH) may be aged by counting branch whorls above 4.5 feet. No timber hardwood species other than red alder are bored for age. For RMRS, one tree is sampled for each species and broad diameter class present on a plot. Only collected by certain FIA work units (SURVEY.RSCD = 22 or 26) and is left blank (null) when it is not collected.

67. **TOTAGE** Total age. The age of a live tree derived either from counting tree rings from an increment core sample extracted at the base of a tree where diameter is measured at root collar (DRC), or for small saplings (1.0 to 2.9 inches DBH) by counting all branch whorls, or by adding a species-dependent number of years to breast height age. Total age is collected for a subset of trees and is used to calculate classification variables such as stand age. Only collected by certain FIA work units (SURVEY.RSCD = 22 or 26) and is left blank (null) when it is not collected.

68. **CULLDEAD** Dead cull. The percent of the gross cubic-foot volume that is cull due to sound dead material. Recorded for all trees that are at least 5.0 inches in diameter. Only collected by certain FIA work units (SURVEY.RSCD = 22). This attribute is blank (null) for trees smaller than 5 inches and is always null for the other FIA work units.

69. **CULLFORM** Form cull. The percent of the gross cubic-foot volume that is cull due to form defect. Recorded for live trees that are at least 5.0 inches DBH. Only

| Code | Description |
|------|-------------|
| 00   | 0%          |
| 05   | 1-5%        |
| 10   | 6-10%       |
| 15   | 11-15%      |
|      |             |
| 95   | 91-95%      |
| 99   | 96-100%     |
collected by certain FIA work units (SURVEY.RSCD = 22). This attribute is blank (null) for dead trees, trees smaller than 5 inches DBH, for all trees where the diameter is measured at root collar (DRC), and is always null for the other FIA work units.

70. **CULLMSTOP**  
Missing top cull. The percent of the gross cubic-foot volume that is cull due to a missing (broken) merchantable top. Recorded for trees that are at least 5.0 inches in diameter. The volume estimate does not include any portion of the missing top that is <4.0 inches DOB (diameter outside bark). Many broken top trees may have 0% missing top cull because no merchantable volume was lost. Only collected by certain FIA work units (SURVEY.RSCD = 22). This attribute is blank (null) for trees smaller than 5 inches diameter and is always null for the other FIA work units.

71. **CULLBF**  
Board-foot cull. The percent of the gross board-foot volume that is cull due to rot or form. Only collected by certain FIA work units (SURVEY.RSCD = 24).

72. **CULLCF**  
Cubic-foot cull. The percent of the gross cubic-foot volume that is cull due to rot or form. Only collected by certain FIA work units (SURVEY.RSCD = 24).

73. **BFSND**  
Board-foot-cull soundness. The percent of the board-foot cull that is sound (due to form). Only collected by certain FIA work units (SURVEY.RSCD = 24).

74. **CFSND**  
Cubic-foot-cull soundness. The percent of the cubic-foot cull that is sound (due to form). Only collected by certain FIA work units (SURVEY.RSCD = 24).

75. **SAWHT**  
Sawlog height. The length (height) of a tree, recorded to a 7-inch top (9-inch for hardwoods), where at least one 8-foot log, merchantable or not, is present. On broken topped trees, sawlog length is recorded to the point of the break. Only collected by certain FIA work units (SURVEY.RSCD = 24).

76. **BOLEHT**  
Bole height. The length (height) of a tree, recorded to a 4-inch top, where at least one 4-foot section is present. Only collected by certain FIA work units (SURVEY.RSCD = 24).

77. **FORMCL**  
Form class. A code used in calculating merchantable bole net volume. Recorded for all live hardwood trees tallied that are ≥5.0 inch DBH/DRC. Also recorded for conifers ≥5.0 inch DBH in Region 5 National Forests. Only collected by certain FIA work units (SURVEY.RSCD = 26).

| Code | Description |
|------|-------------|
| 1    | First 8 feet above stump is straight |
| 2    | First 8 feet above stump is NOT straight or forked; but there is at least one straight 8-foot log elsewhere in the tree |
| 3    | No 8-foot logs anywhere in the tree now or in the future due to form |

78. **HTCALC**  
Current height calculated. If the height is unmeasurable (i.e., the tree is cut or dead), the height is calculated (in feet) and stored in this variable. Only collected by certain FIA work units (SURVEY.RSCD = 33).
79. **HRWD_CLUMP_CD**

   Hardwood clump code. A code sequentially assigned to each hardwood clump within each species as they are found on a subplot. Up to 9 hardwood clumps can be identified and coded within each species on each subplot. A clump is defined as having 3 or more live stems originating from a common point on the root system. Western woodland hardwood species are not evaluated for clump code. Clump code data are used to adjust stocking estimates since trees growing in clumps contribute less to stocking than do individual trees. Only collected by certain FIA work units (SURVEY.RSCD = 26).

80. **SITREE**

   Calculated site index. Computed for every tree. The site index represents the average total length (in feet) that dominant and co-dominant trees in fully-stocked, even-aged stands (of the same species as this tree) will obtain at key ages (usually 25 or 50 years). Only collected by certain FIA work units (SURVEY.RSCD = 23).

81. **CREATED_BY**

   Created by. The employee who created the record. This attribute is intentionally left blank in download files.

82. **CREATED_DATE**

   Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

83. **CREATED_IN_INSTANCE**

   Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

84. **MODIFIED_BY**

   Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

85. **MODIFIED_DATE**

   Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.
86. MODIFIED_IN_INSTANCE

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.

87. MORTCD  
Mortality code. (*Core optional.*) Used for a tree that was alive within past 5 years, but has died.

| Code | Description                   |
|------|-------------------------------|
| 0    | Tree does not qualify as mortality |
| 1    | Tree does qualify as mortality  |

88. HTDMP  
Height to diameter measurement point. (*Core optional.*) For trees measured directly at 4.5 feet above ground, this item is blank (null). If the diameter is not measured at 4.5 feet, the actual length from the ground, to the nearest 0.1 foot, at which the diameter was measured for each tally tree, 1.0-inch DBH and larger.

89. ROUGHCULL  
Rough cull. (*Core optional.*) Percentage of sound dead cull, as a percent of the merchantable bole/portion of the tree.

90. MIST_CL_CD  
Mistletoe class code. (*Core optional.*) A rating of dwarf mistletoe infection. Recorded on all live conifer species except juniper. Using the Hawksworth (1979) six-class rating system, the live crown is divided into thirds, and each third is rated using the following scale: 0 is for no visible infection, 1 for <50 percent of branches infected, 2 for >50 percent of branches infected. The ratings for each third are summed together to yield the Hawksworth rating.

| Code | Description                                                                 |
|------|-----------------------------------------------------------------------------|
| 0    | Hawksworth tree DMR rating of 0, no infection                               |
| 1    | Hawksworth tree DMR rating of 1, light infection                            |
| 2    | Hawksworth tree DMR rating of 2, light infection                            |
| 3    | Hawksworth tree DMR rating of 3, medium infection                           |
| 4    | Hawksworth tree DMR rating of 4, medium infection                           |
| 5    | Hawksworth tree DMR rating of 5, heavy infection                            |
| 6    | Hawksworth tree DMR rating of 6, heavy infection                            |

91. CULL_FLD  
Rotten/missing cull, field-recorded. (*Core: ≥5.0-inch live trees; Core optional: ≥5.0-inch standing dead trees.*) The percentage rotten or missing cubic-foot cull volume, estimated to the nearest 1 percent. This estimate does not include any cull estimate above actual length; therefore volume lost from a broken top is not included (see CULL for percent cull including cull from broken top). When field crews estimate volume loss (tree cull), they only consider the cull on the merchantable bole/portion of the tree, from a 1-foot stump to a 4-inch top diameter outside bark (DOB). For western woodland species, the merchantable portion is between the point of DRC measurement to a 1.5-inch top DOB.
92. RECONCILECD

Reconcile code. Recorded for remeasurement locations only. A code indicating the reason a tree either enters or is no longer a part of the inventory.

| Code | Description |
|------|-------------|
| 1    | Ingrowth or reversions – either a new tally tree not qualifying as through growth or a new tree on land that was formerly nonforest and now qualifies as forest land (includes reversion or encroachments). |
| 2    | Through growth – new tally tree 5 inches DBH/DRC and larger, within the microplot, which was not missed at the previous inventory. |
| 3    | Missed live – a live tree missed at previous inventory and that is live, dead, or removed now. |
| 4    | Missed dead – a dead tree missed at previous inventory and that is dead or removed now. |
| 5    | Shrank – live tree that shrunk below threshold diameter on microplot/subplot/macroplot plot. |
| 6    | Missing (moved) – tree was correctly tallied in previous inventory, but has now moved beyond the radius of the plot due to natural causes (i.e., small earth movement, hurricane). Tree must be either live before and still alive now or dead before and dead now. If tree was live before and now dead, this is a mortality tree and should have STATUSCD = 2 (not 0). |
| 7    | Cruiser error – erroneously tallied at previous inventory |
| 8    | Procedural change – tree was tallied at the previous inventory, but is no longer tallied due to a definition or procedural change. |
| 9    | Tree was sampled before, but now the area where the tree was located is nonsampled. All trees on the nonsampled area have RECONCILECD = 9. |

93. PREVDIA

Previous diameter. The previous diameter (in inches) of the sample tree at the point of diameter measurement. Populated for remeasured trees.

94. FGROWCFGs

Net annual merchantable cubic-foot growth of a growing-stock tree on forest land. This is the net change in cubic-foot volume per year of this tree (for remeasured plots, \( (V_2 - V_1)/(t_2 - t_1) \); where 1 and 2 denote the past and current measurement, respectively, \( V \) is volume, \( t \) indicates date of measurement, and \( t_2 - t_1 = PLOT.REMPER \)). Because this value is net growth, it may be a negative number. Negative growth values are usually due to mortality \( (V_2 = 0) \) but can also occur on live trees that have a net loss in volume because of damage, rot, broken top, or other causes. To expand to a per acre value, multiply by TPAGROW_UNADJ.

95. FGROWBFSL

Net annual merchantable board-foot growth of a sawtimber tree on forest land. This is the net change in board-foot (International ¼-inch rule) volume per year of this tree (for remeasured plots \( (V_2 - V_1)/(t_2 - t_1) \)). Because this value is net growth, it may be a negative number. Negative growth values are usually due to mortality \( (V_2 = 0) \) but can also occur on live trees that have a net loss in volume because of damage, rot, broken top, or other causes. To expand to a per acre value, multiply by TPAGROW_UNADJ.

96. FGROWCFAL

Net annual sound cubic-foot growth of a live tree on forest land. The net change in cubic-foot volume per year of this tree (for remeasured plots
Because this value is net growth, it may be a negative number. Negative growth values are usually due to mortality \((V_2 = 0)\) but can also occur on live trees that have a net loss in volume because of damage, rot, broken top, or other causes. To expand to a per acre value, multiply by TPAGROW_UNADJ. FGROWCFAL differs from FGROWCFGS by including all trees, regardless of tree class.

97. FMORTCFGS Cubic-foot volume of a growing-stock tree for mortality purposes on forest land. Represents the cubic-foot volume of a growing-stock tree at time of mortality. To obtain estimates of annual per acre mortality, multiply by TPAMORT_UNADJ.

98. FMORTBFSL Board-foot volume of a sawtimber tree for mortality purposes on forest land. Represents the board-foot (International ¼-rule) volume of a sawtimber tree at time of mortality. To obtain estimates of annual per acre mortality, multiply by TPAMORT_UNADJ.

99. FMORTCFAL Sound cubic-foot volume of a tree for mortality purposes on forest land. Represents the cubic-foot volume of the tree at time of mortality. To obtain estimates of annual per acre mortality, multiply by TPAMORT_UNADJ. FMORTCFAL differs from FMORTCFGS by including all trees, regardless of tree class.

100. FREMVCFGS Cubic-foot volume of a growing-stock tree for removal purposes on forest land. Represents the cubic-foot volume of the tree at time of removal. To obtain estimates of annual per acre removals, multiply by TPAREMV_UNADJ.

101. FREMVBFSL Board-foot volume of a sawtimber size tree for removal purposes on forest land. Represents the board-foot (International ¼-rule) volume of the tree at time of removal. To obtain estimates of annual per acre removals, multiply by TPAREMV_UNADJ.

102. FREMVCFAL Sound cubic-foot volume of the tree for removal purposes on forest land. Represents the cubic-foot volume of the tree at time of removal. To obtain estimates of annual per acre removals, multiply by TPAREMV_UNADJ. FREMVCFAL differs from FREMVCFGS by including all trees, regardless of tree class.

103. P2A_GRM_FLG

Periodic to annual growth, removal, and mortality flag. A code indicating if this tree is part of a periodic inventory (usually from a variable-radius plot design) that is only included for the purposes of computing growth, removals and/or mortality estimates. This tree does not contribute to current estimates of such attributes as volume, biomass or number of trees. The flag is set to Y for those trees that are needed for estimation and otherwise is left blank (null).
### 104. TREECLCD_NERS

Tree class code, Northeastern Research Station. In annual inventory, this code represents a classification of the overall quality of a tree that is 5.0 inches DBH and larger. It classifies the quality of a sawtimber tree based on the present condition, or it classifies the quality of a poletimber tree as a prospective determination (i.e., a forecast of potential quality when and if the tree becomes sawtimber size). For more detailed description, see the regional field guide. Only collected by certain FIA work units (SURVEY.RSCD = 24).

| Code  | Description |
|-------|-------------|
| 1     | Preferred – Live tree that would be favored in cultural operations. Mature tree, that is older than the rest of the stand; has less than 20 percent total board foot cull; is expected to live for 5 more years; and is a low risk tree. In general, the tree has the following qualifications:  
  - must be free from “general” damage (i.e., damages that would now or prospectively cause a reduction of tree class, significantly deter growth, or prevent it from producing marketable products in the next 5 years).  
  - should have no more than 10 percent board-foot cull due to form defect.  
  - should have good vigor, usually indicated by a crown ratio of 30 percent or more and dominant or co-dominant.  
  - usually has a grade 1 butt log. |
| 2     | Acceptable – This class includes:  
  - live sawtimber tree that does not qualify as a preferred tree but is not a cull tree (see Rough and Rotten Cull).  
  - live poletimber tree that prospectively will not qualify as a preferred tree, but is not now or prospectively a cull tree (see Rough and Rotten Cull). |
| 3     | Rough Cull – This class includes:  
  - live sawtimber tree that currently has 67 percent or more predominantly sound board-foot cull; or does not contain one merchantable 12-foot sawlog or two non-contiguous merchantable 8-foot sawlogs.  
  - live poletimber tree that currently has 67 percent or more predominantly sound cubic-foot cull; or prospectively will have 67 percent or more predominantly sound board-foot cull; or will not contain one merchantable 12-foot sawlog or two noncontiguous merchantable 8-foot sawlogs. |
| 4     | Rotten Cull – This class includes:  
  - live sawtimber tree that currently has 67 percent or more predominantly unsound board-foot cull.  
  - live poletimber tree that currently has 67 percent or more predominantly unsound cubic-foot cull; or prospectively will have 67 percent or more predominantly unsound board-foot cull. |
| 5     | Dead – Tree that has recently died (within the last several years); but still retains many branches (including some small branches and possibly some fine twigs); and has bark that is generally tight and hard to remove from the tree. |
| 6     | Snag – Dead tree, or what remains of a dead tree, that is at least 4.5 feet tall and is missing most of its bark. This category includes a tree covered with bark that is very loose. This bark can usually be removed, often times in big strips, with very little effort. A snag is not a recently dead tree. Most often, it has been dead for several years – sometimes, for more than a decade. |

### 105. TREECLCD_SRS

Tree class code, Southern Research Station. A code indicating the general quality of the tree. Prior to the merger of the Southern and Southeastern Research Stations (INVYR <1997), growing-stock (code 2) was only
assigned to species that were considered to have commercial value. Since the merger (INVYR >1997), code 2 has been applied to all tree species meeting the growing-stock form, grade, size and soundness requirements, regardless of commercial value. Only collected by certain FIA work units (SURVEY.RSCD = 33).

| Code | Description |
|------|-------------|
| 2    | Growing-stock – All trees that have at least one 12-foot log or two 8-foot logs that meet grade and size requirements and at least \( \frac{1}{3} \) of the total board foot volume is merchantable. Poletimber-sized trees are evaluated based on their potential. |
| 3    | Rough cull – Trees that do not contain at least one 12-foot log or two 8-foot logs, or more than \( \frac{1}{3} \) of the total board foot volume is not merchantable, primarily due to roughness or poor form. |
| 4    | Rotten cull: Trees that do not contain at least one 12-foot log or two 8-foot logs, or more than \( \frac{1}{3} \) of the total board foot volume is not merchantable, primarily due to rotten, unsound wood. |

106. TREECLCD_NCRS

Tree class code, North Central Research Station. In annual inventory, a code indicating tree suitability for timber products, or the extent of decay in the butt section of down-dead trees. It is recorded on live standing, standing-dead, and down dead trees that are 1.0 inches DBH and larger. Tree class is basically a check for the straightness and soundness of the sawlog portion on a sawtimber tree or the potential sawlog portion on a poletimber tree or sapling. “Sawlog portion” is defined as the length between the 1-foot stump and the 9.0-inch top diameter of outside bark, DOB, for hardwoods, or the 7.0-inch top DOB for softwoods. For more detailed description, see the regional field guide http://www.nrs.fs.fed.us/fia/data-collection/. Only collected by certain FIA work units (SURVEY.RSCD = 23).
### Code Description

| Code | Description |
|------|-------------|
| 20   | Growing-stock – Any live tree of commercial species that is saw-timber size and has at least one merchantable 12-foot sawlog or two merchantable 8-foot sawlogs meeting minimum log-grade requirements. At least one-third of the gross board-foot volume of the sawlog portion must be merchantable material. A merchantable sawlog must be at least 50 percent sound at any point. Any pole timber size tree that has the potential to meet the above specifications. |
| 30   | Rough Cull, Salvable, and Salvable-down – Includes any tree of noncommercial species, or any tree that is saw-timber size and has no merchantable sawlog. Over one-half of the volume in the sawlog portion does not meet minimum log-grade specifications due to roughness, excessive sweep or crook, splits, cracks, limbs, or forks. Rough cull pole-size trees do not have the potential to meet the specifications for growing-stock because of forks, limb stoppers, or excessive sweep or crook. A down-dead tree ≥5.0-inch DBH that meets these standards is given a tree/decay code of 30. |
| 31   | Short-log Cull – Any live saw-timber-size tree of commercial species that has at least one 8-foot sawlog, but less than a 12-foot sawlog, meeting minimum log-grade specifications. Any live saw-timber-size tree of commercial species that has less than one-third of the volume of the sawlog portion in merchantable logs, but has at least one 8-foot or longer sawlog meeting minimum log-grade specifications. A short sawlog must be 50 percent sound at any point. Pole-size trees never receive a tree class code 31. |
| 40   | Rotten Cull – Any live tree of commercial species that is saw-timber size and has no merchantable sawlog. Over one-half of the volume in the sawlog portion does not meet minimum log-grade specifications primarily because of rot, missing sections, or deadwood. Classify any pole-size tree that does not have the potential to meet the specifications for growing-stock because of rot as rotten cull. Assume that all live trees will eventually attain sawlog size at DBH. Predicted death, tree vigor, and plot site index are not considered in determining tree class. A standing-dead tree without an 8-foot or longer section that is at least 50 percent sound has a tree class of 40. On remeasurement of a sapling, if it has died and is still standing it is given a tree class of 40. |

### 107. TREECLCD_RMRS

Tree class code, Rocky Mountain Research Station. A code indicating the general quality of the tree. Only collected by certain FIA work units (SURVEY.RSCD = 22).

| Code | Description |
|------|-------------|
| 1    | Sound-live timber species – All live timber trees (species with diameter measured at breast height) that meet minimum merchantability standards. In general, these trees have at least one solid 8-foot section, are reasonably free of form defect on the merchantable bole, and at least 34 percent or more of the volume is merchantable. Excludes rough or rotten cull timber trees. |
| 2    | All live woodland species – All live woodland trees (species with diameter measured at root collar). All trees assigned to species groups 23 and 48 belong in this category (see appendix G). |
| Code | Description                                                                 |
|------|-----------------------------------------------------------------------------|
| 3    | Rough-live timber species — All live trees that do not now, or prospectively, have at least one solid 8-foot section, reasonably free of form defect on the merchantable bole, or have 67 percent or more of the merchantable volume cull; and more than half of this cull is due to sound dead wood cubic-foot loss or severe form defect volume loss. |
| 4    | Rotten-live timber species — All live trees with 67 percent or more of the merchantable volume cull, and more than half of this cull is due to rotten or missing cubic-foot volume loss. |
| 5    | Hard (salvable) dead — dead trees that have less than 67 percent of the volume cull due to rotten or missing cubic-foot volume loss. |
| 6    | Soft (nonsalvable) dead — dead trees that have 67 percent or more of the volume cull due to rotten or missing cubic-foot volume loss. |

108. STANDING_DEAD_CD

Standing dead code. A code indicating if a tree qualifies as standing dead. To qualify as a standing dead tally tree, the dead tree must be at least 5.0 inches in diameter, have a bole that has an unbroken actual length of at least 4.5 feet, and lean less than 45 degrees from vertical as measured from the base of the tree to 4.5 feet. Populated where PLOT_MANUAL ≥ 2.0; may be populated using information collected on dead trees in earlier inventories for dead trees.

For western woodland species with multiple stems, a tree is considered down if more than ⅔ of the volume is no longer attached or upright; cut and removed volume is not considered. For western woodland species with single stems to qualify as a standing dead tally tree, dead trees must be at least 5.0 inches in diameter, be at least 1.0 foot in unbroken ACTUAL LENGTH, and lean less than 45 degrees from vertical.

| Code | Description                                      |
|------|--------------------------------------------------|
| 0    | No — tree does not qualify as standing dead       |
| 1    | Yes — tree does qualify as standing dead          |

109. PREV_STATUS_CD

Previous tree status code. Tree status that was recorded at the previous inventory on all tally trees ≥ 1.0 inch in diameter.

| Code | Description                                      |
|------|--------------------------------------------------|
| 1    | Live tree — live tree at the previous inventory  |
| 2    | Dead tree — standing dead at the previous inventory |

110. PREV_WDLDSTEM

Previous woodland stem count. Woodland tree species stem count that was recorded at the previous inventory.

111. TPA_UNADJ

Trees per acre unadjusted. The number of trees per acre that the sample tree theoretically represents based on the sample design. For fixed radius plots taken with the mapped plot design (PLOT_DESIGNCD = 1), TPA_UNADJ is set to a constant derived from the plot size and equals 6.018046 for trees sampled on subplots, 74.965282 for trees sampled on microplots, and
0.999188 for trees sampled on macroplots. Variable radius plots were often used in earlier inventories, so the value in TPA_UNADJ decreases as the tree diameter increases. Based on the procedures described in Bechtold and Patterson (2005), this attribute can be adjusted using factors stored on the POP_STRATUM table to derive population estimates. Examples of estimating population totals are shown in chapter 4.

112. TPAMORT_UNADJ

Mortality trees per acre unadjusted. The number of mortality trees per acre per year that the sample tree theoretically represents based on the sample design. For fixed radius plots taken with the mapped plot design (PLOT.DESIGNCD = 1), TPAMORT_UNADJ is set to a constant derived from the plot size divided by PLOT.REMPER. Variable radius plots were often used in earlier inventories, so the value in TPAMORT_UNADJ decreases as the tree diameter increases. This attribute will be blank (null) if the tree does not contribute to mortality estimates. Based on the procedures described in Bechtold and Patterson (2005), this attribute can be adjusted using factors stored on the POP_STRATUM table to derive population estimates. Examples of estimating population totals are shown in chapter 4.

113. TPAREMV_UNADJ

Removal trees per acre unadjusted. The number of removal trees per acre per year that the sample tree theoretically represents based on the sample design. For fixed radius plots taken with the mapped plot design (PLOT.DESIGNCD = 1), TPAREMV_UNADJ is set to a constant derived from the plot size divided by PLOT.REMPER. Variable radius plots were often used in earlier inventories, so the value in TPAREMV_UNADJ decreases as the tree diameter increases. This attribute will be blank (null) if the tree does not contribute to removals estimates. Based on the procedures described in Bechtold and Patterson (2005), this attribute can be adjusted using factors stored on the POP_STRATUM table to derive population estimates. Examples of estimating population totals are shown in chapter 4.

114. TPAGROW_UNADJ

Growth trees per acre unadjusted. The number of growth trees per acre that the sample tree theoretically represents based on the sample design. For fixed radius plots taken with the mapped plot design (PLOT.DESIGNCD = 1), TPAGROW_UNADJ is set to a constant derived from the plot size. Variable radius plots were often used in earlier inventories, so the value in TPAGROW_UNADJ decreases as the tree diameter increases. This attribute will be blank (null) if the tree does not contribute to growth estimates. Based on the procedures described in Bechtold and Patterson (2005), this attribute can be adjusted using factors stored on the POP_STRATUM table to derive population estimates. Examples of estimating population totals are shown in chapter 4.
115. DRYBIO_BOLE

Dry biomass in the merchantable bole. The oven-dry biomass (pounds) in the merchantable bole of timber species [trees where diameter is measured at breast height (DBH)] ≥5 inches in diameter. This is the biomass of sound wood in live and dead trees, including bark, from a 1-foot stump to a minimum 4-inch top diameter of the central stem. This is a per tree value and must be multiplied by TPA_UNADJ to obtain per acre information. This attribute is blank (null) for timber species with DIA <5.0 inches and for woodland species. See DRYBIO_WDLD_SPP for biomass of woodland species and DRYBIO_SAPLING for biomass of timber species with DIA <5 inches. For dead or cut timber trees, this number represents the biomass at the time of death or last measurement. DRYBIO_BOLE is based on VOLCFSND and specific gravity information derived by the Forest Products Lab and others (values stored in the REF_SPECIES table). If VOLCFSND is not available, then either VOLCFGRS * Percent Sound or VOLCFNET * (average ratio of cubic foot sound to cubic foot net volume, calculated as national averages by species group and diameter) is used. The source of specific gravity information for each species can be found by linking the REF_SPECIES table to the REF_CITATION table. Appendix J contains equations used to estimate biomass components in the FIADB.

116. DRYBIO_TOP

Dry biomass in the top of the tree. The oven-dry biomass (pounds) in the top and branches (combined) of timber species [trees where diameter is measured at breast height (DBH)] ≥5 inches in diameter. DRYBIO_TOP includes the tip, the portion of the stem above the merchantable bole (i.e., above the 4-inch top diameter), and all branches; excludes foliage. Estimated for live and dead trees. This is a per tree value and must be multiplied by TPA_UNADJ to obtain per acre information. For dead or cut trees, this number represents the biomass at the time of death or last measurement. This attribute is blank (null) for timber species with DIA <5.0 inches and for woodland species. See DRYBIO_WDLD_SPP for biomass of woodland species, and DRYBIO_SAPLING for biomass of timber species with DIA <5.0 inches. Appendix J contains equations used to estimate biomass components in the FIADB.

117. DRYBIO_STUMP

Dry biomass in the tree stump. The oven-dry biomass (pounds) in the stump of timber species [trees where diameter is measured at breast height (DBH)] ≥5 inches in diameter. The stump is that portion of the tree from the ground to the bottom of the merchantable bole (i.e., below 1 foot). This is a per tree value and must be multiplied by TPA_UNADJ to obtain per acre information. Estimated for live and dead trees. For dead or cut trees, this number represents the biomass at the time of death or last measurement. This attribute is blank (null) for timber species with DIA <5.0 inches and for woodland species. See DRYBIO_WDLD_SPP for biomass of woodland species, and DRYBIO_SAPLING for biomass of timber species with
114. DRYBIO_SAPLING

Dry biomass of saplings. The oven-dry biomass (pounds) of the aboveground portion, excluding foliage, of live trees with a diameter from 1 to 4.9 inches. Calculated for timber species only. The biomass of saplings is based on biomass computed from Jenkins and others (2003), using the observed diameter and an adjustment factor. This is a per tree value and must be multiplied by TPA_UNADJ to obtain per acre information. Appendix J contains equations used to estimate biomass components in the FIADB.

119. DRYBIO_WDLD_SPP

Dry biomass of woodland tree species. The oven-dry biomass (pounds) of the aboveground portion of a live or dead tree, excluding foliage, the tree tip (top of the tree above 1½ inches in diameter), and a portion of the stump from ground to diameter at root collar (DRC). Calculated for woodland species (trees where diameter is measured at DRC) with a diameter $\geq 1$ inch. This is a per tree value and must be multiplied by TPA_UNADJ to obtain per acre information. This attribute is blank (null) for woodland species with DIA $<1.0$ inch and for all timber species. Appendix J contains equations used to estimate biomass components in the FIADB.

120. DRYBIO_BG

Dry biomass of the roots. The oven-dry biomass (pounds) of the belowground portion of a tree, includes coarse roots with a root diameter $\geq 0.1$ inch. This is a modeled estimate, calculated on live trees with a diameter of $\geq 1$ inch and dead trees with a diameter of $\geq 5$ inches, for both timber and woodland. This is a per tree value and must be multiplied by TPA_UNADJ to obtain per acre information. Appendix J contains equations used to estimate biomass components in the FIADB.

121. CARBON_AG

Carbon in the aboveground portion of the tree. The carbon (pounds) in the aboveground portion, excluding foliage, of live trees with a diameter $\geq 1$ inch, and dead trees with a diameter $\geq 5$ inches. Calculated for both timber and woodland species. This is a per tree value and must be multiplied by TPA_UNADJ to obtain per acre information. Carbon is assumed to be one-half the value of biomass and is derived by summing the aboveground biomass estimates and multiplying by 0.5 as follows:

$$\text{CARBON\_AG} = 0.5 \times (\text{DRYBIO\_BOLE} + \text{DRYBIO\_STUMP} + \text{DRYBIO\_TOP} + \text{DRYBIO\_SAPLING} + \text{DRYBIO\_WDLD\_SPP})$$

122. CARBON_BG

Carbon in the belowground portion of the tree. The carbon (pounds) of coarse roots $>0.1$ inch in root diameter. Calculated for live trees with a diameter $\geq 1$ inch, and dead trees with a diameter $\geq 5$ inches, for both timber and woodland species. This is a per tree value and must be multiplied by...
TPA_UNADJ to obtain per acre information. Carbon is assumed to be one-
half the value of belowground biomass as follows:

\[ \text{CARBON\_BG} = 0.5 \times \text{DRYBIO\_BG} \]

123. CYCLE

Inventory cycle number. A number assigned to a set of plots, measured over
a particular period of time from which a State estimate using all possible
plots is obtained. A cycle number >1 does not necessarily mean that
information for previous cycles resides in the database. A cycle is relevant
for periodic and annual inventories.

124. SUBCYCLE

Inventory subcycle number. For an annual inventory that takes n years to
measure all plots, subcycle shows in which of the n years of the cycle the
data were measured. Subcycle is 0 for a periodic inventory. Subcycle 99 may
be used for plots that are not included in the estimation process.

125. BORED\_CD\_PNWRS

Tree bored code, Pacific Northwest Research Station. Used in conjunction
with tree age (BHAGE and TOTAGE). Only collected by certain FIA work
units (SURVEY.RSCD = 26).

| Code | Description |
|------|-------------|
| 1    | Trees bored or ‘whorl counted’ at the current inventory |
| 2    | Tree age derived from a previous inventory |
| 3    | Tree age was extrapolated |

126. DAMLOC1\_PNWRS

Damage location 1, Pacific Northwest Research Station. The location on the
tree where Damage Agent 1 is found. Only collected by certain FIA work
units (SURVEY.RSCD = 26).

| Code | Location | Definition |
|------|----------|------------|
| 0    | Roots    | Above ground up to 12 inches on bole. |
| 1    | Bole     | Main stem(s) starting at 12 inches above the ground, including forks up to a 4 inch top. (A fork is at least equal to 1/3 diameter of the bole, and occurs at an angle <45 degrees in relation to the bole.) This is not a valid location code for woodland species; use only locations 1, 3, and 4. |
| 2    | Branch   | All other woody material. Primary branch(s) occur at an angle \(\geq 45^\circ\) in relation to the bole. |
| 3    | Foliage  | All leaves, buds, and shoots. |

127. DAMLOC2\_PNWRS

Damage location 2, Pacific Northwest Research Station. See DAMLOC1\_PNWRS. Only collected by certain FIA work units (SURVEY.RSCD = 26).
128. **DIACHECK_PNWRS**

Diameter check, Pacific Northwest Research Station. A separate estimate of the diameter without the obstruction if the diameter was estimated because of moss/vine/obstruction, etc. Only collected by certain FIA work units (SURVEY.RSCD = 26).

| Code | Description                        |
|------|-----------------------------------|
| 5    | Diameter estimated because of moss. |
| 6    | Diameter estimated because of vines. |
| 7    | Diameter estimated (double nail diameter). |

129. **DMG_AGENT1_CD_PNWRS**

Damage agent 1, Pacific Northwest Research Station. Primary damage agent code in PNW. Up to three damaging agents can be coded in PNW as DMG_AGENT1_CD_PNWRS, DMG_AGENT2_CD_PNWRS, and DMG_AGENT3_CD_PNWRS. A code indicating the tree damaging agent that is considered to be of greatest importance to predict tree growth, survival, and forest composition and structure. Additionally, there are two classes of damaging agents. Class I damage agents are considered more important than class II agents and are thus coded as a primary agent before the class II agents. For more information, see appendix H. Only collected by certain FIA work units (SURVEY.RSCD = 26).

130. **DMG_AGENT2_CD_PNWRS**

Damage agent 2, Pacific Northwest Research Station. See DAM_AGENT1_CD_PNWRS. Only collected by certain FIA work units (SURVEY.RSCD = 26).

131. **DMG_AGENT3_CD_PNWRS**

Damage agent 3, Pacific Northwest Research Station. Damage Agent is a 2-digit code with values 01 to 91. Only collected by certain FIA work units (SURVEY.RSCD = 26).

132. **MIST_CL_CD_PNWRS**

Leafy mistletoe class code, Pacific Northwest Research Station. All juniper species, incense cedars, white fir (CA only) and oak trees are rated for leafy mistletoe infection. This item is used to describe the extent and severity of leafy mistletoe infection (see MIST_CL_CD for dwarf mistletoe information). Only collected by certain FIA work units (SURVEY.RSCD=26).

| Code | Description                              |
|------|-----------------------------------------|
| 0    | None                                    |
| 7    | <50 percent of crown infected           |
| 8    | ≥50 percent of crown infected or any occurrence on the bole |
133. SEVERITY1_CD_PNWRS

Damage severity 1, Pacific Northwest Research Station for years 2001-2004. Damage severity depends on the damage agent coded (see appendix H for codes). This is a 2-digit code that indicates either percent of location damaged (01-99), or the appropriate class of damage (values vary from 0-9 depending on the specific Damage Agent). Only collected by certain FIA work units (SURVEY.RSCD = 26).

134. SEVERITY1A_CD_PNWRS

Damage severity 1A, Pacific Northwest Research Station. Damage severity depends on the damage agent coded (see appendix H for codes). This is a 2-digit code indicating either percent of location damaged (01-99), or the appropriate class of damage (values vary from 0-4 depending on the specific Damage Agent). Only collected by certain FIA work units (SURVEY.RSCD = 26).

135. SEVERITY1B_CD_PNWRS

Damage severity 1B, Pacific Northwest Research Station. Damage severity B is only coded when the Damage Agent is white pine blister rust (36). Only collected by certain FIA work units (SURVEY.RSCD = 26).

Code Description
1 Branch infections located more than 2.0 feet from tree bole.
2 Branch infections located 0.5 to 2.0 feet from tree bole.
3 Branch infection located within 0.5 feet of tree bole OR tree bole infection present.

136. SEVERITY2_CD_PNWRS

Damage severity 2, Pacific Northwest Research Station for years 2001-2004. Damage severity depends on the damage agent coded (see appendix H for codes). This is a 2-digit code indicating either percent of location damaged (01-99), or the appropriate class of damage (values vary from 0-9 depending on the specific Damage Agent). Only collected by certain FIA work units (SURVEY.RSCD = 26).

137. SEVERITY2A_CD_PNWRS

Damage severity 2A, Pacific Northwest Research Station starting in 2005. See SEVERITY1A_CD_PNWRS. Only collected by certain FIA work units (SURVEY.RSCD = 26).

138. SEVERITY2B_CD_PNWRS

Damage severity 2B, Pacific Northwest Research Station starting in 2005. See SEVERITY1B_CD_PNWRS. Only collected by certain FIA work units (SURVEY.RSCD = 26).
139. SEVERITY3_CD_PNWRS

Damage severity 3, Pacific Northwest Research Station for years 2001-2004. Damage severity depends on the damage agent coded (see appendix H for codes). This is a 2-digit code indicating either percent of location damaged (01-99), or the appropriate class of damage (values vary from 0-9 depending on the specific Damage Agent). Only collected by certain FIA work units (SURVEY.RSCD = 26).

140. UNKNOWN_DAMTP1_PNWRS

Unknown damage type 1, Pacific Northwest Research Station. A code indicating the sign or symptom recorded when UNKNOWN damage code 90 is used. Only collected by certain FIA work units (SURVEY.RSCD = 26).

| Code | Description                  |
|------|------------------------------|
| 1    | canker/gall                  |
| 2    | open wound                   |
| 3    | resinosis                    |
| 4    | broken                       |
| 5    | damaged or discolored foliage|
| 6    | other                        |

141. UNKNOWN_DAMTP2_PNWRS

Unknown damage type 2, Pacific Northwest Research Station. See UNKNOWN_DAMTP1_PNWRS. Only collected by certain FIA work units (SURVEY.RSCD = 26).

142. PREV_PNTN_SRS

Previous periodic prism number, tree number, Southern Research Station. In some older Southeast Experiment Station states, the prism point, tree number (PNTN) of the current cycle did not match the previous cycle's prism point, tree number. PREV_PNTN_SRS is used to join the current and the previous prism plot trees.
Seedling Table (Oracle table name is SEEDLING)

| Column name | Descriptive name                  | Oracle data type |
|-------------|-----------------------------------|------------------|
| 1 CN        | Sequence number                   | VARCHAR2(34)     |
| 2 PLT_CN    | Plot sequence number              | VARCHAR2(34)     |
| 3 INVYR     | Inventory year                    | NUMBER(4)        |
| 4 STATECD   | State code                        | NUMBER(4)        |
| 5 UNITCD    | Unit code                         | NUMBER(2)        |
| 6 COUNTYCD  | County code                       | NUMBER(3)        |
| 7 PLOT      | Phase 2 plot number               | NUMBER(5)        |
| 8 SUBP      | Subplot number                    | NUMBER(3)        |
| 9 CONDID    | Condition class number            | NUMBER(1)        |
| 10 SPCD     | Species code                      | NUMBER           |
| 11 SPGRPCD  | Species group code                | NUMBER(2)        |
| 12 STOCKING | Tree stocking                     | NUMBER(7,4)      |
| 13 TREECOUNT| Tree count for seedlings          | NUMBER(3)        |
| 14 TOTAGE   | Total age                         | NUMBER(3)        |
| 15 CREATED_BY| Created by                       | VARCHAR2(30)     |
| 16 CREATED_DATE| Created date                    | DATE             |
| 17 CREATED_IN_INSTANCE| Created in instance              | VARCHAR2(6)     |
| 18 MODIFIED_BY| Modified by                     | VARCHAR2(30)     |
| 19 MODIFIED_DATE| Modified date                   | DATE             |
| 20 MODIFIED_IN_INSTANCE| Modified in instance          | VARCHAR2(6)     |
| 21 TREECOUNT_CALC| Tree count used in calculations | NUMBER          |
| 22 TPA_UNADJ| Trees per acre unadjusted        | NUMBER(11,6)     |
| 23 CYCLE    | Inventory cycle number            | NUMBER(2)        |
| 24 SUBCYCLE | Inventory subcycle number         | NUMBER(2)        |

Type of key | Column(s) | Tables to link | Abbreviated notation |
|------------|-----------|----------------|----------------------|
| Primary    | (CN)      | N/A            | SDL_PK               |
| Unique     | (PLT_CN, SUBP, CONDID, SPCD) | N/A | SDL_UK               |
| Natural    | (STATECD, INVYR, UNITCD, COUNTYCD, PLOT, SUBP, CONDID, SPCD) | N/A | SDL_NAT_I               |
| Foreign    | (PLT-CN)  | SEEDLING to PLOT | SDL_PLT_FK         |

Seedling data collection overview – When PLOT.MANUAL <2.0, the national core procedure was to record the actual seedling count up to six seedlings and then record 6+ if at least six seedlings were present. However, the following regions collected the actual seedling count when PLOT.MANUAL <2.0: Rocky Mountain Research Station (RMRS) and North Central Research Station (NCRS). If PLOT.MANUAL <2.0 and TREECOUNT is blank (null), then a value of 6 in TREECOUNT_CALC represents 6 or more seedlings. In the past, seedlings were often tallied in FIA inventories only to the extent necessary to determine if some minimum number were present,
which means that seedlings were often under-reported. Note: The SEEDLING record may not exist for some periodic inventories.

1. **CN**  
   Sequence number. A unique index used to easily identify a seedling.

2. **PLT_CN**  
   Plot sequence number. Foreign key linking the seedling record to the plot record.

3. **INVYR**  
   Inventory year. The year that best represents when the inventory data were collected. Under the annual inventory system, a group of plots is selected each year for sampling. The selection is based on a panel system. INVYR is the year in which the majority of plots in that group were collected (plots in the group have the same panel and, if applicable, subpanel). Under periodic inventory, a reporting inventory year was selected, usually based on the year in which the majority of the plots were collected or the mid-point of the years over which the inventory spanned. For either annual or periodic inventory, INVYR is not necessarily the same as MEASYEAR.

   **Exceptions:**
   INVYR = 9999. INVYR is set to 9999 to distinguish Phase 3 plots taken by the western FIA work units that are “off subpanel.” This is due to differences in measurement intervals between Phase 3 (measurement interval = 5 years) and Phase 2 (measurement interval = 10 years) plots. Only users interested in performing certain Phase 3 data analyses should access plots with this anomalous value in INVYR.

   INVYR <100. INVYR <100 indicates that population estimates were derived from a pre-NIMS regional processing system and the same plot either has been or may soon be re-processed in NIMS as part of a separate evaluation. The NIMS processed copy of the plot follows the standard INVYR format. This only applies to plots collected in the South (SURVEY.RSCD = 33) with the national design or a similar regional design (PLOT.DESIGNCD = 1 or 220-233) that were collected when the inventory year was 1998 through 2005.

   INVYR = 98 is equivalent to 1998 but processed through regional system
   INVYR = 99 is equivalent to 1999 but processed through regional system
   INVYR = 0 is equivalent to 2000 but processed through regional system
   INVYR = 1 is equivalent to 2001 but processed through regional system
   INVYR = 2 is equivalent to 2002 but processed through regional system
   INVYR = 3 is equivalent to 2003 but processed through regional system
   INVYR = 4 is equivalent to 2004 but processed through regional system
   INVYR = 5 is equivalent to 2005 but processed through regional system

4. **STATECD**  
   State code. Bureau of the Census Federal Information Processing Standards (FIPS) two-digit code for each State. Refer to appendix C.
5. **UNITCD** Survey unit number. Forest Inventory and Analysis survey unit identification number. Survey units are usually groups of counties within each State. For periodic inventories, Survey units may be made up of lands of particular owners. Refer to appendix C for codes.

6. **COUNTYCD** County code. The identification number for a county, parish, watershed, borough, or similar governmental unit in a State. FIPS codes from the Bureau of the Census are used. Refer to appendix C for codes.

7. **PLOT** Phase 2 plot number. An identifier for a plot. Along with STATECD, INVYR, UNITCD, COUNTYCD and/or some other combinations of variables, PLOT may be used to uniquely identify a plot.

8. **SUBP** Subplot number. The number assigned to the subplot. The national plot design (PLOT.DESIGNCD = 1) has subplot number values of 1 through 4. Other plot designs have various subplot number values. See PLOT.DESIGNCD and appendix B for information about plot designs. For more explanation about SUBP, contact the appropriate FIA work unit (table 6).

9. **CONDID** Condition class number. Unique identifying number assigned to each condition on a plot. A condition is initially defined by condition class status. Differences in reserved status, owner group, forest type, stand-size class, regeneration status, and stand density further define condition for forest land. Mapped nonforest conditions are also assigned numbers. At the time of the plot establishment, the condition class at plot center (the center of subplot 1) is usually designated as condition class 1. Other condition classes are assigned numbers sequentially at the time each condition class is delineated. On a plot, each sampled condition class must have a unique number that can change at remeasurement to reflect new conditions on the plot.

10. **SPCD** Species code. An FIA species code. Refer to appendix F for codes.

11. **SPGRPCD** Species group code. A code assigned to each tree species in order to group them for reporting purposes on presentation tables. Codes and their associated names (see REF_SPECIES_GROUP.NAME) are shown in appendix G. Individual tree species and corresponding species group codes are shown in appendix F.

12. **STOCKING** Tree stocking. The stocking value assigned to each count of seedlings, by species. Stocking is a relative term used to describe (in percent) the adequacy of a given stand density in meeting a specific management objective. Species or forest type stocking functions were used to assess the stocking contribution of seedling records. These functions, which were developed using stocking guides, relate the area occupied by an individual tree to the area occupied by a tree of the same size growing in a fully stocked stand of like trees. The stocking of seedling count records is used in the calculation of COND.GSSTKCD and COND.ALSTKCD on the condition record.
13. **TREECOUNT**  Tree count (for seedlings). Indicates the number of seedlings (DIA <1.0 inch) present on the microplot. Conifer seedlings are at least 6 inches tall and hardwood seedlings are at least 12 inches tall. When PLOT MANUAL <2.0, the national core procedure was to record the actual seedling count up to six seedlings and then record 6+ if at least six seedlings were present. However, the following regions collected the actual seedling count when PLOT MANUAL <2.0: Rocky Mountain Research Station (RMRS) and North Central Research Station (NCRS). If PLOT MANUAL <2.0 and TREECOUNT is blank (null), then a value of 6 in TREECOUNT_CALC represents 6 or more seedlings.

14. **TOTAGE**  Total age. The seedling’s total age. Total age is collected for a subset of seedling count records, using one representative seedling for the species. The age is obtained by counting the terminal bud scars or the whorls of branches and may be used in the stand age calculation. Only collected by certain FIA work units (SURVEY.RSCD = 22). This attribute may be blank (null) for SURVEY.RSCD = 22 and is always null for the other FIA work units.

15. **CREATED_BY**  Created by. The employee who created the record. This attribute is intentionally left blank in download files.

16. **CREATED_DATE**

   Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

17. **CREATED_IN_INSTANCE**

   Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

18. **MODIFIED_BY**

   Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

19. **MODIFIED_DATE**

   Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

20. **MODIFIED_IN_INSTANCE**

   Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.
21. TREECOUNT_CALC

Tree count used in calculations. This attribute is set either to COUNTCD, which was dropped in FIADB version 2.1, or TREECOUNT. When PLOT.MANUAL <2.0, the national core procedure was to record the actual seedling count up to six seedlings and then record 6+ if at least six seedlings were present. However, the following regions collected the actual seedling count when PLOT.MANUAL <2.0: Rocky Mountain Research Station (RMRS) and North Central Research Station (NCRS). If PLOT.MANUAL <2.0 and TREECOUNT is blank (null), then a value of 6 in TREECOUNT_CALC represents 6 or more seedlings.

22. TPA_UNADJ

Trees per acre unadjusted. The number of seedlings per acre that the seedling count theoretically represents based on the sample design. For fixed radius plots taken with the mapped plot design (PLOT.DESIGNCMD =1), TPA_UNADJ equals 74.965282 times the number of seedlings counted. For plots taken with other sample designs, this attribute may be blank (null). Based on the procedures described in Bechtold and Patterson (2005), this attribute can be adjusted using factors stored on the POP_STRATUM table to derive population estimates. Examples of estimating population totals are shown in chapter 4.

23. CYCLE

Inventory cycle number. A number assigned to a set of plots, measured over a particular period of time from which a State estimate using all possible plots is obtained. A cycle number >1 does not necessarily mean that information for previous cycles resides in the database. A cycle is relevant for periodic and annual inventories.

24. SUBCYCLE

Inventory subcycle number. For an annual inventory that takes n years to measure all plots, subcycle shows in which of the n years of the cycle the data were measured. Subcycle is 0 for a periodic inventory. Subcycle 99 may be used for plots that are not included in the estimation process.
### Site Tree Table (Oracle table name is SITETREE)

| Column name | Descriptive name | Oracle data type |
|-------------|------------------|------------------|
| 1 CN        | Sequence number  | VARCHAR2(34)     |
| 2 PLT_CN    | Plot sequence number | VARCHAR2(34) |
| 3 PREV_SIT_CN | Previous site tree sequence number | VARCHAR2(34) |
| 4 INVYR     | Inventory year   | NUMBER(4)        |
| 5 STATECD   | State code       | NUMBER(4)        |
| 6 UNITCD    | Survey unit code | NUMBER(2)        |
| 7 COUNTYCD  | County code      | NUMBER(3)        |
| 8 PLOT      | Phase 2 plot number | NUMBER(5) |
| 9 CONDID    | Condition class number | NUMBER(1) |
| 10 TREE     | Tree number      | NUMBER(9)        |
| 11 SPCD     | Species code     | NUMBER           |
| 12 DIA      | Diameter         | NUMBER(5,2)      |
| 13 HT       | Total height     | NUMBER(3)        |
| 14 AGEDIA   | Tree age at diameter | NUMBER(3) |
| 15 SPGRPCD  | Species group code | NUMBER(2) |
| 16 SITREE   | Site index for the tree | NUMBER(3) |
| 17 SIBASE   | Site index base age | NUMBER(3) |
| 18 SUBP     | Subplot number   | NUMBER(3)        |
| 19 AZIMUTH  | Azimuth          | NUMBER(3)        |
| 20 DIST     | Horizontal distance | NUMBER(4,1) |
| 21 METHOD   | Site tree method code | NUMBER(2) |
| 22 SITREE_EST | Estimated site index for the tree | NUMBER(3) |
| 23 VALIDCD  | Validity code    | NUMBER(1)        |
| 24 CONDLIST | Condition class list | NUMBER(4) |
| 25 CREATED_BY | Created by | VARCHAR2(30) |
| 26 CREATED_DATE | Created date | DATE |
| 27 CREATED_IN_INSTANCE | Created in instance | VARCHAR2(6) |
| 28 MODIFIED_BY | Modified by | VARCHAR2(30) |
| 29 MODIFIED_DATE | Modified date | DATE |
| 30 MODIFIED_IN_INSTANCE | Modified in instance | VARCHAR2(6) |
| 31 CYCLE    | Inventory cycle number | NUMBER(2) |
| 32 SUBCYCLE | Inventory subcycle number | NUMBER(2) |

| Type of key | Column(s) order | Tables to link | Abbreviated notation |
|-------------|------------------|----------------|----------------------|
| Primary     | (CN)             | N/A            | SIT_PK               |
| Unique      | (PLT_CN, CONDID, TREE) | N/A            | SIT_UK               |
| Natural     | (STATECD, INVYR, UNITCD, COUNTYCD, PLOT, CONDID, TREE) | N/A            | SIT_NAT_I            |
**Chapter 3. Site Tree Table**

| Type of key | Column(s) order | Tables to link | Abbreviated notation |
|-------------|-----------------|----------------|---------------------|
| Foreign     | (PLT_CN, CONDID)| SITETREE to COND | SIT_CND_FK          |
| (PLT_CN)    | SITETREE to PLOT| SIT_PLT_FK     |

Note: The SITETREE record may not exist for some periodic inventory data.

1. **CN**
   - Sequence number. A unique sequence number used to identify a site tree record.

2. **PLT_CN**
   - Plot sequence number. Foreign key linking the site tree record to the plot record.

3. **PREV_SIT_CN**
   - Previous site tree sequence number. Foreign key linking the site tree to the previous inventory’s site tree record for this tree. Only populated for site trees from previous annual inventories.

4. **INVYR**
   - Inventory year. The year that best represents when the inventory data were collected. Under the annual inventory system, a group of plots is selected each year for sampling. The selection is based on a panel system. INVYR is the year in which the majority of plots in that group were collected (plots in the group have the same panel and, if applicable, subpanel). Under periodic inventory, a reporting inventory year was selected, usually based on the year in which the majority of the plots were collected or the mid-point of the years over which the inventory spanned. For either annual or periodic inventory, INVYR is not necessarily the same as MEASYEAR.

**Exceptions:**

- **INVYR = 9999.** INVYR is set to 9999 to distinguish Phase 3 plots taken by the western FIA work units that are “off subpanel.” This is due to differences in measurement intervals between Phase 3 (measurement interval = 5 years) and Phase 2 (measurement interval = 10 years) plots. Only users interested in performing certain Phase 3 data analyses should access plots with this anomalous value in INVYR.

- **INVYR <100.** INVYR <100 indicates that population estimates were derived from a pre-NIMS regional processing system and the same plot either has been or may soon be re-processed in NIMS as part of a separate evaluation. The NIMS processed copy of the plot follows the standard INVYR format. This only applies to plots collected in the South (SURVEY.RSCD = 33) with the national design or a similar regional design (PLOT.DESIGNCD = 1 or 220-233) that were collected when the inventory year was 1998 through 2005.

- **INVYR = 98** is equivalent to 1998 but processed through regional system
- **INVYR = 99** is equivalent to 1999 but processed through regional system
- **INVYR = 0** is equivalent to 2000 but processed through regional system
- **INVYR = 1** is equivalent to 2001 but processed through regional system
INVYR = 2 is equivalent to 2002 but processed through regional system
INVYR = 3 is equivalent to 2003 but processed through regional system
INVYR = 4 is equivalent to 2004 but processed through regional system
INVYR = 5 is equivalent to 2005 but processed through regional system

5. STATECD State code. Bureau of the Census Federal Information Processing Standards (FIPS) two-digit code for each State. Refer to appendix C.

6. UNITCD Survey unit code. Forest Inventory and Analysis survey unit identification number. Survey units are usually groups of counties within each State. For periodic inventories, survey units may be made up of lands of particular owners. Refer to appendix C for codes.

7. COUNTYCD County code. The identification number for a county, parish, watershed, borough, or similar governmental unit in a State. FIPS codes from the Bureau of the Census are used. Refer to appendix C for codes.

8. PLOT Phase 2 plot number. An identifier for a plot. Along with STATECD, INVYR, UNITCD, COUNTYCD and/or some other combinations of variables, PLOT may be used to uniquely identify a plot.

9. CONDID Condition class number. Unique identifying number assigned to each condition on a plot. A condition is initially defined by condition class status. Differences in reserved status, owner group, forest type, stand-size class, regeneration status, and stand density further define condition for forest land. Mapped nonforest conditions are also assigned numbers. At the time of the plot establishment, the condition class at plot center (the center of subplot 1) is usually designated as condition class 1. Other condition classes are assigned numbers sequentially at the time each condition class is delineated. On a plot, each sampled condition class must have a unique number that can change at remeasurement to reflect new conditions on the plot.

10. TREE Tree number. A number used to uniquely identify a site tree on a condition.

11. SPCD Species code. A standard tree species code. Refer to appendix F for codes.

12. DIA Diameter. The current diameter (in inches) of the tree at the point of diameter measurement (DBH/DRC).

13. HT Total height. The total length (height) of a sample tree (in feet) from the ground to the top of the main stem.

14. AGEDIA Tree age at diameter. Age (in years) of tree at the point of diameter measurement (DBH/DRC). Age is determined by an increment sample.

15. SPGRPCD Species group code. A code assigned to each tree species in order to group them for reporting purposes on presentation tables. Codes and their associated names (see REF_SPECIES_GROUP.NAME) are shown in appendix G. Individual tree species and corresponding species group codes are shown in appendix F.
16. SITREE  Site index for the tree. Site index is calculated for dominant and co-dominant
trees using one of several methods (see METHOD). It is expressed as height
in feet that the tree is expected to attain at a base- or reference age (see
SIBASE). Most commonly, site index is calculated using a family of curves
that show site index as a function of total length and either breast-height age
or total age. The height-intercept (or growth-intercept) method is commonly
used for young trees or species that produce conspicuous annual branch
whorls; using this method, site index is calculated with the height growth
attained for a short period (usually 3 to 5 years) after the tree has reached
breast height. Neither age nor total length determination are necessary when
using the height-intercept method, so one or more of those variables may be
null for a site tree on which the height-intercept method was used.

17. SIBASE  Site index base age. The base age (sometimes called reference age), in years,
of the site index curves used to derive site index. Base age is specific to a
given family of site index curves, and is usually set close to the common
rotation age or the age of culmination of mean annual increment for a
species. The most commonly used base ages are 25, 50, 80, and 100 years. It
is possible for a given species to have different sets of site index curves in
different geographic regions, and each set of curves may use a different base
age.

18. SUBP  Subplot number. (Core optional.) The number assigned to the subplot. The
national plot design (PLOT.DESIGNCD = 1) has subplot number values of 1
through 4. Other plot designs have various subplot number values. See
PLOT.DESIGNCD and appendix B for information about plot designs. For
more explanation about SUBP, contact the appropriate FIA work unit (table
6).

19. AZIMUTH  Azimuth. (Core optional.) The direction, to the nearest degree, from subplot
center to the center of the base of the tree (geographic center for multi-
stemmed woodland species). Due north is represented by 360 degrees.

20. DIST  Horizontal distance. (Core optional.) The horizontal distance in feet from
subplot center (microplot center for saplings) to the pith at the base of the
tree (geographic center for multi-stemmed woodland species).

21. METHOD  Site tree method code. The method for determining the site index.

| Code | Description |
|------|-------------|
| 1    | Tree measurements (length, age, etc.) collected during this inventory. |
| 2    | Tree measurements (length, age, etc.) collected during a previous inventory. |
| 3    | Site index estimated either in the field or office. |
| 4    | Site index determined by the height intercept method during this inventory. |

22. SITREE_EST  Estimated site index for the tree. The estimated site index or the site index
determined by the height intercept method.

23. VALIDCD  Validity code. A code indicating if this site tree provided a valid result from
the site index computation. Some trees collected by the field crew yield a
negative value from the equation due to their age, height or diameter being outside the range of values for which the equation was developed. Computational results for trees that fail are not used to estimate the site index or site productivity class for the condition. If the site calculation for this tree was successful, this attribute is set to 1.

| Code | Description                                      |
|------|--------------------------------------------------|
| 0    | Tree failed in site index calculations.          |
| 1    | Tree was successful in site index calculations.  |

24. CONDLIST Condition class list. A list of numbers indicating all of the condition classes for which the site index data for this tree can be used.

25. CREATED_BY Created by. The employee who created the record. This attribute is intentionally left blank in download files.

26. CREATED_DATE

Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

27. CREATED_IN_INSTANCE

Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

28. MODIFIED_BY

Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

29. MODIFIED_DATE

Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

30. MODIFIED_IN_INSTANCE

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.

31. CYCLE

Inventory cycle number. A number assigned to a set of plots, measured over a particular period of time from which a State estimate using all possible plots is obtained. A cycle number >1 does not necessarily mean that
information for previous cycles resides in the database. A cycle is relevant for periodic and annual inventories.

32. **SUBCYCLE** Inventory subcycle number. For an annual inventory that takes n years to measure all plots, subcycle shows in which of the n years of the cycle the data were measured. Subcycle is 0 for a periodic inventory. Subcycle 99 may be used for plots that are not included in the estimation process.
Boundary Table (Oracle table name is BOUNDARY)

| Column name | Descriptive name          | Oracle data type   |
|-------------|---------------------------|--------------------|
| 1           | CN                        | VARCHAR2(34)       |
| 2           | PLT_CN                    | VARCHAR2(34)       |
| 3           | INVYR                     | NUMBER(4)          |
| 4           | STATECD                   | NUMBER(4)          |
| 5           | UNITCD                    | NUMBER(2)          |
| 6           | COUNTYCD                  | NUMBER(3)          |
| 7           | PLOT                      | NUMBER(5)          |
| 8           | SUBP                      | NUMBER(3)          |
| 9           | SUBPTYP                   | NUMBER(1)          |
| 10          | BNDCHG                    | NUMBER(1)          |
| 11          | CONTRAST                  | NUMBER(1)          |
| 12          | AZMLEFT                   | NUMBER(3)          |
| 13          | AZMCORN                   | NUMBER(3)          |
| 14          | DISTCORN                  | NUMBER(3)          |
| 15          | AZMRIGHT                  | NUMBER(3)          |
| 16          | CYCLE                     | NUMBER(2)          |
| 17          | SUBCYCLE                  | NUMBER(2)          |
| 18          | CREATED_BY                | VARCHAR2(30)       |
| 19          | CREATED_DATE              | DATE               |
| 20          | CREATED_IN_INSTANCE       | VARCHAR2(6)        |
| 21          | MODIFIED_BY               | VARCHAR2(30)       |
| 22          | MODIFIED_DATE             | DATE               |
| 23          | MODIFIED_IN_INSTANCE      | VARCHAR2(6)        |

Type of key | Column(s) order | Tables to link  | Abbreviated notation |
---|-----------------|-----------------|----------------------|
Primary     | (CN)            | N/A             | BND_PK               |
Unique      | (PLT_CN, SUBP, SUBPTYP, AZMLEFT, AZMRIGHT) | N/A | BND_UK               |
Natural     | (STATECD, INVYR, UNITCD, COUNTYCD, PLOT, SUBP, SUBPTYP, AZMLEFT, AZMRIGHT) | N/A | BND_NAT_I             |
Foreign     | (PLT_CN)        | BOUNDARY to PLOT | BND_PLT_FK           |

Note: The BOUNDARY record may not exist for some periodic inventory data.

1. **CN**  Sequence number. A unique sequence number used to identify a boundary record.
2. PLT_CN  
Plot sequence number. Foreign key linking the boundary record to the plot record.

3. INVYR  
Inventory year. The year that best represents when the inventory data were collected. Under the annual inventory system, a group of plots is selected each year for sampling. The selection is based on a panel system. INVYR is the year in which the majority of plots in that group were collected (plots in the group have the same panel and, if applicable, subpanel). Under periodic inventory, a reporting inventory year was selected, usually based on the year in which the majority of the plots were collected or the mid-point of the years over which the inventory spanned. For either annual or periodic inventory, INVYR is not necessarily the same as MEASYEAR.

Exceptions:
INVYR = 9999. INVYR is set to 9999 to distinguish Phase 3 plots taken by the western FIA work units that are “off subpanel.” This is due to differences in measurement intervals between Phase 3 (measurement interval = 5 years) and Phase 2 (measurement interval = 10 years) plots. Only users interested in performing certain Phase 3 data analyses should access plots with this anomalous value in INVYR.

INVYR <100. INVYR <100 indicates that population estimates were derived from a pre-NIMS regional processing system and the same plot either has been or may soon be re-processed in NIMS as part of a separate evaluation. The NIMS processed copy of the plot follows the standard INVYR format. This only applies to plots collected in the South (SURVEY.RSCD = 33) with the national design or a similar regional design (PLOT.DESIGNCD = 1 or 220-233) that were collected when the inventory year was 1998 through 2005.

INVYR = 98 is equivalent to 1998 but processed through regional system
INVYR = 99 is equivalent to 1999 but processed through regional system
INVYR = 0 is equivalent to 2000 but processed through regional system
INVYR = 1 is equivalent to 2001 but processed through regional system
INVYR = 2 is equivalent to 2002 but processed through regional system
INVYR = 3 is equivalent to 2003 but processed through regional system
INVYR = 4 is equivalent to 2004 but processed through regional system
INVYR = 5 is equivalent to 2005 but processed through regional system

4. STATECD  
State code. Bureau of the Census Federal Information Processing Standards (FIPS) two-digit code for each State. Refer to appendix C.

5. UNITCD  
Survey unit code. Forest Inventory and Analysis survey unit identification number. Survey units are usually groups of counties within each State. For periodic inventories, survey units may be made up of lands of particular owners. Refer to appendix C for codes.
6. **COUNTYCD** County code. The identification number for a county, parish, watershed, borough, or similar governmental unit in a State. FIPS codes from the Bureau of the Census are used. Refer to appendix C for codes.

7. **PLOT** Phase 2 plot number. An identifier for a plot. Along with STATECD, UNITCD, INVRY, COUNTYCD and/or some other combinations of variables, PLOT may be used to uniquely identify a plot.

8. **SUBP** Subplot number. The number assigned to the subplot. The national plot design (PLOT.DESIGNCD = 1) has subplot number values of 1 through 4. Other plot designs have various subplot number values. See PLOT.DESIGNCD and appendix B for information about plot designs. For more explanation about SUBP, contact the appropriate FIA work unit.

9. **SUBPTYP** Plot type code. Specifies whether the boundary data are for a subplot, microplot, or macroplot.

| Code | Description       |
|------|-------------------|
| 1    | Subplot boundary  |
| 2    | Microplot boundary|
| 3    | Macroplot boundary|

10. **BNDCHG** Boundary change code. A code indicating the relationship between previously recorded and current boundary information. Set to blank (null) for new plots (PLOT.KINDCD = 1 or 3).

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

11. **CONTRAST** Contrasting condition. The condition class number of the condition class that contrasts with the condition class located at the subplot center (for boundaries on the subplot or macroplot) or at the microplot center (for boundaries on the microplot), e.g., the condition class present on the other side of the boundary.

12. **AZMLEFT** Left azimuth. The azimuth, to the nearest degree, from the subplot, microplot, or macroplot plot center to the farthest left point (facing the contrasting condition class) where the boundary intersects the subplot, microplot, or macroplot plot circumference.

13. **AZMCORN** Corner azimuth. The azimuth, to the nearest degree, from the subplot, microplot, or macroplot plot center to a corner or curve in a boundary. If a boundary is best described by a straight line between the two circumference points, then 000 is recorded for AZMCORN.

14. **DISTCORN** Corner distance. The horizontal distance, to the nearest 1 foot, from the subplot, microplot, or macroplot plot center to the boundary corner point.
Blank (null) when AZMCORN = 000; populated when BOUNDARY.AZMCORN >000.

15. AZMRIGHT Right azimuth. The azimuth, to the nearest degree, from subplot, microplot, or macroplot plot center to the farthest right point (facing the contrasting condition) where the boundary intersects the subplot, microplot, or macroplot plot circumference.

16. CYCLE Inventory cycle number. A number assigned to a set of plots, measured over a particular period of time from which a State estimate using all possible plots is obtained. A cycle number >1 does not necessarily mean that information for previous cycles resides in the database. A cycle is relevant for periodic and annual inventories.

17. SUBCYCLE Inventory subcycle number. For an annual inventory that takes n years to measure all plots, subcycle shows in which of the n years of the cycle the data were measured. Subcycle is 0 for a periodic inventory. Subcycle 99 may be used for plots that are not included in the estimation process.

18. CREATED_BY Created by. The employee who created the record. This attribute is intentionally left blank in download files.

19. CREATED_DATE

Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

20. CREATED_IN_INSTANCE

Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

21. MODIFIED_BY

Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

22. MODIFIED_DATE

Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.
23. **MODIFIED_IN_INSTANCE**

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.
### Subplot Condition Change Matrix (Oracle table name is SUBP_COND_CHNG_MTRX)

| Column name | Descriptive name                      | Oracle data type     |
|-------------|---------------------------------------|----------------------|
| 1 CN        | Sequence number                       | VARCHAR2(34)         |
| 2 STATECD   | State code                            | NUMBER(4)            |
| 3 SUBP      | Subplot number                        | NUMBER(1)            |
| 4 SUBPTYP   | Subplot type                          | NUMBER(1)            |
| 5 PLT_CN    | Plot sequence number                  | VARCHAR2(34)         |
| 6 CONDID    | Condition class number                | NUMBER(1)            |
| 7 PREV_PLT_CN | Previous plot sequence number      | VARCHAR2(34)         |
| 8 PREVCOND  | Previous condition class number       | NUMBER(1)            |
| 9 SUBPTYP_PROP_CHNG | Percent change of subplot condition between previous to current inventory | NUMBER(5,4) |
| 10 CREATED_BY | Created by                           | VARCHAR2(30)         |
| 11 CREATED_DATE | Created date                        | DATE                 |
| 12 CREATED_IN_INSTANCE | Created in instance     | VARCHAR2(6)         |
| 13 MODIFIED_BY | Modified by                          | VARCHAR2(30)         |
| 14 MODIFIED_DATE | Modified date                        | DATE                 |
| 15 MODIFIED_IN_INSTANCE | Modified in instance     | VARCHAR2(6)         |

### Type of key

| Type of key | Column(s) order | Tables to link | Abbreviated notation |
|-------------|-----------------|----------------|----------------------|
| Primary     | (CN)            | N/A            | CMX_PK               |
| Unique      | (PLT_CN, PREV_PLT_CN, SUBP, SUBPTYP, CONDID, PREVCOND) | N/A            | CMX_UK               |
| Foreign     | (PREV_PLT_CN)   | SUBP_COND_CHNG_MTRX to PLOT | CMX_PLT_FK           |
|             | (PLT_CN)        | SUBP_COND_CHNG_MTRX to PLOT | CMX_PLT_FK2          |

This table contains information about the mix of current and previous conditions that occupy the same area on the subplot. Figure 5 provides an illustration of how the information in this table is derived using data from two points in time that is stored in the BOUNDARY and COND tables.
1. **CN**  
   Sequence number. A unique sequence number used to identify a change matrix table record.

2. **STATECD**  
   States code. Bureau of the Census Federal Information Processing Standards (FIPS) two-digit code for each State. Refer to appendix C.

3. **SUBP**  
   Subplot number. The number assigned to the subplot. The national plot design (PLOT.DESIGNCD = 1) has subplot number values of 1 through 4. Other plot designs have various subplot number values.
4. **SUBPTYP**  Plot type code. Specifies whether the record is for a subplot, microplot, or macroplot.

| Code | Description |
|------|-------------|
| 1    | Subplot     |
| 2    | Microplot   |
| 3    | Macroplot   |

5. **PLT_CN**  Plot sequence number. The foreign key linking the SUBP_COND_CHNG_MTRX record to the PLOT record for the current inventory.

6. **CONDID**  Condition class number. Unique identifying number assigned to each condition on a plot.

7. **PREV_PLT_CN**  Previous plot sequence number. The foreign key linking the SUBP_COND_CHNG_MTRX record to the PLOT record from the previous inventory.

8. **PREVCOND**  Previous condition class number. Identifies the condition class number from the previous inventory.

9. **SUBPTYP_PROP_CHNG**  Subplot type proportion change. The unadjusted proportion of the subplot that is in the same geographic area condition for both the previous and current inventory. The sum of all subplot type change proportions for an individual plot equals 4 for each plot type (microplot, subplot, and/or macroplot). Divide the result by 4 to obtain change at the plot level.

10. **CREATED_BY**  Created by. The employee who created the record. This attribute is intentionally left blank in download files.

11. **CREATED_DATE**  Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

12. **CREATED_IN_INSTANCE**  Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.
13. **MODIFIED_BY**

   Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

14. **MODIFIED_DATE**

   Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

15. **MODIFIED_IN_INSTANCE**

   Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.
Tree Regional Biomass Table (Oracle table name is TREE_REGIONAL_BIOMASS)

| Column name  | Descriptive name                  | Oracle data type |
|--------------|-----------------------------------|------------------|
| 1 TRE_CN     | Tree sequence number              | VARCHAR2(34)     |
| 2 STATECD    | State code                        | NUMBER(4)        |
| 3 REGIONAL_DRYBIOT | Regional total tree biomass oven-dry weight | NUMBER(13,6) |
| 4 REGIONAL_DRYBIOM | Regional merchantable stem biomass oven-dry weight | NUMBER(13,6) |
| 5 CREATED_BY | Created by                        | VARCHAR2(30)     |
| 6 CREATED_DATE | Created date                     | DATE             |
| 7 CREATED_IN_INSTANCE | Created in instance         | VARCHAR2(6)     |
| 8 MODIFIED_BY | Modified by                       | VARCHAR2(30)     |
| 9 MODIFIED_DATE | Modified date                    | DATE             |
| 10 MODIFIED_IN_INSTANCE | Modified in instance      | VARCHAR2(6)     |

| Type of key | Column(s) order | Tables to link | Abbreviated notation |
|-------------|-----------------|----------------|----------------------|
| Primary     | (TRE_CN)        | N/A            | TRB_PK               |
| Foreign     | (TRE_CN)        | TREE_REGIONAL_BIOMASS to TREE | TRB_TRE_FK         |

This table provides biomass estimates of live and dead trees 1 inch in diameter and larger using equations and methods that vary by FIA work unit. Both REGIONAL_DRYBIOT and REGIONAL_DRYBIOM preserve the original data and computation procedures used by FIA work units to calculate DRYBIOT and DRYBIOM in previous versions of FIADB. Users should be aware that for some FIA work units, these biomass estimates may not include bark. Biomass estimates in this table will differ from biomass estimates found on the TREE table records because components such as bark, stump, and top (with branches) are now being stored on the TREE table and are derived by applying ratios to stem biomass. The TREE table will be the source of biomass data used in official reporting. However, the TREE_REGIONAL_BIOMASS table contains valuable information for generating biomass estimates that match earlier published reports.

1. **TRE_CN**  
   Tree sequence number. Foreign key linking the tree regional biomass record to the tree record.

2. **STATECD**  
   States code. Bureau of the Census Federal Information Processing Standards (FIPS) two-digit code for each State. Refer to appendix C.

3. **REGIONAL_DRYBIOT**  
   Regional dry total biomass (pounds). The total aboveground biomass of a sample tree 1.0 inch diameter or larger, including all tops and limbs (but excluding foliage). This is a per tree value and must be multiplied by TPA_UNADJ to obtain per acre information. Calculated in oven-dry pounds per tree. This field should have an entry if DIA is 1.0 inch or larger, regardless of STATUSCD or TREECLCD; zero otherwise. For dead or cut trees, this number represents the biomass at the time of death or last
measurement. Because total biomass has been calculated differently among FIA work units, contact the appropriate FIA work units (see table 6) for information on how biomass was estimated and whether bark was included.

4. REGIONAL_DRYBIOM

Regional dry merchantable stem biomass (pounds). The total gross biomass (including bark) of a tree 5.0 inches DBH or larger from a 1-foot stump to a minimum 4-inch top diameter of the central stem. This is a per tree value and must be multiplied by TPA_UNADJ to obtain per acre information. Calculated in oven-dry pounds per tree. This field should have an entry if DIA is 5.0 inches or larger, regardless of STATUSCD or TREECLCD; zero otherwise. For dead or cut trees, this number represents the biomass at the time of death or last measurement. Because total biomass has been calculated differently among FIA work units, contact the appropriate FIA work unit (see table 6) for information on how biomass was estimated and whether bark was actually included.

5. CREATED_BY Created by. The employee who created the record. This attribute is intentionally left blank in download files.

6. CREATED_DATE

Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

7. CREATED_IN_INSTANCE

Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

8. MODIFIED_BY

Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

9. MODIFIED_DATE

Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

10. MODIFIED_IN_INSTANCE

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.
## Population Estimation Unit Table (Oracle table name is POP_ESTN_UNIT)

| Column name        | Descriptive name                        | Oracle data type   |
|--------------------|-----------------------------------------|--------------------|
| 1 CN               | Sequence number                         | VARCHAR2(34)       |
| 2 EVAL_CN          | Evaluation sequence number              | VARCHAR2(34)       |
| 3 RSCD             | Region or station code                  | NUMBER(2)          |
| 4 EVALID           | Evaluation identifier                   | NUMBER(6)          |
| 5 ESTN_UNIT        | Estimation unit                         | NUMBER(6)          |
| 6 ESTN_UNIT_DESCR  | Estimation unit description              | VARCHAR2(255)      |
| 7 STATECD          | State code                              | NUMBER(4)          |
| 8 AREALAND_EU      | Land area within the estimation unit     | NUMBER(12,2)       |
| 9 AREATOT_EU       | Total area within the estimation unit    | NUMBER(12,2)       |
| 10 AREA_USED       | Area used to calculate all expansion factors | NUMBER(12,2)   |
| 11 AREA_SOURCE     | Area source                             | VARCHAR2(50)       |
| 12 P1PNTCNT_EU     | Phase 1 point count for the estimation unit | NUMBER(12)    |
| 13 P1SOURCE        | Phase 1 source                          | VARCHAR2(30)       |
| 14 CREATED_BY      | Created by                              | VARCHAR2(30)       |
| 15 CREATED_DATE    | Created date                            | DATE               |
| 16 CREATED_IN_INSTANCE | Created in instance                  | VARCHAR2(6)       |
| 17 MODIFIED_BY     | Modified by                             | VARCHAR2(30)       |
| 18 MODIFIED_DATE   | Modified date                           | DATE               |
| 19 MODIFIED_IN_INSTANCE | Modified in instance              | VARCHAR2(6)       |

| Type of key | Column(s) order | Tables to link | Abbreviated notation |
|-------------|-----------------|----------------|----------------------|
| Primary     | (CN)            | N/A            | PEU_PK               |
| Unique      | (RSCD, EVALID, ESTN_UNIT) | N/A            | PEU_UK               |
| Foreign     | (EVAL_CN)       | POP_ESTN_UNIT to POP_EVAL | PEU_PEV_FK           |

1. **CN**    Sequence number. A unique sequence number used to identify an estimation unit record.

2. **EVAL_CN** Evaluation sequence number. Foreign key linking the estimation unit record to the evaluation record.

3. **RSCD**  Region or Station Code. Identification number of the Forest Service National Forest System Region or Station (FIA work unit) that provided the inventory data (see appendix C for more information).

| Code | Description |
|------|-------------|
| 22   | Rocky Mountain Research Station (RMRS) |
| 23   | North Central Research Station (NCRS) |
| 24   | Northeastern Research Station (NERS) |
| 26   | Pacific Northwest Research Station (PNWRS) |
| 27   | Pacific Northwest Research Station (PNWRS)-Alaska |
| 33   | Southern Research Station (SRS) |
| Field          | Description                                                                 |
|---------------|-----------------------------------------------------------------------------|
| EVALID        | Evaluation identifier. The EVALID code and the RSCD code together uniquely identify a set of field plots and associated Phase 1 summary data used to make population estimates. |
| ESTN_UNIT     | Estimation unit. The specific geographic area that is stratified. Estimation units are often determined by a combination of geographical boundaries, sampling intensity and ownership. |
| ESTN_UNIT_DESCR | Estimation unit description. A description of the estimation unit (e.g., name of the county). |
| STATECD       | State code. Bureau of the Census Federal Information Processing Standards (FIPS) two-digit code for each State. Refer to appendix C. For evaluations that do not conform to the boundaries of a single State the value of STATECD should be set to 99. |
| AREALAND_EU   | Land area within the estimation unit. The area of land in acres enclosed by the estimation unit. Census water is excluded. |
| AREATOT_EU    | Total area within the estimation unit. This includes land and census water enclosed by the estimation unit. |
| AREA_USED     | Area used to calculate all expansion factors. Is equivalent to AREATOT_EU if a station estimates all area, including census water; and to AREALAND_EU if a station estimates land area only. |
| AREA_SOURCE   | Area Source. Identifies the source of the area numbers. Usually the area source is either the U.S. Census Bureau or area estimates based on pixel counts. Example values are “US CENSUS 2000” or “PIXEL COUNT.” |
| P1PTCNT_EU    | Phase 1 point count for the estimation unit. For remotely sensed data this will be the total number of pixels in the estimation unit. |
| P1SOURCE      | Phase 1 source. Identifies the Phase 1 data source used for this stratification. Examples are NLCD and AERIAL PHOTOS. |
| CREATED_BY    | Created by. The employee who created the record. This attribute is intentionally left blank in download files. |
15. **CREATED_DATE**

Created date. The date the record was created. Date will be in the form DD-MON-YYYYY.

16. **CREATED_IN_INSTANCE**

Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

17. **MODIFIED_BY**

Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

18. **MODIFIED_DATE**

Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYYY.

19. **MODIFIED_IN_INSTANCE**

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.
### Population Evaluation Table (Oracle table name is POP_EVAL)

| Column name | Descriptive name | Oracle data type |
|-------------|------------------|------------------|
| 1 CN        | Sequence number  | VARCHAR2(34)     |
| 2 RSCD      | Region or Station code | NUMBER(2)       |
| 3 EVALID    | Evaluation identifier | NUMBER(6)     |
| 4 EVAL_DESCR| Evaluation description | VARCHAR2(255) |
| 5 STATECD   | State code       | NUMBER(4)       |
| 6 LOCATION_NM | Location name | VARCHAR2(255) |
| 7 REPORT_YEAR_NM | Report year name | VARCHAR2(255) |
| 8 NOTES     | Notes            | VARCHAR2(2000)  |
| 9 CREATED_BY| Created by       | VARCHAR2(30)    |
| 10 CREATED_DATE | Created date | DATE           |
| 11 CREATED_IN_INSTANCE | Created in instance | VARCHAR2(6) |
| 12 MODIFIED_BY | Modified by     | VARCHAR2(30)    |
| 13 MODIFIED_DATE | Modified date    | DATE           |
| 14 MODIFIED_IN_INSTANCE | Modified in instance | VARCHAR2(6) |
| 15 START_INVYR | Start inventory year | NUMBER(4) |
| 16 END_INVYR | End inventory year | NUMBER(4)      |

| Type of key | Column(s) order | Tables to link | Abbreviated notation |
|-------------|------------------|----------------|----------------------|
| Primary     | (CN)             | N/A            | PEV_PK               |
| Unique      | (RSCD, EVALID)   | N/A            | PEV UK               |

1. **CN**  
   Sequence number. A unique sequence number used to identify an evaluation record.

2. **RSCD**  
   Region or Station Code. Identification number of the Forest Service National Forest System Region or Station (FIA work unit) that provided the inventory data (see appendix C for more information).

| Code | Description |
|------|-------------|
| 22   | Rocky Mountain Research Station (RMRS) |
| 23   | North Central Research Station (NCRS) |
| 24   | Northeastern Research Station (NERS) |
| 26   | Pacific Northwest Research Station (PNWRS) |
| 27   | Pacific Northwest Research Station (PNWRS)-Alaska |
| 33   | Southern Research Station (SRS) |

3. **EVALID**  
   Evaluation identifier. The EVALID code and the RSCD code together uniquely identify a set of field plots and associated Phase 1 summary data used to make population estimates.

4. **EVAL_DESCR**  
   Evaluation description. A description of the area being evaluated (often a State), the time period of the evaluation, and the type of estimates the
evaluation can be used to compute (i.e., all lands, area, volume, growth, removals, and mortality).

5. **STATECD**  
State code. Bureau of the Census Federal Information Processing Standards (FIPS) two-digit code for each State. Refer to appendix C.

6. **LOCATION_NM**  
Location name. Geographic area as it would appear in the title of a report.

7. **REPORT_YEAR_NM**  
Report year name. The data collection years that would appear in the title of a report.

8. **NOTES**  
Notes. Notes should include information about the stratification method. May include citation for any publications that used the evaluation.

9. **CREATED_BY**  
Created by. The employee who created the record. This attribute is intentionally left blank in download files.

10. **CREATED_DATE**  
Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

11. **CREATED_IN_INSTANCE**  
Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

12. **MODIFIED_BY**  
Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

13. **MODIFIED_DATE**  
Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

14. **MODIFIED_IN_INSTANCE**  
Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.
15. START_INVYR

Start inventory year. The starting year for the data included in the evaluation.

16. END_INVYR  End inventory year. The ending year for the data included in the evaluation.
Population Evaluation Attribute Table (Oracle table name is POP_EVAL_ATTRIBUTE)

| Column name | Descriptive name | Oracle data type |
|-------------|------------------|------------------|
| 1 CN        | Sequence number  | VARCHAR2(34)     |
| 2 EVAL_CN   | Evaluation sequence number | VARCHAR2(34) |
| 3 ATTRIBUTE_NBR | Attribute number   | NUMBER(3) |
| 4 STATECD   | State code       | NUMBER(4)       |
| 5 CREATED_BY| Created by       | VARCHAR2(30)    |
| 6 CREATED_DATE| Created date    | DATE            |
| 7 CREATED_IN_INSTANCE | Created in instance | VARCHAR2(6) |
| 8 MODIFIED_BY| Modified by     | VARCHAR2(30)    |
| 9 MODIFIED_DATE| Modified date   | DATE            |
| 10 MODIFIED_IN_INSTANCE | Modified in instance | VARCHAR2(6) |

| Type of key | Column(s) order | Tables to link | Abbreviated notation |
|-------------|-----------------|----------------|----------------------|
| Unique      | (EVAL_CN, ATTRIBUTE_NBR) | N/A           | PEA_UK               |
| Foreign     | (ATTRIBUTE_NBR) | POP_EVAL_ATTRIBUTE to REF_POP_ATTRIBUTE | PEA_PAE_FK |
|             | (EVAL_CN)       | POP_EVAL_ATTRIBUTE to POP_EVAL       | PEA_PEV_FK |

1. **CN**  
   Sequence number. A unique sequence number used to identify an evaluation attribute record.

2. **EVAL_CN**  
   Evaluation sequence number. Foreign key linking the population evaluation attribute record to the population evaluation record.

3. **ATTRIBUTE_NBR**  
   Attribute number. Foreign key linking the population evaluation attribute record to the reference population attribute record.

4. **STATECD**  
   State code. Bureau of the Census Federal Information Processing Standards (FIPS) two-digit code for each State. Refer to appendix C.

5. **CREATED_BY**  
   Created by. The employee who created the record. This attribute is intentionally left blank in download files.

6. **CREATED_DATE**  
   Created date. The date the record was created. Date will be in the form DD-MON-YYYY.
7. CREATED_IN_INSTANCE

Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

8. MODIFIED_BY

Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

9. MODIFIED_DATE

Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

10. MODIFIED_IN_INSTANCE

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.
Population Evaluation Group Table (Oracle table name is POP_EVAL_GRP)

| Column name                  | Descriptive name                                             | Oracle data type     |
|------------------------------|---------------------------------------------------------------|----------------------|
| 1 CN                         | Sequence number                                               | VARCHAR2(34)         |
| 2 EVAL_CN_FOR_EXPALL         | Evaluation sequence number for expansions of all plots        | VARCHAR2(34)         |
| 3 EVAL_CN_FOR_EXPCURR        | Evaluation sequence number for expansions of current area      | VARCHAR2(34)         |
| 4 EVAL_CN_FOR_EXPVOL         | Evaluation sequence number for expansions of volume            | VARCHAR2(34)         |
| 5 EVAL_CN_FOR_EXPGROW        | Evaluation sequence number for expansions of growth            | VARCHAR2(34)         |
| 6 EVAL_CN_FOR_EXPMORT        | Evaluation sequence number for expansions of mortality         | VARCHAR2(34)         |
| 7 EVAL_CN_FOR_EXPREMV        | Evaluation sequence number for expansions of removals          | VARCHAR2(34)         |
| 8 RSCD                       | Region or Station code                                        | NUMBER(2)            |
| 9 EVAL_GRP                   | Evaluation group                                              | NUMBER(6)            |
| 10 EVAL_GRP_DESCR             | Evaluation group description                                  | VARCHAR2(255)        |
| 11 STATECD                   | State code                                                    | NUMBER(4)            |
| 12 LAND_ONLY                 | Land only                                                     | VARCHAR2(1)          |
| 13 CREATED_BY                | Created by                                                    | VARCHAR2(30)         |
| 14 CREATED_DATE              | Created date                                                  | DATE                 |
| 15 CREATED_IN_INSTANCE       | Created in instance                                           | VARCHAR2(6)          |
| 16 MODIFIED_BY               | Modified by                                                   | VARCHAR2(30)         |
| 17 MODIFIED_DATE             | Modified date                                                 | DATE                 |
| 18 MODIFIED_IN_INSTANCE      | Modified in instance                                          | VARCHAR2(6)          |
| 19 NOTES                     | Notes                                                         | VARCHAR2(2000)       |

Type of key | Column(s) order | Tables to link | Abbreviated notation |
-------------|-----------------|----------------|----------------------|
Primary      | (CN)            | N/A            | PEG_PK               |
Unique       | (RSCD, EVAL_GRP) | N/A            | PEG_UK               |
Foreign      | (EVAL_CN_FOR_EXPALL) | POP_EVAL_GRP to POP_EVAL | PEG_PEV_FK          |
                                                      | POP_EVAL_GRP to POP_EVAL | PEG_PEV_FK_2        |
                                                      | POP_EVAL_GRP to POP_EVAL | PEG_PEV_FK_3        |
                                                      | POP_EVAL_GRP to POP_EVAL | PEG_PEV_FK_4        |
                                                      | POP_EVAL_GRP to POP_EVAL | PEG_PEV_FK_5        |
                                                      | POP_EVAL_GRP to POP_EVAL | PEG_PEV_FK_6        |

1. **CN**  
   Sequence number. A unique sequence number used to identify an evaluation group record.
2. EVAL_CN_FOR_EXPALL

   Evaluation sequence number for expansions of all plots. This attribute links to the POP_EVAL.CN on the evaluation record. When this attribute is populated, it points to the evaluation used to estimate total area, including both sampled and nonsampled plots. Users must first obtain the correct sequence number in this attribute in order to run queries like those shown in chapter 4. This attribute will be dropped in version 5.0.

3. EVAL_CN_FOR_EXPCURR

   Evaluation sequence number for expansions of current area. This attribute links to the POP_EVAL.CN on the evaluation record. When this attribute is populated, it points to the evaluation used to estimate total area, using only sampled plots. Users must first obtain the correct sequence number in this attribute in order to run queries like those shown in chapter 4. This attribute will be dropped in version 5.0.

4. EVAL_CN_FOR_EXPVOL

   Evaluation sequence number for expansions of volume. This attribute links to the POP_EVAL.CN of the evaluation record. When this attribute is populated, it points to the evaluation used to estimate volume, biomass or number of trees, based on the sampled plots within the population that qualify for volume estimates. Users must first obtain the correct sequence number in this attribute in order to run queries like those shown in chapter 4. This attribute will be dropped in version 5.0.

5. EVAL_CN_FOR_EXPGROW

   Evaluation sequence number for expansions of growth. This attribute links to the POP_EVAL.CN of the evaluation record. When this attribute is populated, it points to the evaluation used to estimate net average annual growth, based on the remeasured plots within the population that qualify for growth estimates. Users must first obtain the correct sequence number in this attribute in order to run queries like those shown in chapter 4. This attribute will be dropped in version 5.0.

6. EVAL_CN_FOR_EXPMORT

   Evaluation sequence number for expansions of mortality. This attribute links to the POP_EVAL.CN of the evaluation record. When this attribute is populated, it points to the evaluation used to estimate average annual mortality, based on the remeasured plots within the population that qualify for mortality estimates. Users must first obtain the correct sequence number in this attribute in order to run queries like those shown in chapter 4. This attribute will be dropped in version 5.0.
7. EVAL_CN_FOR_EXPREMV

Evaluation sequence number for expansions of removals. This attribute links to the POP_EVAL.CN of the evaluation record. When this attribute is populated, it points to the evaluation used to estimate annual removals, based on the remeasured plots within the population that qualify for removals estimates. Users must first obtain the correct sequence number in this attribute in order to run queries like those shown in chapter 4. This attribute will be dropped in version 5.0.

8. RSCD

Region or Station Code. Identification number of the Forest Service National Forest System Region or Station (FIA work unit) that provided the inventory data (see appendix C for more information).

| Code | Description                                      |
|------|--------------------------------------------------|
| 22   | Rocky Mountain Research Station (RMRS)           |
| 23   | North Central Research Station (NCRS)            |
| 24   | Northeastern Research Station (NERS)             |
| 26   | Pacific Northwest Research Station (PNWRS)       |
| 27   | Pacific Northwest Research Station (PNWRS)-Alaska|
| 33   | Southern Research Station (SRS)                  |

9. EVAL_GRP

Evaluation group. An evaluation group identifies the evaluations that were used in producing a core set of tables. In some cases one evaluation will be used for area and volume and another evaluation for growth, removals and mortality. The value of this attribute is used to select the appropriate State and year of interest to produce a set of summary tables.

10. EVAL_GRP_DESCR

Evaluation group description. A description of the evaluation group that includes the State and range of years for the evaluation, for example, “Minnesota: 1004;2005;2006;2007;2008”. This is useful to include in a summary report to clearly identify the source of the data.

11. STATECD

State code. Bureau of the Census Federal Information Processing Standards (FIPS) two-digit code for each State. Refer to appendix C. For evaluations that do not conform to the boundaries of a single State the value of STATECD should be set to 99.

12. LAND_ONLY

Land only. A code indicating area used in stratifying evaluations. See POP_ESTN_UNIT.AREA_SOURCE for more information.

| Code | Description                                      |
|------|--------------------------------------------------|
| Y    | Only census land was used in the stratification process. |
| N    | Census land and water were used in the stratification process. |

13. CREATED_BY

Created by. The employee who created the record. This attribute is intentionally left blank in download files.
14. CREATED_DATE

Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

15. CREATED_IN_INSTANCE

Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

16. MODIFIED_BY

Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

17. MODIFIED_DATE

Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

18. MODIFIED_IN_INSTANCE

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.

19. NOTES

Notes. An optional item where additional information about the evaluation group may be stored.
Population Evaluation Type Table (Oracle table name is POP_EVAL_TYP)

| Column name  | Descriptive name                        | Oracle data type  |
|--------------|-----------------------------------------|-------------------|
| 1 EVAL_GRP_CN| Evaluation group sequence number        | VARCHAR2(34)      |
| 2 EVAL_CN    | Evaluation sequence number              | VARCHAR2(34)      |
| 3 EVAL_TYP   | Evaluation type                         | VARCHAR2(15)      |
| 4 STATECD    | State code                              | NUMBER(4)         |
| 5 CREATED_BY | Created by                              | VARCHAR2(30)      |
| 6 CREATED_DATE| Created date                           | DATE              |
| 7 CREATED_IN_INSTANCE | Created in instance | VARCHAR2(6)      |
| 8 MODIFIED_BY | Modified by                            | VARCHAR2(30)      |
| 9 MODIFIED_DATE| Modified date                         | DATE              |
| 10 MODIFIED_IN_INSTANCE | Modified in instance | VARCHAR2(6)      |
| 11 CN        | Sequence number                         | VARCHAR2(34)      |

**Type of key**

| Type of key | Column(s) order | Tables to link                          | Abbreviated notation |
|-------------|-----------------|-----------------------------------------|----------------------|
| Primary     | (CN)            | N/A                                     | PET_PK               |
| Unique      | (EVAL_GRP_CN, EVAL_CN, EVAL_TYP) | N/A                                     | PET_UK               |
| Foreign     | (EVAL_GRP_CN)   | POP_EVAL_TYP to POP_EVAL_GRP            | PET_PEG_FK           |
|             | (EVAL_CN)       | POP_EVAL_TYP to POP_EVAL                | PET_PEV_FK           |
|             | (EVAL_TYP)      | POP_EVAL_TYP to REF_POP_EVAL_TYP_DESCR  | PET_PED_FK           |

1. **EVAL_GRP_CN**

   Evaluation group sequence number. Foreign key linking the population evaluation type record to the population evaluation group record.

2. **EVAL_CN**

   Evaluation sequence number. Foreign key linking the population evaluation type record to the population evaluation record.

3. **EVAL_TYP**

   Evaluation type. Describes the type of evaluation. Evaluation type is needed to generate summary reports for an inventory. For example, a specific evaluation is associated with the evaluation for volume (Expvol). At the present time, seven types of evaluations can be produced. See also the REF_POP_EVAL_TYP_DESCR table.

   **Evaluation type values**

   Expall
   Expchng
   Expcurr
   Expgrow
   Expmort
   Expremv
   Expvol
4. **STATECD**  
State code. Bureau of the Census Federal Information Processing Standards (FIPS) two-digit code for each State. Refer to appendix C.

5. **CREATED_BY**  
Created by. The employee who created the record. This attribute is intentionally left blank in download files.

6. **CREATED_DATE**  
Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

7. **CREATED_IN_INSTANCE**  
Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

8. **MODIFIED_BY**  
Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

9. **MODIFIED_DATE**  
Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

10. **MODIFIED_IN_INSTANCE**  
Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.

11. **CN**  
Sequence number. A unique sequence number used to identify a population evaluation type record.
### Population Plot Stratum Assignment Table (Oracle table name is POP_PLOT_STRATUM_ASSGN)

| Column name | Descriptive name | Oracle data type |
|-------------|------------------|------------------|
| 1 CN        | Sequence number  | VARCHAR2(34)     |
| 2 STRATUM_CN| Stratum sequence number | VARCHAR2(34) |
| 3 PLT_CN    | Plot sequence number  | VARCHAR2(34)     |
| 4 STATECD   | State code       | NUMBER(4)        |
| 5 INVYR     | Inventory year   | NUMBER(4)        |
| 6 UNITCD    | Survey unit code | NUMBER(2)        |
| 7 COUNTYCD  | County code      | NUMBER(3)        |
| 8 PLOT      | Phase 2 plot number  | NUMBER(5)        |
| 9 RSCD      | Region or Station code | NUMBER(2)    |
| 10 EVALID   | Evaluation identifier | NUMBER(6)   |
| 11 ESTN_UNIT| Estimation unit  | NUMBER(6)        |
| 12 STRATUMCD| Stratum code     | NUMBER(6)        |
| 13 CREATED_BY| Created by     | VARCHAR2(30)     |
| 14 CREATED_DATE| Created date  | DATE             |
| 15 CREATED_IN_INSTANCE| Created in instance | VARCHAR2(6) |
| 16 MODIFIED_BY| Modified by    | VARCHAR2(30)     |
| 17 MODIFIED_DATE| Modified date  | DATE             |
| 18 MODIFIED_IN_INSTANCE| Modified in instance | VARCHAR2(6) |

| Type of key | Column(s) order | Tables to link | Abbreviated notation |
|-------------|-----------------|----------------|----------------------|
| Primary     | (CN)            | N/A            | PPSA_PK              |
| Unique      | (PLT_CN, STRATUM_CN) | N/A            | PPSA_UK              |
|             | (STATECD, INVYR, UNITCD, COUNTYCD, PLOT, RSCD, EVALID, ESTN_UNIT, STRATUMCD) | N/A            | PPSA_UK2             |
| Foreign     | (PLT_CN)        | POP_PLOT_STRATUM_ASSGN to PLOT | PPSA_PLT_FK         |
|             | (STRATUM_CN)    | POP_PLOT_STRATUM_ASSGN to POP_STRATUM | PPSA_PSM_FK         |

1. **CN**
   Sequence number. A unique sequence number used to identify a population plot stratum assignment record.

2. **STRATUM_CN**
   Stratum sequence number. Foreign key linking the population plot stratum assignment record to the population stratum record.
3. **PLT_CN**  Plot sequence number. Foreign key linking the population plot stratum assignment record to the plot record.

4. **STATECD**  State code. Bureau of the Census Federal Information Processing Standards (FIPS) two-digit code for each State. Refer to appendix C.

5. **INVYR**  Inventory year. The year that best represents when the inventory data were collected. Under the annual inventory system, a group of plots is selected each year for sampling. The selection is based on a panel system. INVYR is the year in which the majority of plots in that group were collected (plots in the group have the same panel and, if applicable, subpanel). Under periodic inventory, a reporting inventory year was selected, usually based on the year in which the majority of the plots were collected or the mid-point of the years over which the inventory spanned. For either annual or periodic inventory, INVYR is not necessarily the same as MEASYEAR.

   **Exceptions:**
   - **INVYR = 9999.** INVYR is set to 9999 to distinguish Phase 3 plots taken by the western FIA work units that are “off subpanel.” This is due to differences in measurement intervals between Phase 3 (measurement interval = 5 years) and Phase 2 (measurement interval = 10 years) plots. Only users interested in performing certain Phase 3 data analyses should access plots with this anomalous value in INVYR.
   - **INVYR <100.** INVYR <100 indicates that population estimates were derived from a pre-NIMS regional processing system and the same plot either has been or may soon be re-processed in NIMS as part of a separate evaluation. The NIMS processed copy of the plot follows the standard INVYR format. This only applies to plots collected in the South (RSCD = 33) with the national design or a similar regional design (PLOT.DESIGNCD = 1 or 220-233) that were collected when the inventory year was 1998 through 2005.

   INVYR = 98 is equivalent to 1998 but processed through regional system
   INVYR = 99 is equivalent to 1999 but processed through regional system
   INVYR = 0 is equivalent to 2000 but processed through regional system
   INVYR = 1 is equivalent to 2001 but processed through regional system
   INVYR = 2 is equivalent to 2002 but processed through regional system
   INVYR = 3 is equivalent to 2003 but processed through regional system
   INVYR = 4 is equivalent to 2004 but processed through regional system
   INVYR = 5 is equivalent to 2005 but processed through regional system

6. **UNITCD**  Survey unit code. Forest Inventory and Analysis survey unit identification number. Survey units are usually groups of counties within each State. For periodic inventories, Survey units may be made up of lands of particular owners. Refer to appendix C for codes.

7. **COUNTYCD**  County code. The identification number for a county, parish, watershed, borough, or similar governmental unit in a State. FIPS codes from the Bureau of the Census are used. Refer to appendix C for codes.
8. **PLOT**  Phase 2 plot number. An identifier for a plot. Along with INVYR, STATECD, UNITCD, COUNTYCD, PLOT may be used to uniquely identify a plot.

9. **RSCD**  Region or Station Code. Identification number of the Forest Service National Forest System Region or Station (FIA work unit) that provided the inventory data (see appendix C for more information).

| Code | Description |
|------|-------------|
| 22   | Rocky Mountain Research Station (RMRS) |
| 23   | North Central Research Station (NCRS) |
| 24   | Northeastern Research Station (NERS) |
| 26   | Pacific Northwest Research Station (PNWRS) |
| 27   | Pacific Northwest Research Station (PNWRS) - Alaska |
| 33   | Southern Research Station (SRS) |

10. **EVALID**  Evaluation identifier. The EVALID code and the RSCD code together uniquely identify a set of field plots and associated Phase 1 summary data used to make population estimates.

11. **ESTN_UNIT**  Estimation unit. A geographic area upon which stratification is performed. Sampling intensity is uniform within an estimation unit.

12. **STRATUMCD**  Stratum code. The code used for a particular stratum, which is unique within an RSCD, EVALID, ESTN_UNIT.

13. **CREATED_BY**  Created by. The employee who created the record. This attribute is intentionally left blank in download files.

14. **CREATED_DATE**  Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

15. **CREATED_IN_INSTANCE**  Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

16. **MODIFIED_BY**  Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.
17. MODIFIED_DATE

Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

18. MODIFIED_IN_INSTANCE

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.
### Population Stratum Table (Oracle table name is POP_STRATUM)

| Column name | Descriptive name                      | Oracle data type          |
|-------------|---------------------------------------|---------------------------|
| 1 CN        | Sequence number                       | VARCHAR2(34)              |
| 2 ESTN_UNIT_CN | Estimation unit sequence number      | VARCHAR2(34)              |
| 3 RSCD      | Region or Station code                | NUMBER(2)                 |
| 4 EVALID    | Evaluation identifier                 | NUMBER(6)                 |
| 5 ESTN_UNIT | Estimation unit                       | NUMBER(6)                 |
| 6 STRATUMCD | Stratum code                          | NUMBER(6)                 |
| 7 STRATUM_DESCR | Stratum description               | VARCHAR2(255)             |
| 8 STATECD   | State code                            | NUMBER(4)                 |
| 9 P1POINTCNT | Phase 1 point count                   | NUMBER(12)                |
| 10 P2POINTCNT | Phase 2 point count               | NUMBER(12)                |
| 11 EXPNS    | Expansion factor                      | NUMBER                    |
| 12 ADJ_FACTOR_MACR | Adjustment factor for the macroplot | NUMBER(5,4) |
| 13 ADJ_FACTOR_SUBP | Adjustment factor for the subplot   | NUMBER(5,4) |
| 14 ADJ_FACTOR_MICR | Adjustment factor for the microplot | NUMBER(5,4) |
| 15 CREATED_BY | Created by                             | VARCHAR2(30)             |
| 16 CREATED_DATE | Created date                        | DATE                      |
| 17 CREATED_IN_INSTANCE | Created in instance                | VARCHAR2(6)             |
| 18 MODIFIED_BY   | Modified by                           | VARCHAR2(30)             |
| 19 MODIFIED_DATE   | Modified date                         | DATE                      |
| 20 MODIFIED_IN_INSTANCE | Modified in instance            | VARCHAR2(6)             |

#### Type of key

| Type of key | Column(s) order | Tables to link | Abbreviated notation   |
|-------------|-----------------|----------------|------------------------|
| Primary     | (CN)            | N/A            | PSM_PK                 |
| Unique      | (RSCD, EVALID, ESTN_UNIT, STRATUMCD) | N/A            | PSM_UK                 |
| Foreign     | (ESTN_UNIT_CN)  | POP_STRATUM to POP_ESTN_UNIT | PSM_PEU_FK             |

1. **CN**
   - Sequence number. A unique sequence number used to identify a stratum record.

2. **ESTN_UNIT_CN**
   - Estimation unit sequence number. Foreign key linking the stratum record to the estimation unit record.

3. **RSCD**
   - Region or Station Code. Identification number of the Forest Service National Forest System Region or Station (FIA work unit) that provided the inventory data (see appendix C for more information).
4. **EVALID**  Evaluation identifier. The EVALID code and the RSCD code together uniquely identify a set of field plots and associated Phase 1 summary data used to make population estimates.

5. **ESTN_UNIT**  Estimation unit. The particular geographic area for which a particular computation applies. Estimation units are determined by a combination of sampling intensity and geographical boundaries.

6. **STRATUMCD**  Stratum code. A number used to uniquely identify a stratum within an estimation unit.

7. **STRATUM_DESCR**  Stratum description. Strata are usually based on land use (e.g., forest or nonforest) but may also be based on other criteria such as ownership (e.g., private/public/national forest).

8. **STATECD**  State code. Bureau of the Census Federal Information Processing Standards (FIPS) two-digit code for each State. Refer to appendix C. For evaluations that do not conform to the boundaries of a single State the value of STATECD should be set to 99.

9. **P1POINTCNT**  Phase 1 point count. The number of basic units (pixels or points) in the stratum.

10. **P2POINTCNT**  Phase 2 point count. The number of field plots that are within the stratum.

11. **EXPNS**  Expansion factor. The area, in acres, that a stratum represents divided by the number of sampled plots in that stratum. This attribute can be used to obtain estimates of population area when summed across all the plots in the population of interest. Refer to chapter 4 for detailed examples.

12. **ADJ_FACTOR_MACR**  Adjustment factor for the macroplot. A value that adjusts the population estimates to account for partially nonsampled plots (access denied and hazardous portions). It is used with condition proportion (COND.CONDPROP_UNADJ) and area expansion (EXPNS) to provide area estimates, when COND_PROP_BASIS = “MACR”. ADJ_FACTOR_MACR is also used with EXPNS and trees per acre unadjusted (TREE.TPA_UNADJ, TREE.TPAMORT_UNADJ, TREE.TPAREMV_UNADJ, TREE.TPAGROW_UNADJ) to provide tree estimates for sampled land. If a
macroplot was not installed, this attribute is left blank (null). Refer to chapter 4 for detailed examples.

13. **ADJ_FACTOR_SUBP**

Adjustment factor for the subplot. A value that adjusts the population estimates to account for partially nonsampled plots (access denied and hazardous portions). It is used with condition proportion (COND.CONDPROP_UNADJ) and area expansion (EXPNS) to provide area estimates, when COND.PROPERTY_BASIS = “SUBP”. ADJ_FACTOR_SUBP is also used with EXPNS and trees per acre unadjusted (TREE.TPA_UNADJ, TREE.TPAMORT_UNADJ, TREE.TPAREMV_UNADJ, TREE.TPAGROW_UNADJ) to provide tree estimates for sampled land. Refer to chapter 4 for detailed examples.

14. **ADJ_FACTOR_MICR**

Adjustment factor for the microplot. A value that adjusts population estimates to account for partially nonsampled plots (access denied and hazardous portions). It is used with POP_STRATUM.EXPNS and seedlings per acre unadjusted (SEEDLING.TPA_UNADJ) or saplings per acre unadjusted (TREE.TPA_UNADJ where TREE DIA <5.0) to provide tree estimates for sampled land. Refer to chapter 4 for detailed examples.

15. **CREATED_BY** Created by. The employee who created the record. This attribute is intentionally left blank in download files.

16. **CREATED_DATE**

Created date. The date the record was created. Date will be in the form DD-MON-YYYYY.

17. **CREATED_IN_INSTANCE**

Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

18. **MODIFIED_BY**

Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

19. **MODIFIED_DATE**

Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYYY.
20. MODIFIED_IN_INSTANCE

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.
Reference Population Attribute Table (Oracle table name is REF_POP_ATTRIBUTE)

| Column name       | Descriptive name                  | Oracle data type        |
|-------------------|-----------------------------------|-------------------------|
| 1 CN              | Sequence number                   | VARCHAR2(34)            |
| 2 ATTRIBUTE_NBR   | Attribute number                  | NUMBER(3)               |
| 3 ATTRIBUTE_DESCR | Attribute description             | VARCHAR2(255)           |
| 4 EXPRESSION      | Expression                        | VARCHAR2(2000)          |
| 5 WHERE_CLAUSE    | Where clause                      | VARCHAR2(255)           |
| 6 CREATED_BY      | Created by                         | VARCHAR2(30)            |
| 7 CREATED_DATE    | Created date                       | DATE                    |
| 8 CREATED_IN_INSTANCE | Created in instance       | VARCHAR2(6)             |
| 9 MODIFIED_BY     | Modified by                        | VARCHAR2(30)            |
| 10 MODIFIED_DATE  | Modified date                      | DATE                    |
| 11 MODIFIED_IN_INSTANCE | Modified in instance     | VARCHAR2(6)             |
| 12 FOOTNOTE       | Footnote                           | VARCHAR2(2000)          |

Type of key | Column(s) order | Tables to link | Abbreviated notation |
------------|-----------------|----------------|----------------------|
Primary     | (ATTRIBUTE_NBR) | N/A            | PAE_PK               |

1. **CN**
   Sequence number. A unique sequence number used to identify a reference population attribute record.

2. **ATTRIBUTE_NBR**
   Attribute number. A numeric code used to identify an attribute record. See codes and descriptions in chapter 4, table 4.1.

3. **ATTRIBUTE_DESCR**
   Attribute description. Examples include “Area of forestland (acres)” or “All live biomass on forestland oven-dry (short tons).” See codes and descriptions in chapter 4, table 4.1.

4. **EXPRESSION**
   Expression. SQL expression that identifies variables that are used to generate population estimate identified by ATTRIBUTE_DESCR (chapter 4, table 4.2).

5. **WHERE_CLAUSE**
   Where clause. SQL where clause that identifies the appropriate method for joining tables and screening records to generate population estimate identified by REF_POP_ATTRIBUTE.ATTRIBUTE_DESCR (chapter 4, table 4.2).
6. **CREATED_BY** Created by. The employee who created the record. This attribute is intentionally left blank in download files.

7. **CREATED_DATE**

   Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

8. **CREATED_IN_INSTANCE**

   Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

9. **MODIFIED_BY**

   Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

10. **MODIFIED_DATE**

    Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

11. **MODIFIED_IN_INSTANCE**

    Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.

12. **FOOTNOTE** Footnote. Intentionally left blank. Will be populated in version 5.0
Reference Population Evaluation Type Description Table (Oracle table name is REF_POP_EVAL_TYP_DESCR)

| Column name       | Descriptive name          | Oracle data type |
|-------------------|---------------------------|------------------|
| 1 EVAL_TYP        | Evaluation type           | VARCHAR2(15)     |
| 2 EVAL_TYP_DESCR  | Evaluation type description | VARCHAR2(255)  |
| 3 CREATED_BY      | Created by                | VARCHAR2(30)     |
| 4 CREATED_DATE    | Created date              | DATE             |
| 5 CREATED_IN_INSTANCE | Created in instance  | VARCHAR2(6)      |
| 6 MODIFIED_BY     | Modified by               | VARCHAR2(30)     |
| 7 MODIFIED_DATE   | Modified date             | DATE             |
| 8 MODIFIED_IN_INSTANCE | Modified in instance | VARCHAR2(6)      |
| 9 CN              | Sequence number           | VARCHAR2(34)     |

**Type of key** | **Column(s) order** | **Tables to link** | **Abbreviated notation** |
---             | ---                  | ---               | ---                      |
Primary        | (CN)                 | N/A               | PED_PK                  |
Unique         | (EVAL_TYP)           | N/A               | PED_UK                  |

1. **EVAL_TYP** Evaluation type. Evaluation types (EVAL_TYP) and the description of the evaluation types (EVAL_TYP_DESCR) are:

| Evaluation type | Evaluation type description |
|-----------------|-----------------------------|
| Expall          | All plots: sampled and nonsampled |
| Expchng         | Sampled plots used for area change estimates |
| Expcurr         | Sampled plots used for current area estimates |
| Expgrow         | Sampled plots used for tree growth estimates |
| Expmort         | Sampled plots used for tree mortality estimates |
| Expremv         | Sampled plots used for tree removal estimates |
| Expvol          | Sampled plots used for tree inventory estimates |

2. **EVAL_TYP_DESCR**

Evaluation type description. The description for each evaluation type (EVAL_TYP). See the list of codes and descriptions in EVAL_TYP.

3. **CREATED_BY** Created by. The employee who created the record. This attribute is intentionally left blank in download files.

4. **CREATED_DATE**

Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

5. **CREATED_IN_INSTANCE**

Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute
stores that information to determine on which computer the record was created.

6. MODIFIED_BY

Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

7. MODIFIED_DATE

Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

8. MODIFIED_IN_INSTANCE

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.

9. CN

Sequence number. A unique sequence number used to identify a reference population evaluation type description record.
## Reference Forest Type Table (Oracle table name is REF_FOREST_TYPE)

| Column name         | Descriptive name          | Oracle data type |
|---------------------|---------------------------|------------------|
| 1 VALUE             | Value                     | NUMBER(3)        |
| 2 MEANING           | Meaning                   | VARCHAR2(80)     |
| 3 TYPGRPCD          | Forest type group code    | NUMBER(3)        |
| 4 MANUAL_START      | Manual start              | NUMBER(3,1)      |
| 5 MANUAL_END        | Manual end                | NUMBER(3,1)      |
| 6 ALLOWED_IN_FIELD  | Allowed in field          | VARCHAR2(1)      |
| 7 CREATED_BY        | Created by                | VARCHAR2(30)     |
| 8 CREATED_DATE      | Created date              | DATE             |
| 9 CREATED_IN_INSTANCE | Created in instance      | VARCHAR2(6)     |
| 10 MODIFIED_BY      | Modified by               | VARCHAR2(30)     |
| 11 MODIFIED_DATE    | Modified date             | DATE             |
| 12 MODIFIED_IN_INSTANCE | Modified in instance    | VARCHAR2(6)     |

| Type of key | Column(s) order | Tables to link | Abbreviated notation |
|-------------|-----------------|----------------|----------------------|
| Primary     | (VALUE)         | N/A            | RFT_PK               |

1. **VALUE**: Value. A code used for the forest type (COND.FORTYPCD, COND.FLDTYPCD, COND.FORTYPCDCALC). Refer to appendix D.

2. **MEANING**: Meaning. The descriptive name corresponding with the forest type code (VALUE). The names associated with these codes are used to label rows or columns in National standard presentation tables. Refer to appendix D.

3. **TYPGRPCD**: Forest type group code. A code assigned to individual forest types in order to group them for reporting purposes. Refer to appendix D.

4. **MANUAL_START**: Manual start. The first version of the Field Guide (PLOT.MANUAL) that the forest type code (VALUE) began to be used.

5. **MANUAL_END**: Manual end. The last version of the Field Guide (PLOT.MANUAL) that the forest type code (VALUE) was valid. When MANUAL_END is blank (null), the code is still valid.

6. **ALLOWED_IN_FIELD**: Allowed in field. An indicator to show if a code (VALUE) is allowed to be used by the field crews. This is a Yes/No (Y/N) field. Specifically, forest type group codes are not allowed in the Field Guide nor is the code for a nonstocked forest type (VALUE = 999).
7. CREATED_BY

Created by. The employee who created the record. This attribute is intentionally left blank in download files.

8. CREATED_DATE

Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

9. CREATED_IN_INSTANCE

Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

10. MODIFIED_BY

Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

11. MODIFIED_DATE

Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

12. MODIFIED_IN_INSTANCE

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.
| Column name         | Descriptive name                          | Oracle data type |
|---------------------|-------------------------------------------|------------------|
| 1 SPCD              | Species code                             | NUMBER           |
| 2 COMMON_NAME       | Common name of species                    | VARCHAR2(100)    |
| 3 GENUS             | Genus                                     | VARCHAR2(40)     |
| 4 SPECIES           | Species name                              | VARCHAR2(50)     |
| 5 VARIETY           | Variety                                   | VARCHAR2(50)     |
| 6 SUBSPECIES        | Subspecies name                           | VARCHAR2(50)     |
| 7 SPECIES_SYMBOL    | Species symbol                            | VARCHAR2(8)      |
| 8 E_SPGRPCD         | East species group code                   | NUMBER(2)        |
| 9 W_SPGRPCD         | West species group code                   | NUMBER(2)        |
| 10 MAJOR_SPGRPCD    | Major species group code                  | NUMBER(1)        |
| 11 STOCKING_SPGRPCD | Stocking species group code               | NUMBER(3)        |
| 12 FOREST_TYPE_SPGRPCD | Forest type species group code         | NUMBER(3)        |
| 13 EXISTS_IN_NCRS   | Exists in the North Central Research Station States | VARCHAR2(1) |
| 14 EXISTS_IN_NERS   | Exists in the Northeastern Research Station States | VARCHAR2(1) |
| 15 EXISTS_IN_PNWRS  | Exists in the Pacific Northwest Research Station States | VARCHAR2(1) |
| 16 EXISTS_IN_RMRS   | Exists in the Rocky Mountain Research Station States | VARCHAR2(1) |
| 17 EXISTS_IN_SRS    | Exists in the Southern Research Station States | VARCHAR2(1) |
| 18 SITETREE         | Site tree                                 | VARCHAR2(1)      |
| 19 SFTWD_HRDWD      | Softwood or hardwood                      | VARCHAR2(1)      |
| 20 ST_EXISTS_IN_NCRS| Site tree exists in the North Central Research Station region | VARCHAR2(1) |
| 21 ST_EXISTS_IN_NERS| Site tree exists in the Northeastern Research Station region | VARCHAR2(1) |
| 22 ST_EXISTS_IN_PNWRS| Site tree exists in the Pacific Northwest Research Station region | VARCHAR2(1) |
| 23 ST_EXISTS_IN_RMRS| Site tree exists in the Rocky Mountain Research Station region | VARCHAR2(1) |
| 24 ST_EXISTS_IN_SRS | Site tree exists in the Southern Research Station region | VARCHAR2(1) |
| 25 EAST              | East                                      | VARCHAR2(1)      |
| 26 WEST              | West                                      | VARCHAR2(1)      |
| 27 WOODLAND          | Woodland species                          | VARCHAR2(1)      |
| 28 MANUAL_START      | Manual start                              | NUMBER(3,1)      |
| 29 MANUAL_END        | Manual end                                | NUMBER(3,1)      |
| 30 CREATED_BY        | Created by                                | VARCHAR2(30)     |
| 31 CREATED_DATE      | Created date                              | DATE             |
| 32 CREATED_IN_INSTANCE | Created in instance                       | VARCHAR2(6)      |
| Column name                                      | Descriptive name                                           | Oracle data type       |
|-------------------------------------------------|------------------------------------------------------------|------------------------|
| 33 MODIFIED_BY                                  | Modified by                                                | VARCHAR2(30)           |
| 34 MODIFIED_DATE                                | Modified date                                              | DATE                   |
| 35 MODIFIED_IN_INSTANCE                         | Modified in instance                                       | VARCHAR2(6)            |
| 36 CORE                                         | Core                                                       | VARCHAR2(1)            |
| 37 JENKINS_SPGRPCD                              | Jenkins species group code                                 | NUMBER(8,5)            |
| 38 JENKINS_TOTAL_B1                             | Jenkins total B1                                            | NUMBER(8,5)            |
| 39 JENKINS_TOTAL_B2                             | Jenkins total B2                                            | NUMBER(8,5)            |
| 40 JENKINS_STEM_WOOD_RATIO_B1                   | Jenkins stem wood ratio B1                                  | NUMBER(8,5)            |
| 41 JENKINS_STEM_WOOD_RATIO_B2                   | Jenkins stem wood ratio B2                                  | NUMBER(8,5)            |
| 42 JENKINS_STEM_BARK_RATIO_B1                   | Jenkins stem bark ratio B1                                  | NUMBER(8,5)            |
| 43 JENKINS_STEM_BARK_RATIO_B2                   | Jenkins stem bark ratio B2                                  | NUMBER(8,5)            |
| 44 JENKINS_FOLIAGE_RATIO_B1                     | Jenkins foliage ratio B1                                    | NUMBER(8,5)            |
| 45 JENKINS_FOLIAGE_RATIO_B2                     | Jenkins foliage ratio B2                                    | NUMBER(8,5)            |
| 46 JENKINS_ROOT_RATIO_B1                        | Jenkins root ratio B1                                       | NUMBER(8,5)            |
| 47 JENKINS_ROOT_RATIO_B2                        | Jenkins root ratio B2                                       | NUMBER(8,5)            |
| 48 JENKINS_SAPLING_ADJUSTMENT                   | Jenkins sapling adjustment factor                           | NUMBER(8,5)            |
| 49 WOOD_SPGR_GREENVOL_DRYWT                     | Green specific gravity wood (green volume and oven-dry weight) | NUMBER(8,5)            |
| 50 WOOD_SPGR_GREENVOL_DRYWT_CIT                 | Green specific gravity wood citation                        | NUMBER(7)              |
| 51 BARK_SPGR_GREENVOL_DRYWT                     | Green specific gravity bark (green volume and oven-dry weight) | NUMBER(8,5)            |
| 52 BARK_SPGR_GREENVOL_DRYWT_CIT                 | Green specific gravity bark citation                        | NUMBER(7)              |
| 53 MC_PCT_GREEN_WOOD                            | Moisture content of green wood as a percent of oven-dry weight | NUMBER(8,5)            |
| 54 MC_PCT_GREEN_WOOD_CIT                       | Moisture content of green wood citation                     | NUMBER(7)              |
| 55 MC_PCT_GREEN_BARK                            | Moisture content of green bark as a percent of oven-dry weight | NUMBER(8,5)            |
| 56 MC_PCT_GREEN_BARK_CIT                       | Moisture content of green bark citation                     | NUMBER(7)              |
| 57 WOOD_SPGR_MC12VOL_DRYWT                      | Wood specific gravity (12 percent moisture content volume and oven-dry weight) | NUMBER(8,5)            |
| 58 WOOD_SPGR_MC12VOL_DRYWT_CIT                  | Wood specific gravity (12 percent moisture content volume and oven-dry weight) citation | NUMBER(7)              |
| 59 BARK_VOL_PCT                                 | Bark volume as a percent of wood volume                     | NUMBER(8,5)            |
| 60 BARK_VOL_PCT_CIT                             | Bark volume as a percent of wood volume citation            | NUMBER(7)              |
| 61 RAILE_STUMP_DOB_B1                           | Raile stump diameter outside bark equation coefficient B1   | NUMBER(8,5)            |
| 62 RAILE_STUMP_DIB_B1                           | Raile stump diameter inside bark equation coefficient B1    | NUMBER(8,5)            |
Coefficients for calculating total aboveground biomass based on Jenkins and others (2003) equations are included in the REF_SPECIES table. Coefficients for calculating biomass components (stem wood, stem bark, foliage, coarse roots, stump, and sapling) are also included in the REF_SPECIES table. Biomass in branches and treetops (tops and limbs) may be found by subtracting the biomass in stem wood, stem bark, foliage, and stump from total aboveground biomass. Heath and others (2009) provides an overview of the historical use of Jenkins and others (2003) for biomass estimation for the U.S. forest greenhouse gas inventory (U.S. Environmental Protection Agency 2008) and an overview of the approach of the new biomass equations used for FIA data.

1. SPCD Species code. An FIA tree species code. Refer to appendix F for codes.
2. COMMON_NAME Common name. Common name of the species. Refer to appendix F.
3. GENUS Genus. The genus name associated with the FIA tree species code. Refer to appendix F.
4. SPECIES Species. The species name associated with the FIA tree species code. Refer to appendix F.
5. VARIETY Variety. The variety name associated with the FIA tree species code.
6. SUBSPECIES Subspecies. The subspecies name associated with the FIA tree species code.
7. SPECIES_SYMBOL Species symbol. The NRCS PLANTS database code associated with the FIA tree species code.
8. E_SPGRPCD Eastern species group code. A code indicating the species group assignment for eastern species. Depending on the State in which a tree is tallied, either the eastern or western species group code is associated with the actual TREE, SITETREE, and SEEDLING data. Species group codes and names can be found in appendix G.
9. W_SPGRPCD Western species group code. A code indicating the FIADB species group assignment for western species. Depending on the State in which a tree is tallied, either the eastern or western species group code is associated with the
actual TREE, SITETREE, and SEEDLING data. Species group codes and names can be found in appendix G.

10. MAJOR_SPGRPCD

Major species group code. A code indicating the major species group, which can be used for reporting purposes.

| Code | Description       |
|------|-------------------|
| 1    | Pine              |
| 2    | Other conifers    |
| 3    | Soft hardwood     |
| 4    | Hard hardwood     |

11. STOCKING_SPGRPCD

Stocking species group code. A code indicating which stocking equation a species is assigned.

| Code | Description             |
|------|-------------------------|
| 1    | Spruce-fir              |
| 2    | Western larch           |
| 3    | Black spruce            |
| 4    | Jack pine               |
| 5    | Lodgepole pine          |
| 6    | Shortleaf pine          |
| 7    | Slash pine              |
| 8    | Western white pine      |
| 9    | Longleaf pine           |
| 10   | Ponderosa pine          |
| 11   | Red pine                |
| 12   | Pond pine               |
| 13   | Eastern white pine      |
| 14   | Loblolly pine           |
| 15   | Douglas-fir             |
| 16   | Northern white cedar    |
| 17   | Eastern hemlock         |
| 18   | Western hemlock         |
| 19   | Redwood                 |
| 20   | Average softwood        |
| 25   | Red maple               |
| 26   | Red alder               |
| 27   | Maple, beech, birch     |
| 28   | Paper birch             |
| 29   | Oaks and hickory        |
| 30   | Black walnut            |
| 31   | Sweetgum                |
| 32   | Aspen                   |
| 33   | Cherry, ash, yellow poplar |
| 35   | Basswood                |
| 36   | Elm, ash, cottonwood    |
| 37   | Average hardwood        |
| 38   | Dryland species         |
12. FOREST_TYPE_SPGRPCD

   Forest type species group code. A code indicating which initial forest type
group a species is assigned.

13. EXISTS_IN_NCRS

   Exists in the North Central Research Station. Indicates which species are
valid for North Central Research Station States. Trees that are applicable to
North Central States are marked with an X.

14. EXISTS_IN_NERS

   Exists in the Northeastern Research Station. Indicates which tree species are
valid for Northeastern Research Station States. Tree species that are
applicable to Northeastern States are marked with an X.

15. EXISTS_IN_PNWRS

   Exists in the Pacific Northwest Research Station. Indicates which species are
valid for Pacific Northwest Research Station States. Tree species that are
applicable to Pacific Northwest States are marked with an X.

16. EXISTS_IN_RMRS

   Exists in the Rocky Mountain Research Station. Indicates which species are
valid for Rocky Mountain Research Station States. Tree species that are
applicable to the Rocky Mountain States are marked with an X.

17. EXISTS_IN_SRS

   Exists in the Southern Research Station. Indicates which species are valid for
Southern Research Station States. Tree species that are applicable to the
Southern States are marked with an X.

18. SITETREE

   Sitetree. Indicates whether the tree species can be coded as a site tree. Tree
species that are applicable to have site data collected are marked with an X.

19. SFTWD_HRDWD

   Softwood/hardwood. Indicates whether the species is a softwood or a
hardwood. Softwoods are marked with an S and hardwoods with an H.

20. ST_EXISTS_IN_NCRS

   Site tree exists in the North Central Research Station. Indicates whether or
not the species is valid as a site tree in North Central Research Station States.
Tree species that are applicable to have site data collected are marked with an
X.
21. ST_EXISTS_IN_NERS

Site tree exists in the Northeastern Research Station. Indicates whether or not the species is valid as a site tree in Northeastern Research Station States. Tree species that are applicable to have site data collected are marked with an X.

22. ST_EXISTS_IN_PNWRS

Site tree exists in the Pacific Northwest Research Station. Indicates whether or not the species is valid for a site tree in Pacific Northwest Research Station States. Tree species that are applicable to have site data collected are marked with an X.

23. ST_EXISTS_IN_RMRS

Site tree exists in the Rocky Mountain Research Station. Indicates whether or not the species is valid as a site tree in Rocky Mountain Research Station States. Tree species that are applicable to have site data collected are marked with an X.

24. ST_EXISTS_IN_SRS

Site tree exists in the Southern Research Station. Indicates whether or not the species is valid for a site tree in Southern Research Station States. Tree species that are applicable to have site data collected are marked with an X.

25. EAST

East. Indicates if the species can occur in the Eastern United States. Valid eastern species are marked with an E.

26. WEST

West. Indicates if the species can occur in the Western United States. Valid western species are marked with a W.

27. WOODLAND

Woodland. Indicates if the species is classified as a woodland species, meaning that the diameter is measured as root collar. Woodland species are marked with an X.

28. MANUAL_START

Manual start. The first version of the Field Guide (PLOT.MANUAL) that the species code was used.

29. MANUAL_END

Manual end. The last version of the Field Guide (PLOT.MANUAL) that the species code was valid. When MANUAL_END is blank (null), the code is still valid.

30. CREATED_BY

Created by. The employee who created the record. This attribute is intentionally left blank in download files.
31. CREATED_DATE

Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

32. CREATED_IN_INSTANCE

Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

33. MODIFIED_BY

Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

34. MODIFIED_DATE

Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

35. MODIFIED_IN_INSTANCE

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.

36. CORE

Core. Indicates that the tree species must be tallied (measured) by all FIA work units. Species marked with a Y are core and core optional species are marked with an N.

37. JENKINS_SPGRPCD

Jenkins species group code. A code that identifies a group of similar species, which is used to apply the correct biomass estimation equation and coefficient developed by Jenkins and others (2003). A specific set of biomass equation coefficients are assigned to each group. Additional explanation about how to estimate biomass, and when to use a certain set of coefficients, is provided in appendix J.
### Reference Species Table

| Code | Description                                      |
|------|--------------------------------------------------|
| 1    | Cedar/larch                                      |
| 2    | Douglas-fir                                      |
| 3    | True fir/hemlock                                |
| 4    | Pine                                            |
| 5    | Spruce                                           |
| 6    | Aspen/alder/cottonwood/willow                    |
| 7    | Soft maple/birch                                |
| 8    | Mixed hardwood                                   |
| 9    | Hard maple/oak/hickory/beech                    |
| 10   | Juniper/oak/mesquite                             |

#### 38. JENKINS_TOTAL_B1

Jenkins total B1. Jenkins B1 coefficient used to estimate total aboveground oven-dry biomass (pounds). This is coefficient $B_0$ from table 4 in Jenkins and others (2003). See appendix J for details on biomass equations.

Use JENKINS_TOTAL_B1 along with JENKINS_TOTAL_B2 to estimate total aboveground biomass (includes stem wood (bole), stump, bark, top, limbs, and foliage) with the equation below:

$$\text{Total}_{agb} = (\text{Exp(JENKINS\_TOTAL\_B1 + JENKINS\_TOTAL\_B2 } \times \ln(DIA \times 2.54)) \times 2.2046$$

| JENKINS_SPGRPCD | JENKINS_TOTAL_B1 |
|-----------------|------------------|
| 1               | -2.03360         |
| 2               | -2.23040         |
| 3               | -2.53840         |
| 4               | -2.53560         |
| 5               | -2.07730         |
| 6               | -2.20940         |
| 7               | -1.91230         |
| 8               | -2.48000         |
| 9               | -2.01270         |
| 10              | -0.71520         |

#### 39. JENKINS_TOTAL_B2

Jenkins total B2. Jenkins B2 coefficient used to estimate total aboveground oven-dry biomass (pounds). This is coefficient $B_1$ from table 4 in Jenkins and others (2003). See appendix J for details on biomass equations.

Use JENKINS_TOTAL_B2 along with JENKINS_TOTAL_B1 to estimate total aboveground biomass (includes stem wood (bole), stump, bark, top, limbs, and foliage) with the equation below:

$$\text{Total}_{agb} = (\text{Exp(JENKINS\_TOTAL\_B1 + JENKINS\_TOTAL\_B2 } \times \ln(DIA \times 2.54)) \times 2.2046$$
### 40. JENKINS_STEM_WOOD_RATIO_B1

Jenkins stem wood ratio B1. A coefficient used in computing component ratio biomass. This is equivalent to coefficient B0 for stem wood from table 6 in Jenkins and others (2003). The appropriate coefficient to use is based on the species category (SFTWD_HRDWD). The stem is defined as that portion of the tree from a 1-foot stump to a 4-inch DOB top (i.e., the merchantable bole.) See appendix J for details on biomass equations.

The average proportion of aboveground biomass in stem wood is calculated using this equation:

\[
\text{stem\_ratio} = \exp(\text{JENKINS\_STEM\_WOOD\_RATIO\_B1} + \frac{\text{JENKINS\_STEM\_WOOD\_RATIO\_B2}}{(\text{DIA}*2.54)})
\]

| Species category | JENKINS\_STEM\_WOOD\_RATIO\_B1 |
|------------------|-------------------------------|
| Softwood (S)     | -0.3737                       |
| Hardwood (H)     | -0.3065                       |

### 41. JENKINS_STEM_WOOD_RATIO_B2

Jenkins stem wood ratio B2. A coefficient used in computing component ratio biomass. This is equivalent to coefficient B1 for stem wood from table 6 in Jenkins and others (2003). The appropriate coefficient to use is based on the species category (SFTWD_HRDWD). The stem is defined as that portion of the tree from a 1-foot stump to a 4-inch DOB top (i.e., the merchantable bole.) See appendix J for details on biomass equations.

The average proportion of aboveground biomass in stem wood is calculated using this equation:

\[
\text{stem\_ratio} = \exp(\text{JENKINS\_STEM\_WOOD\_RATIO\_B1} + \frac{\text{JENKINS\_STEM\_WOOD\_RATIO\_B2}}{(\text{DIA}*2.54)})
\]

| Species category | JENKINS\_STEM\_WOOD\_RATIO\_B2 |
|------------------|-------------------------------|
| Softwood (S)     | -1.8055                       |
| Hardwood (H)     | -5.4240                       |
42. JENKINS_STEM_BARK_RATIO_B1

Jenkins stem bark ratio B1. A coefficient used in computing component ratio biomass. This is equivalent to coefficient B0 for stem bark from table 6 in Jenkins and others (2003). The appropriate coefficient to use is based on the species category (SFTWD_HRDWD). This ratio estimates bark biomass on the stem, defined as that portion of the tree from a 1-foot stump to a 4-inch DOB top (i.e., the merchantable bole.) See appendix J for details on biomass equations.

The average proportion of aboveground biomass in stem bark is calculated using this equation:

\[ \text{bark\_ratio} = \exp(J\text{ENKINS\_STEM\_BARK\_RATIO\_B1} + J\text{ENKINS\_STEM\_BARK\_RATIO\_B2} / (\text{DIA*2.54})) \]

| Species category | JENKINS_STEM_BARK_RATIO_B1 |
|------------------|---------------------------|
| Softwood (S)     | -2.0980                   |
| Hardwood (H)     | -2.0129                   |

43. JENKINS_STEM_BARK_RATIO_B2

Jenkins stem bark ratio B2. A coefficient used in computing component ratio biomass. This is equivalent to coefficient B1 for stem bark from table 6 in Jenkins and others (2003). The appropriate coefficient to use is based on the species category (SFTWD_HRDWD). This ratio estimates bark biomass on the stem, defined as that portion of the tree from a 1-foot stump to a 4-inch DOB top (i.e., the merchantable bole.) See appendix J for details on biomass equations.

The average proportion of aboveground biomass in stem bark is calculated using this equation:

\[ \text{bark\_ratio} = \exp(J\text{ENKINS\_STEM\_BARK\_RATIO\_B1} + J\text{ENKINS\_STEM\_BARK\_RATIO\_B2} / (\text{DIA*2.54})) \]

| Species category | JENKINS_STEM_BARK_RATIO_B2 |
|------------------|---------------------------|
| Softwood (S)     | -1.1432                   |
| Hardwood (H)     | -1.6805                   |

44. JENKINS_FOLIAGE_RATIO_B1

Jenkins foliage ratio B1. A coefficient used in computing component ratio biomass. This is equivalent to coefficient B0 for foliage from table 6 in Jenkins and others (2003). The appropriate coefficient to use is based on the species category (SFTWD_HRDWD). See appendix J for details on biomass equations.
The average proportion of aboveground biomass in foliage is calculated using this equation:

\[
\text{foliage\_ratio} = \text{Exp}(\text{JENKINS\_FOLIAGE\_RATIO\_B1} + \frac{\text{JENKINS\_FOLIAGE\_RATIO\_B2}}{(\text{DIA} \times 2.54)})
\]

| Species category | JENKINS\_FOLIAGE\_RATIO\_B1 |
|------------------|-------------------------------|
| Softwood (S)     | -2.9584                       |
| Hardwood (H)     | -4.0813                       |

45. **JENKINS\_FOLIAGE\_RATIO\_B2**

Jenkins foliage ratio B2. A coefficient used in computing component ratio biomass. This is equivalent to coefficient B1 for foliage from table 6 in Jenkins and others (2003). The appropriate coefficient to use is based on the species category (SFTWD\_HRDWD). See appendix J for details on biomass equations.

The average proportion of aboveground biomass in foliage is calculated using this equation:

\[
\text{foliage\_ratio} = \text{Exp}(\text{JENKINS\_FOLIAGE\_RATIO\_B1} + \frac{\text{JENKINS\_FOLIAGE\_RATIO\_B2}}{(\text{DIA} \times 2.54)})
\]

| Species category | JENKINS\_FOLIAGE\_RATIO\_B2 |
|------------------|-------------------------------|
| Softwood (S)     | 4.4766                        |
| Hardwood (H)     | 5.8816                        |

46. **JENKINS\_ROOT\_RATIO\_B1**

Jenkins root ratio B1. A coefficient used in computing component ratio biomass. This is equivalent to coefficient B0 for coarse roots from table 6 in Jenkins and others (2003). The appropriate coefficient to use is based on the species category (SFTWD\_HRDWD). See appendix J for details on biomass equations.

The average proportion of coarse roots to total aboveground biomass is calculated using this equation:

\[
\text{root\_ratio} = \text{Exp}(\text{JENKINS\_ROOT\_RATIO\_B1} + \frac{\text{JENKINS\_ROOT\_RATIO\_B2}}{(\text{DIA} \times 2.54)})
\]

| Species category | JENKINS\_ROOT\_RATIO\_B1 |
|------------------|---------------------------|
| Softwood (S)     | -1.5619                   |
| Hardwood (H)     | -1.6911                   |

47. **JENKINS\_ROOT\_RATIO\_B2**

Jenkins root ratio B2. A coefficient used in computing component ratio biomass. This is equivalent to coefficient B1 for coarse roots from table 6 in Jenkins and others (2003). The appropriate coefficient to use is based on the
species category (SFTWD_HRDWD). See appendix J for details on biomass equations.

The average proportion of coarse roots to total aboveground biomass is calculated using this equation:

\[
\text{root\ ratio} = \text{Exp}(\text{JENKINS_ROOT_RATIO_B1} + \frac{\text{JENKINS_ROOT_RATIO_B2}}{\text{DIA}*2.54})
\]

| Species category          | JENKINS_ROOT_RATIO_B2 |
|---------------------------|-----------------------|
| Softwood (S)              | 0.6614                |
| Hardwood (H)              | 0.8160                |

48. JENKINS_SAPLING_ADJUSTMENT

Jenkins sapling adjustment factor. A factor used to compute the biomass of saplings. Sapling biomass is computed by multiplying diameter (DIA) by the appropriate species adjustment factor (from Jenkins and others [2003]). The sapling adjustment factor was computed as a national average ratio of the REGIONAL_DRYBIOT (total dry biomass) divided by the Jenkins total biomass for all 5.0-inch trees, which is the size at which biomass based on volume begins. Because this adjustment factor was computed at the species level, there is a specific adjustment factor for each species. Users can download the REF_SPECIES table, which includes the values of JENKINS_SAPLING_ADJUSTMENT at http://ncrs2.fs.fed.us/fiadb4-downloads/datamart.html. See appendix J for details on biomass equations.

49. WOOD_SPGR_GREENVOL DRYWT

Green specific gravity of wood (green volume and oven-dry weight). This variable is used to determine the oven-dry weight (in pounds) of live and dead trees based on volume variables in the TREE table (VOLCFSND, VOLCFGRS, VOLCFNET…). These volumes are assumed to be green wood volumes. Oven-dry biomass for the sound volume in a tree can be calculated using this equation:

\[
B_{\text{odw}} = \text{VOLCFSND} \times \text{WOOD_SPGR_GREENVOL_DRYWT} \times 62.4
\]

Where:

\[
B_{\text{odw}} = \text{sound oven-dry biomass of a tree in pounds}
\]

\[
\text{VOLCFSND} = \text{sound volume of a tree in cubic feet}
\]

50. WOOD_SPGR_GREENVOL_DRYWT_CIT

Citation for WOOD_SPGR_GREENVOL_DRYWT. The value of this variable can be linked to the corresponding value in the CITATION_NBR variable in the REF_CITATION table to find the source of the WOOD_SPGR_GREENVOL_DRYWT variable.
51. BARK_SPGR_GREENVOL_DRYWT

Green specific gravity of the bark (green volume and oven-dry weight). There is some shrinkage in bark volume when a live tree is cut and dried. In FIADB, this specific gravity is used on live and dead trees to convert green volume to oven-dry weight in pounds. Oven-dry biomass for bark can be calculated using the volume of a tree using this equation:

\[ B_{odw} = BARK_VOLUME \times BARK_SPGR_GREENVOL_DRYWT \times 62.4 \]

Where:

- \( B_{odw} \) = oven-dry biomass of bark on a tree in pounds
- \( BARK_VOLUME \) = volume of the bark on a tree bole, in cubic feet. Note that bark volume is often estimated by subtracting volume of the bole inside bark from volume of the bole outside bark. Or, an estimate of bark volume can be obtained using any tree volume column along with BARK_VOL_PCT found in this table as follows:

\[ BARK_VOLUME = TREE_VOLUME \times (BARK_VOL_PCT/100.0) \]

52. BARK_SPGR_GREENVOL_DRYWT_CIT

Citation for BARK_SPGR_GREENVOL_DRYWT. The value of this variable can be linked to the corresponding value in the CITATION_NBR variable in the REF_CITATION table to find the source of the BARK_SPGR_GREENVOL_DRYWT variable.

53. MC_PCT_GREEN_WOOD

Moisture content of green wood as a percent of oven-dry weight. Wood and bark are often sold based on green weight. The user is cautioned that green weights can be extremely variable geographically, seasonally, within species and across various portions of individual trees.

54. MC_PCT_GREEN_WOOD_CIT

Citation for MC_PCT_GREEN_WOOD_CIT. The value of this variable can be linked to the corresponding value in the CITATION_NBR variable in the REF_CITATION table to find the source of the MC_PT_GREEN_WOOD variable.

55. MC_PCT_GREEN_BARK

Moisture content of green bark as a percent of oven-dry weight. Wood and bark are often sold based on green weight. The user is cautioned that green weights can be extremely variable geographically, seasonally, within species and across various portions of individual trees.
56. **MC_PCT_GREEN_BARK_CIT**

Citation for MC_PCT_GREEN_BARK. The value of this variable can be linked to the corresponding value in the CITATION_NBR variable in the REF_CITATION table to find the source of the MC_PCT_GREEN_BARK variable.

57. **WOOD_SPGR_MC12VOL_DRYWT**

Wood specific gravity (12 percent moisture content volume and oven-dry weight). Used in biomass estimation of forest products (lumber, veneer, etc.)

58. **WOOD_SPGR_MC12VOL_DRYWT_CIT**

Citation for WOOD_SPGR_MC12VOL_DRYWT. The value of this variable can be linked to the corresponding value in the CITATION_NBR variable in the REF_CITATION table to find the source of the WOOD_SPGR_MC12VOL_DRYWT variable.

59. **BARK_VOL_PCT**

Bark volume as a percent of wood volume. Bark volume expressed as a percent of wood volume. The volume of bark does not include voids due to ridges and valleys in bark.

60. **BARK_VOL_PCT_CIT**

Citation for BARK_VOL_PCT. The value of this variable can be linked to the corresponding value in the CITATION_NBR variable in the REF_CITATION table to find the source of the BARK_VOL_PCT variable.

61. **RAILE_STUMPDOB_B1**

Raile stump diameter outside bark equation coefficient B1. This is equivalent to coefficient B from table 1 in Raile (1982). See appendix J for details on biomass equations.

This coefficient is used in an equation to estimate diameter outside bark at any point on the stump from ground to 1 foot high. From this, volume outside bark is estimated for the selected height along the stump. Volume inside bark is subtracted from volume outside bark to estimate bark volume. Both volumes are converted to biomass using either wood or bark specific gravities. (DOB and DIA are in inches, HT is in feet.)

\[ \text{DOB} = \text{DIA} + (\text{DIA} \times \text{RAILE_STUMPDOB_B1} \times (4.5-\text{HT}) / (\text{HT}+1)) \]
62. RAILE_STUMP_DIB_B1

Raile stump diameter inside bark equation coefficient B1. This is equivalent to coefficient A from table 2 in Raile (1982). See appendix J for details on biomass equations.

This coefficient is used along with RAILE_STUMP_DIB_B2 in an equation to estimate diameter inside bark at any point on the stump from ground to 1 foot high. From this, volume inside bark is estimated for the selected height along the stump. Volume inside bark is subtracted from volume outside bark to estimate bark volume. Both volumes are converted to biomass using either wood or bark specific gravities. (DIB and DIA are in inches, HT is in feet.)

\[
DIB = (DIA \times RAILE_STUMP_DIB_B1) + \\
(DIA \times RAILE_STUMP_DIB_B2 \times (4.5-HT) / (HT+1))
\]

63. RAILE_STUMP_DIB_B2

Raile stump diameter inside bark equation coefficient B2. This is equivalent to coefficient B from table 2 in Raile (1982). See appendix J for details on biomass equations.

This coefficient is used along with RAILE_STUMP_DIB_B1 in an equation to estimate diameter inside bark at any point on the stump from ground to 1 foot high. From this, volume inside bark is estimated for the selected height along the stump. Volume inside bark is subtracted from volume outside bark to estimate bark volume. Both volumes are converted to biomass using either wood or bark specific gravities. (DIB and DIA are in inches, HT is in feet.)

\[
DIB = (DIA \times RAILE_STUMP_DIB_B1) + \\
(DIA \times RAILE_STUMP_DIB_B2 \times (4.5-HT) / (HT+1))
\]
Reference Species Group Table (Oracle table name is REF_SPECIES_GROUP)

| Column name     | Descriptive name       | Oracle data type |
|-----------------|------------------------|-----------------|
| SPGRPCD         | Species group code     | NUMBER(2)       |
| NAME            | Name                   | VARCHAR2(35)    |
| REGION          | Region                 | VARCHAR2(8)     |
| CLASS           | Class                  | VARCHAR2(8)     |
| CREATED_BY      | Created by             | VARCHAR2(30)    |
| CREATED_DATE    | Created date           | DATE            |
| CREATED_IN_INSTANCE | Created in instance   | VARCHAR2(6)    |
| MODIFIED_BY     | Modified by            | VARCHAR2(30)    |
| MODIFIED_DATE   | Modified date          | DATE            |
| MODIFIED_IN_INSTANCE | Modified in instance | VARCHAR2(6)    |

| Type of key | Column(s) order | Tables to link | Abbreviated notation |
|-------------|-----------------|----------------|----------------------|
| Primary     | (SPGRPCD)       | N/A            | SGP_PK               |

1. SPGRPCD  
Species group code. A code assigned to each tree species in order to group them for reporting purposes on presentation tables. Codes and their associated names (NAME) are shown in appendix G. Individual tree species and corresponding species group codes are shown in appendix F.

2. NAME  
Name. A descriptive name for each species group code (SPGRPCD). The names associated with these codes are used to label rows or columns in national standard presentation tables.

3. REGION  
Region. A description of the section of the United States in which the species, and therefore species group is commonly found. Values are ‘EASTERN’ and ‘WESTERN.’

4. CLASS  
Class. A descriptor for the classification of the species type with the species group. Values are ‘SOFTWOOD’ and ‘HARDWOOD.’

5. CREATED_BY  
Created by. The employee who created the record. This attribute is intentionally left blank in download files.

6. CREATED_DATE  
Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

7. CREATED_IN_INSTANCE  
Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.
8. MODIFIED_BY

Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

9. MODIFIED_DATE

Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

10. MODIFIED_IN_INSTANCE

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.
### Reference Habitat Type Description Table (Oracle table name is REF_HABTYP_DESCRIPTION)

| Column name | Descriptive name | Oracle data type |
|-------------|------------------|-----------------|
| CN          | Sequence number  | VARCHAR2(34)    |
| HABTYPCD    | Habitat type code| VARCHAR2(10)    |
| PUB_CD      | Publication code | VARCHAR2(10)    |
| SCIENTIFIC_NAME | Scientific name    | VARCHAR2(115)   |
| COMMON_NAME | Common name       | VARCHAR2(255)   |
| VALID       | Valid             | VARCHAR2(1)     |
| CREATED_BY  | Created by        | VARCHAR2(30)    |
| CREATED_DATE| Created date      | DATE            |
| CREATED_IN_INSTANCE | Created in instance | VARCHAR2(6) |
| MODIFIED_BY | Modified by       | VARCHAR2(30)    |
| MODIFIED_DATE| Modified date    | DATE            |
| MODIFIED_IN_INSTANCE | Modified in instance | VARCHAR2(6) |

| Type of key | Column(s) order | Tables to link | Abbreviated notation |
|-------------|-----------------|----------------|----------------------|
| Primary     | (CN)            | N/A            | RHN_PK               |
| Unique      | (HABTYPCD, PUB_CD) | N/A          | RHN_UK               |
| Foreign     | (PUB_CD)        | REF_HABTYP_DESCRIPTION to REF_HABTYP_PUBLICATION | RHN_RPN_FK |

1. **CN**
   Sequence number. A unique sequence number used to identify a habitat type description record.

2. **HABTYPCD**
   Habitat type code. A code representing a habitat type. Unique codes are determined by combining both habitat type code and publication code (HABTYPCD and PUB_CD).

3. **PUB_CD**
   Publication code. A code indicating the publication that lists the name associated with a particular habitat type code (HABTYPCD).

4. **SCIENTIFIC_NAME**
   Scientific name. This attribute contains some type of descriptor, usually the Latin name, of the plant(s) associated with the habitat type code. It has values such as the entire scientific name or the shortened synonym of the plant(s) represented by the habitat type code or it may have an English geographic type of descriptor.

5. **COMMON_NAME**
   Common name. This attribute contains some type of descriptor, usually the common name, of the plant(s) associated with the habitat type code.
6. **VALID**
   Valid. A flag to indicate if this is a valid, documented habitat type code. Values are Y and N.

7. **CREATED_BY**
   Created by. The employee who created the record. This attribute is intentionally left blank in download files.

8. **CREATED_DATE**
   Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

9. **CREATED_IN_INSTANCE**
   Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

10. **MODIFIED_BY**
    Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

11. **MODIFIED_DATE**
    Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

12. **MODIFIED_IN_INSTANCE**
    Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.
### Reference Habitat Type Publication Table (Oracle table name is REF_HABTYP_PUBLICATION)

| Column name | Descriptive name       | Oracle data type |
|-------------|------------------------|------------------|
| 1 CN        | Sequence number         | VARCHAR2(34)     |
| 2 PUB_CD    | Publication code        | VARCHAR2(10)     |
| 3 TITLE     | Title of publication    | VARCHAR2(200)    |
| 4 AUTHOR    | Author of publication   | VARCHAR2(200)    |
| 5 TYPE      | Type of publication     | VARCHAR2(10)     |
| 6 VALID     | Valid                   | VARCHAR2(1)      |
| 7 CREATED_BY| Created by              | VARCHAR2(30)     |
| 8 CREATED_DATE| Created date           | DATE             |
| 9 CREATED_IN_INSTANCE| Created in instance | VARCHAR2(6)     |
| 10 MODIFIED_BY| Modified by             | VARCHAR2(30)     |
| 11 MODIFIED_DATE| Modified date          | DATE             |
| 12 MODIFIED_IN_INSTANCE| Modified in instance  | VARCHAR2(6)     |

#### Type of key

| Primary     | Column(s) order | Tables to link | Abbreviated notation |
|-------------|-----------------|----------------|----------------------|
| (CN)        | N/A             | RPN_PK         |                      |
| Unique      | (PUB_CD)        | N/A            | RPN_UK               |

1. **CN**  
   - Sequence number. A unique sequence number used to identify a habitat type publication record.

2. **PUB_CD**  
   - Publication code. A code indicating the publication that lists the name associated with a particular habitat type code (REF_HABTYP_DESCRIPTION.HABTYPCD).

3. **TITLE**  
   - Title. The title of the publication defining particular habitat types.

4. **AUTHOR**  
   - Author. The author of the publication defining particular habitat types.

5. **TYPE**  
   - Type. An attribute describing if the habitat type publication describes potential vegetation or existing vegetation. Values are PVREF and EVREF. If it is unknown which type of habitat is being described, then TYPE = ?.

6. **VALID**  
   - Valid. A flag to indicate if this publication is valid for FIA. Values are Y and N.

7. **CREATED_BY**  
   - Created by. The employee who created the record. This attribute is intentionally left blank in download files.

8. **CREATED_DATE**  
   - Created date. The date the record was created. Date will be in the form DD-MON-YYYY.
9. CREATED_IN_INSTANCE

Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

10. MODIFIED_BY

Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

11. MODIFIED_DATE

Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

12. MODIFIED_IN_INSTANCE

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.
Reference Citation Table (Oracle table name is REF_CITATION)

| Column name         | Descriptive name               | Oracle data type |
|---------------------|--------------------------------|------------------|
| 1 CITATION_NBR      | Citation number                | NUMBER(7)        |
| 2 CITATION          | Citation                       | VARCHAR2(2000)   |
| 3 CREATED_BY        | Created by                     | VARCHAR2(30)     |
| 4 CREATED_DATE      | Created date                   | DATE             |
| 5 CREATED_IN_INSTANCE | Created in instance          | VARCHAR2(6)      |
| 6 MODIFIED_BY       | Modified by                    | VARCHAR2(30)     |
| 7 MODIFIED_DATE     | Modified date                  | DATE             |
| 8 MODIFIED_IN_INSTANCE | Modified in instance        | VARCHAR2(6)      |

| Type of key | Column(s) order | Tables to link | Abbreviated notation |
|-------------|-----------------|----------------|----------------------|
| Primary     | (CITATION_NBR)  | N/A            | CIT_PK               |

1. CITATION_NBR

   Citation number. A unique number used to identify a REF_CITATION record. Citation information is currently available in the database only for information about the source of specific gravity and bark volume percent values contained in the REF_SPECIES table. REF_SPECIES variables ending in "_CIT" link back to the REF_CITATION table through CITATION_NBR.

2. CITATION

   Citation. This attribute is usually a publication citation. In some cases CITATION may contain more specific information about how data were populated for a field.

3. CREATED_BY

   Created by. The employee who created the record. This attribute is intentionally left blank in download files.

4. CREATED_DATE

   Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

5. CREATED_IN_INSTANCE

   Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.
6. MODIFIED_BY

Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

7. MODIFIED_DATE

Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

8. MODIFIED_IN_INSTANCE

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.
### Reference Forest Inventory and Analysis Database Version Table (Oracle table name is REF_FIADB_VERSION)

| Column name     | Descriptive name          | Oracle data type       |
|-----------------|---------------------------|------------------------|
| 1 VERSION       | Version number            | NUMBER(3,1)            |
| 2 DESCR         | Version description       | VARCHAR2(2000)         |
| 3 CREATED_BY    | Created by                | VARCHAR2(30)           |
| 4 CREATED_DATE  | Created date              | DATE                   |
| 5 CREATED_IN_INSTANCE | Created in instance         | VARCHAR2(6)           |
| 6 MODIFIED_BY   | Modified by               | VARCHAR2(30)           |
| 7 MODIFIED_DATE | Modified date             | DATE                   |
| 8 MODIFIED_IN_INSTANCE | Modified in instance         | VARCHAR2(6)          |
| 9 INSTALL_TYPE  | Install type              | VARCHAR2(10)           |

| Type of key | Column(s) order | Tables to link | Abbreviated notation |
|-------------|-----------------|----------------|----------------------|
| Primary     | (VERSION)       | N/A            | RFN_PK               |

1. **VERSION**  
   Version number. A unique number used to identify a REF_FIADB_VERSION record. VERSION equals the currently available version of the FIADB.

2. **DESCR**  
   Version description. A description of the FIADB version. This may include a literature citation and internet links to documentation.

3. **CREATED_BY**  
   Created by. The employee who created the record. This attribute is intentionally left blank in download files.

4. **CREATED_DATE**  
   Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

5. **CREATED_IN_INSTANCE**  
   Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

6. **MODIFIED_BY**  
   Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.
7. MODIFIED_DATE

Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

8. MODIFIED_IN_INSTANCE

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.

9. INSTALL_TYPE

Install type. Intentionally left blank. Will be populated in version 5.0.
Reference State Elevation Table (Oracle table name is REF_STATE_ELEV)

| Column name   | Descriptive name          | Oracle data type |
|---------------|---------------------------|------------------|
| 1 STATECD     | State code                | NUMBER(4)        |
| 2 MIN_ELEV    | Minimum elevation         | NUMBER(5)        |
| 3 MAX_ELEV    | Maximum elevation         | NUMBER(5)        |
| 4 LOWEST_POINT| Lowest point              | VARCHAR2(30)     |
| 5 HIGHEST_POINT| Highest point            | VARCHAR2(30)     |
| 6 CREATED_BY  | Created by                | VARCHAR2(30)     |
| 7 CREATED_DATE| Created date              | DATE             |
| 8 CREATED_IN_INSTANCE | Created in instance         | VARCHAR2(6)     |
| 9 MODIFIED_BY | Modified by               | VARCHAR2(30)     |
| 10 MODIFIED_DATE| Modified date            | DATE             |
| 11 MODIFIED_IN_INSTANCE | Modified in instance         | VARCHAR2(6)     |

Type of key | Column(s) order | Tables to link | Abbreviated notation |
Primary     | (STATECD)       | N/A            | RSE_PK               |

1. STATECD State code. Bureau of the Census Federal Information Processing Standards (FIPS) two-digit code for each State. Refer to appendix C.

2. MIN_ELEV Minimum elevation. The minimum elevation within the State in feet.

3. MAX_ELEV Maximum elevation. The maximum elevation within the State in feet.

4. LOWEST_POINT

   Lowest point. The name of the lowest point within the State. ‘SL’ refers to sea level. Negative minimum elevations are listed here.

5. HIGHEST_POINT

   Highest point. The name of the highest point within the State. Alternative names are provided also.

6. CREATED_BY Created by. The employee who created the record. This attribute is intentionally left blank in download files.

7. CREATED_DATE

   Created date. The date the record was created. Date will be in the form DD-MON-YYYY.
8. **CREATED_IN_INSTANCE**

Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

9. **MODIFIED_BY**

Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.

10. **MODIFIED_DATE**

Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

11. **MODIFIED_IN_INSTANCE**

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.
Reference Unit Table (Oracle table name is REF_UNIT)

| Column name  | Descriptive name | Oracle data type |
|--------------|------------------|------------------|
| STATECD      | State code       | NUMBER(4)        |
| VALUE        | Value            | NUMBER(2)        |
| MEANING      | Meaning          | VARCHAR2(80)     |
| CREATED_BY   | Created by       | VARCHAR2(30)     |
| CREATED_DATE | Created date     | DATE             |
| CREATED_IN_INSTANCE | Created in instance | VARCHAR2(6) |
| MODIFIED_BY  | Modified by      | VARCHAR2(30)     |
| MODIFIED_DATE| Modified date    | DATE             |
| MODIFIED_IN_INSTANCE | Modified in instance | VARCHAR2(6) |

| Type of key | Column(s) order | Tables to link | Abbreviated notation |
|-------------|-----------------|----------------|----------------------|
| Primary     | (STATECD, VALUE)| N/A            | UNT_PK               |

1. **STATECD**  
State code. Bureau of the Census Federal Information Processing Standards (FIPS) two-digit code for each State. Refer to appendix C.

2. **VALUE**  
Value. Forest Inventory and Analysis survey unit identification number. Survey units are usually groups of counties within each State. For periodic inventories, survey units may be made up of lands of particular owners. Refer to appendix C for codes.

3. **MEANING**  
Meaning. The name corresponding to the survey unit code (VALUE) in the State (STATECD). Refer to appendix C.

4. **CREATED_BY**  
Created by. The employee who created the record. This attribute is intentionally left blank in download files.

5. **CREATED_DATE**  
Created date. The date the record was created. Date will be in the form DD-MON-YYYY.

6. **CREATED_IN_INSTANCE**  
Created in instance. The database instance in which the record was created. Each computer system has a unique database instance code and this attribute stores that information to determine on which computer the record was created.

7. **MODIFIED_BY**  
Modified by. The employee who modified the record. This field will be blank (null) if the data have not been modified since initial creation. This attribute is intentionally left blank in download files.
8. MODIFIED_DATE

Modified date. The date the record was last modified. This field will be blank (null) if the data have not been modified since initial creation. Date will be in the form DD-MON-YYYY.

9. MODIFIED_IN_INSTANCE

Modified in instance. The database instance in which the record was modified. This field will be blank (null) if the data have not been modified since initial creation.
Chapter 4 – Calculating Population Estimates and Their Associated Sampling Errors

This chapter presents procedures written in Oracle™ SQL script that can be used to obtain population estimates (and associated sampling errors) for standard FIA attributes from the measurement data stored in the FIADB. These estimates follow the equations presented in Bechtold and Patterson (2005, chapter 4). Population estimates for many attributes can be generated using either the web-based EVALIDator tool or the Forest Inventory Data Online (FIDO) tool, which provides interactive access to the FIADB. These tools can be found at http://fia.fs.fed.us/tools-data.

All data stored in FIADB can be downloaded from http://fia.fs.fed.us/tools-data as either comma delimited files or Microsoft (MS) Access databases. Because of size limitations, data are stored in individual State databases. The SQL scripts used with MS Access differ from Oracle™ SQL scripts described in this chapter; however a number of MS Access queries are provided in the MS Access databases. All of the FIADB 4.0 tables are included in both formats. The MS Access databases have a few additional tables that make using the data and constructing queries easier and simpler. In addition, numerous queries that produce population estimates and standard errors are provided. Users can use these queries as a starting point to create customized queries suitable for local or regional analyses.

The FIADB can be used to estimate many attributes (e.g., forest area, timberland area, number of trees, net volume, biomass) from many different samples (typically State-wide inventories for a specific year or set of years). Therefore, the number of estimates that can be made from the FIADB is very large, and continues to increase as more data are added to the FIADB. This chapter provides examples of a few estimation procedures that can be modified by the user. The resulting estimates shown as output are examples only and are not necessarily the exact numbers a user will obtain using current data.

In addition to the naming conventions used in the FIADB, reference is made to the notation and terminology used in Bechtold and Patterson (2005). To fully understand the statistical basis of the estimation, readers may find it useful to refer to that publication as they review this chapter. Examples that estimate area of timberland, number of live trees on forest land, number of seedlings on timberland, and volume of growing-stock on timberland are presented, along with discussion of how these examples can be modified to estimate other attributes measured in Phase 2.

The basic estimation is broken down into four steps, with additional steps for users who want to go beyond the traditional population level estimates.

1. Selecting the attribute of interest (the quantity that is to be estimated).
2. Selecting an appropriate sample.
3. Linking the appropriate tables in the FIADB to produce estimates for attributes of interest for a population.
4. Producing estimates with sampling errors for attributes of interest for a population.
5. Restricting the attribute of interest to a smaller subset of the population (e.g., filtering the data to include only sawtimber stands on publicly owned timberland, versus all stands in all ownerships).
6. Changing the attribute of interest with user-defined criteria.
7. Estimating change over time on the standard 4-subplot fixed area plot.
1. Selecting the attribute of interest (using the REF_POP_ATTRIBUTE table)

The most common attributes of interest in FIADB estimation are described in the REF_POP_ATTRIBUTE table, which currently contains 92 entries. Attributes are currently defined at three levels (1) condition level attributes for area estimates; (2) tree level attributes for numbers of trees, volume, growth, removals, and mortality estimates; and (3) seedling level attributes for number of seedlings estimates. Estimation of condition level attributes requires accessing data on the PLOT and COND tables. Estimation of tree level attributes requires accessing data on the PLOT, COND, and TREE tables. Estimation of seedling level attributes requires accessing data on the PLOT, COND, and SEEDLING tables. Table 4.1 lists the attributes currently defined in the REF_POP_ATTRIBUTE table.

Table 4.1. Values and Descriptions in the REF_POP_ATTRIBUTE table.

| Attribute number (ATTRIBUTE_NBR) | Attribute description (ATTRIBUTE_DESCR) |
|----------------------------------|----------------------------------------|
| 1                                | Area sampled and denied access/hazardous (acres) |
| 2                                | Area of forestland (acres) |
| 3                                | Area of timberland (acres) |
| 4                                | Number of all live trees on forestland (trees) |
| 5                                | Number of growing-stock trees on forestland (trees) |
| 6                                | Number of standing dead trees 5 inches+ dbh on forestland (trees) |
| 7                                | Number of all live trees on timberland (trees) |
| 8                                | Number of growing-stock trees on timberland (trees) |
| 9                                | Number of standing dead trees 5 inches+ dbh on timberland (trees) |
| 10                               | All live tree and sapling aboveground biomass on forestland oven-dry (short tons) |
| 11                               | All live merchantable biomass on forestland oven-dry (short tons) |
| 12                               | All live merchantable biomass on timberland oven-dry (short tons) |
| 13                               | All live tree and sapling aboveground biomass on timberland oven-dry (short tons) |
| 14                               | Volume of all live on forestland (cuft) |
| 15                               | Volume of growing-stock on forestland (cuft) |
| 16                               | Volume of sawlog portion on forestland (cuft) |
| 17                               | Volume of all live on timberland (cuft) |
| 18                               | Volume of growing-stock on timberland (cuft) |
| 19                               | Volume of sawlog portion on timberland (cuft) |
| 20                               | Volume of sawtimber on forestland (bdft) |
| 21                               | Volume of sawtimber on timberland (bdft) |
| 22                               | All live gross sawtimber volume on forestland (bdft) |
| 23                               | All live gross volume on forestland (cuft) |
| 24                               | All live sound volume on forestland (cuft) |
| 25                               | Net growth of all live on forestland (cuft per year) |
| 26                               | Net growth of growing-stock on forestland (cuft per year) |
| 27                               | Net growth of sawtimber on forestland (bdft per year) |
| 28                               | Net growth of all live on timberland (cuft per year) |
| 29                               | Net growth of growing-stock on timberland (cuft per year) |
| 30                               | Net growth of sawtimber on timberland (bdft per year) |
| 31                               | Mortality of all live on forestland (cuft per year) |
| 32                               | Mortality of all live trees on forestland (trees per year) |
| 33                               | Mortality of growing-stock on forestland (cuft per year) |
| 34                               | Mortality of sawtimber on forestland (bdft per year) |
| 35                               | Mortality of all live on timberland (cuft per year) |
| 36                               | Mortality of all live trees on timberland (trees per year) |
| 37                               | Mortality of growing-stock on timberland (cuft per year) |
| 38                               | Mortality of sawtimber on timberland (bdft per year) |
| 39                               | Removals of all live on forestland (cuft per year) |
| Attribute number (ATTRIBUTE_NBR) | Attribute description (ATTRIBUTE_DESCR) |
|----------------------------------|-----------------------------------------|
| 40                               | Removals of growing-stock on forestland (cuft per year) |
| 41                               | Removals of sawtimber on forestland (bdft per year) |
| 42                               | Removals of all live on timberland (cuft per year) |
| 43                               | Removals of growing-stock on timberland (cuft per year) |
| 44                               | Removals of sawtimber on timberland (bdft per year) |
| 45                               | Number of live seedlings on forestland (seedlings) |
| 46                               | Number of live seedlings on timberland (seedlings) |
| 47                               | Carbon in standing dead trees on forestland (short tons) |
| 48                               | Carbon in understory aboveground on forestland (short tons) |
| 49                               | Carbon in understory belowground on forestland (short tons) |
| 50                               | Carbon in down dead on forestland (short tons) |
| 51                               | Carbon in litter on forestland (short tons) |
| 52                               | Soil organic carbon on forestland (short tons) |
| 53                               | Carbon in live trees and saplings aboveground on forestland (short tons) |
| 54                               | Carbon in live trees and saplings belowground on forestland (short tons) |
| 55                               | Carbon in live trees and saplings above and belowground on forestland (short tons) |
| 56                               | All live top and limb biomass on forestland oven-dry (short tons) |
| 57                               | All live sapling biomass on forestland oven-dry (short tons) |
| 58                               | All live stump (ground to 12 inches) biomass on forestland oven-dry (short tons) |
| 59                               | All live belowground tree and sapling and woodland species biomass on forestland oven-dry (short tons) |
| 60                               | All live woodland species biomass on forestland oven-dry (short tons) |
| 61                               | Carbon in standing dead trees on timberland (short tons) |
| 62                               | Carbon in understory aboveground on timberland (short tons) |
| 63                               | Carbon in understory belowground on timberland (short tons) |
| 64                               | Carbon in down dead on timberland (short tons) |
| 65                               | Carbon in litter on timberland (short tons) |
| 66                               | Soil organic carbon on timberland (short tons) |
| 67                               | Carbon in live trees and saplings aboveground on timberland (short tons) |
| 68                               | Carbon in live trees belowground on timberland (short tons) |
| 69                               | Carbon in live trees above and belowground on timberland (short tons) |
| 70                               | All live top and limb biomass on timberland oven-dry (short tons) |
| 71                               | All live sapling biomass on timberland oven-dry (short tons) |
| 72                               | All live stump (ground to 12 inches) biomass on timberland oven-dry (short tons) |
| 73                               | All live belowground tree and sapling and woodland species biomass on timberland oven-dry (short tons) |
| 74                               | All live woodland species biomass on timberland oven-dry (short tons) |
| 75                               | Old regional method - All live tree and sapling aboveground biomass on forestland oven-dry (short tons) |
| 76                               | Old regional method - All live merchantable biomass on forestland oven-dry (short tons) |
| 77                               | Old regional method - All live merchantable biomass on timberland oven-dry (short tons) |
| 78                               | Old regional method - All live tree and sapling aboveground biomass on timberland oven-dry (short tons) |
| 79                               | Area sampled (acres) |
| 80                               | Harvest removals of all live on forestland (cuft per year) |
| 81                               | Harvest removals of growing-stock on forestland (cuft per year) |
| 82                               | Harvest removals of sawtimber on forestland (bdft per year) |
| 83                               | Harvest removals of all live on timberland (cuft per year) |
| 84                               | Harvest removals of growing-stock on timberland (cuft per year) |
| 85                               | Harvest removals of sawtimber on timberland (bdft per year) |
| 86                               | Other removals of all live on forestland (cuft per year) |
In this chapter we present examples that estimate:

- Area of timberland (REF_POP_ATTRIBUTE.ATTRIBUTE_NBR = 3).
- Number of live trees on forest land (REF_POP_ATTRIBUTE.ATTRIBUTE_NBR = 4).
- Volume of growing-stock on timberland (REF_POP_ATTRIBUTE.ATTRIBUTE_NBR = 18).
- Number of live seedlings on timberland (REF_POP_ATTRIBUTE.ATTRIBUTE_NBR = 46).

These are examples of condition, tree, and seedling level attributes that can be modified to produce other estimates of attributes at these levels. For each attribute, the REF_POP_ATTRIBUTE table contains a unique ATTRIBUTE_NBR, a description of the attribute (ATTRIBUTE_DESCR), and the variables EXPRESSION and WHERE_CLAUSE that are both portions of the SQL statements used to produce the estimates of the attribute. Table 4.2 lists these four variables for the four examples we are presenting. (Note: in EXPRESSION and WHERE_CLAUSE, ‘c’ stands for COND table, ‘t’ stands for TREE table, ‘s’ stands for SEEDLING table, and ‘pet’ stands for POP_EVAL_TYP table.)

### Table 4.2. REF_POP_ATTRIBUTE entries for the four examples presented in this chapter.

| ATTRIBUTE NBR | ATTRIBUTE DESCR | EXPRESSION | WHERE CLAUSE |
|---------------|----------------|------------|--------------|
| 3             | Area of timberland (acres) | c.condprop_unadj* decode(c.prop_basis,'MACR',pop_stratum.adj_factor_macr, pop_stratum.adj_factor_subp) | and pet.eval_typ='EXPCURR' and c.cond_status_cd=1 and c.reservcd=0 and c.siteclcd in (1,2,3,4,5,6) and t.tpa_unadj* |
| 4             | Number of all live trees on forestland (trees) | t.tpa_unadj* decode(dia,null,adj_factor_subp, decode(least(dia,5-0.001),dia,adj_factor_micr, decode(least(dia, nvl(macro_breakpoint_dia,9999)-0.001)),dia,adj_factor_subp, adj_factor_macr)) | and pet.eval_typ='EXPVOL' and t.plt_cn=c.plt_cn and t.condid=c.condid and c.cond_status_cd=1 and t.dia>=1.0 |
| 18            | Volume of growing-stock on timberland (cuft) | t.tpa_unadj*t.volcnet* decode(dia,null,adj_factor_subp, decode(least(dia,5-0.001)),dia,adj_factor_micr, decode(least(dia, nvl(macro_breakpoint_dia,9999)-0.001)),dia,adj_factor_subp, adj_factor_macr)) | and pet.eval_typ='EXPVOL' and t.plt_cn=c.plt_cn and t.condid=c.condid and c.cond_status_cd=1 and c.reservcd=0 and c.siteclcd in (1,2,3,4,5,6) and t.statuscdn=1 and t.treeclcd=2 and t.dia>=5.0 |
| 46            | Number of live seedlings on timberland (seedlings) | s.tpa_unadj*adj_factor_micr | and pet.eval_typ='EXPVOL' and s.plt_cn=c.plt_cn and s.condid=c.condid and c.cond_status_cd=1 and c.reservcd=0 and c.siteclcd in (1,2,3,4,5,6) |

*Note that for Microsoft Access SQL, the decode function is replaced with the IIF function*
EXPRESSION is multiplied by the expansion factor POP_STRATUM.EXPNS and summed at the condition level in the estimation procedure. In the notation used in Bechtold and Patterson (2005), this sum is \( P_{\text{hid}} \) for area estimation (see equation 4.1, page 47) or \( y_{\text{hid}} \) for the estimation of tree attributes (see equation 4.8, page 53). In all cases, EXPRESSION consists of the product of two terms, the first term (c.condprop_unadj, t.tpa_unadj, and s.tpa_unadj in our examples) is the unadjusted observation of the attribute of interest (on a per acre basis). The second term is the appropriate stratum adjustment factor. The stratum adjustment factor is the inverse of the mean proportion of the sample plot areas that were within the population. Following the notation of Bechtold and Patterson (2005) this adjustment factor is \( \frac{1}{P_{mh}} \) (see equation 4.2, page 49). The decode statement simply selects the appropriate adjustment factor to be used for the specific estimate. Area estimates use either ADJ_FACTOR_MACR (in inventories where area estimates are based on the macroplot) or ADJ_FACTOR_SUBP (in inventories where area estimates are based on the subplot) for the adjustment. The adjustment of tree- and seedling-level estimates is based on the plot on which the tree or seedling was sampled (seedlings and trees <5 inches diameter are sampled on the microplot, larger trees are sampled on the subplot or macroplot depending on diameter).

Common selection criteria used often with FIA data when creating queries include various classifications of land and groups of trees as shown below:

**Identifying land classes (COND table):**

| Land Class      | Condition Status Code |
|-----------------|-----------------------|
| Forest land     | COND_STATUS_CD = 1    |
| Timberland      | COND_STATUS_CD = 1, SITECLCD <7, RESERVCD = 0 |
| Nonforest land  | COND_STATUS_CD = 2    |
| Reserved forest land | COND_STATUS_CD = 1, RESERVCD = 1 |
| Unreserved forest land | COND_STATUS_CD = 1, RESERVCD = 0 |
| Productive forest land | COND_STATUS_CD = 1, SITECLCD <7 |
| Unproductive forest land | COND_STATUS_CD = 1, SITECLCD = 7 |

**Identifying tree characteristics:**

| Tree Type        | Condition Status Code |
|------------------|-----------------------|
| Live trees       | TREE.STATUSCD = 1     |
| Standing dead    | TREE.STATUSCD = 2, TREE.STANDING_DEAD_CD = 1 |
| Growing-stock    | TREE.STATUSCD = 1, TREE.TREECLCD = 2 |
| Growing-stock volume | TREE.STATUSCD = 1, TREE.TREECLCD = 2, TREE.DIA ≥5.0 |

2. **Selecting an appropriate sample (using the POP_EVAL_GRP, POP_EVAL, and POP_EVAL_TYP tables)**

In order to compute a sample-based population estimate, the appropriate sample and stratification must be identified. In FIA estimation, the sample is a set of plots that were selected for the attribute of interest that was observed. The stratification consists of an assignment of plots to strata (non-overlapping areas of a known or estimated size) that in aggregate define the population of interest. There is an assignment of plots to every stratum, and all plots are assigned to one, and only one stratum, for each evaluation. FIA uses the term “evaluation” to reference the relationship that links a set of plots to a set of strata for estimation purposes. Thus, an evaluation is a set of plots defined...
in the FIADB that can be used to make a statistically valid sample-based estimate for a population (area of land) based on a specific stratification.

Each evaluation used by FIA is identified, named, and stored as a single entry in the POP_EVAL table. The important data items in the POP_EVAL table are listed in table 4.3 for all evaluations that are loaded into the FIADB for data collected in Minnesota through 2006. CN is the control number that uniquely identifies the entry and is used in creating links to other tables. RSCD (Region or Station Code) and EVALID (Evaluation Identifier) are the natural identifiers of a specific record. EVAL_DESCR provides a description of the evaluation. STATECD and LOCATION_NM describe the geographic extent of the population that was sampled and REPORT_YEAR_NM describes the years in which the sample was taken. For older periodic inventories, REPORT_YEAR_NM typically reflects a single reporting year (the one used in the FIA publications), even though the plots may have been measured over several years. Annual inventories (taken since 1999) list the years of data measurements used in the estimation. There are usually multiple evaluations for a specific year because not all plots observed have every attribute of interest, and/or different stratifications are used in the estimation of different attributes of interest. For example, volume estimation can be done on plots measured at only one point in time. However, growth estimates require repeat measurements. Thus, evaluations for the estimation of growth only assign those plots that are repeat measurement plots to strata, and do not include one-time measurement plots.

Table 4.3. Important POP_EVAL entries for Minnesota through 2006 from the FIADB.

| Data item names | Data item values |
|----------------|-----------------|
| CN            | RSCD | EVALID | EVAL_DESCR | STATECD | LOCATION_NM | REPORT_YEAR_NM |
| 107106457010661 | 23   | 277701 | Minnesota, 1977: area (periodic) | 27 | Minnesota | 1977 |
| 107106458010661 | 23   | 277702 | Minnesota, 1977: volume (periodic) | 27 | Minnesota | 1977 |
| 107106459010661 | 23   | 277703 | Minnesota, 1977: growth (periodic) | 27 | Minnesota | 1977 |
| 107106460010661 | 23   | 277704 | Minnesota, 1977: mortality (periodic) | 27 | Minnesota | 1977 |
| 107106461010661 | 23   | 277705 | Minnesota, 1977: removals (periodic) | 27 | Minnesota | 1977 |
| 107106462010661 | 23   | 279001 | Minnesota, 1990: area (periodic) | 27 | Minnesota | 1990 |
| 107106463010661 | 23   | 279002 | Minnesota, 1990: volume (periodic) | 27 | Minnesota | 1990 |
| 107106464010661 | 23   | 279003 | Minnesota, 1990: growth (periodic) | 27 | Minnesota | 1990 |
| 107106465010661 | 23   | 279004 | Minnesota, 1990: mortality (periodic) | 27 | Minnesota | 1990 |
| 107106466010661 | 23   | 279005 | Minnesota, 1990: removals (periodic) | 27 | Minnesota | 1990 |
| 107106467010661 | 23   | 279006 | Minnesota, 1990: change (periodic) | 27 | Minnesota | 1990 |
| 107106444010661 | 23   | 270300 | Minnesota, 1999-2003: all land | 27 | Minnesota | 1999;2000;2001;2002;2003 |
| 107106445010661 | 23   | 270301 | Minnesota, 1999-2003: area/volume | 27 | Minnesota | 1999;2000;2001;2002;2003 |
| 107106446010661 | 23   | 270302 | Minnesota, 1999 to 1999-2003: GRM | 27 | Minnesota | 1999;2000;2001;2002;2003 |
| 107106448010661 | 23   | 270400 | Minnesota, 2000-2004: all land | 27 | Minnesota | 2000;2001;2002;2003;2004 |
| 107106449010661 | 23   | 270401 | Minnesota, 2000-2004: area/volume | 27 | Minnesota | 2000;2001;2002;2003;2004 |
| 107106450010661 | 23   | 270402 | Minnesota, 1999 to 2004: GRM | 27 | Minnesota | 2004 |
| 107106451010661 | 23   | 270500 | Minnesota, 2001-2005: all land | 27 | Minnesota | 2001;2002;2003;2004;2005 |
| 107106452010661 | 23   | 270501 | Minnesota, 2001-2005: area/volume | 27 | Minnesota | 2001;2002;2003;2004;2005 |
| 107106453010661 | 23   | 270502 | Minnesota, 1999-2000 to 2004-2005: GRM | 27 | Minnesota | 2004;2005 |
| 107106454010661 | 23   | 270600 | Minnesota, 2002-2006: all land | 27 | Minnesota | 2002;2003;2004;2005;2006 |
An evaluation group is the set of evaluations that goes into the contents of a typical FIA report for a State. For example the evaluations that went into the report entitled “Minnesota’s forests 1999-2003 (Part A.)” (Miles and others 2007) are identified by EVALIDs 270300, 270301 and 270302, and are collectively identified by a single record in the POP_EVAL_GRP table. Table 4.4 lists the important attributes for all evaluation groups that are loaded into FIADB for data collected in Minnesota through 2006.

In the POP_EVAL_GRP table the data item EVAL_GRP identifies the evaluation group by its State code (first 2 digits) and a year (last 4 digits), which is the year commonly associated with estimates (if EVAL_GRP does not follow this format, see the EVAL_GRP_DESCR for the precise identification). In table 4.4 we see evaluation groups for two periodic inventory estimates (1977 and 1990), and four annual estimates (2003, 2004, 2005 and 2006). The EVAL_GRP_DESCR describes the groups, and indicates that all of the annual inventory estimates are based on 5 years of measurements taken over the 5-year period ending with that date. The data items EVAL_CN_FOR_EXPALL, EVAL_CN_FOR_EXPCURR, EVAL_CN_FOR_EXPVOL, EVAL_CN_FOR_EXPGROW, EVAL_CN_FOR_EXPMORT, and EVAL_CN_FOR_EXPREMV identify the evaluations in POP_EVAL that are appropriate for the estimation of various attributes of interest. EVAL_CN_FOR_EXPCURR identifies the evaluation used in the estimation of most area estimates, such as the area of forestland or the area of timberland. EVAL_CN_FOR_EXPVOL identifies the evaluation used in the estimation of tree-level attributes such as number, volume, and biomass of trees, and seedling-level estimates, such as number of seedlings. EVAL_CN_FOR_EXPGROW, EVAL_CN_FOR_EXPMORT, and EVAL_CN_FOR_EXPREMV identify the evaluations used in the estimation of growth, mortality, and removals, respectively. The evaluation identified by EVAL_CN_FOR_EXPALL is only appropriate for area estimation where the area of hazardous and denied access are of interest. All other evaluations treat hazardous and denied access as non-measured and adjust the estimate to account for these areas.
The POP_EVAL_TYP table was added to the FIADB in the transition from version 3.0 to 4.0 to provide a link between the evaluation groups in POP_EVAL_GRP and the evaluations in POP_EVAL. In FIADB 3.0, users could select the appropriate evaluation sequence number (EVAL_CN_FOR_xxx) from the POP_EVAL_GRP table. This evaluation sequence number allowed them to select the appropriate plots and associated expansions. Evaluations are now also identified by the type of evaluation in the value of POP_EVAL_TYP.EVAL_TYP, which can take on values of “EXPALL,” “EXPCURR,” “EXPVOL,” “EXPGROW,” “EXPMORT,” or “EXPREMV” to identify the type of attributes that can be estimated from a specific evaluation. This table allows users to perform similar queries on the appropriate evaluation by identifying only the eval_grp (STATECD*10000 + INV_YR) and evaluation type (EVAL_TYP) and allows a variety of evaluations to be added in the future. The methods used in version 3.0 will continue to work in version 4.0. The examples presented here incorporate the POP_EVAL_TYP as the link from the POP_EVAL_GRP to the POP_EVAL table. In the examples below, either of the two joins will select the appropriate evaluation for the estimation of area and volume attributes for the Minnesota 2003 annual inventory.

FIADB 4.0 example:
select pev.cn, pev.eval_descr
from pop_eval_typ pet, pop_eval pev, pop_eval_grp peg
where peg.eval_grp = 272003 and peg.cn = pet.eval_grp_cn and
    pev.cn = pet.eval_cn and pet.eval_typ = 'EXPCURR'

FIADB 3.0 example:
select pev.cn, pev.eval_descr
from pop_eval pev, pop_eval_grp peg
where peg.eval_grp = 272003 and
    pev.cn = peg.eval_cn_for_expcurr

3. Linking the appropriate tables in FIADB to produce estimates of attributes of interest for a population

The following Oracle™ SQL script can be modified to produce an estimate of any condition-, tree-, or seedling-level attribute listed in the REF_POP_ATTRIBUTE table. In this standard script (example 4.1), the non-bold text applies to all estimates and the bold text is modified by the user, depending on the desired attribute of interest and evaluation group. The line numbers have been added for reference. On line 01, the text in the column EXPRESSION in the REF_POP_ATTRIBUTE table associated with the desired attribute of interest should be inserted. Lines 05 or 06 include either the TREE table or SEEDLING table, and neither line should be included for condition level estimates. Line 05 should be included for tree level estimates and line 06 should be included for seedling level estimates. On line 14, the additions to the SQL where clause from the WHERE_CLAUSE column of the REF_POP_ATTRIBUTE table for the desired attribute of interest should be inserted. Finally, on line 21, the desired evaluation group needs to be indicated by replacing the characters SSYYYY with the desired evaluation group, whereby SS = STATECD of the desired State, and YYYY = year of the desired inventory (if EVAL_GRP does not follow this format, see the EVAL_GRP_DESCR for the precise identification). With these changes, a user can produce the standard estimates for any desired population from the REF_POP_ATTRIBUTE table.
Estimation requires linking the attribute values (on the COND, TREE, and SEEDLING tables) to the stratification information (on the POP_PLOT_STRATUM_ASSGN, POP_STRATUM, and POP_ESTN_UNIT) for the selected evaluation that defines the sample. Those links are provided in lines 15 thru 20 of the script, and these lines do not change. Line 15 links the POP_PLOT_STRATUM_ASSGN record (which contains EXPNS, the plot expansion factor or acres assigned to the plot) to the plot record. Line 16 links the POP_PLOT_STRATUM_ASSGN record to the POP_STRATUM record (which identifies each stratum in the estimation unit). Line 17 links the POP_ESTN_UNIT (which identifies each estimation unit in the evaluation) to the POP_STRATUM record. Line 18 links the POP_EVAL, which identifies each evaluation, to the specific evaluation that is required for the estimation. Lines 19 and 20 link the appropriate evaluation to the attribute and evaluation group for which the estimate is being made. See figure 6 for a schematic of links of some of the FIADB tables.

The following table shows some common aliases or abbreviations used within a SQL script to reduce the overall length of the script and improve readability.

**Common aliases for FIADB tables**

| p  | PLOT  |
| c  | COND  |
| t  | TREE  |
| s  | SEEDLING |
| ppsa | POP_PLOT_STRATUM_ASSGN |
| psm | POP_STRATUM |
| peu | POP_ESTN_UNIT |
| pet | POP_EVAL_TYP |
| peg | POP_EVAL_GRP |
| pev | POP_EVAL |

**Example 4.1. Standard estimation script**

```
01 SELECT SUM(psm.expns * EXPRESSION -- insert ref_pop_attribute EXPRESSION here
02 ) estimate
03 FROM cond c, plot p,
04 tree t, -- tree table must be included for tree level estimates
05 seedling s, -- seedling table must be included for seedling level estimate
06 pop_plot_stratum_assgn ppsa,
07 pop_stratum psm,
08 pop_estn_unit peu,
09 pop_eval pev,
10 pop_eval_typ pet,
11 pop_eval_grp peg
12 WHERE p.cn = c.plt_cn
14 WHERE_CLAUSE -- insert ref_pop_attribute WHERE_CLAUSE here
15 AND ppsa.plt_cn = p.cn
16 AND ppsa.stratum_cn = psm.cn
17 AND peu.cn = psm.estn_unit_cn
18 AND pev.cn = peu.eval_cn
19 AND pev.cn = pet.eval_cn
20 AND pet.eval_grp_cn = peg.cn
21 AND peg.eval_grp = SSYYYY -- the desired evaluation group must be specified
```
Figure 6. An abbreviated diagram of select FIADB tables. Note that there are more columns in each table than are shown.
In the following four examples (4.2, 4.3, 4.4, and 4.5), the scripts are modified from above to produce condition, tree, and seedling level estimates for the Minnesota 2003 inventory. Here the sections in bold are the sections that changed from the standard estimation script, e.g., the REF_POP_ATTRIBUTE.EXPRESSION and REF_POP_ATTRIBUTE.WHERE_CLAUSE have been inserted, along with the chosen evaluation number.

Example 4.2 Estimate area of timberland (acres)

```
SELECT SUM(psm.expns * c.condprop_unadj * 
    decode(c.prop_basis, 
        'MACR', 
        psm.adj_factor_macr, 
        psm.adj_factor_subp) -- this is the expression from ref_pop_attribute table 
) estimate
FROM cond c, 
    plot p, 
    pop_plot_stratum_assign ppsa, 
    pop_stratum psm, 
    pop_estn_unit peu, 
    pop_eval pev, 
    pop_eval_typ pet, 
    pop_eval_grp peg
WHERE p.cn = c.plt_cn
    AND pet.eval_typ = 'EXPCURR'
    AND c.cond_status_cd = 1
    AND c.reservcd = 0
    AND c.siteclcd IN (1, 2, 3, 4, 5, 6) -- this is the where_clause from ref_pop_attribute table
    AND ppsa.plt_cn = p.cn
    AND ppsa.stratum_cn = psm.cn
    AND peu.cn = psm.estn_unit_cn
    AND pev.cn = peu.eval_cn
    AND pev.cn = pet.eval_cn
    AND pet.eval_grp_cn = peg.cn
    AND peg.eval_grp = 272003 -- the desired evaluation group must be specified
```

Produces the following estimate of acres of timberland:

| ESTIMATE |
|----------|
| 14,734,137 |
Example 4.3 Estimate number of live trees on forest land (trees)

```
SELECT SUM(psm.expns * t.tpa_unadj *
    decode(dia,
    null,
    adj_factor_subp,
    decode(least(dia, 5 - 0.001),
    dia,
    adj_factor_micr,
    decode(least(dia,
      nvl(macro_breakpoint_dia, 9999) - 0.001),
    dia,
    adj_factor_subp,
    adj_factor_macr)))) -- this is the expression from ref_pop_attribute table
    ) estimate
FROM cond c,
    plot p,
    tree t, -- tree table must be included for tree level estimates
    pop_plot_stratum_assgn ppsa,
    pop_stratum psm,
    pop_estn_unit peu,
    pop_eval pev,
    pop_eval_typ pet,
    pop_eval_grp peg
WHERE p.cn = c.plt_cn
AND pet.eval_typ = 'EXPVOL'
AND t.plt_cn = c.plt_cn
AND t.condid = c.condid
AND c.cond_status_cd = 1
AND t.statuscd = 1
AND t.dia >= 1.0 -- additional where clause from ref_pop_attribute table
AND ppsa.plt_cn = p.cn
AND ppsa.stratum_cn = psm.cn
AND peu.cn = psm.estn_unit_cn
AND pev.cn = peu.eval_cn
AND pev.cn = pet.eval_cn
AND pet.eval_grp_cn = peg.cn
AND peg.eval_grp = 272003 -- the desired evaluation group must be specified

Produces the following estimate of total number of live trees on forest land:

| ESTIMATE |
|----------|
| 12,078,196,211 |
```
Example 4.4 Estimate number of live seedlings on timberland (seedlings)

```
SELECT SUM(psm.expns * s.tpa_unadj * adj_factor_micr -- expression from ref_pop_attribute table ) estimate 
FROM cond c, 
   plot p, 
   seedling s, -- seedling table must be included for seedling level estimates 
   pop_plot_stratum__assign ppsa, 
   pop_stratum psm, 
   pop_estn_unit peu, 
   pop_eval pev, 
   pop_eval_typ pet, 
   pop_eval_grp peg 
WHERE p.cn = c.plt_cn 
  AND pet.eval_typ = 'EXPVOL' 
  AND s.plt_cn = c.plt_cn 
  AND s.condid = c.condid 
  AND c.cond_status_cd = 1 
  AND c.reservcd = 0 
  AND c.siteclcd IN (1, 2, 3, 4, 5, 6) -- additional where_clause from ref_pop_attribute table 
  AND ppsa.plt_cn = p.cn 
  AND ppsa.stratum_cn = psm.cn 
  AND peu.cn = psm.estn_unit_cn 
  AND pev.cn = peu.eval_cn 
  AND pev.cn = pet.eval_cn 
  AND pet.eval_grp_cn = peg.cn 
  AND peg.eval_grp = 272003 -- the desired evaluation group must be specified 

Produces the following estimate of total number of live seedlings on timberland:

| ESTIMATE          |
|-------------------|
| 37,141,783,495    |
```
Example 4.5 Estimate volume of growing-stock on timberland (cubic feet)

```
SELECT SUM(psm.expns * t.tpa_unadj * t.volcfnet *
    decode(dia,
    null,
    adj_factor_subp,
    decode(least(dia, 5 - 0.001),
        dia,
        adj_factor_micr,
        decode(least(dia,
            nvl(macro_breakpoint_dia, 9999) - 0.001),
        dia,
        adj_factor_subp,
        adj_factor_macr))) -- this is the expression from ref_pop_attribute table
  ) estimate
FROM cond c,
     plot p,
     tree t, -- tree table must be included for tree level estimates
     pop_plot_stratum_assgn ppsa,
     pop_stratum psm,
     pop_estn_unit peu,
     pop_eval pev,
     pop_eval_typ pet,
     pop_eval_grp peg
WHERE p.cn = c.plt_cn
  AND pet.eval_typ = 'EXPVOL'
  AND t.plt_cn = c.plt_cn
  AND t.condid = c.condid
  AND c.cond_status_cd = 1
  AND c.reservcd = 0
  AND c.siteclcd in (1, 2, 3, 4, 5, 6)
  AND t.statuscd = 1
  AND t.treeclcd = 2
  AND t.dia >= 5.0 -- additional where_clause from ref_pop_attribute table
  AND ppsa.plt_cn = p.cn
  AND ppsa.stratum_cn = psm.cn
  AND peu.cn = psm.estn_unit_cn
  AND pev.cn = peu.eval_cn
  AND pev.cn = pet.eval_cn
  AND pet.eval_grp_cn = peg.cn
  AND peg.eval_grp = 272003 -- the desired evaluation group must be specified
```

Produces the following estimate of total growing-stock volume (cubic feet) on timberland:

| ESTIMATE          |
|-------------------|
| 15,242,634,295    |

Users of the FIADB who wish to produce population estimates should test these four examples to be sure they are obtaining identical estimates before proceeding to more complicated estimation. Important Note: Users who access data from periodic inventories should restrict the estimation only to the standard timberland estimates. In most cases, for periodic inventories, the FIADB contains only condition level information on reserved and unproductive forest lands, and tree level information on timberland.
4. Producing estimates with sampling errors for attributes of interest for a population

Producing population estimates that include error estimates (sampling error or variance of the estimate) along with the estimated total is more complicated. The following Oracle™ SQL script can be used as a template in producing estimates with sampling errors. The line numbers have been added for reference. This example follows the notation used in Bechtold and Patterson (2005, equation 4.14 on page 55). Again, the portions of the script that should be changed by the user to specify the attribute of interest and population are in bold. Besides returning the estimates and sampling errors, this script also outputs the total number of plots in the sample (TOTAL_PLOTS), the number of plots where the attribute of interest was observed to occur (NON_ZERO_PLOTS), and the total population area (TOTAL_POPULATION_ACRES). This procedure produces two intermediate tables: phase_1_summary and phase_2_summary. Phase_1_summary is a stratum-level table that contains the stratification information necessary in the estimation within strata sample sizes ($n_h$), stratum weights ($W_h$), and population area ($A_T$). Phase_2_summary is a stratum-level table that contains a summary of the attribute of interest on per-unit-area basis ($y_{hid}$), including the sum and sum of the squared plot-level values and the number of plots where the attribute of interest was observed.

Example 4.6. Standard script for estimates with sampling errors

```
01 SELECT eval_grp,
02 SUM(estimate_by_estn_unit.estimate) estimate,
03 CASE
04 WHEN SUM(estimate_by_estn_unit.estimate) > 0 THEN
05 round(sqrt(SUM(estimate_by_estn_unit.var_of_estimate)) / 
06 SUM(estimate_by_estn_unit.estimate) * 100,
07 3)
08 ELSE 
09 0
10 END AS se_of_estimate_pct,
11 SUM(estimate_by_estn_unit.var_of_estimate) var_of_estimate,
12 SUM(estimate_by_estn_unit.total_plots) total_plots,
13 SUM(estimate_by_estn_unit.non_zero_plots) non_zero_plots,
14 SUM(estimate_by_estn_unit.total_population_area_acres) total_population_acres
15 FROM (SELECT pop_eval_grp_cn,
16 eval_grp,
17 estn_unit_cn,
18 SUM(nvl(ysum_hd, 0) * phase_1_summary.expns) estimate,
19 SUM(phase_1_summary.n_h) total_plots,
20 SUM(phase_2_summary.number_plots_in_domain) domain_plots,
21 SUM(phase_2_summary.non_zero_plots) non_zero_plots,
22 total_area * total_area / SUM(phase_1_summary.n_h) * 
23 ((SUM(w_h * phase_1_summary.n_h * 
24 (((nvl(ysum_hd_sqr, 0) / phase_1_summary.n_h) - 
25 (nvl(ysum_hd, 0) / phase_1_summary.n_h)) / 
26 (phase_1_summary.n_h - 1)))) + 
27 1 / SUM(phase_1_summary.n_h)) * 
28 (SUM((1 - w_h) * phase_1_summary.n_h) * 
29 ((nvl(ysum_hd_sqr, 0) / phase_1_summary.n_h) - 
30 (nvl(ysum_hd, 0) / phase_1_summary.n_h)) / 
31 (nvl(ysum_hd, 0) / phase_1_summary.n_h)) / 
32 (nvl(ysum_hd, 0) / phase_1_summary.n_h)) /
```
(phase_1_summary.n_h - 1))) var_of_estimate,  
total_area total_population_area_acres  
FROM (SELECT peg.eval_grp,  
        peg.cn pop_eval_grp_cn,  
        psm.estn_unit_cn,  
        psm.expns,  
        psm.cn pop_stratum_cn,  
        p1pointcnt /  
        (SELECT SUM(strs.p1pointcnt)  
        FROM pop_stratum strs  
        WHERE strs.estn_unit_cn = psm.estn_unit_cn) w_h,  
        (SELECT SUM(strs.p1pointcnt)  
        FROM pop_stratum strs  
        WHERE strs.estn_unit_cn = psm.estn_unit_cn) n_prime,  
        p1pointcnt n_prime_h,  
        (SELECT SUM(eu_s.area_used)  
        FROM pop_estn_unit eu_s  
        WHERE eu_s.cn = psm.estn_unit_cn) total_area,  
        psm.p2pointcnt n_h  
        FROM pop_estn_unit peu,  
        pop_stratum psm,  
        pop_eval pev,  
        pop_eval_grp peg,  
        pop_eval_typ pet  
        WHERE peu.cn = psm.estn_unit_cn  
        and pev.cn = peu.eval_cn  
        and pet.eval_cn = pev.cn  
        and pet.eval_grp_cn = peg.cn  
        and pet.eval_typ = 'EXPXXX' -- specify the appropriate expansion  
        AND peg.eval_grp = SSYYYY -- the desired evaluation group must be specified  
) phase_1_summary,  
(SELECT pop_stratum_cn,  
    SUM(y_hid_adjusted) ysum_hd,  
    SUM(y_hid_adjusted * y_hid_adjusted) ysum_hd_sqr,  
    COUNT(*) number_plots_in_domain,  
    SUM(decode(y_hid_adjusted, 0, 0, NULL, 0, 1)) non_zero_plots  
    FROM (SELECT psm.cn pop_stratum_cn,  
            p.cn plt_cn,  
            EXPRESSION y_hid_adjusted -- the appropriate expression from ref_pop_attribute table  
            FROM cond c,  
            plot p,  
            tree t, -- tree table must be included for tree level estimates  
            seedling s, -- seedling table must be included for seedling level estimates  
            pop_plot_stratum_assgn ppsa,  
            pop_stratum psm,  
            pop_estn_unit peu,  
            pop_eval pev,  
            pop_eval_grp peg,  
            pop_eval_typ pet  
            WHERE p.cn = c.plt_cn  
            AND ppsa.plt_cn = p.cn  
            AND ppsa.stratum_cn = psm.cn  
            AND peu.cn = psm.estn_unit_cn  
            AND pev.cn = peu.eval_cn  
            WHERE_CLAUSE -- additional where_clause from ref_pop_attribute table)
In the following three examples the scripts were modified from above to produce condition, tree, and seedling level estimates for the Minnesota 2003 inventory. Here the sections in bold are the sections that changed from the standard script for estimates with sampling errors.

Example 4.7. Estimate Area of timberland (acres) with sampling error. Note the bold sections in this example match the bold sections in example 4.2, which estimates the same area without sampling errors.

```
SELECT eval_grp,
SUM(estimate_by_estn_unit.estimate) estimate,
CASE
WHEN SUM(estimate_by_estn_unit.estimate) > 0 THEN
round(sqrt(SUM(estimate_by_estn_unit.var_of_estimate)) /
SUM(estimate_by_estn_unit.estimate) * 100, 3)
ELSE
0
END AS se_of_estimate_pct,
SUM(estimate_by_estn_unit.var_of_estimate) var_of_estimate,
SUM(estimate_by_estn_unit.total_plots) total_plots,
SUM(estimate_by_estn_unit.non_zero_plots) non_zero_plots,
SUM(estimate_by_estn_unit.total_population_area_acres) total_population_acres
FROM (SELECT pop_eval_grp_cn, eval_grp, estn_unit_cn,
SUM(nvl(ysum_hd, 0) * phase_1_summary.expns) estimate,
SUM(phase_1_summary.n_h) total_plots,
SUM(phase_2_summary.number_plots_in_domain) domain_plots,
SUM(phase_2_summary.non_zero_plots) non_zero_plots,
total_area * total_area / SUM(phase_1_summary.n_h) *
((SUM(w_h * phase_1_summary.n_h) -
  (nvl(ysum_hd_sqr, 0) / phase_1_summary.n_h) -
  (nvl(ysum_hd, 0) / phase_1_summary.n_h) *
  (phase_1_summary.n_h - 1))) +
1 / SUM(phase_1_summary.n_h)) *
(SUM(1 - w_h) * phase_1_summary.n_h *
(nvl(ysum_hd_sqr, 0) / phase_1_summary.n_h) -
(nvl(ysum_hd, 0) / phase_1_summary.n_h) *
(phase_1_summary.n_h - 1))) +
1 / SUM(phase_1_summary.n_h)) *
(SUM(1 - w_h) * phase_1_summary.n_h *
(nvl(ysum_hd_sqr, 0) / phase_1_summary.n_h) -
(nvl(ysum_hd, 0) / phase_1_summary.n_h) *
(phase_1_summary.n_h - 1))) +
1 / SUM(phase_1_summary.n_h)) *
(SUM(1 - w_h) * phase_1_summary.n_h *
(nvl(ysum_hd_sqr, 0) / phase_1_summary.n_h) -
(nvl(ysum_hd, 0) / phase_1_summary.n_h) *
(phase_1_summary.n_h - 1))) +
1 / SUM(phase_1_summary.n_h)) *
(SUM(1 - w_h) * phase_1_summary.n_h *
(nvl(ysum_hd_sqr, 0) / phase_1_summary.n_h) -
(nvl(ysum_hd, 0) / phase_1_summary.n_h) *
(phase_1_summary.n_h - 1))) +
1 / SUM(phase_1_summary.n_h)) *
```
\[
\text{(phase}_1_{\text{summary}}.n_h - 1)\text{))} \text{ var}\_\text{of}\_\text{estimate},
\]

\[
\text{total}_\text{area} \text{ total}_\text{population}_\text{area}_\text{acres}
\]

FROM (SELECT peg.eval_grp,
    peg.cn pop_eval_grp_cn,
    psm.estn_unit_cn,
    psm.cn pop_stratum_cn,
    psm.expns,
    p1pointcnt / 
    (SELECT SUM(strs.p1pointcnt)
    FROM pop_stratum strs
    WHERE strs.estn_unit_cn = psm.estn_unit_cn) w_h,
    (SELECT SUM(strs.p1pointcnt)
    FROM pop_stratum strs
    WHERE strs.estn_unit_cn = psm.estn_unit_cn) n_prime,
    p1pointcnt n_prime_h,
    (SELECT SUM(eu_s.area_used)
    FROM pop_estn_unit eu_s
    WHERE eu_s.cn = psm.estn_unit_cn) total_area,
    psm.p2pointcnt n_h
FROM pop_estn_unit peu,
    pop_stratum psm,
    pop_eval pev,
    pop_eval_grp peg,
    pop_eval_typ pet
WHERE peu.cn = psm.estn_unit_cn
AND pev.cn = peu.eval_cn
AND pet.eval_cn = pev.cn
AND pet.eval_grp_cn = peg.cn
AND pet.eval_typ = 'EXPCURR' -- specify the appropriate expansion
AND peg.eval_grp = 272003 -- the desired evaluation group must be specified
) \text{ phase}_1_{\text{summary}},

(SELECT pop_stratum_cn,
    SUM(y_hid_adjusted) ysum_hd,
    SUM(y_hid_adjusted \times y_hid_adjusted) ysum_hd_sqr,
    COUNT(*) number_plots_in_domain,
    SUM(decode(y_hid_adjusted, 0, 0, NULL, 0, 1)) non_zero_plots
FROM (SELECT psm.cn pop_stratum_cn,
    p.cn plt_cn,
    SUM(c.condprop_unadj \times decode(c.prop_basis,
        'MACR',
        psm.adj_factor_macr,
        psm.adj_factor_subp)) -- the expression from ref_pop_attribute table
    y_hid_adjusted
FROM cond c,
    plot p,
    pop_plot_stratum_assign ppsa,
    pop_stratum psm,
    pop_estn_unit peu,
    pop_eval pev,
    pop_eval_grp peg,
    pop_eval_typ pet
WHERE p.cn = c.plt_cn
AND pet.eval_typ = 'EXPCURR'
AND c.cond_status_cd = 1
AND c.reservcd = 0
AND c.siteclcd IN (1, 2, 3, 4, 5, 6) 
-- additional where_clause from ref_pop_attribute table
AND ppsa.plt_cn = p.cn
AND ppsa.stratum_cn = psm.cn
AND peu.cn = psm.estn_unit_cn
AND pev.cn = peu.eval_cn
AND pet.eval_cn = pev.cn
AND pet.eval_grp_cn = peg.cn
AND peg.eval_grp = 272003 -- the desired evaluation group must be specified
GROUP BY psm.cn, p.cn)
GROUP BY pop_stratum_cn) phase_2_summary
WHERE phase_1_summary.pop_stratum_cn =
    phase_2_summary.pop_stratum_cn(+)
GROUP BY pop_eval_grp_cn,
    eval_grp,
estn_unit_cn,
    phase_1_summary.total_area) estimate_by_estn_unit
GROUP BY pop_eval_grp_cn, eval_grp

Produces the following estimate of acres of timberland with sampling error:

| EVAL GRP   | 272003 |
|------------|--------|
| ESTIMATE   | 14,734,137 |
| SE OF ESTIMATE PCT | 0.7 |
| VAR OF ESTIMATE | 10,998,768,175 |
| TOTAL PLOTS | 16,041 |
| NON ZERO PLOTS | 4,774 |
| TOTAL POPULATION ACRES | 54,002,539 |

Example 4.8. Estimate number of live trees on forest land (trees) with sampling error. Note the bold sections in this example match the bold sections in example 4.3, which estimates the same number of trees without sampling errors.

SELECT eval_grp,
    SUM(estimate_by_estn_unit.estimate) estimate,
    CASE
        WHEN SUM(estimate_by_estn_unit.estimate) > 0 THEN
            round(sqrt(SUM(estimate_by_estn_unit.var_of_estimate)) / SUM(estimate_by_estn_unit.estimate) * 100, 3)
        ELSE
            0
    END AS se_of_estimate_pct,
    SUM(estimate_by_estn_unit.var_of_estimate) var_of_estimate,
    SUM(estimate_by_estn_unit.total_plots) total_plots,
    SUM(estimate_by_estn_unit.non_zero_plots) non_zero_plots,
    SUM(estimate_by_estn_unit.total_population_area_acres) total_population_acres
FROM (SELECT pop_eval_grp_cn,
          eval_grp,
estn_unit_cn,
sum(nvl(y.sum_hd, 0) * phase_1_summary.expns) estimate,
    SUM(phase_1_summary.n_h) total_plots,
    SUM(phase_2_summary.number_plots_in_domain) domain_plots,
    SUM(phase_2_summary.non_zero_plots) non_zero_plots,
total_area * total_area / SUM(phase_1_summary.n_h) *
\[
((\sum(w_h \times \text{phase}_1\_\text{summary}.n_h) - \frac{((\text{nvl}(\text{ysum}_\text{hd}_\text{sqr}, 0) / \text{phase}_1\_\text{summary}.n_h) - ((\text{nvl}(\text{ysum}_\text{hd}, 0) / \text{phase}_1\_\text{summary}.n_h) \times ((\text{nvl}(\text{ysum}_\text{hd}, 0) / \text{phase}_1\_\text{summary}.n_h)))}{\text{phase}_1\_\text{summary}.n_h - 1)})) + \frac{1}{\sum(\text{phase}_1\_\text{summary}.n_h)} \times \left(\sum((1 - w_h) \times \text{phase}_1\_\text{summary}.n_h - \frac{((\text{nvl}(\text{ysum}_\text{hd}_\text{sqr}, 0) / \text{phase}_1\_\text{summary}.n_h) - ((\text{nvl}(\text{ysum}_\text{hd}, 0) / \text{phase}_1\_\text{summary}.n_h) \times ((\text{nvl}(\text{ysum}_\text{hd}, 0) / \text{phase}_1\_\text{summary}.n_h)))}{\text{phase}_1\_\text{summary}.n_h - 1})\right)\right) \text{var\_of\_estimate},
\]

\text{total\_area total\_population\_area\_acres}

FROM (SELECT \text{peg.eval\_grp},
\text{peg.cn pop\_eval\_grp\_cn},
\text{psm.estn\_unit\_cn},
\text{psm.expns},
\text{psm.cn pop\_stratum\_cn},
\text{p1pointcnt} /
(\text{SELECT} \sum(\text{strs.p1pointcnt})
\text{FROM pop\_stratum strs}
\text{WHERE strs.estn\_unit\_cn = psm.estn\_unit\_cn}) \text{w}_h,
(\text{SELECT} \sum(\text{strs.p1pointcnt})
\text{FROM pop\_stratum strs}
\text{WHERE strs.estn\_unit\_cn = psm.estn\_unit\_cn}) \text{n\_prime},
\text{p1pointcnt} \text{n\_prime\_h},
(\text{SELECT} \sum(\text{eu\_s.area\_used})
\text{FROM pop\_estn\_unit eu\_s}
\text{WHERE eu\_s.cn = psm.estn\_unit\_cn}) \text{total\_area},
\text{psm.p2pointcnt} \text{n\_h}
\text{FROM pop\_estn\_unit peu},
\text{pop\_stratum psm},
\text{pop\_eval pev},
\text{pop\_eval\_grp peg},
\text{pop\_eval\_typ pet}
\text{WHERE peu.cn = psm.estn\_unit\_cn}
\text{AND pev.cn = peu.eval\_cn}
\text{AND pet.eval\_cn = pev.cn}
\text{AND pet.eval\_grp\_cn = peg.cn}
\text{AND pet.eval\_typ = 'EXPVOL' -- specify the appropriate expansion}
\text{AND peg.eval\_grp = 272003 -- the desired evaluation group must be specified}
) \text{phase}_1\_\text{summary},
(\text{SELECT} \text{pop\_stratum\_cn},
\text{SUM(y\_hid\_adjusted) ysum\_hd},
\text{SUM(y\_hid\_adjusted \times y\_hid\_adjusted) ysum\_hd}_\text{sqr},
\text{COUNT(*) number\_plots\_in\_domain},
\text{SUM(\text{decode(y\_hid\_adjusted, 0, 0, NULL, 0, 1)}) non\_zero\_plots}
\text{FROM (SELECT psm.cn pop\_stratum\_cn},
\text{p.cn plt\_cn},
\text{SUM(t.tpa\_unadj \times decode(dia, NULL, adj\_factor\_subp, decode(least(dia, 5 - 0.001), dia, adj\_factor\_micr, decode(least(dia, nvl(macro\_breakpoint\_dia, 9999) - 0.001), }
dia,
adj_factor_subp,
adj_factor_macr))) -- expression from ref_pop_attribute table
) y_hid_adjusted
FROM cond c,
plot p,
tree t, -- tree table must be included for tree level estimates
pop_plot_stratum_assign ppsa,
pop_stratum psm,
pop_estn_unit peu,
pop_eval pev,
pop_eval_grp peg,
pop_eval_typ pet
WHERE p.cn = c.plt_cn
AND pet.eval_typ = 'EXPVOL'
AND t.plt_cn = c.plt_cn
AND t.condid = c.condid
AND c.cond_status_cd = 1
AND t.statuscd = 1
AND t.dia >= 1.0 -- additional where_clause from ref_pop_attribute table
AND ppsa.plt_cn = p.cn
AND ppsa.stratum_cn = psm.cn
AND peu.cn = psm.estn_unit_cn
AND pev.cn = peu.eval_cn
AND pet.eval_cn = pev.cn
AND pet.eval_grp_cn = peg.cn
AND pev.cn = peg.eval_cn_for_expvol -- specify the appropriate expansion
AND peg.eval_grp = 272003 -- the desired evaluation group must be specified
GROUP BY psm.cn, p.cn)
GROUP BY pop_stratum_cn) phase_2_summary
WHERE phase_1_summary.pop_stratum_cn =
phase_2_summary.pop_stratum_cn(+)
GROUP BY pop_eval.grp_cn,
eval.grp,
estn_unit.cn,
phase_1_summary.total_area) estimate_by_estn_unit
GROUP BY pop_eval.grp_cn, eval.grp

Produces the following estimate of number of live trees on forest land with sampling error:

| EVAL_GRP   | 272003 |
|------------|--------|
| ESTIMATE   | 12,078,196,211 |
| SE OF ESTIMATE PCT | 1.3 |
| VAR OF ESTIMATE | 25,846,103,844,454,600 |
| TOTAL PLOTS | 16,041 |
| NON ZERO PLOTS | 5,069 |
| TOTAL POPULATION ACRES | 54,002,539 |
Example 4.9. Estimate number of seedlings on timberland (seedlings) with sampling error.

```
SELECT eval_grp,
    SUM(estimate_by_estn_unit.estimate) estimate,
    CASE
        WHEN SUM(estimate_by_estn_unit.estimate) > 0 THEN
            round(sqrt(SUM(estimate_by_estn_unit.var_of_estimate)) / 
                   SUM(estimate_by_estn_unit.estimate) * 100,
                3)
        ELSE
            0
    END AS se_of_estimate_pct,
    SUM(estimate_by_estn_unit.var_of_estimate) var_of_estimate,
    SUM(estimate_by_estn_unit.total_plots) total_plots,
    SUM(estimate_by_estn_unit.non_zero_plots) non_zero_plots,
    SUM(estimate_by_estn_unit.total_population_area_acres) total_population_acres
FROM (SELECT pop_eval_grp_cn, 
    eval_grp, 
    estn_unit_cn, 
    sum(nvl(ysum_hd, 0) * phase_1_summary.expns) estimate, 
    SUM(phase_1_summary.n_h) total_plots, 
    SUM(phase_2_summary.number_plots_in_domain) domain_plots, 
    SUM(phase_2_summary.non_zero_plots) non_zero_plots, 
    total_area * total_area / SUM(phase_1_summary.n_h) * 
    ((SUM(w_h * phase_1_summary.n_h * 
      (((nvl(ysum_hd_sqr, 0) / phase_1_summary.n_h) - 
                ((nvl(ysum_hd, 0) / phase_1_summary.n_h) * 
                 (nvl(ysum_hd, 0) / phase_1_summary.n_h))) / 
                     (phase_1_summary.n_h - 1)))) + 
      1 / SUM(phase_1_summary.n_h) * 
    (SUM((1 - w_h) * phase_1_summary.n_h * 
      (((nvl(ysum_hd_sqr, 0) / phase_1_summary.n_h) - 
                ((nvl(ysum_hd, 0) / phase_1_summary.n_h) * 
                 (nvl(ysum_hd, 0) / phase_1_summary.n_h))) / 
                    (phase_1_summary.n_h - 1))))))) var_of_estimate, 
    total_area total_population_area_acres
FROM (SELECT peg.eval_grp, 
    peg.cn pop_eval_grp_cn, 
    psm.estn_unit_cn, 
    psm.expns, 
    psm.cn pop_stratum_cn, 
    p1pointcnt / 
    (SELECT SUM(strs.p1pointcnt) 
    FROM pop_stratum strs 
    WHERE strs.estn_unit_cn = psm.estn_unit_cn) w_h,
    (SELECT SUM(strs.p1pointcnt) 
    FROM pop_stratum strs 
    WHERE strs.estn_unit_cn = psm.estn_unit_cn) n_prime, 
    p1pointcnt n_prime_h, 
    (SELECT SUM(eu_s.area_used) 
    FROM pop_estn_unit eu_s 
    WHERE eu_s.cn = psm.estn_unit_cn) total_area, 
    psm.p2pointcnt n_h 
FROM pop_estn_unit peu, 
    pop_stratum psm, 
    pop_eval pev, 
    pop_eval_grp peg, 
    pop_eval_typ pet
) sum_estimate_by_estn_unit
```
WHERE peu.cn = psm.estn_unit_cn
AND pev.cn = peu.eval_cn
AND pet.eval_cn = pev.cn
AND pet.eval_grp_cn = peg.cn
AND pet.eval_typ = 'EXPVOL' -- specify the appropriate expansion
AND peg.eval_grp = 272003 -- the desired evaluation group must be specified
) phase_1_summary,
(SELECT pop_stratum_cn,
   SUM(y_hid_adjusted) ysum_hd,
   SUM(y_hid_adjusted * y_hid_adjusted) ysum_hd_sqr,
   COUNT(*) number_plots_in_domain,
   SUM(decode(y_hid_adjusted, 0, 0, NULL, 0, 1)) non_zero_plots
FROM (SELECT psm.cn pop_stratum_cn,
         p.cn plt_cn,
         SUM(s.tpa_unadj * adj_factor_micr) y_hid_adjusted
         -- expression from ref_pop_attribute table
FROM cond                          c,
     plot                                   p,
     seedling                          s,  -- seedling table must be included for seedling level estimates
     pop_plot_stratum_assgn ppsa,
     pop_stratum                     psm,
     pop_estn_unit                  peu,
     pop_eval                          pev,
     pop_eval_grp                   peg,
     pop_eval_typ                   pet
WHERE p.cn = c.plt_cn
AND pet.eval_typ = 'EXPVOL'
AND s.plt_cn = c.plt_cn
AND s.condid = c.condid
AND c.cond_status_cd = 1
AND c.reservcd = 0
AND c.siteclcd IN (1, 2, 3, 4, 5, 6)
   -- additional where clause from ref_pop_attribute table
AND ppsa.plt_cn = p.cn
AND ppsa.stratum_cn = psm.cn
AND peu.cn = psm.estn_unit_cn
AND pev.cn = peu.eval_cn
AND pet.eval_cn = pev.cn
AND pet.eval_grp_cn = peg.cn
AND peg.eval_grp = 272003 -- the desired evaluation group must be specified
GROUP BY psm.cn, p.cn)
GROUP BY pop_stratum_cn) phase_2_summary
WHERE phase_1_summary.pop_stratum_cn =
    phase_2_summary.pop_stratum_cn(+)
GROUP BY pop_eval_grp_cn,
   eval_grp,
   estn_unit_cn,
   phase_1_summary.total_area) estimate_by_estn_unit
GROUP BY pop_eval_grp_cn, eval_grp
5. Restricting the attribute of interest to a smaller subset of the population

The estimation procedures presented in examples 4.1 through 4.9 can all be modified to restrict the estimation to a subset, referred to as the domain of interest. An example of a domain would be only sawtimber stands on publicly owned timberland. In effect, the attributes identified in the REF_POP_ATTRIBUTE table are a combination of an attribute (e.g., area, number of trees, volume, number of seedlings) and a domain (e.g., forest land, timberland, ownership, growing-stock trees). The attribute of interest is defined in the REF_POP_ATTRIBUTE.EXPRESSION and the domain of interest is defined by REF_POP_ATTRIBUTE.WHERE_CLAUSE. In example 4.2, the attribute of interest is area, and the domain of interest is restricted to timberland only. In example 4.3, the attribute of interest is number of trees, and the domain of interest is restricted to live trees on forest land with diameters 1 inch and larger. In example 4.4, the attribute of interest is number of seedlings, and the domain of interest is restricted to timberland. In example 4.5, the attribute of interest is volume of growing-stock, and the domain of interest is restricted to timberland.

A word of caution when working with periodic data – not all lands and all attributes were sampled in periodic inventories. In some States, only productive, non-reserved lands were sampled in periodic inventories. So, applying estimation of number of trees to all forest land in older periodic inventories will appear to work, but trees were only measured on timberland, so the estimates will only reflect the trees on timberland. Also, in many periodic inventories, seedlings were not tallied.

In the next example, the domain of interest in example 4.3 is further restricted to a specific species (SPCD = 129, eastern white pine), diameter (DIA ≥20, trees 20 inches and larger), and ownership (OWNGRPCD = 40, private owners only). The boxed lines have been added to the procedure. The procedure now provides an estimate of the total number of live eastern white pine, 20 inches and larger on privately owned forest land.
Example 4.10 Estimate number of live eastern white pine trees 20 inches and larger on privately owned forest land (trees).

```
SELECT SUM(psm.expns * t.tpa_unadj *
    decode(dia,
        NULL, adj_factor_subp,
        decode(least(dia, 5 - 0.001),
            dia, adj_factor_micr,
            decode(least(dia,
                nvl(macro_breakpoint_dia, 9999) - 0.001),
                dia, adj_factor_subp,
                adj_factor_macr)))) estimate -- expression from ref_pop_attribute table
FROM cond c,
    plot p,
    tree t, -- tree table must be included for tree level estimates
    pop_plot_stratum_assgn ppsa,
    pop_stratum psm,
    pop_estn_unit peu,
    pop_eval pev,
    pop_eval_grp peg,
    pop_eval_typ pet
WHERE p.cn = c.plt_cn
    AND pet.eval_typ = 'EXPVOL'
    AND t.plt_cn = c.plt_cn
    AND t.condid = c.condid
    AND c.cond_status_cd = 1
    AND t.statuscd = 1
    AND t.dia >= 1.0 -- additional where_clause from ref_pop_attribute table
    AND t.spcd = 129
    AND t.dia >= 20.0
    AND c.owngrpcd = 40 -- user-defined additional where_clause
    AND ppsa.plt_cn = p.cn
    AND ppsa.stratum_cn = psm.cn
    AND peu.cn = psm.estn_unit_cn
    AND pev.cn = peu.eval_cn
    AND pev.cn = pet.eval_cn
    AND pet.eval_grp.cn = peg.cn
    AND peg.eval_grp = 272003 -- the desired evaluation group must be specified

Produces the following estimate of total number of live eastern white pine, 20 inches and larger on privately owned forest land:

| ESTIMATE |
|----------|
| 519,317  |
```
Adding the same restrictions to the where clause in example 4.8 provides the following output:

| EVAL GRP  |       |
|-----------|-------|
| ESTIMATE  | 519,317|
| SE OF ESTIMATE PCT | 25.1  |
| VAR OF ESTIMATE     | 17,051,491,226 |
| TOTAL PLOTS        | 16,041 |
| NON ZERO PLOTS      | 20     |
| TOTAL POPULATION ACRES | 54,002,539 |

The estimated 519,317 eastern white pine trees, 20 inches and larger on privately owned forest land has a sample error of 25.1 percent. Live eastern white pine 20 inches or larger on private forest land were observed on a total of 20 plots in the State.

6. Changing the attribute of interest with user-defined criteria

Users can define condition level attributes of interest. The standard condition level attributes of interest are sampled land area and all land area (expressed in acres). Sampled land area (adjusted for denied access and hazardous conditions that were not sampled) is the one used for nearly all standard FIA tables that report area estimates. All land area (where denied access and hazardous are considered part of the sample) is only used in estimation that treats denied access (plots on land where field crews were unable to obtain the owner’s permission to measure the plot) and hazardous (conditions that were deemed too hazardous to measure the plots) as part of the sample attribute of interest. Most of the other condition level variables that FIA observes are typically used to categorize the condition, and are most often applied as restrictions on the population in defining the domain, and do not lend themselves as an attribute of interest. For example, BALIVE (the basal area of live trees 1 inch diameter and larger) is mainly used to categorize forest land area rather than as an attribute of interest in population level estimation. Users are more interested in knowing how many acres of forest land meets some basal area requirement (say between 50 and 100 square feet per acre), rather than the total basal area of forest land in a State.

An example of a user-defined condition level attribute of interest, for which an estimate of a total might be of interest, would be total land value (see Example 4.11). Here the user would supply a function that assigns value ($ per acre) to forest land, based on attributes in FIADB. As an example, we use a very arbitrary function of site index and basal area of live tree – value per acre = 1000 + (site index x 3) + (basal area x 4), and limit the domain of interest to only private timberland.

Modifying example 1 produces the following script and estimate of total value. Since the function is a condition level value per acre, it is simply included in the expression as a multiplication factor, and the domain restriction (private timberland) is added to the where clause. The sections that have been added to example 4.2 are in boxes. The same modifications were added to example 4.7 to produce the estimates with sampling errors.
Example 4.11 Estimated dollar value of private timberland (user defined function).

```
SELECT SUM(psm.expns * c.condprop_unadj * 
  decode(c.prop_basis, 
    'MACR', 
    psm.adj_factor_macr, 
    psm.adj_factor_subp) -- expression from ref_pop_attribute table
  * (1000 + c.sicond * 3 + c.balive * 4) -- user-defined value function
) estimate 
FROM cond c, 
  plot p, 
  pop_plot_stratum_assign ppsa, 
  pop_stratum psm, 
  pop_estn_unit peu, 
  pop_eval pev, 
  pop_eval_grp peg, 
  pop_eval_typ pet 
WHERE p.cn = c.plt_cn
  AND pet.eval_typ = 'EXPCURR'
  AND c.cond_status_cd = 1
  AND c.reservcd = 0
  AND c.siteclcd IN (1, 2, 3, 4, 5, 6) -- additional where_clause from ref_pop_attribute table
  AND c.owngrpcd = 40 -- user-defined additional where_clause
  AND ppsa.plt_cn = p.cn
  AND ppsa.stratum_cn = psm.cn
  AND peu.cn = psm.estn_unit_cn
  AND pev.cn = peu.eval_cn
  AND pev.cn = pet.eval_cn
  AND pet.eval_grp_cn = peg.cn
  AND peg.eval_grp = 272003 -- the desired evaluation group must be specified

Produces the following estimate only from above example:

```
| ESTIMATE                  |
|---------------------------|
| 10,156,384,067            |
```

And the same modification to example 4.7 produces the following estimate with sampling errors:

```
| EVAL GRP      | 272003 |
|--------------|--------|
| ESTIMATE     | 10,156,384,067 |
| SE OF ESTIMATE PCT | 1.4    |
| VAR OF ESTIMATE | 18,850,461,684,117,200 |
| TOTAL PLOTS  | 16,041 |
| NON ZERO PLOTS | 2,290  |
| TOTAL POPULATION ACRES | 54,002,539 |
```

Based on this function, the estimated total value of private timberland in the State is 10.1 billion dollars. This value function is used only as an example, any type of user defined function that assigns quantities, such as value ($ per acre), wildlife population level (animals per acre), productivity (yield per acre), or carbon sequestration potential (tons per acre) could be used as long as it is a function of data items in the FIADB, and/or data attributes from other sources that can be linked to FIA plots.
7. Estimates of change over time on the standard 4-subplot fixed area plot

A number of the attributes described in the REF_POP_ATTRIBUTE table are related to change over time and are based on computed attributes that utilize data from two points in time from the same plot. The attributes identified by values 25-44 (e.g., net growth of all live on forestland represented by 25) of REF_POP_ATTRIBUTE.ATTRIBUTE_NBR are the standard growth, removals and mortality attributes that FIA presents in its reports. The computation of these values as presented in the previous section will provide estimates of these change attributes; however, all estimation is done through the observations made and recorded at the second measurement of the plot. Users often wish (1) to obtain estimates that reflect changes in attributes over the remeasurement of the plot that go beyond these attributes, (2) to classify these standard estimates and other estimates by attributes from the previous measurement, or (3) to cross classify them by changes in various attributes over time. Examples of these types of estimations are:

- Breakdowns of change in area over time by past and current land use, forest type, or other condition attributes.
- Number of trees on forest land that changed to nonforest land.
- Removals of trees on forest land of a specific forest type that changed to a different forest type after removals.
- Mortality of trees that were in a specific diameter range in the previous measurement.
- Change in the number of seedlings per acre over time for a specific forest type.

The estimation of these and many other change attributes require properly selecting the appropriate set of plots that were measured at both points in time and linking data from these two measurements.

Prior to 1999, FIA used periodic inventories with different plot designs. Since 1999, the new annual inventory uses a national standard, 4-subplot fixed area plot design. The change estimation procedures described here are applicable to all plots measured at least twice in the annual inventory, but may not be appropriate for change estimation between periodic and annual inventories.

7.1 Selecting an appropriate set of plots (evaluation) for change estimations

For change estimation, select an evaluation that consists of only remeasured plots, evaluations used for growth, removals, and mortality estimation. These growth-removals-mortality (GRM) evaluations can be identified by either of the following restrictions in the where clause:

\[
\text{and pop_eval.cn} = \text{pop_eval_grp.eval_cn} \text{ for expgrow},
\]

or

\[
\text{and pop_eval_typ.eval_grp.cn} = \text{pop_eval_grp.cn} \\
\text{and pop_eval_typ.eval_typ} = \text{‘EXPGROW’}
\]

Either of these statements will restrict the sample plots to only those used in the estimation of growth: only the set of plots that have been measured at two points in time. In the examples we continue linking to evaluations through the POP_EVAL_TYP table (second example).
7.2 Linking tree level data to past condition data

In the following examples, we demonstrate how to produce a tree-level estimate (net growth of all live trees on forest land), and then link it to conditions at two points in time (past and current) to produce a table that breaks down the estimate by condition-level attributes and the two points in time.

First we begin with the script that produces an estimate of total net growth of all live trees on forest land for the 2007 Minnesota inventory. The evaluation used in this estimate (pop_eval.evalid = 270703) consists of plots measured in 1999, 2000, 2001, and 2002 that were remeasured in 2004, 2005, 2006, and 2007, respectively.

Example 4.12 Estimate net growth of all live trees on forest land (cubic feet per year).

```
SELECT SUM(psm.expns * t.tpagrow_unadj * fgrowcfal *
    decode(dia,
        null,
        adj_factor_subp,
        decode(least(dia, 5 - 0.001),
            dia,
            adj_factor_micr,
            decode(least(dia,
                nvl(macro_breakpoint_dia, 9999) - 0.001),
                dia,
                adj_factor_subp,
                adj_factor_macr)))) estimate
    -- expression from ref_pop_attribute table
FROM cond                          c,
    plot                                   p,
    -- tree table must be included for tree level estimates
    tree                                   t,
    pop_plot_stratum_assgn ppsa,
    pop_stratum                     psm,
    pop_estn_unit                  peu,
    pop_eval                          pev,
    pop_eval_grp                   peg,
    pop_eval_typ                   pet
WHERE p.cn = c.plt_cn
AND pet.eval_typ = 'EXPGROW'
AND t.plt_cn = c.plt_cn
AND t.condid = c.condid -- additional where_clause from ref_pop_attribute table
AND ppsa.plt_cn = p.cn
AND ppsa.stratum_cn = psm.cn
AND peu.cn = psm.estn_unit_cn
AND pev.cn = peu.eval_cn
AND pev.cn = pet.eval_cn
AND pet.eval_grp_cn = peg.cn
AND peg.eval_grp = 272007 -- the desired evaluation group must be specified
```

The example above produces the following estimate of total net growth of all live trees on forest land:

427,200,491 cubic feet per year

We then modified this example to link not only to the condition record at the current (second) measurement, but also to the condition record at the previous (first) measurement by using the attribute TREE.PREVCOND to link each tree record to its previous condition. We also added a
group by clause to produce the estimates broken down by values of the condition level attributes COND_STATUS_CD (condition status code) and STDSZCD (stand-size class code) at both points in time. This procedure is shown in example 4.13, which was created by adding the bold sections to example 4.12.

Example 4.13 Estimate net growth of all live on forest land (cubic feet per year) by condition status and stand size at two points in time.

```
SELECT c_past.cond_status_cd past_cond_status_cd,
       c_past.stdszcd past_stdszcd,
       c.cond_status_cd current_cond_status_cd,
       c.stdszcd current_stdszcd,
       SUM(psm.expns * t.tpagrow_unadj * fgrowcfa * 
           decode(dia, 
           null, 
           adj_factor_subp, 
           decode(least(dia, 5 - 0.001), 
           dia, 
           adj_factor_micr, 
           decode(least(dia, 
             nvl(macro_breakpoint_dia, 9999) - 0.001), 
           dia, 
           adj_factor_subp, 
           adj_factor_macr)))) estimate
FROM cond                          c,
    cond                                c_past, --past condition is added
    plot                                   p,-- tree table must be included for tree level estimates
    tree                                   t, -- tree table must be included for tree level estimates
    pop_plot_stratum_assgn ppsa,
    pop_stratum                            psm,
    pop_estn_unit                          peu,
    pop_eval                               pev,
    pop_eval_grp                          peg,
    pop_eval_typ                          pet
WHERE p.cn = c.plt_cn
AND pet.eval_typ = 'EXPGROW'
AND t.plt_cn = c.plt_cn
AND t.condid = c.condid -- additional where_clause from ref_pop_attribute table
AND ppsa.plt_cn = p.cn
AND ppsa.stratum_cn = psm.cn
AND peu.cn = psm.estn_unit_cn
AND pev.cn = peu.eval_cn
AND pev.cn = pet.eval_cn
AND pet.eval_grp_cn = peg.cn
AND pet.eval_grp = 272007 -- the desired evaluation group must be specified
AND c_past.plt_cn = p.prev_plt_cn
-- links to only those conditions at previous measurement of plot
AND c_past.condid = t.prevcond -- links trees to their past condition
group by c_past.cond_status_cd,
    c_past.stdszcd,
    c.cond_status_cd,
    c.stdszcd
```
Example 4.13 produces the following estimates of total net growth of all live trees on forest land broken down by past and current COND_STATUS_CD and STDSZCD values.

| PAST_COND_STATUS_CD | PAST_STDSZCD | CURRENT_COND_STATUS_CD | CURRENT_STDSZCD | ESTIMATE   |
|---------------------|--------------|------------------------|-----------------|------------|
| 1                   | 1            | 1                      | 1               | 81,494,163.3 |
| 1                   | 1            | 1                      | 2               | -1,056,519.2 |
| 1                   | 1            | 1                      | 3               | -6,077,491.9 |
| 1                   | 1            | 1                      | 5               | -4,520,213.8 |
| 1                   | 1            | 2                      |                 | 708,394.8   |
| 1                   | 1            | 5                      |                 | 0.0         |
| 1                   | 2            | 1                      | 1               | 24,639,163.2 |
| 1                   | 2            | 1                      | 2               | 121,373,610.5 |
| 1                   | 2            | 1                      | 3               | -298,122.7  |
| 1                   | 2            | 1                      | 5               | -1,358,131.3 |
| 1                   | 2            | 2                      | 2               | -720,502.7  |
| 1                   | 2            | 3                      |                 | -41,231.9   |
| 1                   | 3            | 1                      | 1               | 4,596,722.9 |
| 1                   | 3            | 1                      | 2               | 29,398,997.6 |
| 1                   | 3            | 1                      | 3               | 38,089,804.3 |
| 1                   | 3            | 1                      | 5               | 78,764.7    |
| 1                   | 3            | 2                      |                 | 380,739.8   |
| 1                   | 3            | 3                      |                 | 0.0         |
| 1                   | 3            | 4                      |                 | -327,337.8  |
| 1                   | 5            | 1                      | 1               | 1,591,344.2 |
| 1                   | 5            | 1                      | 2               | 579,855.3   |
| 1                   | 5            | 1                      | 3               | 135,054.2   |
| 1                   | 5            | 1                      | 5               | 11,488.4    |
| 1                   | 5            | 2                      |                 | 2,210.0     |
| 1                   | 5            | 5                      |                 | 0.0         |
| 2                   | 1            | 1                      | 1               | 67,569,968.1 |
| 2                   | 1            | 2                      |                 | 45,417,363.4 |
| 2                   | 1            | 3                      |                 | 11,180,894.0 |
| 2                   | 1            | 5                      |                 | 557,059.5   |
| 2                   | 2            | 2                      |                 | 0.0         |
| 3                   | 1            | 1                      | 1               | 4,285,796.0 |
| 3                   | 1            | 2                      |                 | 1,838,167.0 |
| 3                   | 1            | 3                      |                 | 1,187,875.3 |
| 4                   | 1            | 1                      |                 | 5,868,590.9 |
| 4                   | 1            | 2                      |                 | 212,902.8   |
| 4                   | 1            | 3                      |                 | 401,112.0   |
| 5                   | 1            | 1                      |                 | 0.0         |
The following tabulation of estimated net growth on forest land by condition status code and stand-size class at the two points in time can be made from the example 4.13 results. Note that we have added the code labels to the row and column headings, and each cell in the tabulation is the appropriate value from example 4.13.

Estimated total net growth of all live trees on forest land broken down by past and current condition status code and stand-size class, Minnesota, 2007 (cubic feet per year).

| PAST_COND_STATUS_CD | PAST_STDSZCD | 1 Forest land | 2 Nonforest land | 3 Noncensus water | 4 Census water | 5 Nonsampled | Total |
|---------------------|--------------|---------------|------------------|------------------|---------------|-------------|-------|
|                     |              | 1 Large diameter | 2 Medium diameter | 3 Small diameter | 5 Nonstocked | Total on Forest land | Total on Nonforest land | 3 Noncensus water | 4 Census water | 5 Nonsampled | Total |
| 1 Forest land       |              | 81,494,163.3   | -1,056,519.2     | -6,077,491.9     | -4,520,213.8  | 69,839,938.4       | 708,394.8            | 0.0             | -41,231.9       | 72,217,691.4 | 0.0 | 70,548,333.2 |
| 2 Medium diameter   |              | 24,639,163.2   | 121,373,610.5    | -298,122.7       | -1,358,131.3  | 144,356,519.6      | -720,502.7           | -41,231.9       | -327,337.8     | 143,594,785.1 | 0.0 | 143,594,785.1 |
| 3 Small diameter    |              | 4,596,722.9    | 29,398,997.6     | 38,089,804.3     | 78,764.7      | 72,164,289.4       | 380,739.8           | 0.0             | 2,319,952.0    | 72,217,691.4 | 0.0 | 72,217,691.4 |
| 5 Nonsampled        |              | 1,591,344.2    | 579,855.3        | 135,054.2        | 11,488.4      | 2,317,742.0        | 2,210.0             | 0.0             | 2,319,952.0    | 2,319,952.0  | 0.0 | 2,319,952.0 |
| Total on forest land|              | 112,321,393.5  | 150,295,944.1    | 31,849,243.9     | -5,788,092.1  | 288,678,489.4      | 370,842.0            | -41,231.9       | -327,337.8     | 288,680,761.7 | 0.0 | 288,680,761.7 |
| 2 Nonforest land    |              | 67,569,988.1   | 45,417,363.4     | 11,180,894.0     | 557,059.5     | 124,725,284.9      | 0.0                   | 0.0             | 124,725,284.9  | 124,725,284.9 | 0.0 | 124,725,284.9 |
| 3 Noncensus water   |              | 4,285,796.0    | 1,838,167.0      | 1,187,875.3      | 7,311,838.3   | 7,311,838.3        | 6,482,605.6          | 0.0             | 6,482,605.6    | 6,482,605.6  | 0.0 | 6,482,605.6 |
| 4 Census water      |              | 5,868,590.9    | 212,902.8        | 401,112.0        | 0.0           | 6,482,605.6        | 0.0                   | 0.0             | 6,482,605.6    | 6,482,605.6  | 0.0 | 6,482,605.6 |
| 5 Nonsampled        |              | 0.0            | 0.0              | 0.0              | 0.0           | 0.0                  | 0.0                   | 0.0             | 0.0             | 0.0            | 0.0 | 0.0 |
| Total net growth    |              | 190,045,748.4  | 197,764,377.3    | 44,619,125.1     | -5,231,032.6  | 427,198,218.2      | 370,842.0             | -41,231.9       | -327,337.8     | 427,200,490.5 | 0.0 | 427,200,490.5 |
7.3 The SUBP_COND_CHNG_MTRX (CMX) table

The SUBP_COND_CHNG_MTRX (CMX) table was added in the FIADB version 4.0 to facilitate the tracking of area change for the annual inventory. Under this design, a plot measures area change by tracking the movement in condition boundaries within the area of the four subplots. Figure 7 shows what can happen on a plot when a condition boundary (in this case the edge of a beaver pond) moves over time. Beaver activity raised the level of the pond, increasing the pond area and converting some of the forest land to water. The same kind of changes can occur from any number of human-caused events such as timber harvesting, land clearing or road construction, or natural events such as fire, storms, or insect attacks.

It is important to remember that condition boundaries are not just defined along changes in condition status code, but also may occur within forest land. The following tabulation shows how the area change information in figure 7 would be recorded in the CMX table.

**CMX table data for figure 7**

| SUBP | SUBPTYP | CONID | PREVCOND | SUBPTYP_PROP_CHNG |
|------|---------|-------|-----------|------------------|
| 1    | 1       | 1     | 1         | 0.8000           |
| 1    | 1       | 1     | 2         | 0.2000           |
| 1    | 2       | 1     | 1         | 1.0000           |
| 2    | 1       | 1     | 1         | 1.0000           |
| 2    | 2       | 1     | 1         | 1.0000           |
| 3    | 1       | 2     | 2         | 1.0000           |
| 3    | 2       | 2     | 2         | 1.0000           |
| 4    | 1       | 1     | 2         | 1.0000           |
| 4    | 2       | 1     | 2         | 1.0000           |
The CMX table tracks the change in condition areas for each of the four subplots (SUBPTYP = 1) and each of the four microplots (SUBPTYP = 2) on this plot. In inventories where the macroplot is used there would also be entries for each macroplot (SUBPTYP = 3). The attribute PROP_BASIS in the COND table identifies how area estimation was conducted for each plot, on the basis of either the macroplot or the subplot. In this example area estimation (and thus area change estimation) is based on the subplot information, not the macroplot. Area estimation is typically based on the largest area sampled (macroplot in States where it is measured, otherwise the subplot) and not on the microplot. Area and area change estimation based on the microplot is only appropriate with another estimate solely collected on the microplot such as number of trees or biomass in trees <5 inches diameter at breast height. The examples of change presented here are based on the subplot, but could easily be modified to obtain estimates based on the microplots.

In the example shown in figure 7, the CMX table has two entries where SUBPTYP = 1 and SUBP = 1. The first entry indicates that 80 percent of the subplot area was in condition 1 (water) at both measurements, and the second entry indicates 20 percent of the subplot area changed from forest to water. For the other three subplots and all four microplots, only one record exists, indicating that the entire subplot or microplot either stayed in the same condition (subplots and microplots 2 and 3) or the entire area changed from one condition to another (subplot and microplot 4). For this remeasured plot, change based on the four subplots is water to water 45 percent, forest to water 30 percent, and forest to forest 25 percent; change based on the four microplots is water to water 50 percent, forest to water 25 percent, and forest to forest 25 percent. The following section presents SQL script that produces these estimates.

7.4 Using the CMX table to estimate area change between two measurements

The estimation of area change over time requires linking past and current conditions through the CMX table to determine the portion of plot area that transitioned from conditions observed at time 1 to those observed at time 2 (methods applicable only between two measurements in the annual inventory). As in examples 4.12 and 4.13, select an evaluation that consists of only remeasured plots. In the examples that follow, we show how to create area change estimates that go with the net growth of all live trees on forest land as obtained from example 4.13.

We begin by modifying the script that produces the estimate of area of forest land so that it uses the net growth evaluation EXPGROW rather than the area evaluation EXPCURR that is standard for area estimations. Example 4.14 shows this modification in bold.
Example 4.14 Estimate area of forest land (acres) based on the net growth evaluation.

```
SELECT SUM(psm.expns * c.condprop_unadj * 
    decode(c.prop_basis, 
    'MACR', 
    psm.adj_factor_macr, 
    psm.adj_factor_subp) -- expression from ref_pop_attribute table
) estimate 
FROM cond c, 
plot p, 
pop_plot_stratum_assgn ppsa, 
pop_stratum psm, 
pop_estn_unit peu, 
pop_eval pev, 
pop_eval_grp peg, 
pop_eval_typ pet 
WHERE p.cn = c.plt_cn 
and pet.eval_typ = 'EXPGROW' 
AND c.cond_status_cd = 1 -- additional where_clause from ref_pop_attribute table 
AND ppsa.plt_cn = p.cn 
AND ppsa.stratum_cn = psm.cn 
AND peu.cn = psm.estn_unit_cn 
AND pev.cn = peu.eval_cn 
AND pev.cn = pet.eval_cn 
AND pet.eval_grp_cn = peg.cn 
AND peg.eval_grp = 272007 -- the desired evaluation group must be specified
```

The remeasured plots (12,280 plots) associated with EXPGROW produce an area estimate of 16,962,397.2 acres of forest land versus 16,723,532.5 provided by EXCURR using all plots (17,855 plots). Both estimates of forest area are valid; however, only the one based on the remeasurement sample can be broken down into two points in time.

To estimate area change over time, the script has been further modified to link past and current condition records through the CMX table. This table has entries for every subplot on a remeasured plot and stores the proportion of the area of each subplot by the two points in time in the attribute CMX.SUBTYP_PROP_CHNG. Example 4.15 shows the script that produces the area change estimates that go with the net growth estimates produced in example 4.13. Again, changes and additions from example 4.14 are shown in bold. Line numbers are for reference purposes.
Example 4.15 Estimate area change (acres) by condition status and stand size at two points in time, Minnesota, time 1 from 1999-2002 and time 2 from 2003-2007

```
1  SELECT c_past.cond_status_cd past_cond_status_cd,
2      c_past.stdszcd past_stdszcd,
3      c.cond_status_cd current_cond_status_cd,
4      c.stdszcd current_stdszcd,
5      SUM(psm.expns * CMX.subptyp_prop_chng / 4 *
6            decode(c.prop_basis,
7            'MACR',
8            psm.adj_factor_macr,
9            psm.adj_factor_subp) -- expression from ref_pop_attribute table
10       ) estimate,
11      count(*) COUNT,
12      SUM(cmx.subptyp_prop_chng / 4) plot_area
13  FROM cond c,
14      plot p,
15      pop_plot_stratum_assgn ppsa,
16      pop_stratum psm,
17      pop_eval_typ pet,
18      pop_eval_grp peg
19  WHERE p.cn = c.plt_cn
20      AND pet.eval_typ = 'EXPGROW'
21      AND (c.cond_status_cd = 1 or c_past.cond_status_cd = 1)
22      AND ppsa.plt_cn = p.cn
23      AND ppsa.stratum_cn = psm.cn
24      AND peu.cn = psm.estn_unit_cn
25      AND peg.eval_grp = 272007  -- the desired evaluation group must be specified
26      AND peg.eval_grp = p.prev_plt_cn = c_past.plt_cn
27      AND cmx.prev_plt_cn = c_past.plt_cn
28      AND cmx.condid = c.condid
29      AND (cmx.subptyp = 3 and c.prop_basis = 'MACR') or
30      (cmx.subptyp = 1 and c.prop_basis = 'SUBP'))
31  group by c_past.cond_status_cd,
32      c_past.stdszcd,
33      c.cond_status_cd,
34      c.stdszcd
```

Example 4.15 can be used as a template to create almost any cross tabulation of past and current area estimates based on a remeasured set of plots. The following changes (bold sections) were made to example 4.14 to facilitate the estimation of area change:

- Line 21 – The table **COND** with the alias **C_PAST** was added to the list of tables to be joined. This provides the condition level attributes for the past (time 1) measurement of the plot.
• Line 22 – The table **SUBP_COND_CHG_MTRX** with the alias **CMX** was added to the list of tables to be joined. This table provides the link between past (time 1) and current (time 2) conditions at the subplot level. Each entry in this table defines the portion (0-1) of the subplot, microplot or macroplot that was observed in a condition at time 2 and observed in a condition at time 1. For a subplot that was entirely in a single condition at both times, there will only be one entry for the subplot, with **CMX.SUBPTYP_PROP_CHNG = 1.0**. For a subplot that was mapped to be 40 percent in one condition and 60 percent in another condition at both times with no change in boundary, there will be two entries for the subplot, one with **CMX.SUBPTYP_PROP_CHNG = 0.4** and the other with **CMX.SUBPTYP_PROP_CHNG = 0.6**. For subplots where boundaries have changed, there will be entries that account for all the pieces of the subplot area with the total value of **CMX.SUBPTYP_PROP_CHNG** adding to 1.0.

• Lines 1-4 and 39-42 – As in example 4.13, past and current condition status and stand-size class codes (group by c_past.cond_status_cd, c_past.stdszcd, c.cond_status_cd, c.stdszcd) were grouped to obtain estimate breakdowns by these attributes.

• Line 5 – **c.condprop_unadj** (the total plot condition proportions that are within a specific condition) was replaced with **cmx.subptyp_prop_chng / 4** (the subplot condition proportion divided by the number of subplots in the plot). The division by 4 is required because the **CMX** table tracks area at the subplot level (4 subplots per plot).

• Line 25 – The restrictions were changed in the where clause from **AND c.cond_status_cd = 1** to **AND (c.cond_status_cd = 1 or c_past.cond_status_cd = 1)**, to select conditions that were forest in at least one of the measurements, not just the current measurement. This query tracks the area of land that moves in and out of forest, as well as changes in stand-size class on land that remains forest.

• Lines 33-38 – These additions to the where clause provide the proper links to the **C_PAST** and **CMX** tables that were added to the table list. Line 33 (**AND p.prev_plt_cn = c_past.plt_cn**) matches the past and current condition records to the same plot, and lines 34-38 provide the other restrictions that link the appropriate conditions at the two measurements through the **CMX** table. Lines 37 and 38 ensure that in inventories where area estimates are based on the macroplot observations, the area change estimates are based on the macroplot observations, and in all other cases the estimates are based on the subplot observations.

• Lines 11 and 12 – **count(*) COUNT** and **SUM(CMX.subptyp_prop_chng / 4)** **PLOT_AREA** provide two additional summary attributes along with the area estimates. **COUNT** is the total number of subplot pieces that is tracked in the estimation. **PLOT_AREA** is the total portion of plots that is tracked in the estimation.
Example 4.15 produces the following estimates of total area (ESTIMATE), total number of subplots (COUNT), and total portion of plots (PLOT_AREA) broken down by past and current COND_STATUS_CD and STDSZCD values, for land that was forest at measurement time 1, measurement time 2, or both.

| PAST_COND_STATUS_CD | PAST_STDSZCD | CURRENT_COND_STATUS_CD | CURRENT_STDSZCD | ESTIMATE   | COUNT | PLOT_AREA |
|---------------------|--------------|------------------------|-----------------|------------|-------|-----------|
| 1                   | 1            | 1                      | 1               | 3,631,160.4| 3208  | 767.8     |
| 1                   | 1            | 1                      | 2               | 291,277.3  | 274   | 63.1      |
| 1                   | 1            | 1                      | 3               | 390,763.5  | 360   | 83.0      |
| 1                   | 1            | 1                      | 5               | 58,700.4   | 53    | 12.0      |
| 1                   | 1            | 2                      |                | 70,387.0   | 117   | 15.2      |
| 1                   | 1            | 3                      |                | 3,961.3    | 10    | 0.8       |
| 1                   | 1            | 4                      |                | 2,892.6    | 9     | 0.6       |
| 1                   | 1            | 5                      |                | 2,289.7    | 2     | 0.5       |
| 1                   | 2            | 1                      | 1               | 786,401.0  | 709   | 167.1     |
| 1                   | 2            | 1                      | 2               | 4,648,293.5| 4160  | 996.0     |
| 1                   | 2            | 1                      | 3               | 620,036.7  | 571   | 132.4     |
| 1                   | 2            | 1                      | 5               | 46,356.9   | 46    | 10.2      |
| 1                   | 2            | 2                      |                | 84,928.1   | 133   | 18.8      |
| 1                   | 2            | 3                      |                | 1,990.6    | 6     | 0.4       |
| 1                   | 2            | 4                      |                | 895.2      | 1     | 0.2       |
| 1                   | 3            | 1                      | 1               | 158,110.2  | 151   | 32.5      |
| 1                   | 3            | 1                      | 2               | 648,108.5  | 604   | 138.3     |
| 1                   | 3            | 1                      | 3               | 4,243,065.9| 3884  | 934.6     |
| 1                   | 3            | 1                      | 5               | 61,623.3   | 56    | 13.1      |
| 1                   | 3            | 2                      |                | 98,616.9   | 126   | 21.4      |
| 1                   | 3            | 3                      |                | 12,348.1   | 11    | 2.1       |
| 1                   | 3            | 4                      |                | 4,707.5    | 4     | 1.0       |
| 1                   | 5            | 1                      | 1               | 16,820.1   | 18    | 3.7       |
| 1                   | 5            | 1                      | 2               | 18,273.1   | 20    | 4.2       |
| 1                   | 5            | 1                      | 3               | 95,244.4   | 94    | 21.5      |
| 1                   | 5            | 1                      | 5               | 61,597.5   | 59    | 14.2      |
| 1                   | 5            | 2                      |                | 55,411.0   | 53    | 11.9      |
| 1                   | 5            | 3                      |                | 549.8      | 1     | 0.1       |
| 1                   | 5            | 5                      |                | 2,814.4    | 2     | 0.5       |
| 2                   | 1            | 1                      | 1               | 234,236.1  | 288   | 50.7      |
| 2                   | 1            | 2                      |                | 267,173.3  | 326   | 59.6      |
| 2                   | 1            | 3                      |                | 556,373.0  | 564   | 126.3     |
| 2                   | 1            | 5                      |                | 48,463.7   | 51    | 11.0      |
| 3                   | 1            | 1                      |                | 14,427.4   | 19    | 3.1       |
| 3                   | 1            | 2                      |                | 9,767.2    | 13    | 2.3       |
| 3                   | 1            | 3                      |                | 21,966.0   | 21    | 4.3       |
| 3                   | 1            | 5                      |                | 1,255.3    | 2     | 0.3       |
| 4                   | 1            | 1                      |                | 17,585.0   | 19    | 4.0       |
| 4                   | 1            | 2                      |                | 4,149.1    | 10    | 0.9       |
| 4                   | 1            | 3                      |                | 8,858.1    | 9     | 2.0       |
| 5                   | 1            | 1                      |                | 2,339.8    | 2     | 0.5       |
These results are used to produce the following tabulation of estimated change in forest area by condition status code and stand-size class at two points in time.

Estimated forest land area broken down by past and current condition status code and stand-size class, Minnesota, 2007 (acres). Includes lands classified as forest at either or both measurements. Based on plots first measured in 1999-2002 and remeasured in 2003-2007.

| PAST_COND_STATUS_CD | PAST_STDSZCD | CURRENT_COND_STATUS_CD | CURRENT_STDSZCD | Total Forest land | 2 Nonforest land | 3 Nocensus water | 4 Census water | 5 Nonsampled | Total |
|---------------------|--------------|------------------------|-----------------|------------------|------------------|-----------------|----------------|-------------|-------|
| 1 Forest land       | 1 Large diameter | 4,592,491.7 | 5,605,952.3 | 5,349,110.6 | 228,278.0 | 15,775,832.6 | 309,343.1 | 18,849.8 | 30,189.3 | 16,117,624.8 |
|                     | 2 Medium diameter | 234,236.1 | 267,173.3 | 556,373.0 | 48,463.7 | 1,106,246.1 |             |             |             | 1,106,246.1 |
|                     | 3 Small diameter | 14,427.4 | 9,767.2 | 21,966.0 | 1,225.5 | 47,386.1 |             |             |             | 47,386.1 |
|                     | 5 Nonstocked | 17,585.0 | 4,149.1 | 8,858.1 | 30,592.1 |             |             |             |             | 30,592.1 |
| 2 Nonforest land    | 4 Census water | 2,339.8 |             |             |             |             |             |             |             | 2,339.8 |

Total: 4,861,080.0 | 5,887,041.9 | 5,936,307.6 | 277,967.2 | 16,962,396.8 | 309,343.1 | 18,849.8 | 8,495.3 | 5,104.1 | 17,304,189.0 |
The total current forest land area in the table above (16,962,396.8 acres) matches (within 1 acre) the results we obtained in example 4.14 (16,962,397.2 acres). The difference between these two estimates is simply the rounding error introduced by storing and computing condition proportions for each of the individual subplot sections in `cmx_subtyp_prop_chng` versus the total condition proportion in `c.condprop_unadj`. The total past forest land area in the tabulation above (16,117,624.8 acres) is based on the same remeasured plots and comes close, but does not match the 2003 estimate of forest land area (16,230,325.3 acres) one obtains when using example 4.14 and setting `pet.eval_typ='EXPCURR'` and `pop_eval_grp.eval_grp = 272003`.

The COUNT and PLOT_AREA values provide data users with the number of measurements associated with each estimate, giving users some information about the reliability of the estimates. For example, conditions that remained as large diameter (COND.STDSZCD equals 1) from time 1 to time 2 had an area estimate of 3,631,160.4 acres at time 2. From time 1 to time 2, 3,208 subplots or portions of subplots maintained their large diameter condition. These subplots or portions of subplots represent an area equivalent to 767.8 total plots. The estimates are based on a considerable number of observations. In contrast, if one is interested in tracking area of water (either census or noncensus water) that converts to or from forest land over time, estimates are based on far fewer observed changes. The estimated area that changed from water (COND.COND_STATUS_CD equals 3 or 4) to forest (COND.COND_STATUS_CD equals 1) is 77,978.2 acres, and the estimated change from forest to water is 27,345.1 acres. The water to forest change is based on observations from 93 subplots where at least a portion of the subplot was observed to change from water to forest. The total area of this observed change is equal to 16.8 plots. The change from forest to water estimate (27,345.1 acres) is based on 42 subplot observations over an area equivalent to 5.2 plots.

Example 4.16 presents sampling errors for the forest to water area change estimate. This script was created from the script presented in example 4.7 with modifications similar to those made in example 4.15. The bold sections indicate where changes were made. The addition of the following code to the where clause restricts the estimation to conditions that change from forest `(c_past.cond_status_cd = 1)` to water `(c.cond_status_cd IN (3,4))`:

```
AND (c.cond_status_cd IN (3,4) AND c_past.cond_status_cd = 1).
```

Further modifications to this example were made to produce estimates and sampling errors for the water to forest area change and for areas that remained as large diameter conditions as discussed in the previous paragraph. The results are presented in the tabulation that follows example 4.16. Users will note that the sampling errors for the estimates of forest to water and water to forest area change are quite high (29.2 percent and 18.4 percent, respectively) and the sampling error on conditions remaining large diameter is fairly low (2.9 percent). To obtain other area change and sampling error estimates, users should modify the where clause and eval_grp.

Example 4.16. Estimate area change from forest (cond_status_cd equals 1) to water (cond_status_cd equals 3 or 4) with sampling error. Based on the Minnesota 2007 remeasurement sample. Note the bold sections in this example indicate where changes in code from example 4.7 were made.

```sql
SELECT eval_grp,
    SUM(estimate_by_estn_unit.estimate) estimate,
    CASE
        WHEN SUM(estimate_by_estn_unit.estimate) > 0 THEN
            round(sqrt(SUM(estimate_by_estn_unit.var_of_estimate)) /
```

USDA Forest Service Gen. Tech. Rep. RMRS-GTR-245. 2010
SUM(estimate_by_estn_unit.estimate) * 100,
ELSE 0
END AS se_of_estimate_pct,
SUM(estimate_by_estn_unit.var_of_estimate) var_of_estimate,
SUM(estimate_by_estn_unit.total_plots) total_plots,
SUM(estimate_by_estn_unit.non_zero_plots) non_zero_plots,
SUM(estimate_by_estn_unit.total_population_area_acres) total_population_acres
FROM (SELECT pop_eval_grp_cn,
    eval_grp,
estn_unit_cn,
    sum(nvl(ysum_hd, 0) * phase_1_summary.expns) estimate,
    SUM(phase_1_summary.n_h) total_plots,
    SUM(phase_2_summary.number_plots_in_domain) domain_plots,
    SUM(phase_2_summary.non_zero_plots) non_zero_plots,
    total_area * total_area / SUM(phase_1_summary.n_h) *
    ((SUM(w_h * phase_1_summary.n_h) *
        (((nvl(ysum_hd_sqr, 0) / phase_1_summary.n_h) -
            (nvl(ysum_hd, 0) / phase_1_summary.n_h)) /
            (phase_1_summary.n_h - 1)))) +
    1 / SUM(phase_1_summary.n_h) *
    (SUM((1 - w_h) * phase_1_summary.n_h) *
        (((nvl(ysum_hd_sqr, 0) / phase_1_summary.n_h) -
            (nvl(ysum_hd, 0) / phase_1_summary.n_h) *
            (nvl(ysum_hd, 0) / phase_1_summary.n_h))) /
            (phase_1_summary.n_h - 1)))))) var_of_estimate,
    total_area total_population_area_acres
FROM (SELECT peg.eval_grp,
    peg.cn pop_eval_grp_cn,
estn_unit_cn,
    psm.estn_unit_cn,
    psm.cn pop_stratum_cn,
    psm.expns,
p1pointcnt / (SELECT SUM(strs.p1pointcnt)
    FROM pop_stratum strs
    WHERE strs.estn_unit_cn = psm.estn_unit_cn) w_h,
    (SELECT SUM(strs.p1pointcnt)
    FROM pop_stratum strs
    WHERE strs.estn_unit_cn = psm.estn_unit_cn) n_prime,
p1pointcnt n_prime_h,
    (SELECT SUM(eu_s.area_used)
    FROM pop_estn_unit eu_s
    WHERE eu_s.cn = psm.estn_unit_cn) total_area,
    psm.p2pointcnt n_h
FROM pop_estn_unit peu,
    pop_stratum psm,
    pop_eval pev,
    pop_eval_grp peg,
    pop_eval_typ pet
WHERE peu.cn = psm.estn_unit_cn
AND pev.cn = peu.eval_cn
AND pet.eval_cn = pev.cn
AND pet.eval_grp_cn = peg.cn
AND pet.eval_typ = 'EXPGROW' -- expansion factor tracking change
AND peg.eval_grp = 272007 -- desired evaluation group must be specified
) phase_1_summary,
(SELECT pop_stratum_cn,
    SUM(y_hid_adjusted) ysum_hd,
    SUM(y_hid_adjusted * y_hid_adjusted) ysum_hd_sqr,
    COUNT(*) number_plots_in_domain,
    SUM(decode(y_hid_adjusted, 0, 0, NULL, 0, 1)) non_zero_plots
FROM (SELECT psm.cn pop_stratum_cn,
    p.cn plt_cn,
    SUM(cmx.subptyp_prop_chng / 4 *
      decode(c.prop_basis,
        'MACR',
        psm.adj_factor_macr,
        psm.adj_factor_subp) -- expression for proportion of tracked plots
    ) y_hid_adjusted
FROM cond c,
    plot p,
    pop_plot_stratum_assgn ppsa,
    pop_stratum psm,
    pop_estn_unit peu,
    pop_eval pev,
    pop_eval_typ pet,
    pop_eval_grp peg,
    cond c_past,
    subp_cond_chng_mtrx cmx
WHERE p.cn = c.plt_cn
AND pet.eval_type = 'EXPGROW'
AND (c.cond_status_cd IN (3, 4) AND c_past.cond_status_cd = 1)
    -- where clause tracking change
AND ppsa.plt_cn = p.cn
AND ppsa.stratum_cn = psm.cn
AND peu.cn = psm.estn_unit_cn
AND pev.cn = peu.eval_cn
AND pev.cn = pet.eval_cn
AND pet.eval_grp_cn = peg.cn
AND peg.eval_grp = 272007 -- desired evaluation group must be specified
AND p.prev_plt_cn = c_past.plt_cn
AND cmx.prev_plt_cn = c_past.plt_cn
AND cmx.prevcond = c_past.condid
AND cmx.condid = c.condid
AND ((cmx.subptyp = 3 and c.prop_basis = 'MACR') or
    (cmx.subptyp = 1 and c.prop_basis = 'SUBP'))
    -- join past conditions / change matrix table
GROUP BY psm.cn, p.cn)
GROUP BY pop_stratum_cn) phase_2_summary
WHERE phase_1_summary.pop_stratum_cn =
    phase_2_summary.pop_stratum_cn(+)
GROUP BY pop_eval_grp_cn,
    eval_grp,
    estn_unit_cn,
    phase_1_summary.total_area) estimate_by_estn_unit
GROUP BY pop_eval_grp_cn, eval_grp
Results of Example 4.16:

Area change estimates and sampling errors based on remeasured plots, Minnesota, 2007.

| Changes to where clause | Forest to water | Water to forest | Large diameter forest at both measurements |
|-------------------------|-----------------|-----------------|-------------------------------------------|
|                         | AND (c.cond_status_cd IN (3,4) AND c_past.cond_status_cd = 1) | AND (c.cond_status_cd = 1 AND c_past.cond_status_cd IN (3,4)) | AND (c.cond_status_cd = 1 AND c_past.cond_status_cd = 1 AND C.STDSZCD = 1 AND c_past.STDSZCD = 1) |
| EVAL_GRP                | 272007          | 272007          | 272007                                    |
| ESTIMATE                | 27,345.1        | 77,978.2        | 3,631,160.4                               |
| SE_OF_ESTIMATE_PCT      | 29.2            | 18.4            | 2.9                                       |
| VAR_OF_ESTIMATE         | 63,796,853      | 206,390,712     | 11,427,498,039                            |
| TOTAL_PLOTS             | 12,280          | 12,280          | 12,280                                    |
| NON ZERO PLOTS          | 32              | 57              | 1,007                                     |
| TOTAL_POPULATION_ACRES  | 54,008,479      | 54,008,479      | 54,008,479                                |
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### Appendix A. Index of Column Names

The following table lists column names used in the database tables, their location within the table, and a short description.

| Column name with (field guide section) | Table name | Location in table | Description |
|----------------------------------------|------------|-------------------|-------------|
| ACTUALHT (5.15) TREE 22               |            | Actual height of tree |
| ADFORCD COND 15                       |            | Administrative forest code |
| ADJ_FACTOR_MACR POP_STRATUM 12         |            | Adjustment factor for the macroplot |
| ADJ_FACTOR_MICR POP_STRATUM 14         |            | Adjustment factor for the microplot |
| ADJ_FACTOR_SUBP POP_STRATUM 13         |            | Adjustment factor for the subplot |
| AGEDIA (7.2.5) SITETREE 14            |            | Age at diameter height |
| AGENTCD (5.21) TREE 12                |            | Cause of death (agent) code |
| ALLOWED_IN_FIELD REF FOREST_TYPE 6    |            | Allowed in field |
| ALSTK COND 53                         |            | All-live-tree stocking percent |
| ALSTKCOND COND 37                     |            | All live stocking code |
| ANN_INVENTORY SURVEY 8                |            | Annual inventory |
| AREA_SOURCE POP_ESTN_UNIT 11          |            | Source of area figures usually Census Bureau or from pixel counts |
| AREA_USED POP_ESTN_UNIT 10            |            | Area used to calculate all expansion factors |
| AREAUSED EU POP_ESTN_UNIT 8           |            | Land area within the estimation unit |
| AREATEOT EU POP_ESTN_UNIT 9           |            | Total area within the estimation unit |
| ASPECT COND 34                        |            | Aspect |
| ASPECT (3.7) SUBPLOT 17               |            | Subplot aspect |
| ATTRIBUTE_DESCR REF_POP_ATTRIBUTE 3   |            | Estimation attribute e.g., Area of timberland |
| ATTRIBUTE_NBR REF_POP_ATTRIBUTE 2     |            | Arbitrary unique number |
| AUTHOR REF_HABTYP_PUBLICATION 4       |            | Author of publication |
| AZIMUTH (7.2.8) SITETREE 19           |            | Azimuth |
| AZIMUTH (5.4) TREE 12                 |            | Azimuth |
| AZMCORN (4.2.6) BOUNDARY 13           |            | Corner azimuth |
| AZMLLEFT (4.2.5) BOUNDARY 12          |            | Left azimuth |
| AZMRIGHT (4.2.8) BOUNDARY 15          |            | Right azimuth |
| BALIVE COND 51                        |            | Basal area of live trees |
| BARK_SPGR_GREENVOL_DRYWT REF_SPECIES 51 |            | Green specific gravity bark (green volume and oven-dry weight) |
| BARK_SPGR_GREENVOL_DRYWT CIT REF_SPECIES 52 |            | Green specific gravity bark citation |
| BARK_VOL_PCT REF_SPECIES 59           |            | Bark volume as a percent of wood volume |
| BARK_VOL_PCT_CIT REF_SPECIES 60       |            | Bark volume as a percent of wood volume citation |
| BFSND TREE 73                         |            | Board-foot-cull soundness |
| BHAGE TREE 66                         |            | Breast height age |
| BNDCHG (4.2.3) BOUNDARY 10           |            | Boundary change code |
| BOLEHT TREE 76                        |            | Bole height |
| BORED_CD_PNWRS TREE 125               |            | Tree bored code, Pacific Northwest Research Station |
| CANOPY_CVR_SAMPLE_METHOD_CD           | COND 97    | Canopy cover sample method code |
| CARBON_AG TREE 121                    |            | Carbon aboveground |
| CARBON_BG TREE 122                    |            | Carbon belowground |
| CARBON_DOWN_DEAD COND 67              |            | Carbon in down dead |
| CARBON_LITTER COND 68                 |            | Carbon in litter |
| Column name with (field guide section) | Table name | Location in table | Description |
|----------------------------------------|------------|-------------------|-------------|
| CARBON_SOIL_ORG                        | COND       | 69                | Carbon in soil fine organic material |
| CARBON_STANDING DEAD                   | COND       | 70                | Carbon in standing dead trees        |
| CARBON_UNDERSTORY_AG                   | COND       | 71                | Carbon in the aboveground portions of seedlings, shrubs, and bushes |
| CARBON_UNDERSTORY_BG                   | COND       | 72                | Carbon in the belowground portion of seedlings, shrubs, and bushes |
| CCCLCD (5.17)                          | TREE       | 25                | Crown class code                     |
| CDENCD (12.9)                          | TREE       | 61                | Crown density code                   |
| CDIEBKCD (12.10)                       | TREE       | 62                | Crown dieback code                   |
| CFSND                                  | TREE       | 74                | Cubic-foot-cull soundness            |
| CITATION                               | REF_CITATION | 2          | Citation                              |
| CITATION_NBR                           | REF_CITATION | 1          | Citation number                       |
| CLASS                                  | REF_SPECIES_GROUP | 4       | Class                                 |
| CLIGHTCD (12.6)                        | TREE       | 59                | Crown light exposure code             |
| CN                                     | BOUNDARY   | 1                 | Sequence number                       |
| CN                                     | COND       | 1                 | Sequence number                       |
| CN                                     | COUNTY     | 5                 | Sequence number                       |
| CN                                     | POP_ESTN_UNIT | 1           | Sequence number                       |
| CN                                     | POP_EV__AL | 1                 | Sequence number                       |
| CN                                     | POP_EV__AL_ATTRIBUTE | 1        | Sequence number                       |
| CN                                     | POP_EV__AL_GRP | 1         | Sequence number                       |
| CN                                     | POP_EV__AL_TYP | 11       | Sequence number                       |
| CN                                     | POP_PLOT_STRATUM_ASSGN | 1   | Sequence number                       |
| CN                                     | POP_STRATUM | 1                 | Sequence number                       |
| CN                                     | REF_HABTYP_DESCRIPTION | 1          | Sequence number                       |
| CN                                     | REF_HABTYP_PUBLICATION | 1      | Sequence number                       |
| CN                                     | REF_POP_ATTRIBUTE | 1        | Sequence number                       |
| CN                                     | REF_POP_EV__AL_TYP_DESCR | 9       | Sequence number                       |
| CN                                     | SEEDLING   | 1                 | Sequence number                       |
| CN                                     | SITETREE   | 1                 | Sequence number                       |
| CN                                     | SUBPLOT    | 1                 | Sequence number                       |
| CN                                     | SUBP_COND  | 1                 | Sequence number                       |
| CN                                     | SUBP_COND_CHNG_MTRX | 1       | Sequence number                       |
| CN                                     | SURVEY     | 1                 | Sequence number                       |
| CN                                     | TREE       | 1                 | Sequence number                       |
| COMMON_NAME                            | REF_HABTYP_DESCRIPTION | 5       | Common name                           |
| COMMON_NAME                            | REF_SPECIES | 2              | Common name of species                |
| CORE                                   | REF_SPECIES | 36         | Core                                  |
| COND_NONSAMPLE_REASNR_CD (2.4.3)       | COND       | 10                | Condition nonsampled reason code      |
| COND_STATUS_CD (2.4.2)                 | COND       | 9                 | Condition status code                 |
| CONDID (2.4.1)                         | COND       | 8                 | Condition class number                |
| CONDID (6.3)                           | SEEDLING   | 9                 | Condition class number                |
| CONDID                                 | SITETREE   | 9                 | Condition class number                |
| CONDID                                 | SUBP_COND  | 9                 | Condition class number                |
| CONDID                                 | SUBP_COND_CHNG_MTRX | 6      | Condition class number                |
| CONDID (5.3)                           | TREE       | 11                | Condition class number                |
| CONDLIST                                | SUBPLOT    | 15                | Subplot/macroplot plot condition list |
| CONDLIST                                | SITETREE   | 24                | Condition class list                  |
| CONDPROP_UNADJ                         | COND       | 29                | Condition proportion unadjusted       |
| CONGCD                                 | PLOT       | 28                | Congressional district code           |
| CONTRAST (4.2.4)                       | BOUNDARY   | 11                | Contrasting condition                 |
| COUNTYCd                               | BOUNDARY   | 6                 | County code                           |
| COUNTYCd                               | COND       | 6                 | County code                           |
| COUNTYCd                               | COUNTY     | 3                 | County code                           |
| COUNTYCd                               | PLOT       | 8                 | County code                           |
| Column name with (field guide section) | Table name | Location in table | Description |
|----------------------------------------|------------|------------------|-------------|
| COUNTYCD POP_PLOT_STRATUM_ASSGN        | 7          | County code      |
| COUNTYCD SEEDLING                      | 6          | County code      |
| COUNTYCD SITETREE                      | 7          | County code      |
| COUNTYCD SUBPLOT                       | 7          | County code      |
| COUNTYCD SUBP_COND                     | 6          | County code      |
| COUNTYCD TREE                          | 7          | County code      |
| COUNTYCD COUNTY                        | 4          | County name      |
| CPOSCD TREE (12.7)                     | 58         | Crown position code |
| CR (5.19) TREE                         | 24         | Compact crown ratio |
| CREATED_BY BOUNDARY                    | 18         | Created by       |
| CREATED_BY COND                        | 73         | Created by       |
| CREATED_BY COUNTY                      | 6          | Created by       |
| CREATED_BY PLOT                        | 33         | Created by       |
| CREATED_BY POP_ESTN_UNIT               | 14         | Created by       |
| CREATED_BY POP_EVAL                     | 9          | Created by       |
| CREATED_BY POP_EVAL_ATTRIBUTE          | 5          | Created by       |
| CREATED_BY POP_EVAL_GRP                | 13         | Created by       |
| CREATED_BY POP_EVAL_TYP                | 5          | Created by       |
| CREATED_BY POP_PLOT_STRATUM_ASSGN      | 13         | Created by       |
| CREATED_BY POP_STRATUM                 | 15         | Created by       |
| CREATED_BY REF_CITATION                | 3          | Created by       |
| CREATED_BY REF_FIADB_VERSION           | 3          | Created by       |
| CREATED_BY REF_FOREST_TYPE             | 7          | Created by       |
| CREATED_BY REF_HABTYP_DESCRIPTION      | 7          | Created by       |
| CREATED_BY REF_HABTYP_PUBLICATION      | 7          | Created by       |
| CREATED_BY REF_POP_ATTRIBUTE           | 6          | Created by       |
| CREATED_BY REF_POP_EVAL_TYP_DESCR      | 3          | Created by       |
| CREATED_BY REF_SPECIES                 | 30         | Created by       |
| CREATED_BY REF_SPECIES_GROUP           | 5          | Created by       |
| CREATED_BY REF_STATE_ELEV              | 6          | Created by       |
| CREATED_BY REF_UNIT                    | 4          | Created by       |
| CREATED_BY SEEDLING                    | 15         | Created by       |
| CREATED_BY SITETREE                    | 25         | Created by       |
| CREATED_BY SUBPLOT                     | 20         | Created by       |
| CREATED_BY SUBP_COND                   | 10         | Created by       |
| CREATED_BY SUBP_COND_CHNG_MTRX         | 10         | Created by       |
| CREATED_BY SURVEY                      | 10         | Created by       |
| CREATED_BY TREE                        | 81         | Created by       |
| CREATED_BY TREE_REGIONAL_BIOMASS       | 5          | Created by       |
| CREATED_DATE BOUNDARY                  | 19         | Created date     |
| CREATED_DATE COND                      | 74         | Created date     |
| CREATED_DATE COUNTY                    | 7          | Created date     |
| CREATED_DATE PLOT                      | 34         | Created date     |
| CREATED_DATE POP_ESTN_UNIT             | 15         | Created date     |
| CREATED_DATE POP_EVAL                   | 10         | Created date     |
| CREATED_DATE POP_EVAL_ATTRIBUTE         | 6          | Created date     |
| CREATED_DATE POP_EVAL_GRP               | 14         | Created date     |
| CREATED_DATE POP_EVAL_TYP               | 6          | Created date     |
| CREATED_DATE POP_PLOT_STRATUM_ASSGN    | 14         | Created date     |
| CREATED_DATE POP_STRATUM               | 16         | Created date     |
| CREATED_DATE REF_CITATION              | 4          | Created date     |
| CREATED_DATE REF_FIADB_VERSION         | 4          | Created date     |
| CREATED_DATE REF_FOREST_TYPE           | 8          | Created date     |
| CREATED_DATE REF_HABTYP_DESCRIPTION    | 8          | Created date     |
| CREATED_DATE REF_HABTYP_PUBLICATION    | 8          | Created date     |
| CREATED_DATE REF_POP_ATTRIBUTE         | 7          | Created date     |
| CREATED_DATE REF_POP_EVAL_TYP_DESCR    | 4          | Created date     |
| CREATED_DATE REF_SPECIES               | 31         | Created date     |
| CREATED_DATE REF_SPECIES_GROUP         | 6          | Created date     |
| CREATED_DATE REF_STATE_ELEV            | 7          | Created date     |
| CREATED_DATE REF_UNIT                  | 5          | Created date     |
| Column name with (field guide section) | Table name                  | Location in table | Description                          |
|---------------------------------------|-----------------------------|-------------------|--------------------------------------|
| CREATED_DATE                          | SEEDLING                    | 16                | Created date                         |
| CREATED_DATE                          | SITETREE                    | 26                | Created date                         |
| CREATED_DATE                          | SUBPLOT                     | 21                | Created date                         |
| CREATED_DATE                          | SUBP_COND                   | 11                | Created date                         |
| CREATED_DATE                          | SUBP_COND_CHNG_MTRX         | 11                | Created date                         |
| CREATED_DATE                          | SURVEY                      | 11                | Created date                         |
| CREATED_DATE                          | TREE                        | 82                | Created date                         |
| CREATED_DATE                          | TREE_REGIONAL_BIOMASS       | 6                 | Created date                         |
| CREATED_IN_INSTANCE                   | BOUNDARY                    | 20                | Created in instance                  |
| CREATED_IN_INSTANCE                   | COND                        | 75                | Created in instance                  |
| CREATED_IN_INSTANCE                   | COUNTY                      | 8                 | Created in instance                  |
| CREATED_IN_INSTANCE                   | PLOT                       | 35                | Created in instance                  |
| CREATED_IN_INSTANCE                   | POP_ESTN_UNIT               | 16                | Created in instance                  |
| CREATED_IN_INSTANCE                   | POP_EVAL                    | 11                | Created in instance                  |
| CREATED_IN_INSTANCE                   | POP_EVAL_ATTRIBUTE          | 7                 | Created in instance                  |
| CREATED_IN_INSTANCE                   | POP_EVAL_GRP                | 15                | Created in instance                  |
| CREATED_IN_INSTANCE                   | POP_EVAL_TYP                | 7                 | Created in instance                  |
| CREATED_IN_INSTANCE                   | POP_PLOT_STRATUM_ASSGN      | 15                | Created in instance                  |
| CREATED_IN_INSTANCE                   | POP_STRATUM                 | 17                | Created in instance                  |
| CREATED_IN_INSTANCE                   | REF_CITATION                | 5                 | Created in instance                  |
| CREATED_IN_INSTANCE                   | REF_FIADB_VERSION           | 5                 | Created in instance                  |
| CREATED_IN_INSTANCE                   | REF_FOREST_TYPE             | 9                 | Created in instance                  |
| CREATED_IN_INSTANCE                   | REF_HABTYP_DESCRIPTION      | 9                 | Created in instance                  |
| CREATED_IN_INSTANCE                   | REF_HABTYP_PUBLICATION      | 9                 | Created in instance                  |
| CREATED_IN_INSTANCE                   | REF_POP_ATTRIBUTE           | 8                 | Created in instance                  |
| CREATED_IN_INSTANCE                   | REF_POP_EVAL_TYP_DESCR      | 5                 | Created in instance                  |
| CREATED_IN_INSTANCE                   | REF_SPECIES                | 32                | Created in instance                  |
| CREATED_IN_INSTANCE                   | REF_SPECIES_GROUP           | 7                 | Created in instance                  |
| CREATED_IN_INSTANCE                   | REF_STATE_ELEV             | 8                 | Created in instance                  |
| CREATED_IN_INSTANCE                   | REF_UNIT                    | 6                 | Created in instance                  |
| CREATED_IN_INSTANCE                   | SEEDLING                    | 17                | Created in instance                  |
| CREATED_IN_INSTANCE                   | SITETREE                    | 27                | Created in instance                  |
| CREATED_IN_INSTANCE                   | SUBPLOT                     | 22                | Created in instance                  |
| CREATED_IN_INSTANCE                   | SUBP_COND                   | 12                | Created in instance                  |
| CREATED_IN_INSTANCE                   | SUBP_COND_CHNG_MTRX         | 12                | Created in instance                  |
| CREATED_IN_INSTANCE                   | SURVEY                      | 12                | Created in instance                  |
| CREATED_IN_INSTANCE                   | TREE                        | 83                | Created in instance                  |
| CREATED_IN_INSTANCE                   | TREE_REGIONAL_BIOMASS       | 7                 | Created in instance                  |
| CTY_CN                                | PLOT                        | 3                 | County sequence number              |
| CULL                                  | TREE                        | 28                | Rotten and missing cull, computed and includes percent missing top |
| CULL_BLD (5.13)                       | TREE                        | 91                | Rotten and missing cull, field-recorded |
| CULLBF                                | TREE                        | 71                | Board-foot cull                     |
| CULLCF                                | TREE                        | 72                | Cubic-foot cull                     |
| CULLDEAD                              | TREE                        | 68                | Dead cull                          |
| CULLFORM                              | TREE                        | 69                | Form cull                          |
| CULLMSTOP                              | TREE                        | 70                | Missing top cull                    |
| CVIGORCD (12.8)                       | TREE                        | 60                | Sapling vigor code                  |
| CYCLE                                 | BOUNDARY                    | 16                | Inventory cycle number              |
| CYCLE                                 | COND                        | 79                | Inventory cycle number              |
| CYCLE                                 | PLOT                        | 46                | Inventory cycle number              |
| CYCLE                                 | SEEDLING                    | 23                | Inventory cycle number              |
| CYCLE                                 | SITETREE                    | 31                | Inventory cycle number              |
| CYCLE                                 | SUBPLOT                     | 26                | Inventory cycle number              |
| CYCLE                                 | SUBP_COND                   | 21                | Inventory cycle number              |
| CYCLE                                 | SURVEY                      | 16                | Inventory cycle number              |
| CYCLE                                 | TREE                        | 123               | Inventory cycle number              |
| DAMLOC1 (5.20.1)                      | TREE                        | 29                | Damage location 1 code              |
| Column name with (field guide section) | Table name | Location in table | Description |
|---------------------------------------|------------|-------------------|-------------|
| DAMLOC1_PNWRS TREE 126               | TREE       | 126               | Damage location 1, Pacific Northwest Research Station |
| DAMLOC2 (5.20.4) TREE 32             | TREE       | 32                | Damage location 2 code |
| DAMLOC2_PNWRS TREE 127               | TREE       | 127               | Damage location 2, Pacific Northwest Research Station |
| DAMSEV1 (5.20.3) TREE 31             | TREE       | 31                | Damage severity 1 code |
| DAMSEV2 (5.20.6) TREE 34             | TREE       | 34                | Damage severity 2 code |
| DAMTYP1 (5.20.2) TREE 30             | TREE       | 30                | Damage type 1 code |
| DAMTYP2 (5.20.5) TREE 33             | TREE       | 33                | Damage type 2 code |
| DECAYCD (5.23) TREE 35               | TREE       | 35                | Decay class code |
| DECLINATION (1.11) PLOT 40           | PLOT       | 40                | Declination |
| DESCR REF_FIADB_VERSION 2            | PLOT       | 2                 | Version description |
| DESIGNCD PLOT 17                    | PLOT       | 17                | Plot design code |
| DIA (7.2.3) SITETREE 12              | SITETREE   | 12                | Current diameter |
| DIA (5.9.2) TREE 18                  | TREE       | 18                | Current diameter |
| DIACALC TREE 65                     | TREE       | 65                | Current diameter calculated |
| DIACHECK (5.12) TREE 54              | TREE       | 54                | Diameter check code |
| DIACHECK_PNWRS TREE 128             | TREE       | 128               | Diameter check, Pacific Northwest Research Station |
| DIAHTCD TREE 19                      | TREE       | 19                | Diameter height code |
| DIST (7.2.9) SITETREE 20             | SITETREE   | 20                | Horizontal distance |
| DIST (5.5) TREE 13                   | TREE       | 13                | Horizontal distance |
| DISTCORN (4.2.7) BOUNDARY 14         | BOUNDARY   | 14                | Corner distance |
| DMG_AGENT1_CD_PNWRS TREE 129         | TREE       | 129               | Damage agent 1, Pacific Northwest Research Station |
| DMG_AGENT2_CD_PNWRS TREE 130         | TREE       | 130               | Damage agent 2, Pacific Northwest Research Station |
| DMG_AGENT3_CD_PNWRS TREE 131         | TREE       | 131               | Damage agent 3, Pacific Northwest Research Station |
| DRYBIO_BG TREE 120                   | TREE       | 120               | Dry biomass belowground |
| DRYBIO_BOLE TREE 115                 | TREE       | 115               | Dry biomass of bole |
| DRYBIO_SAPLING TREE 118              | TREE       | 118               | Dry biomass of sapling |
| DRYBIO_STUMP TREE 117                | TREE       | 117               | Dry biomass of stump |
| DRYBIO_TOP TREE 116                  | TREE       | 116               | Dry biomass of top |
| DRYBIO_WDLD_SPP TREE 119             | TREE       | 119               | Dry biomass of woodland species |
| DSTRBCD1 (2.5.11) COND 38            | COND       | 38                | Disturbance 1 code |
| DSTRBCD2 (2.5.13) COND 40            | COND       | 40                | Disturbance 2 code |
| DSTRBCD3 (2.5.15) COND 42            | COND       | 42                | Disturbance 3 code |
| DSTRBYR1 (2.5.12) COND 39            | COND       | 39                | Year of disturbance 1 |
| DSTRBYR2 (2.5.14) COND 41            | COND       | 41                | Year of disturbance 2 |
| DSTRBYR3 (2.5.16) COND 43            | COND       | 43                | Year of disturbance 3 |
| E_SPGRPCD REF_SPECIES 8              | REF_SPECIES| 8                 | East species group code |
| EAST REF_SPECIES 25                  | REF_SPECIES| 25                | East |
| ECO_UNIT_PNW PLOT 48                 | PLOT       | 48                | Pacific Northwest Research Station stockability algorithms |
| ECOSUBCD PLOT 27                     | PLOT       | 27                | Ecological subsection code |
| ELEV PLOT 22                         | PLOT       | 22                | Elevation |
| EMAP_HEX PLOT 41                     | PLOT       | 41                | EMAP hexagon |
| END_INVYR POP_EVAL 16                | POP_EVAL   | 16                | End inventory year |
| ESTN_UNIT POP_ESTN_UNIT 5            | POP_ESTN_UNIT| 5            | Estimation unit |
| ESTN_UNIT POP_PLOT_STRATUM_ASSGN 11  | POP_PLOT_STRATUM_ASSGN| 11 | Estimation unit sequence number |
| ESTN_UNIT POP_STRATUM 5              | POP_STRATUM| 5                 | Estimation unit description |
| ESTN_UNIT_CN POP_STRATUM 2           | POP_STRATUM| 2                 | Evaluation sequence number |
| ESTN_UNIT_DESCR POP_ESTN_UNIT 6      | POP_ESTN_UNIT| 6            | Evaluation sequence number |
| EVAL CN POP_ESTN_UNIT 2              | POP_ESTN_UNIT| 2            | Evaluation sequence number for expansions of all plots |
| Column name with (field guide section) | Table name          | Location in table | Description                                                                                                                                 |
|----------------------------------------|---------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| EVAL_CN_FOR_EXPCURR                    | POP_EVAL_GRP        | 3                 | Evaluation sequence number for expansions of current area                                                                                  |
| EVAL_CN_FOR_EXPGROW                    | POP_EVAL_GRP        | 5                 | Evaluation sequence number for expansions of growth                                                                                         |
| EVAL_CN_FOR_EXPMORT                    | POP_EVAL_GRP        | 6                 | Evaluation sequence number for expansions of mortality                                                                                      |
| EVAL_CN_FOR_EXPREMV                    | POP_EVAL_GRP        | 7                 | Evaluation sequence number for expansions of removals                                                                                       |
| EVAL_CN_FOR_EXPVOL                     | POP_EVAL_GRP        | 4                 | Evaluation sequence number for expansions of volume                                                                                         |
| EVAL_DESCR                             | POP_EVAL            | 4                 | Reporting description                                                                                                                      |
| EVAL_GRP                               | POP_EVAL_GRP        | 9                 | Reporting year followed by 4 more digits to make the stated/eval_grp combo unique                                                           |
| EVAL_GRP_CN                             | POP_EVAL_TYP        | 1                 | Evaluation group sequence number                                                                                                             |
| EVAL_GRP_DESCR                          | POP_EVAL_GRP        | 10                | Evaluation group description                                                                                                                |
| EVAL_TYP                               | POP_EVAL_TYP        | 3                 | Evaluation type                                                                                                                             |
| EVAL_TYP_DESCR                          | REF_POP_EVAL_TYP_DESCR | 1                      | Evaluation type description                                                                                                                |
| EVAL_TYP                               | REF_POP_EVAL_TYP_DESCR | 2                      | Evaluation type description                                                                                                                |
| EVALID                                 | POP_ESTN_UNIT       | 4                 | Evaluation identifier                                                                                                                      |
| EVALID                                 | POP_EVAL            | 3                 | Evaluation identifier                                                                                                                      |
| EVALID                                 | POP_PLOT_STRATUM_ASSGN | 10                      | Evaluation identifier                                                                                                                      |
| EVALID                                 | POP_STRATUM         | 4                 | Evaluation identifier                                                                                                                      |
| EXISTS_IN_NCRS                          | REF_SPECIES         | 13                | Exists in the North Central Research Station States                                                                                          |
| EXISTS_IN_NERS                          | REF_SPECIES         | 14                | Exists in the Northeastern Research Station States                                                                                           |
| EXISTS_IN_PNWRS                         | REF_SPECIES         | 15                | Exists in the Pacific Northwest Research Station States                                                                                      |
| EXISTS_IN_RMRS                          | REF_SPECIES         | 16                | Exists in the Rocky Mountain Research Station States                                                                                         |
| EXISTS_IN_SRS                           | REF_SPECIES         | 17                | Exists in the Southern Research Station States                                                                                               |
| EXPNS                                  | POP_STRATUM         | 11                | Expansion factor                                                                                                                           |
| EXPRESSION                             | REF_POP_ATTRIBUTE   | 4                 | Part of the expression used to produce the estimate                                                                                         |
| FGROWBFSL                              | TREE                | 95                | Net annual merchantable board-foot growth of sawtimber tree on forest land                                                                |
| FGROWCFAL                               | TREE                | 96                | Net annual sound cubic-foot growth of a live tree on forest land                                                                             |
| FGROWCFG5                               | TREE                | 94                | Net annual merchantable cubic-foot growth of growing-stock tree on forest land                                                           |
| FIRE_SRS                                | COND                | 87                | Fire, Southern Research Station                                                                                                             |
| FLDA GE                                | COND                | 52                | Field-recorded stand age                                                                                                                   |
| FLDSZCD (2.5.4)                         | COND                | 21                | Field stand-size class code                                                                                                                 |
| FLDTYPCD (2.5.3)                        | COND                | 17                | Field forest type code                                                                                                                     |
| FMORTBFSL                              | TREE                | 98                | Board-foot volume of a sawtimber tree for mortality purposes on forest land                                                               |
| FMORTCFAL                               | TREE                | 99                | Sound cubic-foot volume of a tree for mortality purposes on forest land                                                                  |
| FMORTCFG5                               | TREE                | 97                | Cubic-foot volume of a growing-stock tree for mortality purposes on forest land                                                            |
| FOOTNOTE                                | REF_POP_ATTRIBUTE   | 12                | Footnote                                                                                                                                   |
| FOREST_TYPE_SPGRPCD                     | REF_SPECIES         | 12                | Forest type species group code                                                                                                             |
| Column name with (field guide section) | Table name   | Location in table | Description                                                                 |
|--------------------------------------|--------------|-------------------|-----------------------------------------------------------------------------|
| FORINDCD (2.5.8)                     | COND         | 14                | Private owner industrial status code                                        |
| FORMCL                               | TREE         | 77                | Form class                                                                  |
| FORTYPCD                             | COND         | 16                | Forest type code                                                            |
| FORTYPCDCALC                         | COND         | 55                | Forest type code calculated with a national algorithm                       |
| FREMVBFSL                            | TREE         | 101               | Board-foot volume of a sawtimber tree for removal purposes on forest land    |
| FREMVCFAL                            | TREE         | 102               | Sound cubic-foot volume of the tree for removal purposes on forest land      |
| FREMVCFGS                            | TREE         | 100               | Cubic-foot volume of a growing-stock tree for removal purposes on forest land|
| GENUS                                | REF_SPECIES  | 3                 | Genus                                                                       |
| GRAZING_SRS                          | COND         | 88                | Grazing, Southern Research Station                                           |
| GROUND_LAND_CLASS_PNW                | COND         | 82                | Present ground class code, Pacific Northwest Research Station               |
| GROW_TYP_CD                          | PLOT         | 23                | Type of annual volume growth code                                           |
| GROWBFSL                             | TREE         | 46                | Net annual merchantable board-foot growth of sawtimber size tree on timberland|
| GROWCFAL                             | TREE         | 47                | Net annual sound cubic-foot growth of a live tree on timberland             |
| GROWCFGS                             | TREE         | 45                | Net annual merchantable cubic-foot growth of growing-stock tree on timberland|
| GSSTK                                | COND         | 54                | Growing-stock stocking percent                                              |
| GSSTKCD                              | COND         | 36                | Growing-stock stocking code                                                 |
| HAPTYPCD                             | REF_HABTYP_DESCRIPTION | 2 | Habitat type code                                                           |
| HABTYPCD1                            | COND         | 56                | Primary condition habitat type                                              |
| HABTYPCD1_DESCR_PUB_CD               | COND         | 58                | Habitat type code 1 description publication code                            |
| HABTYPCD1_PUB_CD                     | COND         | 57                | Habitat type code 1 publication code                                         |
| HABTYPCD2                            | COND         | 59                | Secondary condition habitat type                                            |
| HABTYPCD2_DESCR_PUB_CD               | COND         | 61                | Habitat type code 2 description publication code                            |
| HABTYPCD2_PUB_CD                     | COND         | 60                | Habitat type code 2 publication code                                        |
| HARVEST_TYPE1_SRS                    | COND         | 89                | Harvest type code 1, Southern Research Station                              |
| HARVEST_TYPE2_SRS                    | COND         | 90                | Harvest type code 2, Southern Research Station                              |
| HARVEST_TYPE3_SRS                    | COND         | 91                | Harvest type code 3, Southern Research Station                              |
| HIGHEST_POINT                        | REF_STATE_ELEV | 5 | Highest point                                                              |
| HRDWD_CLUMP_CD                       | TREE         | 79                | Hardwood clump code                                                         |
| HT (7.24)                            | SITETREE     | 13                | Total height                                                               |
| HT (5.14)                            | TREE         | 20                | Total height                                                               |
| HTCALC                               | TREE         | 78                | Current height calculated                                                   |
| HTCD (5.16)                          | TREE         | 21                | Height method code                                                         |
| HTDMP (5.24)                         | TREE         | 88                | Length (height) to diameter measurement point                              |
| INSTALL_TYPE                         | REF_FIADB_VERSION | 12 | Install type                                                               |
| INTENSITY                            | PLOT         | 45                | Intensity                                                                  |
| Column name with (field guide section) | Table name | Location in table | Description |
|--------------------------------------|------------|-------------------|-------------|
| INVASIVE_NONSAMPLE_REASON_CD         | SUBPLOT    | 34                | Invasive nonsampled reason code |
| INVASIVE_SAMPLING_STATUS_CD          | PLOT       | 55                | Invasive sampling status code |
| INVASIVE_SPECIMEN_RULE_CD           | PLOT/SUBPLOT | 56/33          | Invasive specimen rule code |
| INVYR                                | BOUNDARY   | 3                 | Inventory year |
| INVYR                                | COND       | 3                 | Inventory year |
| INVYR                                | PLOT       | 5                 | Inventory year |
| INVYR                                | POP_PLOT_STRATUM_ASSGN | 5         | Inventory year |
| INVYR                                | SEEDLING   | 3                 | Inventory year |
| INVYR                                | SITETREE   | 4                 | Inventory year |
| INVYR                                | SUBPLOT    | 4                 | Inventory year |
| INVYR                                | SUBP_COND  | 3                 | Inventory year |
| INVYR                                | SURVEY     | 2                 | Inventory year |
| JENKINS_FOLIAGE_RATIO_B1             | REF_SPECIES | 44            | Jenkins foliage ratio B1 |
| JENKINS_FOLIAGE_RATIO_B2             | REF_SPECIES | 45            | Jenkins foliage ratio B2 |
| JENKINS_ROOT_RATIO_B1                | REF_SPECIES | 46            | Jenkins root ratio B1 |
| JENKINS_ROOT_RATIO_B2                | REF_SPECIES | 47            | Jenkins root ratio B2 |
| JENKINS_SAPLING_ADJUSTMENT          | REF_SPECIES | 49            | Jenkins sapling adjustment factor |
| JENKINS_SPGRPCD                      | REF_SPECIES | 37            | Jenkins species group code |
| JENKINS_STEM_BARK_RATIO_B1           | REF_SPECIES | 42            | Jenkins stem bark ratio B1 |
| JENKINS_STEM_BARK_RATIO_B2           | REF_SPECIES | 43            | Jenkins stem bark ratio B2 |
| JENKINS_STEM_WOOD_RATIO_B1           | REF_SPECIES | 40            | Jenkins stem wood ratio B1 |
| JENKINS_STEM_WOOD_RATIO_B2           | REF_SPECIES | 41            | Jenkins stem wood ratio B2 |
| JENKINS_TOTAL_B1                    | REF_SPECIES | 38            | Jenkins coefficient B1 |
| JENKINS_TOTAL_B2                    | REF_SPECIES | 39            | Jenkins coefficient B2 |
| KINDCD (1.7)                        | PLOT       | 16                | Sample kind code |
| KINDCD_NC                           | PLOT       | 31                | Sample kind code, North Central |
| LAND_ONLY                           | POP_EVAL_GRP | 12         | Land only |
| LAND_USE_SRS                        | COND       | 92                | Land use, Southern Research Station |
| LAT (1.6.7)                         | PLOT       | 20                | Latitude |
| LIVE_CANOPY_CVR_PCT                 | COND       | 98                | Live canopy cover percent |
| LIVE_MISSING_CANOPY_CVR_PCT         | COND       | 99                | Live plus missing canopy cover percent |
| LOCATION_NM                         | POP_EVAL   | 6                 | Usually State name or super State |
| LON (1.16.8)                        | PLOT       | 21                | Longitude |
| LOWEST_POINT                        | REF_STATE_ELEV | 4     | Lowest point |
| MACRCOND                            | SUBPLOT    | 14                | Macroplot center condition |
| MACRCOND_PROP                       | SUBP_COND  | 18                | Proportion of this macroplot in this condition |
| MACRO_BREAKPOINT_DIA (1.17)         | PLOT       | 44                | Macroplot breakpoint diameter |
| MACRPROP_UNADJ                      | COND       | 32                | Macroplot proportion unadjusted |
| MAJOR_SPGRPCD                       | REF_SPECIES | 10            | Major species group code |
| MANUAL (1.9)                        | PLOT       | 29                | Manual (field guide) version number |
| MANUAL_END                          | REF_FOREST_TYPE | 5         | Manual end |
| MANUAL_END                          | REF_SPECIES | 29            | Manual end |
| MANUAL_START                        | REF_FOREST_TYPE | 4         | Manual start |
| MANUAL_START                        | REF_SPECIES | 28            | Manual start |
| MAPDEN                              | COND       | 18                | Mapping density |
| MAX_ELEV                            | REF_STATE_ELEV | 3     | Maximum elevation |
| MC_PCT_GREEN_BARK                   | REF_SPECIES | 55            | Moisture content of green bark as a percent of oven-dry weight |
| MC_PCT_GREEN_BARK_CIT               | REF_SPECIES | 56            | Moisture content of green bark citation |
| MC_PCT_GREEN_WOOD                   | REF_SPECIES | 53            | Moisture content of green wood as a percent of oven-dry weight |
| Column name with (field guide section) | Table name            | Location in table | Description                                                                 |
|---------------------------------------|-----------------------|-------------------|-----------------------------------------------------------------------------|
| MC_PCT_GREEN_WOOD_CIT                | REF_SPECIES           | 54                | Moisture content of green wood citation                                    |
| MEANING                               | REF_FOREST_TYPE       | 2                 | Meaning                                                                     |
| MEANING                               | REF_UNIT              | 3                 | Meaning                                                                     |
| MEASDAY (1.10.3)                      | PLOT                  | 14                | Measurement day                                                             |
| MEASMON (1.10.2)                      | PLOT                  | 13                | Measurement month                                                           |
| MEASYEAR (1.10.1)                     | PLOT                  | 12                | Measurement year                                                            |
| METHOD                                | SITETREE              | 21                | Site tree method code                                                       |
| MICRCOND (3.5)                        | SUBPLOT               | 12                | Microplot center condition                                                  |
| MICRCOND_PROP                         | SUBP_COND             | 16                | Proportion of this microplot in this condition                              |
| MICROPLLOT_LOC                        | PLOT                  | 39                | Microplot location                                                          |
| MICRPROP_UNADJ                        | COND                  | 30                | Microplot proportion unadjusted                                            |
| MIN_ELEV                              | REF_STATE_ELEV        | 2                 | Minimum elevation                                                           |
| MIST_CL_CD (5.26)                     | TREE                  | 90                | Mistletoe class code                                                        |
| MIST_CL_CD_PNWRS                       | TREE                  | 132               | Leafy mistletoe class code, Pacific Northwest Research Station              |
| MIXEDCONFCD                           | COND                  | 62                | Calculated forest type for mixed conifer site                               |
| MODIFIED_BY                           | BOUNDARY              | 21                | Modified by                                                                 |
| MODIFIED_BY                           | COND                  | 76                | Modified by                                                                 |
| MODIFIED_BY                           | COUNTY                | 9                 | Modified by                                                                 |
| MODIFIED_BY                           | PLOT                  | 36                | Modified by                                                                 |
| MODIFIED_BY                           | POP_ESTN_UNIT         | 17                | Modified by                                                                 |
| MODIFIED_BY                           | POP_EVAL              | 12                | Modified by                                                                 |
| MODIFIED_BY                           | POP_EVAL_ATTRIBUTE    | 8                 | Modified by                                                                 |
| MODIFIED_BY                           | POP_EVAL_GRP          | 16                | Modified by                                                                 |
| MODIFIED_BY                           | POP_EVAL_TYP          | 8                 | Modified by                                                                 |
| MODIFIED_BY                           | POP_PLOT_STRATUM_ASSGN| 16               | Modified by                                                                 |
| MODIFIED_BY                           | POP_STRATUM           | 18                | Modified by                                                                 |
| MODIFIED_BY                           | REF_CITATION          | 6                 | Modified by                                                                 |
| MODIFIED_BY                           | REF_FIADB_VERSION     | 6                 | Modified by                                                                 |
| MODIFIED_BY                           | REF_FOREST_TYPE       | 10                | Modified by                                                                 |
| MODIFIED_BY                           | REF_HABTYP_DESCRIPTION| 10                | Modified by                                                                 |
| MODIFIED_BY                           | REF_HABTYP_PUBLICATION| 10                | Modified by                                                                 |
| MODIFIED_BY                           | REF_POP_ATTRIBUTE     | 9                 | Modified by                                                                 |
| MODIFIED_BY                           | REF_POP_EVAL_TYP_DESCR| 6                 | Modified by                                                                 |
| MODIFIED_BY                           | REF_SPECIES           | 33                | Modified by                                                                 |
| MODIFIED_BY                           | REF_SPECIES_GROUP     | 8                 | Modified by                                                                 |
| MODIFIED_BY                           | REF_STATE_ELEV        | 9                 | Modified by                                                                 |
| MODIFIED_BY                           | REF_UNIT              | 7                 | Modified by                                                                 |
| MODIFIED_BY                           | SEEDLING              | 18                | Modified by                                                                 |
| MODIFIED_BY                           | SITETREE              | 28                | Modified by                                                                 |
| MODIFIED_BY                           | SUBPLOT               | 23                | Modified by                                                                 |
| MODIFIED_BY                           | SUBP_COND             | 13                | Modified by                                                                 |
| MODIFIED_BY                           | SUBP_COND_CHNG_MTRX   | 13                | Modified by                                                                 |
| MODIFIED_BY                           | SUVEY                 | 13                | Modified by                                                                 |
| MODIFIED_BY                           | TREE                  | 84                | Modified by                                                                 |
| MODIFIED_BY                           | TREE_REGIONAL_BIOMASS | 8                 | Modified by                                                                 |
| MODIFIED_DATE                          | BOUNDARY              | 22                | Modified date                                                              |
| MODIFIED_DATE                          | COND                  | 77                | Modified date                                                              |
| MODIFIED_DATE                          | COUNTY                | 10                | Modified date                                                              |
| MODIFIED_DATE                          | PLOT                  | 37                | Modified date                                                              |
| MODIFIED_DATE                          | POP_ESTN_UNIT         | 18                | Modified date                                                              |
| MODIFIED_DATE                          | POP_EVAL              | 13                | Modified date                                                              |
| MODIFIED_DATE                          | POP_EVAL_ATTRIBUTE    | 9                 | Modified date                                                              |
| MODIFIED_DATE                          | POP_EVAL_GRP          | 17                | Modified date                                                              |
| MODIFIED_DATE                          | POP_EVAL_TYP          | 9                 | Modified date                                                              |
| MODIFIED_DATE                          | POP_PLOT_STRATUM_ASSGN| 17               | Modified date                                                              |
| MODIFIED_DATE                          | POP_STRATUM           | 19                | Modified date                                                              |
| Column name with (field guide section) | Table name                          | Location in table | Description                                                                 |
|---------------------------------------|-------------------------------------|-------------------|-----------------------------------------------------------------------------|
| MODIFIED_DATE                         | REF_CITATION                        | 7                 | Modified date                                                              |
| MODIFIED_DATE                         | REF_FIA DB_VERSION                  | 7                 | Modified date                                                              |
| MODIFIED_DATE                         | REF_FOREST_TYPE                     | 11                | Modified date                                                              |
| MODIFIED_DATE                         | REF_HABTYPE DESCRIPTION             | 11                | Modified date                                                              |
| MODIFIED_DATE                         | REF_HABTYPE_PUBLICATION             | 11                | Modified date                                                              |
| MODIFIED_DATE                         | REF_POP_ATTRIBUTE                   | 10                | Modified date                                                              |
| MODIFIED_DATE                         | REF_POP_EVAL_TYP_DESCR              | 7                 | Modified date                                                              |
| MODIFIED_DATE                         | REF_SPECIES                         | 34                | Modified date                                                              |
| MODIFIED_DATE                         | REF_SPECIES_GROUP                   | 9                 | Modified date                                                              |
| MODIFIED_DATE                         | REF_STATE_ELEV                      | 10                | Modified date                                                              |
| MODIFIED_DATE                         | REF_UNIT                            | 8                 | Modified date                                                              |
| MODIFIED_DATE                         | SEEDLING                            | 19                | Modified date                                                              |
| MODIFIED_DATE                         | SITE_TREE                           | 29                | Modified date                                                              |
| MODIFIED_DATE                         | SUBPLOT                             | 24                | Modified date                                                              |
| MODIFIED_DATE                         | SUBP_COND                           | 14                | Modified date                                                              |
| MODIFIED_DATE                         | SUBP_COND_CHNG_MTRX                 | 14                | Modified date                                                              |
| MODIFIED_DATE                         | SURVEY                              | 14                | Modified date                                                              |
| MODIFIED_DATE                         | TREE                                 | 85                | Modified date                                                              |
| MODIFIED_DATE                         | TREE_REGIONAL_BIOMASS               | 9                 | Modified date                                                              |
| MODIFIED_IN_INSTANCE                  | BOUNDARY                            | 78                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | COND                                 | 78                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | COUNTY                               | 11                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | PLOT                                 | 38                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | POP_ESTN_UNIT                       | 19                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | POP_EVAL                             | 14                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | POP_EVAL_ATTRIBUTE                   | 10                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | POP_EVAL_GRP                         | 18                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | POP_EVAL_TYP                         | 10                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | POP_PLOT_STRATUM_ASSGN              | 18                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | POP_STRATUM                          | 20                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | REF_CITATION                        | 8                 | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | REF_FIA DB_VERSION                  | 8                 | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | REF_FOREST_TYPE                     | 12                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | REF_HABTYPE_DESCRIPTION             | 12                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | REF_HABTYPE_PUBLICATION             | 12                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | REF_POP_ATTRIBUTE                   | 11                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | REF_POP_EVAL_TYP_DESCR              | 8                 | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | REF_SPECIES                         | 35                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | REF_SPECIES_GROUP                   | 10                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | REF_STATE_ELEV                      | 11                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | REF_UNIT                            | 9                 | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | SEEDLING                            | 20                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | SITE_TREE                           | 30                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | SUBPLOT                             | 25                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | SUBP_COND                           | 15                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | SUBP_COND_CHNG_MTRX                 | 15                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | SURVEY                              | 15                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | TREE                                 | 86                | Modified in instance                                                       |
| MODIFIED_IN_INSTANCE                  | TREE_REGIONAL_BIOMASS               | 10                | Modified in instance                                                       |
| MORT_TYP_CD                           | PLOT                                | 24                | Type of annual mortality volume code                                       |
| MORTBFSL                              | TREE                                | 49                | Board-foot volume of a sawtimber size tree on timberland for mortality purposes |
| MORTCD (5.7.3)                        | TREE                                | 87                | Mortality code                                                             |
| MORTCFAL                              | TREE                                | 50                | Sound cubic-foot volume of a tree on timberland for mortality purposes       |
| MORTCFGFS                             | TREE                                | 48                | Cubic-foot volume of a growing-stock tree on timberland for mortality purposes |
| Column name with (field guide section) | Table name | Location in table | Description |
|----------------------------------------|------------|-------------------|-------------|
| MORTYR (5.22)                          | TREE       | 55                | Mortality year |
| NAME                                   | REF_SPECIES_GROUP | 2               | Name        |
| NBR_LIVE_STEMS                         | COND       | 100               | Number of live stems |
| NF_COND_NONSAMPLE_REASN_CD             | COND       | 96                | Nonforest condition nonsampled reason code |
| NF_COND_STATUS_CD                      | COND       | 95                | Nonforest condition status code |
| NF_PLOT_NONSAMPLE_REASN_CD             | PLOT       | 52                | Nonforest plot nonsampled reason code |
| NF_PLOT_STATUS_CD                      | PLOT       | 51                | Nonforest plot status code |
| NF_SAMPLING_STATUS_CD                  | PLOT       | 50                | Nonforest sampling status code |
| NF_SUBP_NONSAMPLE_REASN_CD             | SUBPLOT    | 30                | Nonforest subplot nonsampled reason code |
| NF_SUBP_STATUS_CD                      | SUBPLOT    | 29                | Nonforest subplot status code |
| NONFR_INCL_PCT_MACRO                   | SUBP_COND  | 20                | Nonforest inclusions percentage of macroplot |
| NONFR_INCL_PCT_SUBP                    | SUBP_COND  | 19                | Nonforest inclusions percentage of subplot |
| NOTES                                  | POP_EVAL   | 8                 | Evaluation notes |
| NOTES                                  | POP_EVAL_GRP | 19             | Notes         |
| NOTES                                  | SURVEY     | 9                 | Notes (about the inventory) |
| OPERABILITY_SRS                        | COND       | 93                | Operability in Southern Research Station |
| OWNCD (2.5.7)                          | COND       | 12                | Owner class code |
| OWNGRPDC (2.5.2)                       | COND       | 13                | Owner group code |
| P1PNTCNT_EU                            | POP_ESTN_UNIT | 12             | Phase 1 point count (total number of pixels) in the estimation unit |
| P1POINTCNT                             | POP_ESTN_UNIT | 9               | Phase 1 point count |
| P1SOURCE                               | POP_ESTN_UNIT | 13             | Phase 1 source |
| P2A_GRM_FLG                            | SUBPLOT    | 19                | Periodic to annual growth, removal, and mortality flag |
| P2A_GRM_FLG                            | TREE       | 103               | Periodic to annual growth, removal, and mortality flag |
| P2PANEL                                | PLOT       | 25                | Phase 2 panel number |
| P2POINTCNT                             | POP_ESTN_UNIT | 10         | Phase 2 point count |
| P2VEG_SAMPLING_LEVEL_DETAIL_CD         | PLOT       | 54                | P2 vegetation sampling level detail code |
| P2VEG_SAMPLING_STATUS_CD               | PLOT       | 53                | P2 vegetation sampling status code |
| P2VEG_SUBP_NONSAMPLE_REASN_CD          | SUBPLOT    | 32                | P2 vegetation nonsampled reason code |
| P2VEG_SUBP_STATUS_CD                   | SUBPLOT    | 31                | P2 vegetation subplot status code |
| P3_OZONE_IND                           | SURVEY     | 3                 | Phase 3 ozone indicator plot. |
| P3PANEL                                | PLOT       | 26                | Phase 3 panel number |
| PHYSCLCD (2.5.23)                      | COND       | 35                | Physiographic class code |
| PLANT_STOCKABILITY_FACTOR_PNW          | COND       | 83                | Plant stockability factor, Pacific Northwest Research Station |
| PLOT                                   | BOUNDARY   | 7                 | Phase 2 Plot number |
| PLOT                                   | COND       | 7                 | Phase 2 Plot number |
| PLOT (1.3)                             | PLOT       | 9                 | Phase 2 Plot number |
| PLOT                                   | POP_PLOT_STRATUM_ASSGN | 8           | Phase 2 Plot number |
| PLOT                                   | SEEDLING   | 7                 | Phase 2 Plot number |
| PLOT                                   | SITETREE   | 8                 | Phase 2 Plot number |
| PLOT                                   | SUBPLOT    | 8                 | Phase 2 Plot number |
| PLOT                                   | SUBP_COND  | 7                 | Phase 2 Plot number |
| PLOT                                   | TREE       | 8                 | Phase 2 Plot number |
| PLOT_NONSAMPLE_REASN_CD (1.5)          | PLOT       | 11                | Plot nonsampled reason code |
| PLOT_STATUS_CD (1.4)                   | PLOT       | 10                | Plot status code |
| PLT_CN                                 | BOUNDARY   | 2                 | Plot sequence number |
| PLT_CN                                 | COND       | 2                 | Plot sequence number |
| PLT_CN                                 | POP_PLOT_STRATUM_ASSGN | 3         | Plot sequence number |
| Column name with (field guide section) | Table name       | Location in table | Description                                                                 |
|---------------------------------------|------------------|-------------------|-----------------------------------------------------------------------------|
| PLT_CN                                | SEEDLING         | 2                 | Plot sequence number                                                        |
| PLT_CN                                | SITETREE         | 2                 | Plot sequence number                                                        |
| PLT_CN                                | SUBPLOT          | 2                 | Plot sequence number                                                        |
| PLT_CN                                | SUBP_COND        | 2                 | Plot sequence number                                                        |
| PLT_CN                                | SUBP_COND_CHNG_MTRX | 5             | Plot sequence number                                                        |
| PLT_CN                                | TREE             | 2                 | Plot sequence number                                                        |
| POINT_NONSAMPLE_REASN_CD              | SUBPLOT          | 11                | Point nonsampled reason code                                                |
| PREV_PLT_CN                           | PLOT             | 4                 | Previous plot sequence number                                               |
| PREV_PLT_CN                           | SUBP_COND_CHNG_MTRX | 7             | Previous plot sequence number                                               |
| PREV_PNTN_SRS                         | TREE             | 142               | Previous periodic prism point, tree number, Southern Research Station       |
| PREV_SB_P_CN                          | SUBPLOT          | 3                 | Previous subplot sequence number                                            |
| PREV_SIT_CN                           | SITETREE         | 3                 | Previous site tree sequence number                                          |
| PREV_STATUS_CD                        | TREE             | 109               | Previous tree status code                                                   |
| PREV_TRE_CN                           | TREE             | 3                 | Previous tree sequence number                                               |
| PREV_WDLDSTEM                         | TREE             | 110               | Previous woodland tree species stem count                                   |
| PREVCOND                              | SUBP_COND_CHNG_MTRX | 8             | Previous condition class number                                             |
| PREVCOND                              | TREE             | 14                | Previous condition class number                                             |
| PREVDIA (5.9.1)                       | TREE             | 93                | Previous diameter                                                           |
| PROP_BASIS                            | COND             | 28                | Proportion basis                                                            |
| PUB_CD                                | REF_HABTYP_DESCRIPTION | 3             | Publication code                                                            |
| PUB_CD                                | REF_HABTYP_PUBLICATION | 2           | Publication code                                                            |
| QA_STATUS (1.14)                      | PLOT             | 32                | Quality assurance status                                                    |
| RAILE_STUMP_DIB_B1                    | REF_SPECIES      | 62                | Raile stump diameter inside bark equation coefficient B1                     |
| RAILE_STUMP_DIB_B2                    | REF_SPECIES      | 63                | Raile stump diameter outside bark equation coefficient B2                    |
| RAILE_STUMP_DOB_B1                    | REF_SPECIES      | 61                | Raile stump diameter outside bark equation coefficient B1                    |
| RDDISTCD (1.12)                       | PLOT             | 18                | Horizontal distance to improved road code                                  |
| RECONCILECD (5.7.1)                   | TREE             | 92                | Reconcile code                                                              |
| REGION                                | TREE_SPECIES_GROUP | 3               | Region                                                                      |
| REGIONAL_DRYBIOM                      | TREE_REGIONAL_BIOMASS | 4             | Regional merchantable stem biomass oven-dry weight                          |
| REGIONAL_DRYBIOT                      | TREE_REGIONAL_BIOMASS | 3             | Regional total live tree biomass oven-dry weight                            |
| REMPER                                | PLOT             | 15                | Remeasurement period                                                        |
| REMVBFSL                              | TREE             | 52                | Board-foot volume of a sawtimber size tree on timberland for removal purposes|
| REMVCFA                               | TREE             | 53                | Cubic-foot volume of a growing-stock tree on timberland for removal purposes |
| REPORT_YEAR_NM                        | POP_EVAL         | 7                 | Report year name                                                            |
| RESERVCD (2.5.1)                      | COND             | 11                | Reserved status code                                                        |
| ROOT_DIS_SEV_CD_PNWRS                 | SUBPLOT          | 28                | Root disease severity rating code, Pacific Northwest Research Station        |
| ROUGHCULL (5.25)                      | TREE             | 89                | Rough cull percentage                                                       |
| RSCD                                  | POP_ESTN_UNIT    | 3                 | Region or Station code                                                      |
| Column name with (field guide section) | Table name | Location in table | Description |
|----------------------------------------|------------|-------------------|-------------|
| RSCD                                    | POP_EVAL   | 2                 | Region or Station code |
| RSCD                                    | POP_EVAL_GRP | 8               | Region or Station code |
| RSCD                                    | POP_PLOT_STRATUM_ASSGN | 9            | Region or Station code |
| RSCD                                    | POP_STRATUM | 3                | Region or Station code |
| RSCD                                    | SURVEY      | 7                | Region or Station code |
| SALVCD                                  | TREE        | 56               | Salvable dead code  |
| SAMP_METHOD_CD                          | PLOT        | 42               | Sample method code  |
| SAWHT                                   | TREE        | 75               | Sawlog height      |
| SCIENTIFIC_NAME                        | REF_HABTYP_DESCRIPTION | 4         | Scientific name    |
| SEVERITY1_CD_PNWRS                      | TREE        | 133              | Damage severity 1, Pacific Northwest Research Station, for years 2001-2004 |
| SEVERITY1A_CD_PNWRS                     | TREE        | 134              | Damage Severity 1, Pacific Northwest Research Station |
| SEVERITY1B_CD_PNWRS                     | TREE        | 135              | Damage severity B, Pacific Northwest Research Station |
| SEVERITY2_CD_PNWRS                      | TREE        | 136              | Damage severity 2, Pacific Northwest Research Station, for years 2001-2004 |
| SEVERITY2A_CD_PNWRS                     | TREE        | 137              | Damage severity 2A, Pacific Northwest Research Station, starting in 2005 |
| SEVERITY2B_CD_PNWRS                     | TREE        | 138              | Damage severity in 2B, Pacific Northwest Research Station, starting in 2005 |
| SEVERITY3_CD_PNWRS                      | TREE        | 139              | Damage severity 3, Pacific Northwest Research Station, for years 2001-2004 |
| SFTWD_HRDWD                             | REF_SPECIES | 19              | Softwood or hardwood |
| SIBASE                                  | COND        | 24               | Site index base age |
| SIBASE                                  | SITETREE    | 17               | Site index base age |
| SICOND                                  | COND        | 23               | Site index for the condition |
| SISP                                    | COND        | 25               | Site index species code |
| SITECL_METHOD                           | COND        | 66               | Site class method |
| SITECLCD                                | COND        | 64               | Site productivity class code estimated |
| SITECLCDEST                             | COND        | 22               | Site productivity class code |
| SITETREE                                | REF_SPECIES | 18               | Site tree |
| SITETREE_TREE                           | COND        | 65               | Site tree tree number |
| SITREE                                  | SITETREE    | 16               | Site index for the tree |
| SITREE                                  | TREE        | 80               | Calculated site index |
| SITREE_EST                              | SITETREE    | 22               | Estimated site index for the tree |
| SLOPE                                   | COND        | 33               | Slope |
| SLOPE (3.6)                             | SUBPLOT     | 16               | Subplot slope |
| SOIL_ROOTING_DEPTH_PNW                  | COND        | 81               | Soil rooting depth code, Pacific Northwest Research Station |
| SPCD                                    | REF_SPECIES | 1               | Species code |
| SPCD (6.2)                              | SEEDLING    | 10               | Species code |
| SPCD (7.2.2)                            | SITETREE    | 11               | Species code |
| SPCD (5.8)                              | TREE        | 16               | Species code |
| SPECIES                                 | REF_SPECIES | 4               | Species name |
| SPECIES_SYMBOL                          | REF_SPECIES | 7               | Species symbol |
| SPGRPCD                                 | REF_SPECIES_GROUP | 1        | Species group code |
| SPGRPCD                                 | SEEDLING    | 11               | Species group code |
| SPGRPCD                                 | SITETREE    | 15               | Species group code |
| SPGRPCD                                 | TREE        | 17               | Species group code |
| SRV_CN                                  | PLOT        | 2                | Survey sequence number |
| ST_EXISTS_IN_NCRS                       | REF_SPECIES | 20              | Site tree exists in the North Central Research Station region |
| Column name with (field guide section) | Table name | Location in table | Description |
|----------------------------------------|------------|-------------------|-------------|
| ST_EXISTS_IN_NERS                      | REF_SPECIES| 21                | Site tree exists in the Northeastern Research Station region |
| ST_EXISTS_IN_PNWRS                     | REF_SPECIES| 22                | Site tree exists in the Pacific Northwest Research Station region |
| ST_EXISTS_IN_RMRS                      | REF_SPECIES| 23                | Site tree exists in the Rocky Mountain Research Station region |
| ST_EXISTS_IN_SRS                       | REF_SPECIES| 24                | Site tree exists in the Southern Research Station region |
| STAND_STRUCTURE_SRS                    | COND       | 94                | Stand structure, Southern Research Station |
| STANDING DEAD_CD (5.7.2)               | TREE       | 108               | Standing dead code |
| START_INVYR                            | POP_EVAL   | 15                | Start inventory year |
| STATEAB                                | SURVEY     | 5                 | State abbreviation |
| STATECD                                | BOUNDARY   | 4                 | State code |
| STATECD                                | COND       | 4                 | State code |
| STATECD                                | COUNTY     | 1                 | State code |
| STATECD (1.1)                          | PLOT       | 6                 | State code |
| STATECD                                | POP_ESTN_UNIT | 7          | State code |
| STATECD                                | POP_EVAL   | 5                 | State code |
| STATECD                                | POP_EVAL_ATTRIBUTE | 4      | State code |
| STATECD                                | POP_EVAL_GRP | 11       | State code |
| STATECD                                | POP_EVAL_TYP | 4              | State code |
| STATECD                                | POP_PLOT_STRATUM_ASSIGN | 4       | State code |
| STATECD                                | POP_STRATUM | 8                 | State code |
| STATECD                                | REF_STATE_ELEV | 1           | State code |
| STATECD                                | REF_UNIT   | 1                 | State code |
| STATECD                                | SEEDLING   | 4                 | State code |
| STATECD                                | SITETREE   | 5                 | State code |
| STATECD                                | SUBPLOT    | 5                 | State code |
| STATECD                                | SUBP_COND  | 4                 | State code |
| STATECD                                | SUBP_COND_CHNG_MTRX | 2        | State code |
| STATECD                                | SURVEY     | 4                 | State code |
| STATECD                                | TREE       | 5                 | State code |
| STATECD                                | TREE_REGIONAL_BIOMASS | 2       | State code |
| STATENM                                | SURVEY     | 6                 | State name |
| STATUSCD                               | TREE       | 15                | Status code |
| STDAGE (2.5.10)                        | COND       | 19                | Stand age |
| STDORGCD                               | COND       | 26                | Stand origin code |
| STDORGSP                               | COND       | 27                | Stand origin species code |
| STD_SZCD                                | COND       | 20                | Stand-size class code derived by algorithm |
| STND_COND_CD_PNWRS                     | COND       | 84                | Stand condition code, Pacific Northwest Research Station |
| STND_STRUC_CD_PNWRS                    | COND       | 85                | Stand structure code, Pacific Northwest Research Station |
| STOCKING                                | SEEDLING   | 12                | Tree stocking |
| STOCKING                                | TREE       | 36                | Tree stocking |
| STOCKING_SPGRPCD                        | REF_SPECIES| 11                | Stocking species group code |
| STRATUM_CN                              | POP_PLOT_STRATUM_ASSIGN | 2       | Stratum sequence number |
| STRATUM_DESCR                           | POP_STRATUM | 7                 | Stratum description |
| STRATUM_CD                              | POP_PLOT_STRATUM_ASSIGN | 12      | Stratum code |
| STRATUM_CD                              | POP_STRATUM | 6                 | Stratum code |
| STUMP_CD_PNWRS                          | COND       | 86                | Stump code, Pacific Northwest Research Station |
| SUBCYCLE                                | BOUNDARY   | 17                | Inventory subcycle number |
| SUBCYCLE                                | COND       | 80                | Inventory subcycle number |
| SUBCYCLE                                | PLOT       | 47                | Inventory subcycle number |
| SUBCYCLE                                | SEEDLING   | 24                | Inventory subcycle number |
| SUBCYCLE                                | SITETREE   | 32                | Inventory subcycle number |
| SUBCYCLE                                | SUBPLOT    | 27                | Inventory subcycle number |
| Column name with (field guide section) | Table name | Location in table | Description |
|----------------------------------------|------------|-------------------|-------------|
| SUBCYCLE                              | SUBP_COND  | 22                | Inventory subcycle number |
| SUBCYCLE                              | SURVEY     | 17                | Inventory subcycle number |
| SUBCYCLE                              | TREE       | 124               | Inventory subcycle number |
| SUBP (4.2.1)                          | BOUNDARY   | 8                 | Subplot number |
| SUBP (6.1)                            | SEEDLING   | 8                 | Subplot number |
| SUBP (7.2.7)                          | SITETREE   | 18                | Subplot number |
| SUBP (3.1)                            | SUBPLOT    | 9                 | Subplot number |
| SUBP                                  | SUBP_COND  | 8                 | Subplot number |
| SUBP                                  | SUBP_COND_CHNG_MTRX | 3 | Subplot number |
| SUBP (5.1)                            | TREE       | 9                 | Subplot number |
| SUBP_EXAMINE_CD (1.6)                 | PLOT       | 43                | Subplots examined code |
| SUBP_STATUS_CD (3.2)                  | SUBPLOT    | 10                | Subplot status code |
| SUBPANEL                              | PLOT       | 30                | Subpanel |
| SUBPCOND (3.4)                        | SUBPLOT    | 13                | Subplot status code |
| SUBPCOND_PROP                         | SUBP_COND  | 17                | Proportion of this subplot in this condition |
| SUBPPROP_UNADJ                        | COND       | 31                | Subplot proportion unadjusted |
| SUBPTYP (4.2.2)                       | BOUNDARY   | 9                 | Subplot type code |
| SUBPTYP                               | SUBP_COND_CHNG_MTRX | 4 | Subplot type code |
| SUBPTYP_PROP_CHNG                     | SUBP_COND_CHNG_MTRX | 9 | Percent change of subplot condition between previous to current inventory |
| SUBSPECIES                            | REF_SPECIES | 6       | Subspecie name |
| TITLE                                 | REF_HABTYP_PUBLICATION | 3 | Title of publication |
| TOPO_POSITION_PNW                    | PLOT       | 49                | Topographic position, Pacific Northwest Research Station |
| TOTAGE                                | SEEDLING   | 14                | Total age of seedling |
| TOTAGE                                | TREE       | 67                | Total tree age |
| TPA_UNADJ                             | SEEDLING   | 22                | Trees per acre unadjusted |
| TPA_UNADJ                             | TREE       | 111               | Trees per acre unadjusted |
| TPAGROW_UNADJ                         | TREE       | 114               | Growth trees per acre unadjusted for denied access, hazardous, out of sample conditions |
| TPAMORT_UNADJ                         | TREE       | 112               | Mortality trees per acre per year unadjusted for denied access, hazardous, out of sample conditions |
| Tparemv_unadj                         | TREE       | 113               | Removal trees per acre per year unadjusted for denied access, hazardous, out of sample conditions |
| TRANSCD (12.11)                       | TREE       | 63                | Foliage transparency code |
| TRE_CN                                | TREE_REGIONAL_BIOMASS | 1 | Tree sequence number |
| TREE                                  | SITETREE   | 10                | Tree number |
| TREE (5.2)                            | TREE       | 10                | Tree record number |
| TREECLCD                              | TREE       | 23                | Tree class code |
| TREECLCD_NCRS                         | TREE       | 106               | Tree class code, North Central Research Station |
| TREECLCD_NERS                         | TREE       | 104               | Tree class code, Northeastern Research Station |
| TREECLCD_RMRS                         | TREE       | 107               | Tree class code, Rocky Mountain Research Station |
| TREECLCD_SRS                          | TREE       | 105               | Tree class code, Southern Research Station |
| TREECOUNT (6.4)                       | SEEDLING   | 13                | Tree count for seedlings |
| TREECOUNT_CALC                        | SEEDLING   | 21                | Tree count used in calculations |
| TREEGRCD                              | TREE       | 26                | Tree grade code |
| TREEHISTCD                            | TREE       | 64                | Tree history code |
| TRTCD1 (2.5.17)                       | COND       | 44                | Stand Treatment 1 code |
| TRTCD2 (2.5.19)                       | COND       | 46                | Stand treatment 2 code |
| TRTCD3 (2.5.21)                       | COND       | 48                | Stand Treatment 3 code |
| Column name with (field guide section) | Table name | Location in table | Description |
|--------------------------------------|------------|-------------------|-------------|
| TRTYR1 (2.5.18)                      | COND       | 45                | Treatment year 1 |
| TRTYR2 (2.5.20)                      | COND       | 47                | Treatment year 2 |
| TRTYR3 (2.5.22)                      | COND       | 49                | Treatment year 3 |
| TYPE                                 | REF_HABTYP_PUBLICATION | 5       | Type of publication |
| TYPGRPCD                             | REF_FOREST_TYPE     | 3       | Forest type group code |
| UNCRCD (5.18, 12.5)                  | TREE       | 57                | Uncompacted live crown ratio |
| UNITCD                               | BOUNDARY     | 5                 | Survey unit code |
| UNITCD                               | COND        | 5                 | Survey unit code |
| UNITCD                               | COUNTY      | 2                 | Survey unit code |
| UNITCD                               | PLOT        | 7                 | Survey unit code |
| UNITCD                               | POP_PLOT_STRATUM_ASSIGN | 6     | Survey unit code |
| UNITCD                               | SEEDLING     | 5                 | Survey unit code |
| UNITCD                               | SITETREE    | 6                 | Survey unit code |
| UNITCD                               | SUBPLOT     | 6                 | Survey unit code |
| UNITCD                               | SUBP_COND   | 5                 | Survey unit code |
| UNITCD                               | TREE        | 6                 | Survey unit code |
| UNKNOWN_DAMTYP1_PNWRS                 | TREE       | 140               | Unknown damage type 1, Pacific Northwest Research Station |
| UNKNOWN_DAMTYP2_PNWRS                 | TREE       | 141               | Unknown damage type 2, Pacific Northwest Research Station |
| VALID                                | REF_HABTYP_DESCRIPTION | 6     | Valid |
| VALID                                | REF_HABTYP_PUBLICATION | 6     | Valid |
| VALIDCD                              | SITETREE    | 23                | Validity code |
| VALUE                                | REF_FOREST_TYPE     | 1     | Value |
| VALUE                                | REF_UNIT     | 2                 | Value |
| VARIETY                              | REF_SPECIES   | 5                 | Variety |
| VERSION                              | REF_FIADB_VERSION | 1     | Version number |
| VOL_LOC_GRP                          | COND        | 63                | Volume location group |
| VOLBFGRS                             | TREE        | 43                | Gross board-foot volume in the sawlog portion |
| VOLBFNET                             | TREE        | 42                | Net board-foot volume in the sawlog portion |
| VOLECFGRS                            | TREE        | 39                | Gross cubic-foot volume |
| VOLECFNET                            | TREE        | 38                | Net cubic-foot volume |
| VOLECSND                             | TREE        | 44                | Sound cubic-foot volume |
| VOLECSGRS                            | TREE        | 41                | Gross cubic-foot volume in the sawlog portion |
| VOLCSNET                             | TREE        | 40                | Net cubic-foot volume in the sawlog portion |
| W_SPGRPCD                            | REF_SPECIES   | 9     | West species group code |
| WATERCD (1.13)                       | PLOT        | 19                | Water on plot code |
| WATERDEP (3.8)                       | SUBPLOT     | 18                | Water or snow depth |
| WLDSTEM (5.11)                       | TREE        | 37                | Woodland tree species current stem count |
| WEST                                 | REF_SPECIES   | 26               | West |
| WHERE_CLAUSE                         | REF_POP_ATTRIBUTE | 5     | Part of the where clause |
| WOOD_SPGR_GREENVOL_DRYWT             | REF_SPECIES   | 49               | Green specific gravity wood (green volume and oven-dry weight) |
| WOOD_SPGR_GREENVOL_DRYWT_CIT         | REF_SPECIES   | 50               | Green specific gravity wood citation |
| WOOD_SPGR_MC12VOL_DRYWT              | REF_SPECIES   | 57               | Wood specific gravity (12 percent moisture content volume and oven-dry weight) |
| WOOD_SPGR_MC12VOL_DRYWT_CIT          | REF_SPECIES   | 58               | Wood specific gravity (12 percent moisture content volume and oven-dry weight) citation |
| WOODLAND                             | REF_SPECIES   | 27               | Woodland species |
### Appendix B. Forest Inventory and Analysis (FIA) Plot Design Codes and Definitions by FIA Work Unit

| FIA work unit | Plot design code (DESIGNCD) | Definition |
|---------------|-----------------------------|------------|
| aNRS-NE, bNRS-NC, cSRS, dRMRS, ePNWRS | 1 | National plot design consists of four 24-foot fixed-radius subplots for trees ≥5 inches DBH, and four 6.8-foot fixed-radius microplots for seedlings and trees ≥1 and <5 inches DBH. Subplot 1 is the center plot, and subplots 2, 3, and 4 are located 120.0 feet, horizontal, at azimuths of 360, 120, and 240, respectively. The microplot center is 12 feet east of the subplot center. Four 58.9-foot fixed-radius macroplots are optional. A plot may sample more than one condition. When multiple conditions are encountered, condition boundaries are delineated (mapped). |
| ePNWRS | 101 | Various plot designs. Converted from Eastwide Database format, some fields may be null. |
| aNRS-NE | 111 | Four-subplot design similar to DESIGNCD 1, except the microplot for seedlings is 1/1000 acre (3.7-foot radius). If the plot is used for growth estimates, it is overlaid on a 5 subplot design, where remeasurement of trees (≥5 inches) is on subplot 1 only. Poletimber-sized trees remeasured on a 24-foot radius plot, sawtimber-sized trees remeasured on a 49-foot radius plot. If the plot is not used for growth estimates, it is an initial plot establishment. |
| aNRS-NE | 112 | DESIGNCD 111, except that if the plot is used for growth estimates, the remeasurement of trees (≥5 inches) is on the 24-foot-radius subplot 1 only, regardless of tree size or previous plot size or type (varied). |
| aNRS-NE | 113 | DESIGNCD 111, except that if the plot is used for growth estimates, the remeasurement of trees (≥5 inches) is on the 24-foot-radius subplot 1 only, regardless of tree size or previous plot size or type (single subplot 1/5 acre). |
| aNRS-NE | 115 | DESIGNCD 1. Overlaid on a FHM 4-subplot plot design. These plots are not used in change estimates. |
| aNRS-NE | 116 | DESIGNCD 1. Overlaid on 1/5 acre plot for all trees ≥5 inches DBH (1/5 acre plot was an initial measurement). Remeasurement of subplot 1 is only on the 24-foot-radius plot for all trees (≥5 inches), regardless of tree size or previous plot size. |
| aNRS-NE | 117 | DESIGNCD 1. Overlaid on 1/5 acre plot for all trees ≥5 inches DBH (1/5 acre plot was remeasurement). Remeasurement of subplot 1 is only on the 24-foot-radius plot for all trees (≥5 inches), regardless of tree size or previous plot size. |
| aNRS-NE | 118 | DESIGNCD 1. Overlaid on 10-subplot, variable-radius design. Remeasurement of trees (≥5 inches) on 5 of the 10 subplots; ingrowth based on trees (≥5 inches) that grew onto five 6.8-foot radius subplots. |
| ePNWRS | 301 | Various plot designs. Converted from Eastwide Database format, some fields may be null. |
| ePNWRS | 311 | Four-subplot design similar to DESIGNCD 1, except the 1/24 acre and 1/300 acre plots have common centers. Conditions are mapped and boundaries may be within the plots. |
| ePNWRS | 312 | DESIGNCD 1. Initial plot establishment. |
| ePNWRS | 313 | DESIGNCD 311. Overlaid on previous plots, no remeasurements. |
| ePNWRS | 314 | DESIGNCD 1. Overlaid on previous plots, no remeasurements. |
| ePNWRS | 315 | DESIGNCD 311. Overlaid on same design. Only trees ≥5 inches DBH are remeasured. |
| ePNWRS | 316 | DESIGNCD 1. Overlaid on DESIGNCD 311 Only trees ≥5 inches DBH are remeasured. |
| ePNWRS | 317 | DESIGNCD 1. Overlaid on DESIGNCD 326. Only the first 5 points (trees ≥5 inches DBH) and first 3, 1/300 acre plots (trees ≥1 and <5 inches DBH) are remeasured, but conditions were not re-mapped. |
| FIA work unit | Plot design code (DESIGNCD) | Definition |
|---------------|-----------------------------|------------|
| 318           | DESIGNCD 311. Overlaid on DESIGNCD 325. Only the first 5 points (trees ≥5 inches DBH) and first 3, 1/300 acre plots (trees ≥1 and <5 inches DBH) are remeasured. |
| 319           | DESIGNCD 1. Overlaid on DESIGNCD 325. Only the first 5 points (trees ≥5 inches DBH) and first 3, 1/300 acre plots (trees ≥1 and <5 inches DBH) are remeasured. |
| 320           | DESIGNCD 311. Overlaid on modified DESIGNCD 325. Only the first 5 points (trees ≥5 inches DBH) and first 3 1/300 acre plots (trees ≥1 and <5 inches DBH) are remeasured. |
| 321           | DESIGNCD 1. Overlaid on modified DESIGNCD 325. Only the first 5 points (trees ≥5 inches DBH) and first 3 1/300 acre plots (trees ≥1 and <5 inches DBH) are remeasured. |
| 322           | DESIGNCD 311. Overlaid on DESIGNCD 327. Only the first 5 points (trees ≥5 inches DBH) and first 3, 1/300 acre plots (trees ≥1 and <5 inches DBH) are remeasured. |
| 323           | DESIGNCD 1. Overlaid on DESIGNCD 327. Only the first 5 points (trees ≥5 inches DBH) and first 3 1/300 acre plots (trees ≥1 and <5 inches DBH) are remeasured. |
| 324           | Ten variable-radius, 37.5 BAF points, 70 feet apart, for trees ≥5 inches DBH and 10, 1/300 acre plots for seedlings and trees ≥1 and <5 inches DBH. Point and plot center were coincident. Conditions were not mapped. Instead, points were rotated into forest or nonforest based on the condition at point center. |
| 325           | Ten variable-radius, 37.5 BAF points, 70 feet apart, for trees ≥5 inches DBH and 10, 1/300 acre plots for seedlings and trees ≥1 and <5 inches DBH. Point and plot center were coincident. Conditions were mapped. |
| 326           | Ten variable-radius, 37.5 BAF points, 70 feet apart, for trees ≥5 and <17.0 inches DBH, 10 1/24 acre plots for trees ≥17.0 inches DBH, and 10, 1/300 acre plots for seedlings and trees ≥1 and <5 inches DBH. Point and plot center were coincident. Conditions were not mapped. Instead, points were rotated into forest or nonforest based on the condition at point center. Diameters were estimated with a model, but all dead and cut trees were recorded. |
| 327           | DESIGNCD 1. Overlaid on DESIGNCD 311. All trees and saplings are remeasured. |
| SRS 210       | Other plot design installed by previous research stations within the 13-State Southern area not described by DESIGNCD 211-219. |
| 211           | Ten variable-radius, 37.5 BAF points, 70 feet apart. Remeasure first 3 points of same design or new/replacement plot. |
| 212           | Five variable-radius, 37.5 BAF points, 70 feet apart. Remeasure first 5 points of DESIGNCD 211 or new/replacement plot. |
| 213           | Five variable-radius, 37.5 BAF points, 70 feet apart. Remeasure DESIGNCD 212. |
| 214           | Ten variable-radius, 37.5 BAF points, 66 feet apart. Remeasure same design or new/replacement plot. |
| 215           | Five variable-radius, 37.5 BAF points, 66 feet apart. Remeasure first 5 points of DESIGNCD 214 or new/replacement plot. |
| 216           | Ten variable-radius, 37.5 BAF points, 66 feet apart. Remeasure DESIGNCD 215. |
| 217           | Five point cluster plot, point 1 is 1/5th acre sawtimber plot and 1/10th acre poletimber plot, points 2-5 are 37.5 BAF prism points. No remeasurement. |
| 218           | Remeasurement of DESIGNCD 217, point 1 only. Used only for change estimates. |
| 219           | Three point, 2.5 BAF metric prism plot, points 25 meters apart. Remeasure same design or new/replacement plot. |
| FIA work unit | Plot design code (DESIGNCD) | Definition |
|--------------|-----------------------------|------------|
| 220          | Four 1/24 acre plots for trees ≥5 inches DBH and 4, 1/300 acre plots for seedlings and trees ≥1 and <5 inches DBH. The 1/24 acre and 1/300 acre plots have common centers. Conditions are mapped and boundaries may be within the plots. Remeasurement plot not described by 221-229. |
| 221          | DESIGNCD 220. Remeasure same design or new/replacement plot. |
| 222          | DESIGNCD 220. Overlaid on and remeasurement of DESIGNCD 212 or 213. |
| 223          | DESIGNCD 220. Overlaid on and remeasurement of first 5 points of DESIGNCD 214 or 216. |
| 230          | DESIGNCD 1. Remeasurement plot not described by DESIGNCD 231-239. |
| 231          | DESIGNCD 1. Overlaid on and remeasurement of DESIGNCD 212 or DESIGNCD 213. |
| 232          | DESIGNCD 1. Overlaid on and remeasurement of first 5 points of DESIGNCD 214 or 216. |
| 233          | DESIGNCD 1. Overlaid on and remeasurement of DESIGNCD 220, 221, 222, or 223. |
| 240          | DESIGNCD 1. Collected in metric and converted to English in the database. Remeasurement not described by 241-249. |
| 241          | DESIGNCD 1. Collected in metric and converted to English in the database. Remeasure same design or new/replacement plot. |
| 242          | DESIGNCD 1. Overlaid on and remeasurement of DESIGNCD 219. Collected in metric and converted to English in the database. |
| 299          | Other plot design not described in DESIGNCD 200-298. |
| 4RMRS        | One 1/10th acre fixed-radius plot divided into 4 quadrants and four 1/300th acre fixed-radius microplots. Timber and woodland tree species <5.0 inches DRC tallied on microplot. |
| 403          | One 1/20th acre fixed-radius plot divided into 4 quadrants and four 1/300th acre fixed-radius microplots. Timber and woodland tree species <5.0 inches DRC tallied on microplot. |
| 404          | One 1/5th acre fixed-radius plot divided into 4 quadrants and four 1/300th acre fixed-radius microplots. Timber and woodland tree species <5.0 inches DRC tallied on microplot. |
| 410          | 40 BAF variable-radius plots and 1/300th acre fixed-radius microplots; number of microplots = number of points installed. Timber tree species <5.0 inches DBH; woodland tree species <3.0 inches DRC measured on microplot. |
| 411          | 40 BAF variable-radius plots and 1/300th acre fixed-radius microplots; 3 microplots installed on points 1, 2, and 3. Timber tree species <5.0 inches DBH; woodland tree species <3.0 inches DRC measured on microplot. |
| 412          | 40 BAF variable-radius plots and 1/300th acre fixed-radius microplots; 3 microplots installed on points 1, 2, and 5. Timber tree species <5.0 inches DBH; woodland tree species <3.0 inches DRC measured on microplot. |
| 413          | 20 BAF variable-radius plots and 1/300th acre fixed-radius microplots; number of microplots = number of points installed. Timber tree species <5.0 inches DBH; woodland tree species <3.0 inches DRC measured on microplot. |
| 414          | 20 BAF variable-radius plots and 1/300th acre fixed-radius microplots; 3 microplots installed on points 1, 2, and 3. Timber tree species <5.0 inches DBH; woodland tree species <3.0 inches DRC measured on microplot. |
| 415          | 20 BAF variable-radius plots and 1/300th acre fixed-radius microplots; 3 microplots installed on points 1, 2, and 5. Timber tree species <5.0 inches DBH; woodland tree species <3.0 inches DRC measured on microplot. |
| 420          | One 1/10th acre fixed-radius plot and one centered 1/100th acre microplot. Timber tree species <5.0 inches DBH; woodland tree species <3.0 inches DRC measured on microplot. |
| FIA work unit | Plot design code (DESIGNCD) | Definition |
|---------------|----------------------------|------------|
| 421           | One 1/20th acre fixed-radius plot and one centered 1/100th acre microplot. Timber tree species <5.0 inches DBH; woodland tree species <3.0 inches DRC measured on microplot. | |
| 422           | One 1/5th acre fixed-radius plot and one centered 1/100th acre microplot. Timber tree species <5.0 inches DBH; woodland tree species <3.0 inches DRC measured on microplot. | |
| 423           | One 1/10th acre fixed-radius plot divided into 4 quadrants and four 1/300th acre fixed-radius microplots. Timber tree species <5.0 inches DBH; woodland tree species <3.0 inches DRC measured on microplot. | |
| 424           | One 1/20th acre fixed-radius plot divided into 4 quadrants and four 1/300th acre fixed-radius microplots. Timber tree species <5.0 inches DBH; woodland tree species <3.0 inches DRC measured on microplot. | |
| 425           | One 1/5th acre fixed-radius plot divided into 4 quadrants and four 1/300th acre fixed-radius microplots. Timber tree species <5.0 inches DBH; woodland tree species <3.0 inches DRC measured on microplot. | |
| 501           | DESIGNCD 1 with optional macroplot. Trees ≥ 24 inches DBH are tallied on macroplot. | |
| 502           | DESIGNCD 1 with optional macroplot. Trees ≥ 30 inches DBH are tallied on macroplot. | |
| 503           | DESIGNCD 1 with optional macroplot. Trees ≥ 4 inches DBH are tallied on macroplot. Trees ≥ 32 inches DBH are tallied on one 1-hectare plot. | |
| 504           | DESIGNCD 1 with optional macroplot. Trees ≥ 24 inches DBH are tallied on macroplot. Trees ≥ 48 inches DBH are tallied on one 1-hectare plot. | |
| 505           | DESIGNCD 1 with optional macroplot. Trees ≥ 30 inches DBH are tallied on macroplot. Trees ≥ 48 inches DBH are tallied on one 1-hectare plot. | |
| 550           | Five 30.5 BAF points for trees ≥ 5 inches and < 35.4 inches DBH; five 55.8 foot fixed-radius plots for trees ≥ 35.4 inches DBH; and five 7.7-foot fixed-radius plots for seedlings and saplings < 5 inches DBH. Point and plot centers are coincident. Conditions are mapped. | |
| 551           | Five 20 BAF points for trees ≥ 5 inches and < 35.4 inches DBH; five 55.6 foot fixed-radius plots for trees ≥ 35.4 inches DBH; and five 9.7-foot fixed-radius plots for seedlings and saplings < 5 inches DBH. Point and plot centers are coincident. Conditions are mapped. | |
| 552           | Five 30 BAF points for trees ≥ 5 inches and < 35.4 inches DBH; five 55.6-foot fixed-radius plots for trees ≥ 35.4 inches DBH; and five 7.9-foot fixed-radius plots for seedlings and saplings < 5 inches DBH. Point and plot centers are coincident. Conditions are mapped. | |
| 553           | Four 1/24 acre plots for live trees and four 58.9-foot fixed-radius plots for trees ≥ 11.8 inches DBH. Plot centers are coincident. Conditions are mapped. | |
| 554           | Four 1/24 acre plots for live trees and four 58.9-foot fixed-radius plots for trees ≥ 19.7 inches DBH. Plot centers are coincident. Conditions are mapped. | |
| 555           | Five 30.5 BAF points for trees ≥ 6.9 inches and < 35.4 inches DBH; five 55.8-foot fixed-radius plots for trees ≥ 35.4 inches DBH; and five 10.8-foot fixed-radius plots for seedlings and saplings < 6.9 inches DBH. Point and plot centers are coincident. Conditions are mapped. | |
| 556           | Five 30.5 BAF points for trees ≥ 6.9 inches and < 35.4 inches DBH; five 55.8-foot fixed-radius plots for trees ≥ 35.4 inches DBH; five 10.8-foot fixed-radius plots for saplings ≥ 5 inches and < 6.9 inches DBH; and the northeast quadrant of each of the five 10.8-foot fixed-radius plots for trees < 5 inches DBH. Point and plot centers are coincident. Conditions are not mapped. | |
| 557           | Five 40 BAF points for trees ≥ 5 inches DBH; and five 6.9-foot fixed-radius plots for saplings ≥ 1 and < 5 inches DBH. Point and plot centers are coincident. Conditions are not mapped. | |
| FIA work unit | Plot design code (DESIGNCD) | Definition |
|---------------|----------------------------|------------|
|               | 558                        | Three 30.5 BAF points for trees $\geq 6.9$ inches and $< 35.4$ inches DBH; three 55.8-foot fixed-radius plots for trees $\geq 35.4$ inches DBH; three 10.8-foot fixed-radius plots for saplings $\geq 5$ inches and $< 6.9$ inches DBH; and the northeast quadrant of each of the three 10.8-foot fixed-radius plots for trees $< 5$ inches DBH. Point and plot centers are coincident. Conditions are mapped, only condition class 1 measured. Overlaid on and remeasurement of same design. |
|               | 559                        | Four 40 BAF points for trees $\geq 5$ inches DBH; and four 6.9-foot fixed-radius plots for saplings $\geq 1$ and $< 5$ inches DBH. Point and plot centers are coincident. Conditions are mapped, only condition class 1 measured. Overlaid on and remeasurement of same design. |
| $^{a}$NRS-NE, $^{b}$NRS-NC, $^{c}$SRS, $^{d}$RMRS, $^{e}$PNWRS | 999                        | A plot record created to represent reserved or other nonsampled or undersampled areas where there were no ground plots; the plot has no design type; rather, it is a placeholder for area estimates. In all cases where DESIGNCD 999 plots are present, they are only used for estimates of area; they are not used in estimates of numbers of trees, volume or change (i.e., tree level estimates). |

$^{a}$Northern Research Station – previously Northeastern  
$^{b}$Northern Research Station – previously North Central  
$^{c}$Southern Research Station  
$^{d}$Rocky Mountain Research Station  
$^{e}$Pacific Northwest Research Station

Other acronyms and definitions:  
BAF – basal area factor  
DRC – diameter at root collar  
Sawtimber-sized trees – softwoods $\geq 9$ inches DBH, hardwoods $\geq 11$ inches DBH.  
Poletimber-sized trees – softwoods $\geq 5$ inches and $< 9$ inches DBH, hardwoods $\geq 5$ inches and $< 11$ inches DBH
### Appendix C. State, Survey Unit, and County Codes

| State Code | State Name | State Abbreviation | Region/Station Code |
|------------|------------|--------------------|---------------------|
| 1          | Alabama    | AL                 | 33                  |

#### Survey Unit Code: 1, Survey Unit Name: Southwest-South

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|-------------------|-----------------------------|
| 3                | Baldwin           | 53 Escambia 129 Washington  |
| 39               | Covington         | 97 Mobile                   |

#### Survey Unit Code: 2, Survey Unit Name: Southwest-North

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|-------------------|-----------------------------|
| 23               | Choctaw           | 35 Conecuh 99 Monroe 131 Wilcox |
| 25               | Clarke            | 91 Marengo 119 Sumter       |

#### Survey Unit Code: 3, Survey Unit Name: Southeast

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|-------------------|-----------------------------|
| 1                | Autauga           | 31 Coffee 67 Henry 109 Pike  |
| 5                | Barbour           | 41 Crenshaw 69 Houston 113 Russell |
| 11               | Bullock           | 45 Dale 81 Lee 123 Tallapoosa |
| 13               | Butler            | 47 Dallas 85 Lowndes        |
| 17               | Chambers          | 51 Elmore 87 Macon          |
| 21               | Chilton           | 61 Geneva 101 Montgomery    |

#### Survey Unit Code: 4, Survey Unit Name: West Central

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|-------------------|-----------------------------|
| 7                | Bibb              | 65 Hale 105 Perry           |
| 57               | Fayette           | 75 Lamar 107 Pickens        |
| 63               | Greene            | 93 Marion 125 Tuscaloosa   |

#### Survey Unit Code: 5, Survey Unit Name: North Central

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|-------------------|-----------------------------|
| 9                | Blount            | 29 Cleburne 73 Jefferson 121 Talladega |
| 15               | Calhoun           | 37 Coosa 111 Randolph 127 Walker   |
| 19               | Cherokee          | 43 Cullman 115 St. Clair 133 Winston |
| 27               | Clay              | 55 Etowah 117 Shelby         |

#### Survey Unit Code: 6, Survey Unit Name: North

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|-------------------|-----------------------------|
| 33               | Colbert           | 71 Jackson 83 Limestone 103 Morgan |
| 49               | DeKalb            | 77 Lauderdale 89 Madison    |
| 59               | Franklin          | 79 Lawrence 95 Marshall     |
### Alaska

| State Code | State Name  | State Abbreviation | Region/Station Code | Survey Unit Code | Survey Unit Name                  |
|------------|-------------|--------------------|---------------------|------------------|-----------------------------------|
| 2          | Alaska      | AK                 | 27                  | 1                | Alaska                            |

#### County code and county name

| County code | County Name                          |
|-------------|--------------------------------------|
| 13          | Aleutians East Borough               |
| 16          | Aleutians West Census Area           |
| 20          | Anchorage Borough                    |
| 50          | Bethel Census Area                   |
| 60          | Bristol Bay Borough                  |
| 68          | Denali Borough                       |
| 70          | Dillingham Census Area               |
| 90          | Fairbanks North Star Borough         |
| 100         | Haines Borough                       |
| 110         | Juneau Borough                       |
| 122         | Kenai Peninsula Borough              |
| 130         | Ketchikan Gateway Borough            |
| 150         | Kodiak Island Borough                |
| 164         | Lake and Peninsula Borough           |
| 170         | Matanuska-Susitna Borough            |
| 180         | Nome Census Area                     |
| 185         | North Slope Borough                  |
| 188         | Northwest Arctic Borough             |
| 201         | Prince of Wales-Outer Ketchikan Census Area |
| 220         | Sitka Borough                        |
| 232         | Skagway-Hoonah-Angoon Census Area    |
| 240         | Southeast Fairbanks Census Area      |
| 261         | Valdez-Cordova Census Area           |
| 270         | Wade Hampton Census Area             |
| 280         | Wrangell-Petersburg Census Area      |
| 282         | Yakutat Borough                      |
| 290         | Yukon-Koyukuk Census Area            |

### Arizona

| State Code | State Name  | State Abbreviation | Region/Station Code | Survey Unit Code | Survey Unit Name                  |
|------------|-------------|--------------------|---------------------|------------------|-----------------------------------|
| 4          | Arizona     | AZ                 | 22                  | 1                | Southern                          |

#### County code and county name

| County code | County Name                          |
|-------------|--------------------------------------|
| 3           | Cochise                              |
| 9           | Graham                               |
| 11          | Greenlee                             |
| 12          | La Paz                               |
| 13          | Maricopa                             |
| 15          | Mohave                               |
| 19          | Pima                                 |
| 21          | Pinal                                |
| 23          | Santa Cruz                           |
| 27          | Yuma                                 |

#### County code and county name

| County code | County Name                          |
|-------------|--------------------------------------|
| 1           | Apache                               |
| 5           | Coconino                             |
| 7           | Gila                                 |
| 15          | Mohave                               |
| 17          | Navajo                               |
| 25          | Yavapai                              |
| State Code: | 5 | State Name: | Arkansas | State Abbreviation: | AR | Region/Station Code: | 33 |
|---|---|---|---|---|---|---|---|

### Survey Unit Code: 1  
**Survey Unit Name:** South Delta

| County code and county name |
|---|---|---|---|---|
| 1 | Arkansas | 69 Jefferson | 85 Lonoke | 117 Prairie |
| 17 | Chicot | 77 Lee | 95 Monroe |
| 41 | Desha | 79 Lincoln | 107 Phillips |

### Survey Unit Code: 2  
**Survey Unit Name:** North Delta

| County code and county name |
|---|---|---|---|---|
| 21 | Clay | 37 Cross | 75 Lawrence | 123 St. Francis |
| 31 | Craighead | 55 Greene | 93 Mississippi | 147 Woodruff |
| 35 | Crittenden | 67 Jackson | 111 Poinsett |

### Survey Unit Code: 3  
**Survey Unit Name:** Southwest

| County code and county name |
|---|---|---|---|---|
| 3 | Ashley | 27 Columbia | 59 Hot Spring | 99 Nevada |
| 11 | Bradley | 39 Dallas | 61 Howard | 103 Ouachita |
| 13 | Calhoun | 43 Drew | 73 Lafayette | 109 Pike |
| 19 | Clark | 53 Grant | 81 Little River | 133 Sevier |
| 25 | Cleveland | 57 Hempstead | 91 Miller | 139 Union |

### Survey Unit Code: 4  
**Survey Unit Name:** Ouachita

| County code and county name |
|---|---|---|---|---|
| 51 | Garland | 105 Perry | 125 Saline | 149 Yell |
| 83 | Logan | 113 Polk | 127 Scott |
| 97 | Montgomery | 119 Pulaski | 131 Sebastian |

### Survey Unit Code: 5  
**Survey Unit Name:** Ozark

| County code and county name |
|---|---|---|---|---|
| 5 | Baxter | 33 Crawford | 71 Johnson | 129 Searcy |
| 7 | Benton | 45 Faulkner | 87 Madison | 135 Sharp |
| 9 | Boone | 47 Franklin | 89 Marion | 137 Stone |
| 15 | Carroll | 49 Fulton | 101 Newton | 141 Van Buren |
| 23 | Cleburne | 63 Independence | 115 Pope | 143 Washington |
| 29 | Conway | 65 Izard | 121 Randolph | 145 White |
| State Code: 6 | State Name: California | State Abbreviation: CA | Region/Station Code: 26 |
|--------------|------------------------|------------------------|-------------------------|
| **Survey Unit Code:** 1 | **Survey Unit Name:** North Coast |
| **County code and county name** |
| 15 Del Norte | 23 Humboldt | 45 Mendocino | 97 Sonoma |
| **Survey Unit Code:** 2 | **Survey Unit Name:** North Interior |
| **County code and county name** |
| 35 Lassen | 89 Shasta | 105 Trinity |
| 49 Modoc | 93 Siskiyou |
| **Survey Unit Code:** 3 | **Survey Unit Name:** Sacramento |
| **County code and county name** |
| 7 Butte | 33 Lake | 63 Plumas | 103 Tehama |
| 11 Colusa | 55 Napa | 67 Sacramento | 113 Yolo |
| 17 El Dorado | 57 Nevada | 91 Sierra | 115 Yuba |
| 21 Glenn | 61 Placer | 101 Sutter |
| **Survey Unit Code:** 4 | **Survey Unit Name:** Central Coast |
| **County code and county name** |
| 1 Alameda | 69 San Benito | 83 Santa Barbara | 111 Ventura |
| 13 Contra Costa | 75 San Francisco | 85 Santa Clara |
| 41 Marin | 79 San Luis Obispo | 87 Santa Cruz |
| 53 Monterey | 81 San Mateo | 95 Solano |
| **Survey Unit Code:** 5 | **Survey Unit Name:** San Joaquin |
| **County code and county name** |
| 3 Alpine | 29 Kern | 47 Merced | 107 Tulare |
| 5 Amador | 31 Kings | 51 Mono | 109 Tuolumne |
| 9 Calaveras | 39 Madera | 77 San Joaquin |
| 19 Fresno | 43 Mariposa | 99 Stanislaus |
| **Survey Unit Code:** 6 | **Survey Unit Name:** Southern |
| **County code and county name** |
| 25 Imperial | 37 Los Angeles | 65 Riverside | 73 San Diego |
| 27 Inyo | 59 Orange | 71 San Bernardino |
### State Code: 8  State Name: Colorado  State Abbreviation: CO  Region/Station Code: 22

**Survey Unit Code: 1**  
Survey Unit Name: Northern Front Range

| Survey Unit Code | County code and county name |
|------------------|-----------------------------|
| 13 Boulder       | 39 Elbert 59 Jefferson 93 Park |
| 19 Clear Creek   | 41 El Paso 65 Lake 119 Teller |
| 35 Douglas       | 47 Gilpin 69 Larimer         |

### State Code: 9  State Name: Connecticut  State Abbreviation: CT  Region/Station Code: 24

**Survey Unit Code: 1**  
Survey Unit Name: Connecticut

| Survey Unit Code | County code and county name |
|------------------|-----------------------------|
| 1 Fairfield      | 5 Litchfield 9 New Haven 13 Tolland |
| 3 Hartford       | 7 Middlesex 11 New London 15 Windham |

### State Code: 10  State Name: Delaware  State Abbreviation: DE  Region/Station Code: 24

**Survey Unit Code: 1**  
Survey Unit Name: Delaware

| Survey Unit Code | County code and county name |
|------------------|-----------------------------|
| 1 Kent           | 3 New Castle 5 Sussex        |

### State Code: 11  State Name: District of Columbia  State Abbrev.: DC  Region/Station Code: 24

| Survey Unit Code | County code and county name |
|------------------|-----------------------------|
| 1                |                            |
### State Code: 12  |  State Name: Florida  |  State Abbreviation: FL  |  Region/Station Code: 33

#### Survey Unit Code: 1  |  Survey Unit Name: Northeastern

| County code and county name |
|-----------------------------|
| 1  |  Alachua  |  31  |  Duval  |  79  |  Madison  |  123  |  Taylor  |
| 3  |  Baker  |  35  |  Flagler  |  83  |  Marion  |  125  |  Union  |
| 7  |  Bradford  |  41  |  Gilchrist  |  89  |  Nassau  |  127  |  Volusia  |
| 19  |  Clay  |  47  |  Hamilton  |  107  |  Putnam  |
| 23  |  Columbia  |  67  |  Lafayette  |  109  |  St. Johns  |
| 29  |  Dixie  |  75  |  Levy  |  121  |  Suwannee  |

#### Survey Unit Code: 2  |  Survey Unit Name: Northwestern

| County code and county name |
|-----------------------------|
| 5  |  Bay  |  39  |  Gadsden  |  65  |  Jefferson  |  113  |  Santa Rosa  |
| 13  |  Calhoun  |  45  |  Gulf  |  73  |  Leon  |  129  |  Wakulla  |
| 33  |  Escambia  |  59  |  Holmes  |  77  |  Liberty  |  131  |  Walton  |
| 37  |  Franklin  |  63  |  Jackson  |  91  |  Okaloosa  |  133  |  Washington  |

#### Survey Unit Code: 3  |  Survey Unit Name: Central

| County code and county name |
|-----------------------------|
| 9  |  Brevard  |  55  |  Highlands  |  93  |  Okeechobee  |  105  |  Polk  |
| 17  |  Citrus  |  57  |  Hillsborough  |  95  |  Orange  |  111  |  St. Lucie  |
| 27  |  DeSoto  |  61  |  Indian River  |  97  |  Osceola  |  115  |  Sarasota  |
| 49  |  Hardee  |  69  |  Lake  |  101  |  Pasco  |  117  |  Seminole  |
| 53  |  Hernando  |  81  |  Manatee  |  103  |  Pinellas  |  119  |  Sumter  |

#### Survey Unit Code: 4  |  Survey Unit Name: Southern

| County code and county name |
|-----------------------------|
| 11  |  Broward  |  25  |  Dade  |  71  |  Lee  |  99  |  Palm Beach  |
| 15  |  Charlotte  |  43  |  Glades  |  85  |  Martin  |
| 21  |  Collier  |  51  |  Hendry  |  87  |  Monroe  |
| Survey Unit Code | Survey Unit Name  | County code and county name |
|------------------|-------------------|----------------------------|
| 1                | Southeastern      |                            |
|                  |                   |                            |
| 1                | Appling           | 51 Chatham 161 Jeff Davis 251 Screven |
| 3                | Atkinson          | 65 Clinch 165 Jenkins 267 Tattnall |
| 5                | Bacon             | 69 Coffee 167 Johnson 271 Telfair |
| 25               | Brantley          | 91 Dodge 175 Laurens 279 Toombs |
| 29               | Bryan             | 101 Echols 179 Liberty 283 Treutlen |
| 31               | Bulloch           | 103 Effingham 183 Long 299 Ware |
| 39               | Camden            | 107 Emanuel 191 McIntosh 305 Wayne |
| 43               | Candler           | 109 Evans 209 Montgomery 309 Wheeler |
| 49               | Charlton          | 127 Glynn 229 Pierce        |
|                  |                   |                            |
| 2                | Southwestern      |                            |
|                  |                   |                            |
| 7                | Baker             | 81 Crisp 173 Lanier 277 Tift |
| 17               | Ben Hill          | 87 Decatur 185 Lowndes 287 Turner |
| 19               | Berrien           | 93 Dooly 201 Miller 315 Wilcox |
| 27               | Brooks            | 99 Early 205 Mitchell 321 Worth |
| 71               | Colquitt          | 131 Grady 253 Seminole     |
| 75               | Cook              | 155 Irwin 275 Thomas       |
|                  |                   |                            |
| 3                | Central           |                            |
|                  |                   |                            |
| 9                | Baldwin           | 141 Hancock 211 Morgan 265 Taliaferro |
| 21               | Bibb              | 145 Harris 215 Muscogee 269 Taylor |
| 23               | Bleckley          | 153 Houston 225 Peach 273 Terrell |
| 33               | Burke             | 159 Jasper 231 Pike 289 Twiggs |
| 35               | Butts             | 163 Jefferson 235 Pulaski 293 Upson |
| 37               | Calhoun           | 169 Jones 237 Putnam 301 Warren |
| 53               | Chattahoochee     | 171 Lamar 239 Quitman 303 Washington |
| 61               | Clay              | 177 Lee 243 Randolph 307 Webster |
| 73               | Columbia          | 181 Lincoln 245 Richmond 317 Wilkes |
| 79               | Crawford          | 189 McDuffie 249 Schley 319 Wilkinson |
| 95               | Dougherty         | 193 Macon 259 Stewart      |
| 125              | Glascock          | 197 Marion 261 Sumter      |
| 133              | Greene            | 207 Monroe 263 Talbot      |
|                  |                   |                            |
| 4                | North Central     |                            |
|                  |                   |                            |
| 11               | Banks             | 97 Douglas 143 Haralson 219 Oconee |
| 13               | Barrow            | 105 Elbert 147 Hart 221 Oglethorpe |
| 45               | Carroll           | 113 Fayette 149 Heard 223 Polk |
| 59               | Clarke            | 117 Forsyth 151 Henry 233 Polk |
| 63               | Clayton           | 119 Franklin 157 Jackson 247 Rockdale |
| 67               | Cobb              | 121 Fulton 195 Madison 255 Spalding |
| 77               | Coweta            | 135 Gwinnett 199 Meriwether 285 Troup |
| 89               | DeKalb            | 139 Hall 217 Newton 297 Walton |

Georgia cont.
| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|------------------------------|
| 15               | Bartow           | 111 Fannin 213 Murray 295 Walker |
| 47               | Catoosa          | 115 Floyd 227 Pickens 311 White  |
| 55               | Chattooga        | 123 Gilmer 241 Rabun 313 Whitfield |
| 57               | Cherokee         | 129 Gordon 257 Stephens  |
| 83               | Dade             | 137 Habersham 281 Towns  |
| 85               | Dawson           | 187 Lumpkin 291 Union  |

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|------------------------------|
| 1               | Hawaii           | 5 Kalawao 9 Maui  |
| 3               | Honolulu         | 7 Kauai  |

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|------------------------------|
| 9                | Benewah          | 35 Clearwater 57 Latah 79 Shoshone |
| 17               | Bonner           | 49 Idaho 61 Lewis  |
| 21               | Boundary         | 55 Kootenai 69 Nez Perce  |

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|------------------------------|
| 1                | Ada              | 27 Canyon 73 Owyhee 87 Washington |
| 3                | Adams            | 39 Elmore 75 Payette  |
| 15               | Boise            | 45 Gem 85 Valley  |

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|------------------------------|
| 5                | Bannock          | 25 Camas 43 Fremont 65 Madison |
| 7                | Bear Lake        | 29 Caribou 47 Gooding 67 Minidoka |
| 11               | Bingham          | 31 Cassia 51 Jefferson 71 Oneida |
| 13               | Blaine           | 33 Clark 53 Jerome 77 Power  |
| 19               | Bonneville       | 37 Custer 59 Lemhi 81 Teton  |
| 23               | Butte            | 41 Franklin 63 Lincoln 83 Twin Falls  |
### Survey Unit Code: 1  Survey Unit Name: Southern

| State Code | Survey Unit Code | Survey Unit Name | County code and county name |
|------------|------------------|------------------|-----------------------------|
| 17         | 1                | Southern         | 3 Alexander 69 Hardin 145 Perry 165 Saline 55 Franklin 77 Jackson 151 Pope 181 Union 59 Gallatin 87 Johnson 153 Pulaski 193 White 65 Hamilton 127 Massac 157 Randolph 199 Williamson |

### Survey Unit Code: 2  Survey Unit Name: Claypan

| State Code | Survey Unit Code | Survey Unit Name | County code and county name |
|------------|------------------|------------------|-----------------------------|
| 17         | 2                | Claypan          | 5 Bond 47 Edwards 101 Lawrence 163 St. Clair 13 Calhoun 49 Effingham 117 Macoupin 173 Shelby 23 Clark 51 Fayette 119 Madison 185 Wabash 25 Clay 61 Greene 121 Marion 189 Washington 27 Clinton 79 Jasper 133 Monroe 191 Wayne 33 Crawford 81 Jefferson 135 Montgomery 35 Cumberland 83 Jersey 159 Richland |

### Survey Unit Code: 3  Survey Unit Name: Prairie

| State Code | Survey Unit Code | Survey Unit Name | County code and county name |
|------------|------------------|------------------|-----------------------------|
| 17         | 3                | Prairie          | 1 Adams 53 Ford 105 Livingston 149 Pike 7 Boone 57 Fulton 107 Logan 155 Putnam 9 Brown 63 Grundy 109 McDonough 161 Rock Island 11 Bureau 67 Hancock 111 McHenry 167 Sangamon 15 Carroll 71 Henderson 113 McLean 169 Schuyler 17 Cass 73 Henry 115 Macon 171 Scott 19 Champaign 75 Iroquois 123 Marshall 175 Stark 21 Christian 85 Jo Daviess 125 Mason 177 Stephenson 29 Coles 89 Kane 129 Menard 179 Tazewell 31 Cook 91 Kankakee 131 Mercer 183 Vermilion 37 DeKalb 93 Kendall 137 Morgan 187 Warren 39 De Witt 95 Knox 139 Moultrie 195 Whiteside 41 Douglas 97 Lake 141 Ogle 197 Will 43 DuPage 99 La Salle 143 Peoria 201 Winnebago 45 Edgar 103 Lee 147 Piatt 203 Woodford |
| State Code: 18 | State Name: Indiana | State Abbreviation: IN | Region/Station Code: 23 |
|----------------|---------------------|------------------------|-------------------------|
| Survey Unit Code: 1 | Survey Unit Name: Lower Wabash |
| County code and county name |
| 21 | Clay | 83 | Knox | 129 | Posey | 165 | Vermillion |
| 27 | Daviess | 101 | Martin | 133 | Putnam | 167 | Vigo |
| 51 | Gibson | 121 | Parke | 153 | Sullivan |
| 55 | Greene | 125 | Pike | 163 | Vanderburgh |
| Survey Unit Code: 2 | Survey Unit Name: Knobs |
| County code and county name |
| 13 | Brown | 61 | Harrison | 117 | Orange | 173 | Warrick |
| 19 | Clark | 71 | Jackson | 119 | Owen | 175 | Washington |
| 25 | Crawford | 93 | Lawrence | 123 | Perry |
| 37 | Dubois | 105 | Monroe | 143 | Scott |
| 43 | Floyd | 109 | Morgan | 147 | Spencer |
| Survey Unit Code: 3 | Survey Unit Name: Upland Flats |
| County code and county name |
| 29 | Dearborn | 77 | Jefferson | 137 | Ripley |
| 41 | Fayette | 79 | Jennings | 155 | Switzerland |
| 47 | Franklin | 115 | Ohio | 161 | Union |
| Survey Unit Code: 4 | Survey Unit Name: Northern |
| County code and county name |
| 1 | Adams | 45 | Fountain | 87 | Lagrange | 139 | Rush |
| 3 | Allen | 49 | Fulton | 89 | Lake | 141 | St. Joseph |
| 5 | Bartholomew | 53 | Grant | 91 | La Porte | 145 | Shelby |
| 7 | Benton | 57 | Hamilton | 95 | Madison | 149 | Starke |
| 9 | Blackford | 59 | Hancock | 97 | Marion | 151 | Steuben |
| 11 | Boone | 63 | Hendricks | 99 | Marshall | 157 | Tippecanoe |
| 15 | Carroll | 65 | Henry | 103 | Miami | 159 | Tipton |
| 17 | Cass | 67 | Howard | 107 | Montgomery | 169 | Wabash |
| 23 | Clinton | 69 | Huntington | 111 | Newton | 171 | Warren |
| 31 | Decatur | 73 | Jasper | 113 | Noble | 177 | Wayne |
| 33 | De Kalb | 75 | Jay | 127 | Porter | 179 | Wells |
| 35 | Delaware | 81 | Johnson | 131 | Pulaski | 181 | White |
| 39 | Elkhart | 85 | Kosciusko | 135 | Randolph | 183 | Whitley |
### State Code: 19  State Name: Iowa  State Abbreviation: IA  Region/Station Code: 23

#### Survey Unit Code: 1  Survey Unit Name: Northeastern

| County code and county name | Survey Unit Code | Survey Unit Name |
|-----------------------------|-----------------|-----------------|
| Allamakee 31 Cedar 65 Fayette 105 Jones | 5 | Northeastern |
| Benton 37 Chickasaw 67 Floyd 113 Linn | 11 | |
| Black Hawk 43 Clayton 75 Grundy 131 Mitchell | 13 | |
| Bremer 45 Clinton 89 Howard 163 Scott | 17 | |
| Buchanan 55 Delaware 97 Jackson 171 Tama | 19 | |
| Butler 61 Dubuque 103 Johnson 191 Winneshiek | 23 | |

#### Survey Unit Code: 2  Survey Unit Name: Southeastern

| County code and county name | Survey Unit Code | Survey Unit Name |
|-----------------------------|-----------------|-----------------|
| Appanoose 83 Hardin 121 Madison 177 Van Buren | 7 | Southeastern |
| Boone 87 Henry 123 Mahaska 179 Wapello | 15 | |
| Clarke 95 Iowa 125 Marion 181 Warren | 39 | |
| Dallas 99 Jasper 127 Marshall 183 Washington | 49 | |
| Davis 101 Jefferson 135 Monroe 185 Wayne | 51 | |
| Decatur 107 Keokuk 139 Muscatine 187 Webster | 53 | |
| Des Moines 111 Lee 153 Polk | 57 | |
| Guthrie 115 Louisa 157 Poweshiek | 77 | |
| Hamilton 117 Lucas 169 Story | 79 | |

#### Survey Unit Code: 3  Survey Unit Name: Southwestern

| County code and county name | Survey Unit Code | Survey Unit Name |
|-----------------------------|-----------------|-----------------|
| Adair 47 Crawford 133 Monona 165 Shelby | 1 | Southwestern |
| Adams 71 Fremont 137 Montgomery 173 Taylor | 3 | |
| Audubon 73 Greene 145 Page 175 Union | 9 | |
| Carroll 85 Harrison 155 Pottawattamie 193 Woodbury | 27 | |
| Cass 129 Mills 159 Ringgold | 29 | |

#### Survey Unit Code: 4  Survey Unit Name: Northwestern

| County code and county name | Survey Unit Code | Survey Unit Name |
|-----------------------------|-----------------|-----------------|
| Buena Vista 63 Emmet 119 Lyon 161 Sac | 21 | Northwestern |
| Calhoun 69 Franklin 141 O'Brien 167 Sioux | 25 | |
| Cerro Gordo 81 Hancock 143 Osceola 189 Winnebago | 33 | |
| Cherokee 91 Humboldt 147 Palo Alto 195 Worth | 35 | |
| Clay 93 Ida 149 Plymouth 197 Wright | 41 | |
| Dickinson 109 Kossuth 151 Pocahontas | 59 | |
| State Code: | 20 | State Name: | Kansas | State Abbreviation: | KS | Region/Station Code: | 23 |
|---|---|---|---|---|---|---|---|

**Survey Unit Code: 1**  
**Survey Unit Name: Northeastern**

| County code and county name |
|---|---|---|---|---|
| 5 | Atchison | 59 | Franklin | 117 | Marshall | 177 | Shawnee |
| 13 | Brown | 61 | Geary | 121 | Miami | 197 | Wabaunsee |
| 27 | Clay | 85 | Jackson | 131 | Nemaha | 201 | Washington |
| 41 | Dickinson | 87 | Jefferson | 139 | Osage | 209 | Wyandotte |
| 43 | Doniphan | 91 | Johnson | 149 | Pottawatomie | |
| 45 | Douglas | 103 | Leavenworth | 161 | Riley | |

**Survey Unit Code: 2**  
**Survey Unit Name: Southeastern**

| County code and county name |
|---|---|---|---|---|
| 1 | Allen | 21 | Cherokee | 99 | Labette | 133 | Neosho |
| 3 | Anderson | 31 | Coffey | 107 | Linn | 205 | Wilson |
| 11 | Bourbon | 35 | Cowley | 111 | Lyon | 207 | Woodson |
| 15 | Butler | 37 | Crawford | 115 | Marion | |
| 17 | Chase | 49 | Elk | 125 | Montgomery | |
| 19 | Chautauqua | 73 | Greenwood | 127 | Morris | |

**Survey Unit Code: 3**  
**Survey Unit Name: Western**

| County code and county name |
|---|---|---|---|---|
| 7 | Barber | 71 | Greeley | 129 | Morton | 171 | Scott |
| 9 | Barton | 75 | Hamilton | 135 | Ness | 173 | Sedgwick |
| 23 | Cheyenne | 77 | Harper | 137 | Norton | 175 | Seward |
| 25 | Clark | 79 | Harvey | 141 | Osborne | 179 | Sheridan |
| 29 | Cloud | 81 | Haskell | 143 | Ottawa | 181 | Sherman |
| 33 | Comanche | 83 | Hodgeman | 145 | Pawnee | 183 | Smith |
| 39 | Decatur | 89 | Jewell | 147 | Phillips | 185 | Stafford |
| 47 | Edwards | 93 | Kearny | 151 | Pratt | 187 | Stantion |
| 51 | Ellis | 95 | Kingman | 153 | Rawlins | 189 | Stevens |
| 53 | Ellsworth | 97 | Kiowa | 155 | Reno | 191 | Sumner |
| 55 | Finney | 101 | Lane | 157 | Republic | 193 | Thomas |
| 57 | Ford | 105 | Lincoln | 159 | Rice | 195 | Trego |
| 63 | Gove | 109 | Logan | 163 | Rooks | 199 | Wallace |
| 65 | Graham | 113 | McPherson | 165 | Rush | 203 | Wichita |
| 67 | Grant | 119 | Meade | 167 | Russell | |
| 69 | Gray | 123 | Mitchell | 169 | Saline | |
### Kentucky

| State Code | State Name | State Abbreviation | Region/Station Code |
|------------|------------|--------------------|---------------------|
| 21         | Kentucky   | KY                 | 33                  |

#### Survey Unit Code: 1 Eastern

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|----------------------------|
| 1                | Eastern          | Floyd 119 | Knott 133 | Letcher 193 | Perry 195 |
| 95               | Harlan 131 | Leslie 159 | Martin 195 | Pike 195 |

#### Survey Unit Code: 2 Northern Cumberland

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|----------------------------|
| 2                | Northern Cumberland | Boyd 115 | Johnson 165 | Menifee 237 | Wolfe 237 |
| 19               | Carter 127 | Lawrence 175 | Morgan 201 | Robertson 201 |
| 43               | Elliott 135 | Lewis 197 | Powell 197 | |
| 89               | Greenup 153 | Magoffin 205 | Rowan 205 | |

#### Survey Unit Code: 3 Southern Cumberland

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|----------------------------|
| 3                | Southern Cumberland | Bell 13 | Estill 125 | Laurel 189 | Owsley 189 |
| 25               | Breathitt 109 | Jackson 129 | Lee 203 | Rockcastle 203 |
| 51               | Clay 121 | Knox 147 | McCreary 235 | Whitley 235 |

#### Survey Unit Code: 4 Bluegrass

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|----------------------------|
| 4                | Bluegrass        | Anderson 67 | Fayette 113 | Jessamine 187 | Owen 187 |
| 11               | Bath 69 | Fleming 117 | Kenton 191 | Pendleton 191 |
| 15               | Boone 73 | Franklin 137 | Lincoln 201 | Robertson 201 |
| 17               | Bourbon 77 | Gallatin 151 | Madison 209 | Scott 209 |
| 21               | Boyle 79 | Garrard 161 | Mason 211 | Shelby 211 |
| 23               | Bracken 81 | Grant 167 | Mercer 215 | Spencer 215 |
| 37               | Campbell 97 | Harrison 173 | Montgomery 223 | Trimble 223 |
| 41               | Carroll 103 | Henry 181 | Nicholas 229 | Washington 229 |
| 49               | Clark 111 | Jefferson 185 | Oldham 239 | Woodford 239 |

#### Survey Unit Code: 5 Pennyroyal

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|----------------------------|
| 5                | Pennyroyal       | Adair 57 | Cumberland 99 | Hart 179 | Nelson 179 |
| 11               | Bath 69 | Fleming 117 | Kenton 191 | Pendleton 191 |
| 15               | Boone 73 | Franklin 137 | Lincoln 201 | Robertson 201 |
| 17               | Bourbon 77 | Gallatin 151 | Madison 209 | Scott 209 |
| 21               | Boyle 79 | Garrard 161 | Mason 211 | Shelby 211 |
| 23               | Bracken 81 | Grant 167 | Mercer 215 | Spencer 215 |
| 37               | Campbell 97 | Harrison 173 | Montgomery 223 | Trimble 223 |
| 41               | Carroll 103 | Henry 181 | Nicholas 229 | Washington 229 |
| 49               | Clark 111 | Jefferson 185 | Oldham 239 | Woodford 239 |

#### Survey Unit Code: 6 Western Coalfield

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|----------------------------|
| 6                | Western Coalfield | Allen 55 | Crittenden 141 | Logan 213 | Simpson 213 |
| 9                | Barren 59 | Daviess 149 | McLean 219 | Todd 219 |
| 31               | Butler 61 | Edmonson 171 | Monroe 225 | Union 225 |
| 33               | Caldwell 101 | Henderson 177 | Muhlenberg 227 | Warren 227 |
| 47               | Christian 107 | Hopkins 183 | Ohio 233 | Webster 233 |

#### Survey Unit Code: 7 Western

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|----------------------------|
| 7                | Western          | Ballard 75 | Fulton 139 | Livingston 157 | Marshall 157 |
| 35               | Calloway 83 | Graves 143 | Lyon 221 | Trigg 221 |
| 39               | Carlisle 105 | Hickman 145 | McCracken 233 | |
| Survey Unit Code | Survey Unit Name       | County code and county name |
|------------------|------------------------|----------------------------|
| 1                | North Delta            |                            |
|                  |                        | 25 Catahoula               | 41 Franklin | 83 Richland  |
|                  |                        | 29 Concordia               | 65 Madison  | 107 Tensas   |
|                  |                        | 35 East Carroll            | 67 Morehouse| 123 West Carroll |
| 2                | South Delta            |                            |
|                  |                        | 1 Acadia                  | 47 Iberville| 77 Pointe Coupee |
|                  |                        | 5 Ascension               | 51 Jefferson| 87 St. Bernard  |
|                  |                        | 7 Assumption              | 55 Lafayette| 89 St. Charles |
|                  |                        | 9 Avoyelles               | 57 Lafourche| 93 St. James   |
|                  |                        | 23 Cameron                | 71 Orleans  | 95 St. John the Baptist |
|                  |                        | 45 Iberia                 | 75 Plaquemines| 97 St. Landry |
| 3                | Southwest              |                            |
|                  |                        | 3 Allen                   | 39 Evangeline| 59 La Salle |
|                  |                        | 11 Beauregard             | 43 Grant     | 69 Natchitoches |
|                  |                        | 19 Calcasieu              | 53 Jefferson Davis| 79 Rapides |
| 4                | Southeast              |                            |
|                  |                        | 33 East Baton Rouge       | 63 Livingston| 103 St. Tammany |
|                  |                        | 37 East Feliciana         | 91 St. Helena| 105 Tangipahoa |
| 5                | Northwest              |                            |
|                  |                        | 13 Bienville              | 27 Claiborne | 73 Ouachita |
|                  |                        | 15 Bossier                | 31 De Soto   | 81 Red River  |
|                  |                        | 17 Caddo                  | 49 Jackson   | 111 Union     |
|                  |                        | 21 Caldwell               | 61 Lincoln   | 119 Webster   |
| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|-----------------------------|
| 1                | Washington       | 29 Washington               |
| 2                | Aroostook        | 3 Aroostook                 |
| 3                | Penobscot        | 19 Penobscot                |
| 4                | Hancock          | 9 Hancock                   |
| 5                | Piscataquis      | 21 Piscataquis              |
| 6                | Capitol Region   | 11 Kennebec 13 Knox 15 Lincoln 27 Waldo |
| 7                | Somerset         | 25 Somerset                 |
| 8                | Casco Bay        | 1 Androscoggin 5 Cumberland 23 Sagadahoc 31 York |
| 9                | Western Maine    | 7 Franklin 17 Oxford        |
### State Code: 24  
**State Name:** Maryland  
**State Abbreviation:** MD  
**Region/Station Code:** 24

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|----------------------------|
| 2                | Central          | 3 Anne Arundel 15 Cecil 29 Kent 41 Talbot 43 Washington 47 Worcester 510 Baltimore city  |
|                  |                  | 5 Baltimore 21 Frederick 31 Montgomery  |
|                  |                  | 11 Caroline 25 Harford 33 Prince George's  |
|                  |                  | 13 Carroll 27 Howard 35 Queen Anne's  |

### State Code: 25  
**State Name:** Massachusetts  
**State Abbreviation:** MA  
**Region/Station Code:** 24

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|----------------------------|
| 1                | Massachusetts    | 1 Barnstable 9 Essex 17 Middlesex 25 Suffolk  |
|                  |                  | 3 Berkshire 11 Franklin 19 Nantucket  |
|                  |                  | 5 Bristol 13 Hampden 21 Norfolk  |
|                  |                  | 7 Dukes 15 Hampshire 23 Plymouth  |
| State Code: 26 | State Name: Michigan | State Abbreviation: MI | Region/Station Code: 23 |
|---------------|---------------------|-----------------------|------------------------|
| Survey Unit Code: 1 | Survey Unit Name: Eastern Upper Peninsula |
| Survey Unit Code: 2 | Survey Unit Name: Western Upper Peninsula |
| Survey Unit Code: 3 | Survey Unit Name: Northern Lower Peninsula |
| Survey Unit Code: 4 | Survey Unit Name: Southern Lower Peninsula |

### County code and county name

#### Eastern Upper Peninsula
- **Survey Unit Code:** 1
- **County code and county name:**
  - 3 Alger
  - 33 Chippewa
  - County code and county name:
    - 41 Delta
    - 95 Luce
    - County code and county name:
      - 97 Mackinac
      - 109 Menominee

#### Western Upper Peninsula
- **Survey Unit Code:** 2
- **County code and county name:**
  - 13 Baraga
  - 43 Dickinson
  - County code and county name:
    - 53 Gogebic
    - 61 Houghton
    - County code and county name:
      - 71 Iron
      - 83 Keweenaw

#### Northern Lower Peninsula
- **Survey Unit Code:** 3
- **County code and county name:**
  - 1 Alcona
  - 49 Genesee
  - County code and county name:
    - 39 Crawford
    - 87 Lapeer
    - County code and county name:
      - 101 Manistee
      - 145 Saginaw

#### Southern Lower Peninsula
- **Survey Unit Code:** 4
- **County code and county name:**
  - 5 Allegan
  - 45 Eaton
  - County code and county name:
    - 57 Gratiot
    - 81 Kent
    - County code and county name:
      - 91 Lenawee
      - 139 Ottawa
      - County code and county name:
        - 147 St. Clair
        - 163 Wayne
| State Code: | 27 | State Name: | Minnesota | State Abbreviation: | MN | Region/Station Code: | 23 |
|----------------|-----|-------------|-----------|---------------------|----|---------------------|----|

**Survey Unit Code: 1**  
**Survey Unit Name:** Aspen-Birch

| Survey Unit Code: | Survey Unit Name: | County code and county name |
|-------------------|-------------------|-----------------------------|
| 17                | Carlton           | 71 Koochiching 137 St. Louis |
| 31                | Cook              | 75 Lake                      |

**Survey Unit Code: 2**  
**Survey Unit Name:** Northern Pine

| Survey Unit Code: | Survey Unit Name: | County code and county name |
|-------------------|-------------------|-----------------------------|
| 1                 | Aitkin            | 21 Cass 57 Hubbard 87 Mahnomen |
| 5                 | Becker            | 29 Clearwater 61 Itasca 135 Roseau |
| 7                 | Beltrami          | 35 Crow Wing 77 Lake of the Woods 159 Wadena |

**Survey Unit Code: 3**  
**Survey Unit Name:** Central Hardwood

| Survey Unit Code: | Survey Unit Name: | County code and county name |
|-------------------|-------------------|-----------------------------|
| 3                 | Anoka             | 49 Goodhue 97 Morrison 141 Sherburne |
| 9                 | Benton            | 53 Hennepin 109 Olmsted 145 Stearns |
| 19                | Carver            | 55 Houston 111 Otter Tail 153 Todd |
| 25                | Chisago           | 59 Isanti 115 Pine 157 Wabasha |
| 37                | Dakota            | 65 Kanabec 123 Ramsey 163 Washington |
| 41                | Douglas           | 79 Le Sueur 131 Rice 169 Winona |
| 45                | Fillmore          | 95 Mille Lacs 139 Scott 171 Wright |

**Survey Unit Code: 4**  
**Survey Unit Name:** Prairie

| Survey Unit Code: | Survey Unit Name: | County code and county name |
|-------------------|-------------------|-----------------------------|
| 11                | Big Stone         | 67 Kandiyohi 103 Nicollet 143 Sibley |
| 13                | Blue Earth        | 69 Kittson 105 Nobles 147 Steele |
| 15                | Brown             | 73 Lac qui Parle 107 Norman 149 Stevens |
| 23                | Chippewa          | 81 Lincoln 113 Pennington 151 Swift |
| 27                | Clay              | 83 Lyon 117 Pipestone 155 Traverse |
| 33                | Cottonwood        | 85 McLeod 119 Polk 161 Waseca |
| 39                | Dodge             | 89 Marshall 121 Pope 165 Watonwan |
| 43                | Faribault         | 91 Martin 125 Red Lake 167 Wilkin |
| 47                | Freeborn          | 93 Meeker 127 Redwood 173 Yellow Medicine |
| 51                | Grant             | 99 Mower 129 Renville        |
| 63                | Jackson           | 101 Murray 133 Rock          |
| State Code: 28 | State Name: Mississippi | State Abbreviation: MS | Region/Station Code: 33 |
|---------------|------------------------|------------------------|------------------------|

### Survey Unit Code: 1
**Survey Unit Name:** Delta

| County code and county name |
|-----------------------------|
| 11 Bolivar 55 Issaquena 133 Sunflower 151 Washington |
| 27 Coahoma 83 Leflore 135 Tallahatchie 163 Yazoo |
| 51 Holmes 119 Quitman 143 Tunica |
| 53 Humphreys 125 Sharkey 149 Warren |

### Survey Unit Code: 2
**Survey Unit Name:** North

| County code and county name |
|-----------------------------|
| 3 Alcorn 33 DeSoto 95 Monroe 139 Tippah |
| 9 Benton 43 Grenada 97 Montgomery 141 Tishomingo |
| 13 Calhoun 57 Itawamba 105 Oktibbeha 145 Union |
| 15 Carroll 71 Lafayette 107 Panola 155 Webster |
| 17 Chickasaw 81 Lee 115 Pontotoc 161 Yalobusha |
| 19 Choctaw 87 Lowndes 117 Prentiss |
| 25 Clay 93 Marshall 137 Tate |

### Survey Unit Code: 3
**Survey Unit Name:** Central

| County code and county name |
|-----------------------------|
| 7 Attala 75 Lauderdale 103 Noxubee 129 Smith |
| 23 Clarke 79 Leake 121 Rankin 159 Winston |
| 61 Jasper 99 Neshoba 123 Scott |
| 69 Kemper 101 Newton 127 Simpson |

### Survey Unit Code: 4
**Survey Unit Name:** South

| County code and county name |
|-----------------------------|
| 31 Covington 47 Harrison 77 Lawrence 147 Walthall |
| 35 Forrest 59 Jackson 91 Marion 153 Wayne |
| 39 George 65 Jefferson Davis 109 Pearl River |
| 41 Greene 67 Jones 111 Perry |
| 45 Hancock 73 Lamar 131 Stone |

### Survey Unit Code: 5
**Survey Unit Name:** Southwest

| County code and county name |
|-----------------------------|
| 1 Adams 29 Copiah 63 Jefferson 113 Pike |
| 5 Amite 37 Franklin 85 Lincoln 157 Wilkinson |
| 21 Claiborne 49 Hinds 89 Madison |
### State Code: 29  |  State Name: Missouri  |  State Abbreviation: MO  |  Region/Station Code: 23

#### Survey Unit Code: 1  |  Survey Unit Name: Eastern Ozarks

| County code and county name |
|-----------------------------|
| 17  | Bollinger  | 65  | Dent  | 179 | Reynolds  | 221 | Washington  |
| 23  | Butler  | 93  | Iron  | 181 | Ripley  | 223 | Wayne  |
| 35  | Carter  | 123 | Madison  | 187 | St. Francois  |
| 55  | Crawford  | 149 | Oregon  | 203 | Shannon  |

#### Survey Unit Code: 2  |  Survey Unit Name: Southwestern Ozarks

| County code and county name |
|-----------------------------|
| 9  | Barry  | 91 | Howell  | 153 | Ozark  | 215 | Texas  |
| 43  | Christian  | 119 | McDonald  | 209 | Stone  | 225 | Webster  |
| 67  | Douglas  | 145 | Newton  | 213 | Taney  | 229 | Wright  |

#### Survey Unit Code: 3  |  Survey Unit Name: Northwestern Ozarks

| County code and county name |
|-----------------------------|
| 15  | Benton  | 85 | Hickory  | 141 | Morgan  | 185 | St. Clair  |
| 29  | Camden  | 105 | Laclede  | 161 | Phelps  |
| 39  | Cedar  | 125 | Maries  | 167 | Polk  |
| 59  | Dallas  | 131 | Miller  | 169 | Pulaski  |

#### Survey Unit Code: 4  |  Survey Unit Name: Prairie

| County code and county name |
|-----------------------------|
| 1  | Adair  | 53 | Cooper  | 107 | Lafayette  | 171 | Putnam  |
| 3  | Andrew  | 57 | Dade  | 109 | Lawrence  | 173 | Ralls  |
| 5  | Atchison  | 61 | Daviess  | 111 | Lewis  | 175 | Randolph  |
| 7  | Audrain  | 63 | DeKalb  | 113 | Lincoln  | 177 | Ray  |
| 11  | Barton  | 75 | Gentry  | 115 | Linn  | 195 | Saline  |
| 13  | Bates  | 77 | Greene  | 117 | Livingston  | 197 | Schuyler  |
| 21  | Buchanan  | 79 | Grundy  | 121 | Macon  | 199 | Scotland  |
| 25  | Caldwell  | 81 | Harrison  | 127 | Marion  | 205 | Shelby  |
| 33  | Carroll  | 83 | Henry  | 129 | Mercer  | 211 | Sullivan  |
| 37  | Cass  | 87 | Holt  | 137 | Monroe  | 217 | Vernon  |
| 41  | Chariton  | 95 | Jackson  | 147 | Nodaway  | 227 | Worth  |
| 45  | Clark  | 97 | Jasper  | 159 | Pettis  |
| 47  | Clay  | 101 | Johnson  | 163 | Pike  |
| 49  | Clinton  | 103 | Knox  | 165 | Platte  |

#### Survey Unit Code: 5  |  Survey Unit Name: Riverborder

| County code and county name |
|-----------------------------|
| 19  | Boone  | 73 | Gasconade  | 143 | New Madrid  | 189 | St. Louis  |
| 27  | Callaway  | 89 | Howard  | 151 | Osage  | 201 | Scott  |
| 31  | Cape Girardeau  | 99 | Jefferson  | 155 | Pemiscot  | 207 | Stoddard  |
| 51  | Cole  | 133 | Mississippi  | 157 | Perry  | 219 | Warren  |
| 69  | Dunklin  | 135 | Moniteau  | 183 | St. Charles  | 510 | St. Louis city  |
| 71  | Franklin  | 139 | Montgomery  | 186 | Ste. Genevieve  |
| State Code: | 30 | State Name: | Montana | State Abbreviation: | MT | Region/Station Code: | 22 |
|---|---|---|---|---|---|---|---|

**Survey Unit Code: 1**  
**Survey Unit Name:** Northwestern  
**County code and county name**

| 29 | Flathead | 47 | Lake | 53 | Lincoln | 89 | Sanders |

**Survey Unit Code: 2**  
**Survey Unit Name:** Eastern  
**County code and county name**

| 3  | Big Horn | 27 | Fergus | 71 | Phillips | 95 | Stillwater |
| 5  | Blaine   | 33 | Garfield | 73 | Pondera  | 97 | Sweet Grass |
| 9  | Carbon   | 35 | Glacier  | 75 | Powder River | 99 | Teton |
| 11 | Carter   | 37 | Golden Valley | 79 | Prairie  | 101 | Toole |
| 15 | Chouteau | 41 | Hill     | 83 | Richland | 103 | Treasure |
| 17 | Custer   | 51 | Liberty  | 85 | Roosevelt | 105 | Valley |
| 19 | Daniels  | 55 | McConel | 87 | Rosebud  | 109 | Wibaux |
| 21 | Dawson   | 65 | Musselshell | 91 | Sheridan | 111 | Yellowstone |
| 25 | Fallon   | 69 | Petroleum |

**Survey Unit Code: 3**  
**Survey Unit Name:** Western  
**County code and county name**

| 39 | Granite | 61 | Mineral | 63 | Missoula | 81 | Ravalli |

**Survey Unit Code: 4**  
**Survey Unit Name:** West Central  
**County code and county name**

| 7  | Broadwater | 43 | Jefferson | 49 | Lewis and Clark | 77 | Powell |
| 13 | Cascade    | 45 | Judith Basin | 59 | Meagher  | 107 | Wheatland |

**Survey Unit Code: 5**  
**Survey Unit Name:** Southwestern  
**County code and county name**

| 1  | Beaverhead | 31 | Gallatin | 67 | Park |
| 23 | Deer Lodge | 57 | Madison  | 93 | Silver Bow |
| State Code: | 31 | State Name: | Nebraska | State Abbreviation: | NE | Region/Station Code: | 23 |
|------------|----|-------------|-----------|---------------------|----|----------------------|----|

### Survey Unit Code: 1
#### Survey Unit Name: Eastern

| Survey Code | County Code | County Name   | Survey Code | County Code | County Name   |
|-------------|-------------|---------------|-------------|-------------|---------------|
| 1           | 1           | Adams         | 55          | Douglas     | 99            | Kearney      | 151          | Saline       |
| 11          | 59          | Boone         | 61          | Fillmore    | 119           | Madison      | 155          | Saunders     |
| 19          | 63          | Burt          | 65          | Frontier    | 121           | Merrick      | 159          | Seward       |
| 23          | 67          | Butler        | 69          | Furnas      | 125           | Nance        | 163          | Sherman      |
| 25          | 73          | Cass          | 77          | Gage        | 127           | Nemaha       | 167          | Stanton      |
| 27          | 73          | Cedar         | 77          | Gosper      | 129           | Nuckolls     | 169          | Thayer       |
| 35          | 77          | Clay          | 77          | Greeley     | 131           | Otoe         | 173          | Thurston     |
| 37          | 79          | Colfax        | 81          | Hamiton     | 137           | Phelps       | 177          | Washington   |
| 39          | 83          | Cuming        | 83          | Harlan      | 139           | Pierce       | 179          | Wayne        |
| 43          | 87          | Dakota        | 87          | Hitchcock   | 141           | Platte       | 181          | Webster      |
| 47          | 93          | Dawson        | 93          | Howard      | 143           | Polk         | 185          | York         |
| 51          | 95          | Dixon         | 97          | Johnson     | 147           | Richardson   |              |             |

### Survey Unit Code: 2
#### Survey Unit Name: Western

| Survey Code | County Code | County Name   | Survey Code | County Code | County Name   |
|-------------|-------------|---------------|-------------|-------------|---------------|
| 3           | 33          | Antelope      | 33          | Cheyenne    | 91            | Hooker       | 123          | Morrill      |
| 5           | 45          | Arthur        | 45          | Dawes       | 101           | Keith        | 135          | Perkins      |
| 7           | 49          | Banner        | 49          | Deuel       | 103           | Keya Paha    | 149          | Rock         |
| 9           | 57          | Blaine        | 57          | Dundy       | 105           | Kimball      | 157          | Scotts Bluff |
| 13          | 69          | Box Butte     | 69          | Garden      | 107           | Knox         | 161          | Sheridan     |
| 15          | 71          | Boyd          | 71          | Garfield    | 111           | Lincoln      | 165          | Sioux        |
| 17          | 75          | Brown         | 75          | Grant       | 113           | Logan        | 171          | Thomas       |
| 29          | 85          | Chase         | 85          | Hayes       | 115           | Loup         | 183          | Wheeler      |
| 31          | 89          | Cherry        | 89          | Holt        | 117           | McPherson    |              |             |
### State Code: 32  State Name: Nevada  State Abbreviation: NV  Region/Station Code: 22

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|----------------------------|
| 1                | Nevada           |                            |
|                  |                  | 1  Churchill               |
|                  |                  | 11 Eureka                  |
|                  |                  | 21 Mineral                 |
|                  |                  | 33 White Pine              |
|                  |                  | 3 Clark                    |
|                  |                  | 13 Humboldt                |
|                  |                  | 23 Nye                     |
|                  |                  | 510 Carson City            |
|                  |                  | 5 Douglas                  |
|                  |                  | 15 Lander                  |
|                  |                  | 27 Pershing                |
|                  |                  | 7 Elko                     |
|                  |                  | 17 Lincoln                 |
|                  |                  | 29 Storey                  |
|                  |                  | 9 Esmeralda                |
|                  |                  | 19 Lyon                    |
|                  |                  | 31 Washoe                  |

### State Code: 33  State Name: New Hampshire  State Abbreviation: NH  Region/Station Code: 24

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|----------------------------|
| 2                | Northern         |                            |
|                  |                  | 3 Carroll                  |
|                  |                  | 7 Coos                     |
|                  |                  | 9 Grafton                  |
| 3                | Southern         |                            |
|                  |                  | 1 Belknap                  |
|                  |                  | 11 Hillsborough            |
|                  |                  | 15 Rockingham              |
|                  |                  | 19 Sullivan                |
|                  |                  | 5 Cheshire                 |
|                  |                  | 13 Merrimack               |
|                  |                  | 17 Strafford               |
### New Jersey

| State Code | State Name  | State Abbreviation | Region/Station Code |
|------------|-------------|--------------------|-------------------|
| 34         | New Jersey  | NJ                 | 24                |

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|-------------------|-----------------------------|
| 1                | New Jersey        | 1  Atlantic 13 Essex 25 Monmouth 37 Sussex 3 Berg 15 Gloucester 27 Morris 39 Union 5 Burlington 17 Hudson 29 Ocean 41 Warren 7 Camden 19 Hunterdon 31 Passaic 9 Cape May 21 Mercer 33 Salem 11 Cumberland 23 Middlesex 35 Somerset |

### New Mexico

| State Code | State Name  | State Abbreviation | Region/Station Code |
|------------|-------------|--------------------|-------------------|
| 35         | New Mexico  | NM                 | 22                |

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|-------------------|-----------------------------|
| 1                | Northwestern      | 1  Bernalillo 31 McKinley 45 San Juan 61 Valencia 6 Cibola 39 Rio Arriba 49 Santa Fe 28 Los Alamos 43 Sandoval 55 Taos |
| 2                | Northeastern      | 7  Colfax 21 Harding 37 Quay 57 Torrance 19 Guadalupe 33 Mora 47 San Miguel 59 Union |
| 3                | Southwestern      | 3  Catron 17 Grant 29 Luna 53 Socorro 13 Dona Ana 23 Hidalgo 51 Sierra |
| 4                | Southeastern      | 5  Chaves 11 De Baca 25 Lea 35 Otero 9 Curry 15 Eddy 27 Lincoln 41 Roosevelt |
| State Code: 36 | State Name: New York | State Abbreviation: NY | Region/Station Code: 24 |
|---------------|----------------------|------------------------|------------------------|

| Survey Unit Code: 1 | Survey Unit Name: Adirondack |
|---------------------|-----------------------------|
| County code and county name |
| 19 Clinton | 33 Franklin | 45 Jefferson | 89 St. Lawrence |

| Survey Unit Code: 2 | Survey Unit Name: Lake Plain |
|---------------------|-----------------------------|
| County code and county name |
| 11 Cayuga | 53 Madison | 69 Ontario | 117 Wayne |
| 29 Erie | 55 Monroe | 73 Orleans | 121 Wyoming |
| 37 Genesee | 63 Niagara | 75 Oswego | 123 Yates |
| 51 Livingston | 67 Onondaga | 99 Seneca |

| Survey Unit Code: 3 | Survey Unit Name: Western Adirondack |
|---------------------|-----------------------------|
| County code and county name |
| 35 Fulton | 43 Herkimer | 49 Lewis | 65 Oneida |

| Survey Unit Code: 4 | Survey Unit Name: Eastern Adirondack |
|---------------------|-----------------------------|
| County code and county name |
| 31 Essex | 41 Hamilton | 113 Warren |

| Survey Unit Code: 5 | Survey Unit Name: Southwest Highlands |
|---------------------|-----------------------------|
| County code and county name |
| 3 Allegany | 9 Cattaraugus | 13 Chautauqua | 101 Steuben |

| Survey Unit Code: 6 | Survey Unit Name: South-Central Highlands |
|---------------------|-----------------------------|
| County code and county name |
| 7 Broome | 23 Cortland | 97 Schuyler |
| 15 Chemung | 25 Delaware | 107 Tioga |
| 17 Chenango | 77 Otsego | 109 Tompkins |

| Survey Unit Code: 7 | Survey Unit Name: Capitol District |
|---------------------|-----------------------------|
| County code and county name |
| 1 Albany | 57 Montgomery | 91 Saratoga | 115 Washington |
| 21 Columbia | 83 Rensselaer | 93 Schenectady |

| Survey Unit Code: 8 | Survey Unit Name: Catskill-Lower Hudson |
|---------------------|-----------------------------|
| County code and county name |
| 5 Bronx | 59 Nassau | 81 Queens | 103 Suffolk |
| 27 Dutchess | 61 New York | 85 Richmond | 105 Sullivan |
| 39 Greene | 71 Orange | 87 Rockland | 111 Ulster |
| 47 Kings | 79 Putnam | 95 Schoharie | 119 Westchester |
## State Code: 37  
**State Name:** North Carolina  
**State Abbreviation:** NC  
**Region/Station Code:** 33

### Survey Unit Code: 1  
**Survey Unit Name:** Southern Coastal Plain

| County code and county name       |
|-----------------------------------|
| 17 Bladen  85 Harnett  125 Moore  163 Sampson |
| 19 Brunswick  93 Hoke  129 New Hanover  165 Scotland |
| 47 Columbus  101 Johnston  133 Onslow  191 Wayne |
| 51 Cumberland  103 Jones  141 Pender |
| 61 Duplin  105 Lee  153 Richmond |
| 79 Greene  107 Lenoir  155 Robeson |

### Survey Unit Code: 2  
**Survey Unit Name:** Northern Coastal Plain

| County code and county name       |
|-----------------------------------|
| 13 Beaufort  53 Currituck  95 Hyde  143 Perquimans |
| 15 Bertie  55 Dare  117 Martin  147 Pitt |
| 29 Camden  65 Edgecombe  127 Nash  177 Tyrrell |
| 31 Carteret  73 Gates  131 Northampton  187 Washington |
| 41 Chowan  83 Halifax  137 Pamlico  195 Wilson |
| 49 Craven  91 Hertford  139 Pasquotank |

### Survey Unit Code: 3  
**Survey Unit Name:** Piedmont

| County code and county name       |
|-----------------------------------|
| 1 Alamance  59 Davie  119 Mecklenburg  167 Stanly |
| 3 Alexander  63 Durham  123 Montgomery  169 Stokes |
| 7 Anson  67 Forsyth  135 Orange  171 Surry |
| 25 Cabarrus  69 Franklin  145 Person  179 Union |
| 33 Caswell  71 Gaston  149 Polk  181 Vance |
| 35 Catawba  77 Granville  151 Randolph  183 Wake |
| 37 Chatham  81 Guilford  157 Rockingham  185 Warren |
| 45 Cleveland  97 Iredell  159 Rowan  197 Yadkin |
| 57 Davidson  109 Lincoln  161 Rutherford |

### Survey Unit Code: 4  
**Survey Unit Name:** Mountains

| County code and county name       |
|-----------------------------------|
| 5 Alleghany  39 Cherokee  111 McDowell  189 Watauga |
| 9 Ashe  43 Clay  113 Macon  193 Wilkes |
| 11 Avery  75 Graham  115 Madison  199 Yancey |
| 21 Buncombe  87 Haywood  121 Mitchell |
| 23 Burke  89 Henderson  173 Swain |
| 27 Caldwell  99 Jackson  175 Transylvania |
### State Code: 38  State Name: North Dakota  State Abbreviation: ND  Region/Station Code: 23

#### Survey Unit Code: 1  Survey Unit Name: Eastern

| County code | County name        |
|-------------|--------------------|
| 1           | Adams              |
| 2           | Emmons             |
| 3           | Barnes             |
| 4           | Foster             |
| 5           | Benson             |
| 6           | Golden Valley      |
| 7           | Billings           |
| 8           | Grand Forks        |
| 9           | Bottineau          |
| 10          | Grant              |
| 11          | Bowman             |
| 12          | Griggs             |
| 13          | Burke              |
| 14          | Hettinger          |
| 15          | Burleigh           |
| 16          | Kidder             |
| 17          | Cass               |
| 18          | LaMoure            |
| 19          | Cavalier           |
| 20          | Logan              |
| 21          | Dickey             |
| 22          | McHenry            |
| 23          | Divide             |
| 24          | McIntosh           |
| 25          | Dunn               |
| 26          | McKenzie           |
| 27          | Eddy               |
| 28          | McLean             |
| State Code: | 39  | State Name: | Ohio | State Abbreviation: | OH | Region/Station Code: | 24 |
|-------------|-----|-------------|------|---------------------|----|---------------------|----|

**Survey Unit Code: 1**  
Survey Unit Name: South-Central

| County code and county name |
|----------------------------|
| 1  | Adams | 53  | Gallia | 87  | Lawrence | 145  | Scioto |
| 15 | Brown | 71  | Highland | 131  | Pike |
| 25 | Clermont | 79  | Jackson | 141  | Ross |

**Survey Unit Code: 2**  
Survey Unit Name: Southeastern

| County code and county name |
|----------------------------|
| 9  | Athens | 105  | Meigs | 127  | Perry | 167  | Washington |
| 73 | Hocking | 115  | Morgan | 163  | Vinton |

**Survey Unit Code: 3**  
Survey Unit Name: East-Central

| County code and county name |
|----------------------------|
| 13 | Belmont | 59  | Guernsey | 81  | Jefferson | 121  | Noble |
| 19 | Carroll | 67  | Harrison | 111  | Monroe | 157  | Tuscarawas |
| 31 | Coshocton | 75  | Holmes | 119  | Muskingum |

**Survey Unit Code: 4**  
Survey Unit Name: Northeastern

| County code and county name |
|----------------------------|
| 5  | Ashland | 55  | Geauga | 103  | Medina | 155  | Trumbull |
| 7  | Ashtabula | 77  | Huron | 133  | Portage | 169  | Wayne |
| 29 | Columbiana | 85  | Lake | 139  | Richland |
| 35 | Cuyahoga | 93  | Lorain | 151  | Stark |
| 43 | Erie | 99  | Mahoning | 153  | Summit |

**Survey Unit Code: 5**  
Survey Unit Name: Southwestern

| County code and county name |
|----------------------------|
| 17 | Butler | 45  | Fairfield | 61  | Hamilton | 113  | Montgomery |
| 23 | Clark | 47  | Fayette | 89  | Licking | 129  | Pickaway |
| 27 | Clinton | 49  | Franklin | 97  | Madison | 135  | Preble |
| 37 | Darke | 57  | Greene | 109  | Miami | 165  | Warren |

**Survey Unit Code: 6**  
Survey Unit Name: Northwestern

| County code and county name |
|----------------------------|
| 3  | Allen | 63  | Hancock | 107  | Mercer | 149  | Shelby |
| 11 | Auglaize | 65  | Hardin | 117  | Morrow | 159  | Union |
| 21 | Champaign | 69  | Henry | 123  | Ottawa | 161  | Van Wert |
| 33 | Crawford | 83  | Knox | 125  | Paulding | 171  | Williams |
| 39 | Defiance | 91  | Logan | 137  | Putnam | 173  | Wood |
| 41 | Delaware | 95  | Lucas | 143  | Sandusky | 175  | Wyandot |
| 51 | Fulton | 101  | Marion | 147  | Seneca |
| State Code | State Name | State Abbreviation | Region/Station Code | Survey Unit Code | Survey Unit Name | County code and county name |
|------------|------------|--------------------|---------------------|------------------|------------------|-----------------------------|
| 40         | Oklahoma   | OK                 | 33                  | Survey Unit Code | Survey Unit Name | County code and county name |
|            |            |                    |                     | 1                | Southeast        | 5 Atoka 29 Coal 79 Le Flore 127 Pushmataha |
|            |            |                    |                     | 2                | Northeast        | 1 Adair 41 Delaware 97 Mayes 115 Ottawa |
|            |            |                    |                     | 3                | Northcentral     | 35 Craig 113 Osage 131 Rogers 145 Wagoner |
|            |            |                    |                     | 4                | Southcentral     | 19 Carter 81 Lincoln 95 Marshall 111 Okmulgee |
|            |            |                    |                     | 5                | Southwest        | 9 Beckham 33 Cotton 57 Harmon 129 Roger Mills |
|            |            |                    |                     | 6                | High Plains      | 7 Beaver 45 Ellis 59 Harper 139 Texas |
|            |            |                    |                     | 7                | Great Plains     | 3 Alfalfa 53 Grant 93 Major 151 Woods |

*Survey data for Oklahoma:*

- **Survey Unit Code: 1** Survey Unit Name: Southeast
  - County code and county name: 5 Atoka, 29 Coal, 79 Le Flore, 127 Pushmataha

- **Survey Unit Code: 2** Survey Unit Name: Northeast
  - County code and county name: 1 Adair, 41 Delaware, 97 Mayes, 115 Ottawa

- **Survey Unit Code: 3** Survey Unit Name: Northcentral
  - County code and county name: 35 Craig, 113 Osage, 131 Rogers, 145 Wagoner

- **Survey Unit Code: 4** Survey Unit Name: Southcentral
  - County code and county name: 19 Carter, 81 Lincoln, 95 Marshall, 111 Okmulgee

- **Survey Unit Code: 5** Survey Unit Name: Southwest
  - County code and county name: 9 Beckham, 33 Cotton, 57 Harmon, 129 Roger Mills

- **Survey Unit Code: 6** Survey Unit Name: High Plains
  - County code and county name: 7 Beaver, 45 Ellis, 59 Harper, 139 Texas

- **Survey Unit Code: 7** Survey Unit Name: Great Plains
  - County code and county name: 3 Alfalfa, 53 Grant, 93 Major, 151 Woods

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|----------------------------|
| 0                | Northwest        | 5 Clackamas 27 Hood River 53 Polk 71 Yamhill |
|                  |                  | 7 Clatsop 47 Marion 57 Tillamook |
|                  |                  | 9 Columbia 51 Multnomah 67 Washington |
| 1                | West Central     | 3 Benton 39 Lane 41 Lincoln 43 Linn |
| 2                | Southwest        | 11 Coos 19 Douglas 33 Josephine |
|                  |                  | 15 Curry 29 Jackson |
| 3                | Central          | 13 Crook 31 Jefferson 55 Sherman |
|                  |                  | 17 Deschutes 35 Klamath 65 Wasco |
|                  |                  | 21 Gilliam 37 Lake 69 Wheeler |
| 4                | Blue Mountains   | 1 Baker 25 Harney 49 Morrow 61 Union |
|                  |                  | 23 Grant 45 Malheur 59 Umatilla 63 Wallowa |
| State Code: 42 | State Name: Pennsylvania | State Abbreviation: PA | Region/Station Code: 24 |
|---|---|---|---|
| **Survey Unit Code** | **Survey Unit Name** | **County code and county name** |
| 0 | South Central | 43 Dauphin 61 Huntingdon 99 Perry 55 Franklin 67 Juniata 109 Snyder 57 Fulton 87 Mifflin 119 Union |
| 5 | Western | 3 Allegheny 19 Butler 59 Greene 85 Mercer 5 Armstrong 39 Crawford 63 Indiana 125 Washington 7 Beaver 49 Erie 73 Lawrence 129 Westmoreland |
| 6 | North Central/Allegheny | 23 Cameron 35 Clinton 81 Lycoming 117 Tioga 27 Centre 47 Elk 83 McKeen 121 Venango 31 Clarion 53 Forest 105 Potter 123 Warren 33 Clearfield 65 Jefferson 113 Sullivan |
| 7 | Southwestern | 9 Bedford 21 Cambria 111 Somerset 13 Blair 51 Fayette |
| 8 | Northeastern/Pocono | 15 Bradford 79 Luzerne 103 Pike 131 Wyoming 25 Carbon 89 Monroe 107 Schuylkill 37 Columbia 93 Montour 115 Susquehanna 69 Lackawanna 97 Northumberland 127 Wayne |
| 9 | Southeastern | 1 Adams 41 Cumberland 77 Lehigh 133 York 11 Berks 45 Delaware 91 Montgomery 17 Bucks 71 Lancaster 95 Northampton 29 Chester 75 Lebanon 101 Philadelphia |

| State Code: 44 | State Name: Rhode Island | State Abbreviation: RI | Region/Station Code: 24 |
|---|---|---|---|
| **Survey Unit Code** | **Survey Unit Name** | **County code and county name** |
| 1 | Rhode Island | 1 Bristol 5 Newport 9 Washington 3 Kent 7 Providence |
### State Code: 45  South Carolina  SC  Region/Station Code: 33

#### Survey Unit Code: 1  Survey Unit Name: Southern Coastal Plain

| State Code | State Name | State Abbreviation | Survey Unit Code | Survey Unit Name | County code and county name |
|------------|------------|--------------------|------------------|------------------|-----------------------------|
| 3          | Aiken      | SC                 | 1                | Southern Coastal Plain | 3  Aiken 11 Barnwell 29 Colleton 53 Jasper |
| 5          | Allendale  | SC                 | 1                | Southern Coastal Plain | 5  Allendale 13 Beaufort 35 Dorchester 63 Lexington |
| 9          | Bamberg    | SC                 | 1                | Southern Coastal Plain | 9  Bamberg 17 Calhoun 49 Hampton 75 Orangeburg |

#### Survey Unit Code: 2  Survey Unit Name: Northern Coastal Plain

| State Code | State Name | State Abbreviation | Survey Unit Code | Survey Unit Name | County code and county name |
|------------|------------|--------------------|------------------|------------------|-----------------------------|
| 15         | Berkeley  | SC                 | 2                | Northern Coastal Plain | 15 Berkeley 31 Darlington 51 Horry 69 Marlboro |
| 19         | Charleston| SC                 | 2                | Northern Coastal Plain | 19 Charleston 33 Dillon 55 Kershaw 79 Richland |
| 25         | Chesterfield | SC            | 2                | Northern Coastal Plain | 25 Chesterfield 41 Florence 61 Lee 85 Sumter |
| 27         | Clarendon | SC                 | 2                | Northern Coastal Plain | 27 Clarendon 43 Georgetown 67 Marion 89 Williamsburg |

#### Survey Unit Code: 3  Survey Unit Name: Piedmont

| State Code | State Name | State Abbreviation | Survey Unit Code | Survey Unit Name | County code and county name |
|------------|------------|--------------------|------------------|------------------|-----------------------------|
| 1          | Abbeville | SC                 | 3                | Piedmont         | 1 Abbeville 39 Fairfield 65 McCormick 83 Spartanburg |
| 7          | Anderson  | SC                 | 3                | Piedmont         | 7 Anderson 45 Greenville 71 Newberry 87 Union |
| 21         | Cherokee | SC                 | 3                | Piedmont         | 21 Cherokee 47 Greenwood 73 Oconee 91 York |
| 23         | Chester  | SC                 | 3                | Piedmont         | 23 Chester 57 Lancaster 77 Pickens |
| 37         | Edgefield | SC               | 3                | Piedmont         | 37 Edgefield 59 Laurens 81 Saluda |

### State Code: 46  South Dakota  SD  Region/Station Code: 23

#### Survey Unit Code: 1  Survey Unit Name: Eastern

| State Code | State Name | State Abbreviation | Survey Unit Code | Survey Unit Name | County code and county name |
|------------|------------|--------------------|------------------|------------------|-----------------------------|
| 3          | Aurora    | SD                 | 1                | Eastern          | 3 Aurora 37 Day 71 Jackson 107 Potter |
| 5          | Beadle    | SD                 | 1                | Eastern          | 5 Beadle 39 Deuel 73 Jerauld 109 Roberts |
| 7          | Bennett   | SD                 | 1                | Eastern          | 7 Bennett 41 Dewey 75 Jones 111 Sanborn |
| 9          | Bon Homme | SD                 | 1                | Eastern          | 9 Bon Homme 43 Douglas 77 Kingsbury 115 Spink |
| 11         | Brookings | SD                 | 1                | Eastern          | 11 Brookings 45 Edmunds 79 Lake 117 Stanley |
| 13         | Brown     | SD                 | 1                | Eastern          | 13 Brown 49 Faulk 83 Lincoln 119 Sully |
| 15         | Brule     | SD                 | 1                | Eastern          | 15 Brule 51 Grant 85 Lyman 121 Todd |
| 17         | Buffalo  | SD                 | 1                | Eastern          | 17 Buffalo 53 Gregory 87 McCook 123 Tripp |
| 21         | Campbell | SD                 | 1                | Eastern          | 21 Campbell 55 Haakon 89 McPherson 125 Turner |
| 23         | Charles Mix | SD            | 1                | Eastern          | 23 Charles Mix 57 Hamlin 91 Marshall 127 Union |
| 25         | Clark    | SD                 | 1                | Eastern          | 25 Clark 59 Hand 95 Mellette 129 Walworth |
| 27         | Clay     | SD                 | 1                | Eastern          | 27 Clay 61 Hanson 97 Miner 135 Yankton |
| 29         | Codington | SD                | 1                | Eastern          | 29 Codington 65 Hughes 99 Minnehaha 137 Ziebach |
| 31         | Corson   | SD                 | 1                | Eastern          | 31 Corson 67 Hutchinson 101 Moody |
| 35         | Davison  | SD                 | 1                | Eastern          | 35 Davison 69 Hyde 105 Perkins |

#### Survey Unit Code: 2  Survey Unit Name: Western

| State Code | State Name | State Abbreviation | Survey Unit Code | Survey Unit Name | County code and county name |
|------------|------------|--------------------|------------------|------------------|-----------------------------|
| 19         | Butte     | SD                 | 2                | Western          | 19 Butte 47 Fall River 81 Lawrence 103 Pennington |
| 33         | Custer    | SD                 | 2                | Western          | 33 Custer 63 Harding 93 Meade 113 Shannon |
| Survey Unit Code | Survey Unit Name         | State Code: 47 | State Name: Tennessee | State Abbreviation: TN | Region/Station Code: 33 |
|------------------|--------------------------|----------------|----------------------|------------------------|------------------------|

### West

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|-----------------------------|
| 17               | Carroll          | 53 Gibson                   |
|                  |                  | 95 Lake                     |
|                  |                  | 157 Shelby                  |
| 23               | Chester          | 69 Hardeman                 |
|                  |                  | 97 Lauderdale               |
|                  |                  | 167 Tipton                  |
| 33               | Crockett         | 75 Haywood                  |
|                  |                  | 109 McNairy                 |
|                  |                  | 183 Weakley                 |
| 45               | Dyer             | 77 Henderson                |
|                  |                  | 113 Madison                 |
| 47               | Fayette          | 79 Henry                    |
|                  |                  | 131 Obion                   |

### West Central

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|-----------------------------|
| 5                | Benton           | 81 Hickman                 |
|                  |                  | 99 Lawrence                 |
|                  |                  | 161 Stewart                 |
| 39               | Decatur          | 83 Houston                 |
|                  |                  | 101 Lewis                   |
|                  |                  | 181 Wayne                   |
| 71               | Hardin           | 85 Humphreys                |
|                  |                  | 135 Perry                   |

### Central

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|-----------------------------|
| 3                | Bedford          | 41 DeKalb                  |
|                  |                  | 117 Marshall                |
|                  |                  | 159 Smith                   |
| 15               | Cannon           | 43 Dickson                 |
|                  |                  | 119 Maury                   |
|                  |                  | 165 Sumner                  |
| 21               | Cheatham         | 55 Giles                   |
|                  |                  | 125 Montgomery              |
|                  |                  | 169 Trousdale               |
| 27               | Clay             | 87 Jackson                 |
|                  |                  | 127 Moore                   |
|                  |                  | 187 Williamson              |
| 31               | Coffee           | 103 Lincoln                |
|                  |                  | 147 Robertson               |
|                  |                  | 189 Wilson                  |
| 37               | Davidson         | 111 Macon                  |
|                  |                  | 149 Rutherford              |

### Plateau

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|-----------------------------|
| 7                | Bledsoe          | 51 Franklin                |
|                  |                  | 133 Overton                 |
|                  |                  | 153 Sequatchie              |
| 13               | Campbell         | 61 Grundy                  |
|                  |                  | 137 Pickett                 |
|                  |                  | 175 Van Buren               |
| 35               | Cumberland       | 115 Marion                 |
|                  |                  | 141 Putnam                  |
|                  |                  | 177 Warren                  |
| 49               | Fentress         | 129 Morgan                 |
|                  |                  | 151 Scott                   |
|                  |                  | 185 White                   |

### East

| Survey Unit Code | Survey Unit Name | County code and county name |
|------------------|------------------|-----------------------------|
| 1                | Anderson         | 59 Greene                   |
|                  |                  | 93 Knox                     |
|                  |                  | 145 Roane                   |
| 9                | Blount           | 63 Hamblen                  |
|                  |                  | 105 Loudon                  |
|                  |                  | 155 Sevier                  |
| 11               | Bradley          | 65 Hamilton                 |
|                  |                  | 107 McMinn                  |
|                  |                  | 163 Sullivan                |
| 19               | Carter           | 67 Hancock                 |
|                  |                  | 121 Meigs                   |
|                  |                  | 171 Unicoi                  |
| 25               | Claiborne        | 73 Hawkins                  |
|                  |                  | 123 Monroe                  |
|                  |                  | 173 Union                   |
| 29               | Cocke            | 89 Jefferson                |
|                  |                  | 139 Polk                    |
|                  |                  | 179 Washington              |
| 57               | Grainger         | 91 Johnson                  |
|                  |                  | 143 Rhea                    |
| State Code: 48 | State Name: Texas | State Abbreviation: TX | Region/Station Code: 33 |
|---------------|------------------|------------------------|-------------------------|

### Survey Unit Code: 1  
**Survey Unit Name:** Southeast

| County code and county name |  |
|----------------------------|---|
| 5  | Angelina 241 | Jasper 351 | Newton 455 | Trinity  |
| 71 | Chambers 245 | Jefferson 361 | Orange 457 | Tyler |
| 185 | Grimes 289 | Leon 373 | Polk 471 | Walker |
| 199 | Hardin 291 | Liberty 403 | Sabine 473 | Waller |
| 201 | Harris 313 | Madison 405 | San Augustine  |
| 225 | Houston 339 | Montgomery 407 | San Jacinto  |

### Survey Unit Code: 2  
**Survey Unit Name:** Northeast

| County code and county name |  |
|----------------------------|---|
| 1  | Anderson 183 | Gregg 365 | Panola 459 | Upshur |
| 37 | Bowie 203 | Harrison 387 | Red River 467 | Van Zandt |
| 63 | Camp 213 | Henderson 401 | Rusk 499 | Wood |
| 67 | Cass 313 | Marion 419 | Shelby  |
| 73 | Cherokee 343 | Morris 423 | Smith  |
| 159 | Franklin 347 | Nacogdoches 449 | Titus  |

### Survey Unit Code: 3  
**Survey Unit Name:** Northcentral

| County code and county name |  |
|----------------------------|---|
| 15 | Austin 121 | Denton 217 | Hill 337 | Montague |
| 21 | Bastrop 123 | De Witt 223 | Hopkins 349 | Navarro |
| 41 | Brazos 139 | Ellis 231 | Hunt 367 | Parker |
| 51 | Burleson 145 | Falls 237 | Jack 379 | Rains |
| 55 | Caldwell 147 | Fannin 251 | Johnson 395 | Robertson |
| 77 | Clay 149 | Fayette 257 | Kaufman 397 | Rockwall |
| 85 | Collin 161 | Freestone 277 | Lamar 439 | Tarrant |
| 89 | Colorado 175 | Goliad 285 | Lavaca 477 | Washington |
| 97 | Cooke 177 | Gonzales 287 | Lee 497 | Wise |
| 113 | Dallas 181 | Grayson 293 | Limestone 503 | Young |
| 119 | Delta 187 | Guadalupe 331 | Milam  |

### Survey Unit Code: 4  
**Survey Unit Name:** South

| County code and county name |  |
|----------------------------|---|
| 7  | Aransas 157 | Fort Bend 273 | Kleberg 427 | Starr |
| 13 | Atascosa 163 | Frio 283 | La Salle 469 | Victoria |
| 25 | Bee 167 | Galveston 297 | Live Oak 479 | Webb |
| 39 | Brazoria 215 | Hidalgo 311 | McMullen 481 | Wharton |
| 47 | Brooks 239 | Jackson 321 | Matagorda 489 | Willacy |
| 57 | Calhoun 247 | Jim Hogg 323 | Maverick 493 | Wilson |
| 61 | Cameron 249 | Jim Wells 355 | Nueces 505 | Zapata |
| 127 | Dimmit 255 | Karnes 391 | Refugio 507 | Zavala |
| 131 | Duval 261 | Kenedy 409 | San Patricio | Texas cont. |
Texas cont.

### Texas cont.

| Survey Unit Code: 5 | Survey Unit Name: Westcentral |
|---------------------|------------------------------|
| County code and county name |
| 19 Bandera 99 Coryell 267 Kimble 385 Real |
| 27 Bell 105 Crockett 271 Kinney 399 Runnels |
| 29 Bexar 133 Eastland 281 Lampasas 411 San Saba |
| 31 Blanco 137 Edwards 299 Llano 413 Schleicher |
| 35 Bosque 143 Erath 307 McCulloch 425 Somervell |
| 49 Brown 171 Gillespie 309 McLennan 429 Stephens |
| 53 Burnet 193 Hamilton 319 Mason 435 Sutton |
| 59 Callahan 209 Hays 325 Medina 453 Travis |
| 83 Coleman 221 Hood 327 Menard 463 Uvalde |
| 91 Comal 259 Kendall 333 Mills 465 Val Verde |
| 93 Comanche 265 Kerr 363 Palo Pinto 491 Williamson |
| 95 Concho |

### Survey Unit Code: 6 Survey Unit Name: Northwest

| County code and county name |
|-----------------------------|
| 3 Andrews 129 Donley 235 Irion 375 Potter |
| 9 Archer 151 Fisher 253 Jones 381 Randall |
| 11 Armstrong 153 Floyd 263 Kent 383 Reagan |
| 17 Bailey 155 Foard 269 King 393 Roberts |
| 23 Baylor 165 Gaines 275 Knox 415 Scurry |
| 33 Borden 169 Garza 279 Lamb 417 Shackelford |
| 45 Briscoe 173 Glasscock 295 Lipscomb 421 Sherman |
| 65 Carson 179 Gray 303 Lubbock 431 Sterling |
| 69 Castro 189 Hale 305 Lynn 433 Stonewall |
| 75 Childress 191 Hall 317 Martin 437 Swisher |
| 79 Cochran 195 Hansford 329 Midland 441 Taylor |
| 81 Coke 197 Hardeman 335 Mitchell 445 Terry |
| 87 Collingsworth 205 Hartley 341 Moore 447 Throckmorton |
| 101 Cottle 207 Haskell 345 Motley 451 Tom Green |
| 107 Crosby 211 Hemphill 353 Nolan 483 Wheeler |
| 111 Dallam 219 Hockley 357 Ochiltree 485 Wichita |
| 115 Dawson 227 Howard 359 Oldham 487 Wilbarger |
| 117 Deaf Smith 233 Hutchinson 369 Parmer 501 Yoakum |
| 125 Dickens |

### Survey Unit Code: 7 Survey Unit Name: West

| County code and county name |
|-----------------------------|
| 43 Brewster 141 El Paso 371 Pecos 461 Upton |
| 103 Crane 229 Husbeth 377 Presidio 475 Ward |
| 109 Culberson 243 Jeff Davis 389 Reeves 495 Winkler |
| 135 Ector 301 Loving 443 Terrell |
### Utah

**State Code:** 49  
**State Name:** Utah  
**State Abbreviation:** UT  
**Region/Station Code:** 22

| Survey Unit Code | Survey Unit Name  | County code and county name |
|------------------|-------------------|-----------------------------|
| 1                | Northern          |                             |
| 3                | Box Elder         | 39 Morgan                   |
| 5                | Cache             | 43 Summit                   |
| 11               | Davis             | 49 Utah                     |

| Survey Unit Code | Survey Unit Name |
|------------------|------------------|
| 2                | Uinta            |
| 9                | Daggett          |

| Survey Unit Code | Survey Unit Name  | County code and county name |
|------------------|-------------------|-----------------------------|
| 3                | Central           |                             |
| 23               | Juab              | 31 Piute                    |
| 27               | Millard           | 39 Sanpete                  |

| Survey Unit Code | Survey Unit Name  | County code and county name |
|------------------|-------------------|-----------------------------|
| 4                | Eastern           |                             |
| 7                | Carbon            | 15 Emery                    |

| Survey Unit Code | Survey Unit Name  | County code and county name |
|------------------|-------------------|-----------------------------|
| 5                | Southwestern      |                             |
| 1                | Beaver            | 21 Iron                     |
| 17               | Garfield          | 25 Kane                     |

### Vermont

**State Code:** 50  
**State Name:** Vermont  
**State Abbreviation:** VT  
**Region/Station Code:** 24

| Survey Unit Code | Survey Unit Name  | County code and county name |
|------------------|-------------------|-----------------------------|
| 2                | Northern          |                             |
| 5                | Caledonia         | 11 Franklin                 |
| 9                | Essex             | 13 Grand Isle               |

| Survey Unit Code | Survey Unit Name  | County code and county name |
|------------------|-------------------|-----------------------------|
| 3                | Southern          |
| 1                | Addison           |
| 3                | Bennington        |

| Survey Unit Code | Survey Unit Name  | County code and county name |
|------------------|-------------------|-----------------------------|
| 7                | Chittenden        |
| 25               | Windham           |
| 27               | Windsor           |
| State Code: 51 | State Name: Virginia | State Abbreviation: VA | Region/Station Code: 33 |
|----------------|----------------------|------------------------|--------------------------|
| Survey Unit Code: 1 | Survey Unit Name: Coastal Plain |  |
| County code and county name |  |
| 1 | Accomack | 85 | Hanover | 119 | Middlesex | 193 | Westmoreland |
| 25 | Brunswick | 87 | Henrico | 127 | New Kent | 199 | York |
| 33 | Caroline | 93 | Isle Of Wight | 131 | Northampton | 550 | Chesapeake city |
| 36 | Charles City | 95 | James City | 133 | Northumberland | 650 | Hampton city |
| 41 | Chesterfield | 97 | King And Queen | 149 | Prince George | 700 | Newport News city |
| 53 | Dinwiddie | 99 | King George | 159 | Richmond | 800 | Suffolk city |
| 57 | Essex | 101 | King William | 175 | Southampton | 810 | Virginia Beach city |
| 73 | Gloucester | 103 | Lancaster | 181 | Surry |
| 81 | Greensville | 115 | Mathews | 183 | Sussex |
| Survey Unit Code: 2 | Survey Unit Name: Southern Piedmont |  |
| County code and county name |  |
| 7 | Amelia | 37 | Charlotte | 111 | Lunenburg | 145 | Powhatan |
| 11 | Appomattox | 49 | Cumberland | 117 | Mecklenburg | 147 | Prince Edward |
| 19 | Bedford | 67 | Franklin | 135 | Nottoway |
| 29 | Buckingham | 83 | Halifax | 141 | Patrick |
| 31 | Campbell | 89 | Henry | 143 | Pittsylvania |
| Survey Unit Code: 3 | Survey Unit Name: Northern Piedmont |  |
| County code and county name |  |
| 3 | Albemarle | 61 | Fauquier | 109 | Louisa | 157 | Rappahannock |
| 9 | Amherst | 65 | Fluvanna | 113 | Madison | 177 | Spotsylvania |
| 13 | Arlington | 75 | Goochland | 125 | Nelson | 179 | Stafford |
| 47 | Culpeper | 79 | Greene | 137 | Orange |
| 59 | Fairfax | 107 | Loudoun | 153 | Prince William |
| Survey Unit Code: 4 | Survey Unit Name: Northern Mountains |  |
| County code and county name |  |
| 5 | Alleghany | 43 | Clarke | 139 | Page | 171 | Shenandoah |
| 15 | Augusta | 45 | Craig | 161 | Roanoke | 187 | Warren |
| 17 | Bath | 69 | Frederick | 163 | Rockbridge |
| 23 | Botetourt | 91 | Highland | 165 | Rockingham |
| Survey Unit Code: 5 | Survey Unit Name: Southern Mountains |  |
| County code and county name |  |
| 21 | Bland | 71 | Giles | 167 | Russell | 195 | Wise |
| 27 | Buchanan | 77 | Grayson | 169 | Scott | 197 | Wythe |
| 35 | Carroll | 105 | Lee | 173 | Smyth |
| 51 | Dickenson | 121 | Montgomery | 185 | Tazewell |
| 63 | Floyd | 155 | Pulaski | 191 | Washington |

Virginia cont.
Virginia cont.

**Cities aggregated into other counties**

| City code and city name | Associated county code and county name | City code and city name | Associated county code and county name |
|-------------------------|----------------------------------------|-------------------------|----------------------------------------|
| 510 Alexandria city     | 59 Fairfax                             | 683 Manassas city       | 153 Prince William                     |
| 515 Bedford city        | 19 Bedford                             | 685 Manassas Park city  | 153 Prince William                     |
| 520 Bristol city        | 191 Washington                         | 690 Martinsville city   | 89 Henry                               |
| 530 Buena Vista city    | 163 Rockbridge                         | 710 Norfolk city        | 550 Chesapeake City                    |
| 540 Charlottesville city| 3 Albemarle                            | 720 Norton city         | 195 Wise                               |
| 560 Clifton Forge city  | 5 Allegheny                            | 730 Petersburg city     | 53 Dinwiddie                           |
| 570 Colonial Heights city| 41 Chesterfield                       | 730 Petersburg city     | 149 Prince George                      |
| 580 Covington city      | 5 Allegheny                            | 735 Poquoson city       | 199 York                               |
| 590 Danville city       | 143 Pittsylvania                       | 740 Portsmouth city     | 550 Chesapeake City                    |
| 595 Emporia city        | 81 Greensville                         | 750 Radford city        | 121 Montgomery                         |
| 600 Fairfax city        | 59 Fairfax                             | 760 Richmond city       | 41 Chesterfield                        |
| 610 Falls Church city   | 59 Fairfax                             | 760 Richmond city       | 87 Henrico                             |
| 620 Franklin city       | 175 Southampton                        | 770 Roanoke city        | 161 Roanoke                            |
| 630 Fredericksburg city| 177 Spotsylvania                       | 775 Salem city          | 161 Roanoke                            |
| 640 Galax city          | 35 Carroll                             | 780 South Boston city   | 83 Halifax                             |
| 640 Galax city          | 77 Grayson                             | 790 Staunton city       | 15 Augusta                             |
| 660 Harrisonburg city   | 165 Rockingham                         | 820 Waynesboro city     | 15 Augusta                             |
| 670 Hopewell city       | 149 Prince George                      | 830 Williamsburg city   | 95 County of James City                |
| 678 Lexington city      | 163 Rockbridge                         | 840 Winchester city     | 69 Frederick                           |
| 680 Lynchburg city      | 31 Campbell                            |                         |                                        |
### State Code: 53  |  State Name: Washington  |  State Abbreviation: WA  |  Region/Station Code: 26

| Survey Unit Code | Survey Unit Name     | County code and county name |
|------------------|----------------------|-----------------------------|
| 5                | Puget Sound          | 29 Island, 35 Kitsap, 53 Pierce, 55 San Juan, 57 Skagit, 61 Snohomish, 73 Whatcom |
| 6                | Olympic Peninsula    | 9 Clallam, 31 Jefferson, 45 Mason, 67 Thurston |
| 7                | Southwest            | 11 Clark, 41 Lewis, 49 Pacific, 59 Skamania, 69 Wahkiakum |
| 8                | Central              | 7 Chelan, 37 Kittitas, 39 Klickitat, 47 Okanogan, 77 Yakima |
| 9                | Inland Empire        | 1 Adams, 19 Ferry, 21 Franklin, 23 Garfield, 25 Grant, 43 Lincoln, 51 Pend Oreille, 63 Spokane, 65 Stevens, 71 Walla Walla, 75 Whitman |

- **State Code:** 53
- **State Name:** Washington
- **State Abbreviation:** WA
- **Region/Station Code:** 26

| Survey Unit Code | Survey Unit Name     | County code and county name |
|------------------|----------------------|-----------------------------|
| 5                | Puget Sound          | 29 Island, 35 Kitsap, 53 Pierce, 55 San Juan, 57 Skagit, 61 Snohomish, 73 Whatcom |
| 6                | Olympic Peninsula    | 9 Clallam, 31 Jefferson, 45 Mason, 67 Thurston |
| 7                | Southwest            | 11 Clark, 41 Lewis, 49 Pacific, 59 Skamania, 69 Wahkiakum |
| 8                | Central              | 7 Chelan, 37 Kittitas, 39 Klickitat, 47 Okanogan, 77 Yakima |
| 9                | Inland Empire        | 1 Adams, 19 Ferry, 21 Franklin, 23 Garfield, 25 Grant, 43 Lincoln, 51 Pend Oreille, 63 Spokane, 65 Stevens, 71 Walla Walla, 75 Whitman |
## State Code: 54  State Name: West Virginia  State Abbreviation: WV  Region/Station Code: 24

### Survey Unit Code: 2  Survey Unit Name: Northeastern

| County code and county name |
|-----------------------------|
| 1  Barbour  31  Hardy  65  Morgan  91  Taylor |
| 3  Berkeley  33  Harrison  71  Pendleton  93  Tucker |
| 7  Braxton  37  Jefferson  75  Pocahontas  97  Upshur |
| 23  Grant  41  Lewis  77  Preston  101  Webster |
| 27  Hampshire  57  Mineral  83  Randolph |

### Survey Unit Code: 3  Survey Unit Name: Southern

| County code and county name |
|-----------------------------|
| 5  Boone  39  Kanawha  59  Mingo  89  Summers |
| 15  Clay  45  Logan  63  Monroe  109  Wyoming |
| 19  Fayette  47  McDowell  67  Nicholas |
| 25  Greenbrier  55  Mercer  81  Raleigh |

### Survey Unit Code: 4  Survey Unit Name: Northwestern

| County code and county name |
|-----------------------------|
| 9  Brooke  35  Jackson  69  Ohio  99  Wayne |
| 11  Cabell  43  Lincoln  73  Pleasants  103  Wetzel |
| 13  Calhoun  49  Marion  79  Putnam  105  Wirt |
| 17  Doddridge  51  Marshall  85  Ritchie  107  Wood |
| 21  Gilmer  53  Mason  87  Roane |
| 29  Hancock  61  Monongalia  95  Tyler |
### State Code: 55  State Name: Wisconsin  State Abbreviation: WI  Region/Station Code: 23

#### Survey Unit Code: 1  Survey Unit Name: Northeastern

| County code and county name |
|-----------------------------|
| 37 Florence 69 Lincoln 83 Oconto 125 Vilas |
| 41 Forest 75 Marinette 85 Oneida |
| 67 Langlade 78 Menominee 115 Shawano |

#### Survey Unit Code: 2  Survey Unit Name: Northwestern

| County code and county name |
|-----------------------------|
| 3 Ashland 13 Burnett 95 Polk 113 Sawyer |
| 5 Barron 31 Douglas 99 Price 119 Taylor |
| 7 Bayfield 51 Iron 107 Rusk 129 Washburn |

#### Survey Unit Code: 3  Survey Unit Name: Central

| County code and county name |
|-----------------------------|
| 1 Adams 53 Jackson 81 Monroe 141 Wood |
| 17 Chippewa 57 Juneau 97 Portage |
| 19 Clark 73 Marathon 135 Waupaca |
| 35 Eau Claire 77 Marquette 137 Waushara |

#### Survey Unit Code: 4  Survey Unit Name: Southwestern

| County code and county name |
|-----------------------------|
| 11 Buffalo 49 Iowa 93 Pierce 121 Trempealeau |
| 23 Crawford 63 La Crosse 103 Richland 123 Vernon |
| 33 Dunn 65 Lafayette 109 St. Croix |
| 43 Grant 91 Pepin 111 Sauk |

#### Survey Unit Code: 5  Survey Unit Name: Southeastern

| County code and county name |
|-----------------------------|
| 9 Brown 39 Fond du Lac 71 Manitowoc 117 Sheboygan |
| 15 Calumet 45 Green 79 Milwaukee 127 Walworth |
| 21 Columbia 47 Green Lake 87 Outagamie 131 Washington |
| 25 Dane 55 Jefferson 89 Ozaukee 133 Waukesha |
| 27 Dodge 59 Kenosha 101 Racine 139 Winnebago |
| 29 Door 61 Kewaunee 105 Rock |
| State Code: | 56  | State Name: Wyoming | State Abbreviation: WY | Region/Station Code: 22 |
|------------|-----|---------------------|-------------------------|-------------------------|
| Survey Unit Code: | 1   | Survey Unit Name: Western |
| Survey Unit Code: | 2   | Survey Unit Name: Central and Southeastern |
| Survey Unit Code: | 3   | Survey Unit Name: Northeastern |
| State Code: | 72  | State Name: Puerto Rico | State Abbreviation: PR | Region/Station Code: 33 |
| Survey Unit Code: | 1   | Survey Unit Name: Puerto Rico |
| State Code: | 78  | State Name: U.S. Virgin Islands | State Abbreviation: VI | Region/Station Code: 33 |
| Survey Unit Code: | 1   | Survey Unit Name: Virgin Islands |

### Wyoming

#### Western

| County code and county name |
|-----------------------------|
| 13 Fremont  | 23 Lincoln  | 35 Sublette  | 39 Teton  |
| 17 Hot Springs | 29 Park  | 37 Sweetwater  | 41 Uinta  |

#### Central and Southeastern

| County code and county name |
|-----------------------------|
| 1 Albany  | 9 Converse  | 21 Laramie  | 31 Platte  |
| 3 Big Horn  | 15 Goshen  | 25 Natrona  | 33 Sheridan  |
| 7 Carbon  | 19 Johnson  | 27 Niobrara  | 43 Washakie  |

#### Northeastern

| County code and county name |
|-----------------------------|
| 5 Campbell  | 11 Crook  | 45 Weston  |

### Puerto Rico

#### Puerto Rico

| County code and county name |
|-----------------------------|
| 1 Adjuntas  | 41 Cidra  | 79 Lajas  | 119 Rio Grande  |
| 3 Aguada  | 43 Coamo  | 81 Lares  | 121 Sabana Grande  |
| 5 Aguadilla  | 45 Comerio  | 83 Las Marias  | 123 Salinas  |
| 7 Aguas Buenas  | 47 Corozal  | 85 Las Piedras  | 125 San German  |
| 9 Aibonito  | 49 Culebra  | 87 Loiza  | 127 San Juan  |
| 11 Anasco  | 51 Dorado  | 89 Luquillo  | 129 San Lorenzo  |
| 13 Arecibo  | 53 Fajardo  | 91 Manati  | 131 San Sebastian  |
| 15 Arroyo  | 54 Florida  | 93 Maricao  | 133 Santa Isabel  |
| 17 Barceloneta  | 55 Guanica  | 95 Maunabo  | 135 Toa Alta  |
| 19 Barranquitas  | 57 Guayama  | 97 Mayaguez  | 137 Toa Baja  |
| 21 Bayamon  | 59 Guayanilla  | 99 Moca  | 139 Trujillo Alto  |
| 23 Cabo Rojo  | 61 Guayanabo  | 101 Morovis  | 141 Utuado  |
| 25 Caguas  | 63 Gurabo  | 103 Naguabo  | 143 Vega Alta  |
| 27 Camuy  | 65 Hatillo  | 105 Naranjito  | 145 Vega Baja  |
| 29 Canovanas  | 67 Hormigueros  | 107 Orocovis  | 147 Vieques  |
| 31 Carolina  | 69 Humacao  | 109 Patillas  | 149 Villalba  |
| 33 Catano  | 71 Isabel Municiplio  | 111 Penuelas  | 151 Yabucoa  |
| 35 Cayey  | 73 Jayuya  | 113 Ponce  | 153 Yauco  |
| 37 Ceiba  | 75 Juana Diaz  | 115 Quebradillas  |
| 39 Ciales  | 77 Juncos  | 117 Rincon  |

### U.S. Virgin Islands

#### Virgin Islands

| County code and county name |
|-----------------------------|
| 10 St. Croix Island  | 20 St. John Island  | 30 St. Thomas Island  |
Appendix D. Forest Type Codes and Names

Note: The forest type names used by FIA do not come from a single published reference. The current list of forest type names has been developed over time using sources such as historical FIA lists, lists from the Society of American Foresters, and FIA analysts who developed names to meet current analysis and reporting needs.

| Code | Forest type / type group                                 |
|------|----------------------------------------------------------|
| 100  | White / red / jack pine group                            |
| 101  | Jack pine                                               |
| 102  | Red pine                                                |
| 103  | Eastern white pine                                       |
| 104  | Eastern white pine / eastern hemlock                     |
| 105  | Eastern hemlock                                          |
| 120  | Spruce / fir group                                       |
| 121  | Balsam fir                                               |
| 122  | White spruce                                             |
| 123  | Red spruce                                               |
| 124  | Red spruce / balsam fir                                  |
| 125  | Black spruce                                             |
| 126  | Tamarack                                                 |
| 127  | Northern white-cedar                                     |
| 128  | Fraser fir                                               |
| 129  | Red spruce / Fraser fir                                  |
| 140  | Longleaf / slash pine group                              |
| 141  | Longleaf pine                                            |
| 142  | Slash pine                                               |
| 150  | Tropical pine group                                      |
| 151  | Tropical pines                                           |
| 160  | Loblolly / shortleaf pine group                           |
| 161  | Loblolly pine                                            |
| 162  | Shortleaf pine                                           |
| 163  | Virginia pine                                            |
| 164  | Sand pine                                                |
| 165  | Table mountain pine                                      |
| 166  | Pond pine                                                |
| 167  | Pitch pine                                               |
| 168  | Spruce pine                                              |
| 170  | Other eastern softwoods group                            |
| 171  | Eastern redcedar                                         |
| 172  | Florida softwoods                                        |
| 180  | Pinyon / juniper group                                    |
| 182  | Rocky Mountain juniper                                    |
| 184  | Juniper woodland                                         |
| 185  | Pinyon / juniper woodland                                 |
| 200  | Douglas-fir group                                         |
| 201  | Douglas-fir                                              |
| 202  | Port-Orford-cedar                                        |
| 203  | Bigcone Douglas-fir                                      |
| Code | Forest type / type group                          |
|------|--------------------------------------------------|
| 220  | Ponderosa pine group                            |
| 221  | Ponderosa pine                                  |
| 222  | Incense-cedar                                   |
| 224  | Sugar pine                                      |
| 225  | Jeffrey pine                                    |
| 226  | Coulter pine                                    |
| 240  | Western white pine group                         |
| 241  | Western white pine                              |
| 260  | Fir / spruce / mountain hemlock group            |
| 261  | White fir                                       |
| 262  | Red fir                                         |
| 263  | Noble fir                                       |
| 264  | Pacific silver fir                              |
| 265  | Engelmann spruce                                |
| 266  | Engelmann spruce / subalpine fir                 |
| 267  | Grand fir                                       |
| 268  | Subalpine fir                                   |
| 269  | Blue spruce                                     |
| 270  | Mountain hemlock                                |
| 271  | Alaska-yellow-cedar                             |
| 280  | Lodgepole pine group                            |
| 281  | Lodgepole pine                                  |
| 300  | Hemlock / Sitka spruce group                    |
| 301  | Western hemlock                                 |
| 304  | Western redcedar                                |
| 305  | Sitka spruce                                    |
| 320  | Western larch group                             |
| 321  | Western larch                                   |
| 340  | Redwood group                                   |
| 341  | Redwood                                         |
| 342  | Giant sequoia                                   |
| 360  | Other western softwoods group                   |
| 361  | Knobcone pine                                   |
| 362  | Southwestern white pine                         |
| 363  | Bishop pine                                     |
| 364  | Monterey pine                                   |
| 365  | Foxtail pine / bristlecone pine                 |
| 366  | Limber pine                                     |
| 367  | Whitebark pine                                  |
| 368  | Miscellaneous western softwoods                 |
| 369  | Western juniper                                 |
| 370  | California mixed conifer group                  |
| 371  | California mixed conifer                         |
| 380  | Exotic softwoods group                          |
| 381  | Scotch pine                                      |
| 383  | Other exotic softwoods                          |
| 384  | Norway spruce                                   |
| 385  | Introduced larch                                |

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Appendix D
| Code | Forest type / type group                        |
|------|-----------------------------------------------|
| 390  | Other softwoods group                         |
| 391  | Other softwoods                               |

**400 Oak / pine group**
- 401 Eastern white pine / northern red oak / white ash
- 402 Eastern redcedar / hardwood
- 403 Longleaf pine / oak
- 404 Shortleaf pine / oak
- 405 Virginia pine / southern red oak
- 406 Loblolly pine / hardwood
- 407 Slash pine / hardwood
- 409 Other pine / hardwood

**500 Oak / hickory group**
- 501 Post oak / blackjack oak
- 502 Chestnut oak
- 503 White oak / red oak / hickory
- 504 White oak
- 505 Northern red oak
- 506 Yellow-poplar / white oak / northern red oak
- 507 Sassafras / persimmon
- 508 Sweetgum / yellow-poplar
- 509 Bur oak
- 510 Scarlet oak
- 511 Yellow-poplar
- 512 Black walnut
- 513 Black locust
- 514 Southern scrub oak
- 515 Chestnut oak / black oak / scarlet oak
- 516 Cherry / white ash / yellow-poplar
- 517 Elm / ash / black locust
- 519 Red maple / oak
- 520 Mixed upland hardwoods

**600 Oak / gum / cypress group**
- 601 Swamp chestnut oak / cherrybark oak
- 602 Sweetgum / Nuttall oak / willow oak
- 605 Overcup oak / water hickory
- 606 Atlantic white-cedar
- 607 Baldcypress / water tupelo
- 608 Sweetbay / swamp tupelo / red maple
- 609 Baldcypress / pondcypress

**700 Elm / ash / cottonwood group**
- 701 Black ash / American elm / red maple
- 702 River birch / sycamore
- 703 Cottonwood
- 704 Willow
- 705 Sycamore / pecan / American elm
- 706 Sugarberry / hackberry / elm / green ash
- 707 Silver maple / American elm
- 708 Red maple / lowland
- 709 Cottonwood / willow
- 722 Oregon ash

**800 Maple / beech / birch group**
- 801 Sugar maple / beech / yellow birch
| Code | Forest type / type group                      |
|------|---------------------------------------------|
| 802  | Black cherry                                |
| 805  | Hard maple / basswood                       |
| 809  | Red maple / upland                          |
| 900  | Aspen / birch group                         |
| 901  | Aspen                                       |
| 902  | Paper birch                                 |
| 903  | Gray birch                                  |
| 904  | Balsam poplar                               |
| 905  | Pin cherry                                  |
| 910  | Alder / maple group                         |
| 911  | Red alder                                   |
| 912  | Bigleaf maple                               |
| 920  | Western oak group                           |
| 921  | Gray pine                                   |
| 922  | California black oak                        |
| 923  | Oregon white oak                            |
| 924  | Blue oak                                    |
| 931  | Coast live oak                              |
| 933  | Canyon live oak                             |
| 934  | Interior live oak                           |
| 935  | California white oak (valley oak)           |
| 940  | Tanoak / laurel group                        |
| 941  | Tanoak                                      |
| 942  | California laurel                           |
| 943  | Giant chinkapin                             |
| 960  | Other hardwoods group                        |
| 961  | Pacific madrone                             |
| 962  | Other hardwoods                             |
| 970  | Woodland hardwoods group                    |
| 971  | Deciduous oak woodland                      |
| 972  | Evergreen oak woodland                      |
| 973  | Mesquite woodland                            |
| 974  | Cercocarpus (mountain brush) woodland       |
| 975  | Intermountain maple woodland                |
| 976  | Miscellaneous woodland hardwoods            |
| 980  | Tropical hardwoods group                    |
| 982  | Mangrove                                    |
| 983  | Palms                                       |
| 989  | Other tropical hardwoods                    |
| 990  | Exotic hardwoods group                      |
| 991  | Paulownia                                   |
| 992  | Melaleuca                                   |
| 993  | Eucalyptus                                  |
| 995  | Other exotic hardwoods                      |
| 999  | Nonstocked                                  |
Appendix E. Administrative National Forest Codes and Names

| Region       | Code | National Forest/Grassland/Area                      |
|--------------|------|-----------------------------------------------------|
| Region 1     | 102  | Beaverhead                                          |
|              | 102  | Beaverhead-Deerlodge [now combined]                 |
|              | 103  | Bitterroot                                          |
|              | 104  | Idaho Panhandle                                     |
|              | 105  | Clearwater                                          |
|              | 108  | Custer                                              |
|              | 109  | Deerlodge                                           |
|              | 110  | Flathead                                            |
|              | 111  | Gallatin                                            |
|              | 112  | Helena                                              |
|              | 114  | Kootenai                                            |
|              | 115  | Lewis and Clark                                     |
|              | 116  | Lolo                                                |
|              | 117  | Nez Perce                                           |
|              | 120  | Cedar River NGL (National Grassland)               |
|              | 121  | Little Missouri NGL                                 |
|              | 122  | Sheyenne NGL                                        |
|              | 124  | Grand River NGL                                     |
|              | 199  | Other NFS Areas                                     |
| Region 2     | 202  | Bighorn                                             |
|              | 203  | Black Hills                                         |
|              | 204  | Grand Mesa-Uncompahgre-Gunnison                    |
|              | 206  | Medicine Bow                                        |
|              | 206  | Medicine Bow-Routt [now combined]                   |
|              | 207  | Nebraska                                            |
|              | 209  | Rio Grande                                          |
|              | 210  | Arapaho-Roosevelt                                   |
|              | 211  | Routt                                               |
|              | 212  | Pike and San Isabel                                 |
|              | 213  | San Juan                                            |
|              | 214  | Shoshone                                            |
|              | 215  | White River                                         |
|              | 216  | Samuel R Mckelvie                                    |
|              | 217  | Cimarron NGL                                        |
|              | 218  | Commanche NGL                                       |
|              | 219  | Pawnee NGL                                          |
|              | 220  | Oglala NGL                                          |
|              | 221  | Buffalo Gap NGL                                     |
|              | 222  | Fort Pierre NGL                                     |
|              | 223  | Thunder Basin NGL                                   |
|              | 299  | Other NFS Areas                                     |
| Region 3     | 301  | Apache-Sitgreaves                                   |
|              | 302  | Carson                                              |
|              | 303  | Cibola                                              |
|              | 304  | Coconino                                            |
|              | 305  | Coronado                                            |
|              | 306  | Gila                                                |
|              | 307  | Kaibab                                              |
|              | 308  | Lincoln                                             |
|              | 309  | Prescott                                            |
|              | 310  | Santa Fe                                            |
|              | 312  | Tonto                                               |
|              | 399  | Other NFS Areas                                     |
| Region 4     | 401  | Ashley                                              |
|              | 402  | Boise                                               |
|              | 403  | Bridger-Teton                                       |
| Region | Code | National Forest/Grassland/Area |
|--------|------|-------------------------------|
| 405    | Caribou |                                |
| 406    | Challis  |                                |
| 407    | Dixie    |                                |
| 408    | Fishlake |                                |
| 409    | Humboldt |                                |
| 410    | Manti-La Sal |                            |
| 412    | Payette  |                                |
| 413    | Salmon   |                                |
| 413    | Salmon-Challis [now combined] |                        |
| 414    | Sawtooth |                                |
| 415    | Targhee  |                                |
| 415    | Caribou-Targhee [now combined] |                        |
| 417    | Toiyabe  |                                |
| 417    | Humboldt-Toiyabe [now combined] |                       |
| 418    | Uinta    |                                |
| 419    | Wasatch-Cache |                           |
| 420    | Desert Range Experiment Station |                      |
| 499    | Other NFS Areas |                            |

**Region 5**

| Code | National Forest/Grassland/Area |
|------|--------------------------------|
| 501  | Angeles                        |
| 502  | Cleveland                      |
| 503  | Eldorado                       |
| 504  | Inyo                           |
| 505  | Klamath                        |
| 506  | Lassen                         |
| 507  | Los Padres                     |
| 508  | Mendocino                      |
| 509  | Modoc                          |
| 510  | Six Rivers                     |
| 511  | Plumas                         |
| 512  | San Bernardino                 |
| 513  | Sequoia                        |
| 514  | Shasta-Trinity                 |
| 515  | Sierra                         |
| 516  | Stanislaus                     |
| 517  | Tahoe                          |
| 519  | Lake Tahoe Basin               |
| 599  | Other NFS Areas                |

**Region 6**

| Code | National Forest/Grassland/Area |
|------|--------------------------------|
| 601  | Deschutes                      |
| 602  | Fremont                        |
| 603  | Gifford Pinchot                |
| 604  | Malheur                        |
| 605  | Mt. Baker-Snoqualmie           |
| 606  | Mt. Hood                       |
| 607  | Ochoco                         |
| 608  | Okanogan                       |
| 609  | Olympic                        |
| 610  | Rogue River                    |
| 611  | Siskiyou                       |
| 612  | Siuslaw                        |
| 614  | Umatilla                       |
| 615  | Umpqua                         |
| 616  | Wallowa-Whitman                |
| 617  | Wenatchee                      |
| 618  | Willamette                     |
| 620  | Winema                         |
| 621  | Colville                       |
| 622  | Columbia River Gorge NSA       |
| 650  | Crooked River National Grassland |
| 699  | Other NFS Areas                |
| Region  | Code  | National Forest/Grassland/Area               |
|--------|-------|----------------------------------------------|
| Region 8 |       |                                              |
|         | 801   | NFS in Alabama                               |
|         | 802   | Daniel Boone                                 |
|         | 803   | Chattahoochee-Oconee                         |
|         | 804   | Cherokee                                     |
|         | 805   | NFS in Florida                               |
|         | 806   | Kisatchie                                    |
|         | 807   | NFS in Mississippi                           |
|         | 808   | George Washington                            |
|         | 809   | Ouachita                                     |
|         | 810   | Ozark and St. Francis                        |
|         | 811   | NFS in North Carolina                        |
|         | 812   | Francis Marion-Sumter                        |
|         | 813   | NFS in Texas                                 |
|         | 814   | Jefferson                                    |
|         | 816   | El Yunque                                    |
|         | 899   | Other NFS areas                              |
| Region 9 |       |                                              |
|         | 902   | Chequawamagon                                |
|         | 903   | Chippewa                                     |
|         | 904   | Huron-Manistee                               |
|         | 905   | Mark Twain                                   |
|         | 906   | Nicolet                                      |
|         | 907   | Ottawa                                       |
|         | 908   | Shawnee                                      |
|         | 909   | Superior                                     |
|         | 910   | Hiawatha                                     |
|         | 912   | Hoosier                                      |
|         | 915   | Midewin Tallgrass Prairie                    |
|         | 918   | Wayne                                        |
|         | 919   | Allegheny                                    |
|         | 920   | Green Mountain                               |
|         | 921   | Monongahela                                  |
|         | 922   | White Mountain                               |
|         | 999   | Other NFS areas                              |
| Region 10 |    |                                              |
|         | 1004  | Chugach                                       |
|         | 1005  | Tongass                                      |
|         | 1099  | Other NFS Areas                              |
## Appendix F. Tree Species Codes, Names, and Occurrences

Major groups (MAJGRP) are (1) pines, (2) other softwoods, (3) soft hardwoods, and (4) hard hardwoods. The 48 species groups (SPGRPCD) can be found in appendix G. The FIA work units listed are NC – (former) North Central, NE – (former) Northeastern, PNW – Pacific Northwest, RM – Rocky Mountain, and SO – Southern.

| SPCD  | COMMON NAME               | SCIENTIFIC NAME     | SPGRPCD | MAJGRP | Occurrence by FIA work unit |
|-------|---------------------------|---------------------|---------|-------|----------------------------|
| 0010  | fir spp.                  | Abies spp.          | 6 2     | X X   | X                          |
| 0011  | Pacific silver fir        | Abies amabilis      | 12 2    | X     |                            |
| 0012  | balsam fir                | Abies balsamea      | 6 2     | X X   | X                          |
| 0014  | Santa Lucia fir or         | Abies bracteata     | 12 2    | X     |                            |
| 0015  | white fir                 | Abies concolor      | 12 2    | X X   | X                          |
| 0016  | Fraser fir                | Abies fraseri       | 9 2     | X X   | X                          |
| 0017  | grand fir                 | Abies grandis       | 12 2    | X     |                            |
| 0018  | corkbark fir              | Abies lasiocarpa    | 12 2    | X     |                            |
| 0019  | subalpine fir             | Abies lasiocarpa    | 12 2    | X     |                            |
| 0020  | California red fir        | Abies magnifica     | 12 2    | X     |                            |
| 0021  | Shasta red fir            | Abies shastensis    | 12 2    | X     |                            |
| 0022  | noble fir                 | Abies procera       | 12 2    | X     |                            |
| 0040  | white-cedar spp.          | Chamaecyparis spp.  | 9 E, 24 W 2 | X |                |
| 0041  | Port-Orford-cedar         | Chamaecyparis lawsoniana | 24 2 | X |                    |
| 0042  | Alaska-yellow-cedar       | Chamaecyparis nootkatensis | 24 2 | X |                        |
| 0043  | Atlantic white-cedar      | Chamaecyparis thyoides | 9 2 | X |                                |
| 0050  | cypress                   | Cupressus spp.      | 24 2    | X     |                            |
| 0051  | Arizona cypress           | Cupressus arizonica | 24 2    | X X   |                            |
| 0052  | Baker or Modoc cypress    | Cupressus bakeri    | 24 2    | X     |                            |
| 0053  | Tecate cypress            | Cupressus forbesii  | 24 2    | X     |                            |
| 0054  | Monterey cypress          | Cupressus macrocarpa | 24 2 | X |                    |
| 0055  | Sargent’s cypress         | Cupressus sargentii | 24 2    | X     |                            |
| 0056  | MacNab’s cypress          | Cupressus macnabiana | 9 E, 24 W 2 | X |                |
| 0057  | redcedar / juniper spp.   | Juniperus spp.      | 9 E, 23 W 2 | X |                                |
| 0058  | Pinchot juniper           | Juniperus pinchotti | 23 2    | X     |                            |
| 0059  | redberry juniper          | Juniperus coahuilensis | 23 2 | X X   |                            |
| 0060  | Drooping juniper          | Juniperus flaccida  | 23 2    | X     |                            |
| 0061  | Ashe juniper              | Juniperus ashei     | 23 2    | X     |                            |
| 0062  | California juniper        | Juniperus californica | 23 2 | X X   |                            |
| 0063  | alligator juniper         | Juniperus deppeana  | 23 2    | X     |                            |
| 0064  | western juniper           | Juniperus occidentalis | 24 2 | X X   |                            |
| 0065  | Utah juniper              | Juniperus osteosperma | 23 2 | X |                                |
| 0066  | Rocky Mountain juniper    | Juniperus scopulorum | 9 E, 23 W 2 | X |                                |
| 0067  | southern redcedar         | Juniperus virginiana var. silicicola | 9 2 | X |                                |
| 0068  | eastern redcedar          | Juniperus virginiana | 9 E, 24 W 2 | X |                                |
| 0069  | oneseed juniper           | Juniperus monosperma | 23 2 | X X   |                            |
| 0070  | larch spp.                | Larix spp.          | 9 2     | X X   |                            |
| 0071  | tamarack (native)         | Larix laricina      | 9 E, 24 W 2 | X |                                |
| 0072  | subalpine larch           | Larix lyallii       | 24 2    | X X   |                            |
| 0073  | western larch             | Larix occidentalis  | 19 2    | X X   |                            |
| 0081  | incense-cedar             | Calocedrus decurrens | 20 2 | X |                                |
| 0090  | spruce spp.               | Picea spp.          | 6 2     | X X   |                            |
| 0091  | Norway spruce             | Picea abies         | 9 2     | X X   |                            |
| 0092  | Brewer spruce             | Picea breweriana    | 18 2    | X     |                            |
| 0093  | Engelmann spruce          | Picea engelmannii   | 9 E, 18 W 2 | X |                                |
| 0094  | white spruce              | Picea glauca        | 6 E, 18 W 2 | X |                                |
| 0095  | black spruce              | Picea mariana       | 6 E, 18 W 2 | X |                                |
| 0096  | blue spruce               | Picea pungens       | 9 E, 18 W 2 | X |                                |
| 0097  | red spruce                | Picea rubens        | 6 2     | X     |                            |
| 0098  | Sitka spruce              | Picea stichensis    | 17 2    | X     |                            |
| 0100  | pine spp.                 | Pinus spp.          | 9 E, 24 W 1 | X |                                |
| SPCD | COMMON NAME              | SCIENTIFIC NAME       | SPGRPCD | MAJGRP | NC | NE | PNW | RM | SO |
|------|--------------------------|-----------------------|---------|--------|----|----|-----|----|----|
| 0101 | whitebark pine           | *Pinus albicaulis*    | 24      | 1      | X  | X  |     |    |    |
| 0102 | Rocky Mountain bristlecone pine | *Pinus aristata* | 24      | 1      | X  |     |     |    |    |
| 0103 | knobcone pine            | *Pinus attenuata*     | 24      | 1      | X  |     |     |    |    |
| 0104 | foxtail pine             | *Pinus balfouriana*   | 24      | 1      |     | X  |     |    |    |
| 0105 | jack pine                | *Pinus banksiana*     | 5       | 1      | X  | X  |     |    |    |
| 0106 | common or two-needle pinyon | *Pinus edulis*        | 23      | 1      | X  | X  | X   |    |    |
| 0107 | sand pine                | *Pinus clausa*        | 3       | 1      | X  |     |     |    |    |
| 0108 | lodgepole pine           | *Pinus contorta*      | 21      | 1      | X  | X  | X   |    |    |
| 0109 | Coulter pine             | *Pinus coulteri*      | 24      | 1      |     | X  |     |    |    |
| 0110 | shortleaf pine           | *Pinus echinata*      | 2       | 1      | X  | X  |     |    |    |
| 0111 | slash pine               | *Pinus elliottii*     | 1       | 1      |     |     |     |    |    |
| 0112 | Apache pine              | *Pinus engelmannii*   | 24      | 1      |     |     |     |    |    |
| 0113 | limber pine              | *Pinus flexilis*       | 24      | 1      | X  | X  | X   |    |    |
| 0114 | southwestern white pine  | *Pinus strobiiformis*  | 24      | 1      |     |     |     |    |    |
| 0115 | spruce pine              | *Pinus glabra*         | 3       | 1      |     |     |     |    | X  |
| 0116 | Jeffrey pine             | *Pinus jeffreyi*      | 11      | 1      | X  |     |     |    |    |
| 0117 | sugar pine               | *Pinus lambertiana*    | 14      | 1      |     | X  |     |    |    |
| 0118 | Chihuahua pine           | *Pinus leiophylla*     | 24      | 1      |     |     |     |    |    |
| 0119 | western white pine       | *Pinus monticola*      | 15      | 1      |     | X  |     |    |    |
| 0120 | bishop pine              | *Pinus muricata*       | 24      | 1      |     |     |     |    |    |
| 0121 | longleaf pine            | *Pinus palustris*      | 1       | 1      |     |     |     |    | X  |
| 0122 | ponderosa pine           | *Pinus ponderosa*      | 9 E, 11 W | X  | X  | X   | X  | X  |
| 0123 | Table mountain pine      | *Pinus pungens*        | 3       | 1      |     |     |     |    |    |
| 0124 | Monterey pine            | *Pinus radiata*        | 24      | 1      |     |     |     |    |    |
| 0125 | red pine                 | *Pinus resinosa*       | 4       | 1      | X  | X  | X   |    |    |
| 0126 | pitch pine               | *Pinus rigida*         | 3       | 1      |     |     |     |    | X  |
| 0127 | gray pine or California foothill pine | *Pinus sabinianna* | 24      | 1      |     |     |     |    | X  |
| 0128 | pond pine                | *Pinus serotina*       | 3       | 1      | X  |     |     |    |    |
| 0129 | eastern white pine       | *Pinus strobus*        | 4       | 1      | X  |     |     |    |    |
| 0130 | Scotch pine              | *Pinus sylvestris*     | 3 E, 24 W | X  | X  | X   | X  | X  |
| 0131 | loblolly pine            | *Pinus taeda*          | 2       | 1      | X  | X  |     |    |    |
| 0132 | Virginia pine            | *Pinus virginiana*     | 3       | 1      | X  |     |     |    |    |
| 0133 | singleleaf pinyon        | *Pinus monophylla*     | 23      | 1      |     |     |     |    | X  |
| 0134 | border pinyon            | *Pinus discolor*       | 23      | 1      |     |     |     |    | X  |
| 0135 | Arizona pine             | *Pinus arizonica*      | 11      | 1      |     |     |     |    |    |
| 0136 | Austrian pine            | *Pinus nigra*          | 9 E, 24 W | X  | X  | X   | X  | X  |
| 0137 | Washoe pine              | *Pinus washoensis*     | 24      | 1      |     |     |     |    | X  |
| 0138 | four-leaf pinyon or Parry pinyon pine | *Pinus quatrifolia* | 24      | 1      |     |     |     |    | X  |
| 0139 | Torrey pine              | *Pinus torreyana*      | 24      | 1      |     |     |     |    |    |
| 0140 | Mexican pinyon pine      | *Pinus cembroides*     | 23      | 1      |     |     |     |    | X  |
| 0141 | papershell pinyon pine   | *Pinus remota*         | 23      | 1      |     |     |     |    |    |
| 0142 | Great Basin bristlecone pine | *Pinus longaeva*     | 24      | 1      |     |     |     |    | X  |
| 0143 | Arizona pinyon pine      | *Pinus monophylla var. fallax | 23      | 1      |     |     |     |    | X  |
| 0144 | Honduras pine            | *Pinus elliottii var. elliottii | 9 E, 24 W | X  |     |     |     |    |
| 0200 | Douglas-fir spp.         | *Pseudotsuga spp.*     | 9 E, 10 W | X  |     |     |     |    |
| 0201 | bigcone Douglas-fir      | *Pseudotsuga macrocarpa* | 10     | 2      |     |     |     |    |
| 0202 | Douglas-fir              | *Pseudotsuga menziesii* | 9 E, 10 W | X  | X   | X   | X  | X  |
| 0211 | redwood                  | *Sequoia sempervirens*  | 16      | 2      |     |     |     |    |
| 0212 | giant sequoia            | *Sequoiadendron giganteum* | 24     | 2      |     |     |     |    |
| 0220 | baldecypress spp.        | *Taxodium spp.*        | 9 E, 24 W | X  | X   | X   |     |    |
| 0221 | baldecypress             | *Taxodium distichum*   | 8       | 2      | X  |     |     |    |
| 0222 | pondcypress              | *Taxodium ascendens*   | 8       | 2      |     |     |     |    |
| 0223 | Montezuma baldecypress   | *Taxodium mucronatum*  | 8       | 2      |     |     |     |    |
| 0230 | yew spp.                 | *Taxus spp.*           | 9 E, 24 W | X  |     |     |     |
| 0231 | Pacific yew              | *Taxus brevifolia*     | 24      | 2      | X  |     |     |    |
| 0232 | Florida yew              | *Taxus floridana*      | 9 E, 24 W | X  |     |     |     |    |
| SPCD | COMMON NAME                      | SCIENTIFIC NAME | SPGRPCD | MAJGRP | NC | NE | PNW | RM | SO |
|------|----------------------------------|-----------------|---------|--------|----|----|-----|----|----|
| 0240 | Thuja spp.                       | Thuja spp.      | 9       | 2      | X  |    |     |    |    |
| 0241 | northern white-cedar             | Thuja occidentalis | 9      | 2      | X  | X  |     |    |    |
| 0242 | western redcedar                 | Thuja plicata   | 22      | 2      |    |    |     | X  | X  |
| 0250 | Torreya (nutmeg) spp.           | Torreya spp.    | 9       | 2      | W  | 2  |     |    |    |
| 0251 | California torreya (nutmeg)      | Torreya californica | 24      | 2      |    |    |     |    |    |
| 0252 | Florida torreya (nutmeg)         | Torreya taxifolia | 9      | 2      |    |    |     | X  |    |
| 0260 | hemlock spp.                     | Tsuga spp.      | 7       | 2      | X  |    |     |    | X  |
| 0261 | eastern hemlock                  | Tsuga canadensis | 7       | 2      | X  | X  |     |    |    |
| 0262 | Carolina hemlock                 | Tsuga caroliniana | 7      | 2      |    |    |     |    |    |
| 0263 | western hemlock                  | Tsuga heterophylla | 13      | 2      |    |    |     | X  | X  |
| 0264 | mountain hemlock                 | Tsuga mertensiana | 24      | 2      |    |    |     | X  |    |
| 0299 | Unknown dead conifer             | Tree evergreen   | 9       | 2      | W  | 2  |     |    |    |
| 0300 | acacia spp.                      | Acacia spp.     | 41      | 4      |    |    |     | X  |    |
| 0303 | sweet acacia                     | Acacia farnesiana | 43      | 3      |    |    |     | X  | X  |
| 0304 | cateclaw acacia                  | Acacia greggii   | 43      | 4      |    |    |     | X  | X  |
| 0310 | maple spp.                       | Acer spp.       | 31      | 4      | X  | X  |     |    |    |
| 0311 | Florida maple                    | Acer barbatum    | 31      | 4      |    |    |     |    |    |
| 0312 | bigleaf maple                    | Acer macrophyllum | 47      | 3      |    |    |     | X  | X  |
| 0313 | boxelder                         | Acer negundo     | 41      | 4      | W  | 3  |     | X  | X  |
| 0314 | black maple                      | Acer nigraum     | 31      | 4      | X  | X  |     |    |    |
| 0315 | striped maple                    | Acer pensylvanicum | 43     | 3      | X  | X  |     |    |    |
| 0316 | red maple                        | Acer rubrum      | 32      | 3      | X  | X  |     |    |    |
| 0317 | silver maple                     | Acer saccharinum | 32      | 3      | X  | X  |     |    |    |
| 0318 | sugar maple                      | Acer saccharium  | 31      | 4      | X  | X  |     |    |    |
| 0319 | mountain maple                   | Acer spicatum    | 43      | 4      | X  | X  |     |    |    |
| 0320 | Norway maple                     | Acer platanoides | 31      | 4      | W  | 7  |     | X  |    |
| 0321 | Rocky Mountain maple             | Acer glabrum     | 43      | 4      | W  |    |     | X  |    |
| 0322 | bigtooth maple                   | Acer grandidentatum | 48      | 4      |    |    |     | X  |    |
| 0323 | chalk maple                      | Acer leucoderme  | 31      | 4      |    |    |     |    |    |
| 0330 | buckeye, horsechestnut spp.      | Aesculus spp.    | 41      | 4      | W  | 7  |     | X  | X  |
| 0331 | Ohio buckeye                     | Aesculus glabra  | 41      | 4      | W  |    |     | X  | X  |
| 0332 | yellow buckeye                   | Aesculus flava   | 43      | 3      | X  | X  |     |    |    |
| 0333 | California buckeye               | Aesculus californica | 41      | 4      | W  |    |     | X  |    |
| 0334 | Texas buckeye                    | Aesculus glabra var. arguta | 41 | 3 | X | X |
| 0336 | red buckeye                      | Aesculus pavia   | 43      | 4      | W  |    |     | X  |    |
| 0337 | painted buckeye                  | Aesculus sylatica | 41      | 4      | W  |    |     | X  |    |
| 0341 | ailanthus                        | Ailanthus altissima | 43      | 4      | W  |    |     | X  | X  |
| 0345 | mimosa, silktree                 | Albizia julibrissin | 43      | 3      | X  |    |     |    |    |
| 0350 | alder spp.                       | Alnus spp.       | 41      | 4      | W  | 7  |     | X  |    |
| 0351 | red alder                        | Alnus rubra      | 45      | 3      | X  | X  |     |    |    |
| 0352 | white alder                      | Alnus rhombifolia | 47      | 3      |    |    |     | X  | X  |
| 0353 | Arizona alder                    | Alnus oblongifolia | 43      | 4      | W  | 7  |     | X  |    |
| 0355 | European alder                   | Alnus glutinosus  | 41      | 4      | W  |    |     | X  |    |
| 0356 | serviceberry spp.                | Amelanchier spp. | 43      | 4      | W  |    |     | X  |    |
| 0357 | common serviceberry              | Amelanchier arborea | 43      | 4      | W  |    |     | X  |    |
| 0358 | roundleaf serviceberry           | Amelanchier sanguinea | 43      | 4      | W  |    |     | X  |    |
| 0360 | Madrone spp.                     | Arbutus spp.     | 43      | 4      | W  |    |     | X  |    |
| 0361 | Pacific madrone                  | Arbutus menziesii | 47      | 4      |    |    |     | X  |    |
| 0362 | Arizona madrone                  | Arbutus arizonica | 43      | 4      | W  | 7  |     | X  |    |
| 0363 | Texas madrone                    | Arbutus xalapensis | 48      | 4      |    |    |     | X  |    |
| 0367 | pawpaw                           | Asimina triloba   | 45      | 3      | X  | X  |     |    |    |
| 0370 | birch spp.                       | Betula spp.      | 41      | 4      | X  | X  |     |    |    |
| 0371 | yellow birch                     | Betula alleghaniensis | 30     | 4      | X  | X  |     |    |    |
| 0372 | sweet birch                      | Betula lenta      | 42      | 4      | X  | X  |     |    |    |
| 0373 | river birch                      | Betula nigra      | 41      | 3      | X  | X  |     |    |    |
| 0374 | water birch                      | Betula occidentalis | 41      | 4      | W  |    |     | X  | X  |
| 0375 | paper birch                      | Betula papyrifera  | 41      | 4      | W  |    |     | X  | X  |
| 0377 | Virginia roundleaf birch          | Betula uber       | 41      | 4      | W  | 7  |     | X  |    |
| SPCD  | COMMON NAME                             | SCIENTIFIC NAME               | SPGRPCD | MAJGRP | Occurrence by FIA work unit |
|-------|-----------------------------------------|-------------------------------|---------|--------|-----------------------------|
| 0378  | northwestern paper birch                | *Betula x utahensis*          | 47      | 3      | X                           |
| 0379  | gray birch                              | *Betula populifolia*          | 41      | 3      | X                           |
| 0381  | chittamwood, gum bumelia                | *Sideroxylon lanuginosum*     | 43      | 4      | X                           |
| 0391  | American hornbeam, musclewood           | *Carpinus caroliniana*        | 43      | 4      | X X X                       |
| 0400  | hickory spp.                            | *Carya spp.*                  | 29      | 4      | X X                         |
| 0401  | water hickory                           | *Carya aquatica*              | 29      | 4      | X X                         |
| 0402  | bitternut hickory                       | *Carya cordiformis*           | 29      | 4      | X X                         |
| 0403  | pignut hickory                          | *Carya glabra*                | 29      | 4      | X X                         |
| 0404  | pecan                                   | *Carya illinoiensis*          | 29 E, 47 W | 4 | X X X   |
| 0405  | shellbark hickory                       | *Carya laciniosa*             | 29      | 4      | X X                         |
| 0406  | nutmeg hickory                          | *Carya myristiciformis*       | 29      | 4      | X X                         |
| 0407  | shagbark hickory                        | *Carya ovata*                 | 29      | 4      | X X                         |
| 0408  | black hickory                           | *Carya texana*                | 29      | 4      | X X                         |
| 0409  | mockernut hickory                       | *Carya alba*                  | 29      | 4      | X X                         |
| 0410  | sand hickory                            | *Carya pallida*               | 29      | 4      | X X                         |
| 0411  | scrub hickory                           | *Carya floridana*             | 29 E, 47 W | 4 | X X                       |
| 0412  | red hickory                             | *Carya ovalis*                | 29 E, 47 W | 4 | X X                       |
| 0413  | southern shagbark hickory               | *Carya carolinana-septentrionalis* | 29 E, 47 W | 4 | X X                       |
| 0420  | chestnut spp.                           | *Castanea spp.*               | 43 E, 47 W | 3 | X X                         |
| 0421  | American chestnut                       | *Castanea dentata*            | 43      | 3      | X X                         |
| 0422  | Allegheny chinkapin                     | *Castanea pumila*             | 43      | 3      | X X                         |
| 0423  | Ozark chinkapin                         | *Castanea pumila var. ozarkensis* | 43 | 3 X                           |
| 0424  | Chinese chestnut                        | *Castanea mollissima*         | 43 E, 47 W | 3 | X X X                       |
| 0431  | giant chinkapin,golden chinkapin         | *Chrysolepis chrysophylla var. chrysophylla* | 47 | 3 | X   |
| 0450  | catalpa spp.                            | *Catalpa spp.*                | 42      | 4      | X X                         |
| 0451  | southern catalpa                        | *Catalpa bignonioides*        | 43      | 4      | X X                         |
| 0452  | northern catalpa                        | *Catalpa speciosa*            | 41      | 3      | X X                         |
| 0460  | hackberry spp.                          | *Celtis*                      | 41      | 3      | X X                         |
| 0461  | sugarberry                              | *Celtis laevigata*            | 41 E, 47 W | 3 | X X                         |
| 0462  | hackberry                               | *Celtis occidentalis*         | 41 E, 47 W | 3 | X X                         |
| 0463  | netleaf hackberry                       | *Celtis laevigata var. reticulata* | 41 | 3 X                           |
| 0471  | eastern redbud                          | *Cercis canadensis*           | 43      | 3      | X X                         |
| 0475  | curledleaf mountain-mahogany            | *Cercocarpus ledifolius*      | 48      | 4      | X X                         |
| 0481  | yellowwood                              | *Cladrastis kentukea*         | 43      | 4      | X X                         |
| 0490  | dogwood spp.                            | *Cornus spp.*                 | 43 E, 47 W | 4 | X X                       |
| 0491  | flowering dogwood                       | *Cornus florida*              | 42      | 4      | X X                         |
| 0492  | Pacific dogwood                         | *Cornus nuttallii*            | 47      | 4      | X X                         |
| 0500  | hawthorn spp.                           | *Craetaegus spp.*             | 43 E, 47 W | 4 | X X                       |
| 0501  | cockspur hawthorn                       | *Craetaegus crus-galli*       | 43      | 4      | X X                         |
| 0502  | downy hawthorn                          | *Craetaegus mollis*           | 43      | 4      | X X                         |
| 0503  | Brainerd's hawthorn                     | *Craetaegus brainerdii*       | 43 E, 47 W | 4 | X X                       |
| 0504  | pear hawthorn                           | *Craetaegus calpodendron*     | 43 E, 47 W | 4 | X X                       |
| 0505  | fireberry hawthorn                      | *Craetaegus chrysocarpa*      | 43 E, 47 W | 4 | X X                       |
| 0506  | broadleaf hawthorn                      | *Craetaegus dilatata*         | 43 E, 47 W | 4 | X X                       |
| 0507  | fanleaf hawthorn                        | *Craetaegus flabellata*       | 43 E, 47 W | 4 | X X                       |
| 0508  | oneseed hawthorn                        | *Craetaegus monogyna*         | 43 E, 47 W | 4 | X X                       |
| 0509  | scarlet hawthorn                        | *Craetaegus pedicellata*      | 43 E, 47 W | 4 | X X                       |
| 5091  | Washington hawthorn                     | *Craetaegus phaeomypum*       | 43 E, 47 W | 4 | X X                       |
| 5092  | fleshy hawthorn                         | *Craetaegus succulenta*       | 43 E, 47 W | 4 | X X                       |
| 5093  | dwarf hawthorn                          | *Craetaegus uniflora*         | 43 E, 47 W | 4 | X X                       |
| 0510  | eucalyptus spp.                         | *Eucalyptus spp.*             | 42 E, 47 W | 4 | X X                       |
| 0511  | Tasmanian blue gum                      | *Eucalyptus globulus*         | 43 E, 47 W | 4 | X X                       |
| 0512  | river redgum                            | *Eucalyptus camaldulensis*    | 43 E, 47 W | 4 | X X                       |
| 0513  | grand eucalyptus                        | *Eucalyptus grandis*          | 43 E, 47 W | 4 | X X                       |
| 0514  | swampmahogany                           | *Eucalyptus robusta*          | 43 E, 47 W | 4 | X X                       |
| 0520  | persimmon spp.                          | *Diospyros spp.*              | 43 E, 47 W | 4 | X X                       |
| 0521  | common persimmon                        | *Diospyros virginiana*        | 42      | 4      | X X                       |

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| SPCD | COMMON NAME                | SCIENTIFIC NAME          | SPCRGC | MAJGRP | NC | NE | PNW | RM | SO |
|------|---------------------------|--------------------------|--------|--------|----|----|-----|----|----|
| 0522 | Texas persimmon           | Diospyros texana         | 43 E, 47 W | 4   |    | X  |     |    |    |
| 0523 | Anacua knockaway          | Ehretia anacua           | 48     | 3    |    | X  |     |    |    |
| 0531 | American beech            | Fagus grandifolia        | 33     | 4    |    | X  |     | X  |    |
| 0540 | ash spp.                  | Fraxinus spp.            | 36 E, 47 W | 3 |    | X  | X  | X  |    |
| 0541 | white ash                 | Fraxinus americana       | 36     | 4    |    | X  |     | X  |    |
| 0542 | Oregon ash                | Fraxinus latifolia       | 47     | 4    |    |    |     |    |    |
| 0543 | black ash                 | Fraxinus nigra           | 36     | 3    |    | X  |     | X  |    |
| 0544 | green ash                 | Fraxinus pennsylvanica   | 36 E, 47 W | 4 |    | X  | X  | X  |    |
| 0545 | pumpkin ash               | Fraxinus profunda        | 36     | 3    |    | X  |     | X  |    |
| 0546 | blue ash                  | Fraxinus quadrangularita | 36     | 4    |    | X  |     | X  |    |
| 0547 | velvet ash                | Fraxinus velutina        | 47     | 4    |    |    |     | X  | X  |
| 0548 | Carolina ash              | Fraxinus caroliniana     | 36     | 4    |    |    |     |    |    |
| 0549 | Texas ash                 | Fraxinus texensis        | 36 E, 47 W | 3 |    |    |    |    |    |
| 5491 | Berlandier ash            | Fraxinus berlandieriana  | 36     | 3    |    |    |     |    |    |
| 0550 | honeylocust spp.          | Gleditsia spp.           | 42 E, 47 W | 4 |    | X  | X  |    |    |
| 0551 | waterlocust               | Gleditsia aquatica       | 42     | 4    |    |    |     | X  |    |
| 0552 | honeylocust               | Gleditsia triacanthos    | 42 E, 47 W | 4 |    | X  | X  | X  |    |
| 0555 | loblolly-bay              | Gordonia lasianthes      | 41     | 3    |    |    |     |    |    |
| 0561 | Ginkgo, maidenhair tree   | Ginkgo biloba            | 43 E, 47 W | 3 |    | X  | X  |    |    |
| 0571 | Kentucky coffee tree      | Gymnocladus dioicus      | 42     | 4    |    |    |     | X  |    |
| 0580 | silverbell spp.           | Halesia spp.             | 43     | 3    |    | X  |     | X  |    |
| 0581 | Carolina silverbell       | Halesia carolina         | 41 E, 47 W | 3 |    |    |    |    |    |
| 0582 | two-wing silverbell       | Halesia diptera          | 41 E, 47 W | 3 |    |    |    |    |    |
| 0583 | little silverbell         | Halesia parviflora       | 41 E, 47 W | 3 |    |    |    |    |    |
| 0591 | American holly            | Ilex opaca               | 42 E, 47 W | 4 |    | X  | X  | X  |    |
| 0600 | walnut spp.               | Juglans spp.             | 41 E, 47 W | 4 |    | X  | X  | X  |    |
| 0601 | butternut                 | Juglans cinerea          | 41     | 3    |    | X  |     | X  |    |
| 0602 | black walnut              | Juglans nigra            | 40 E, 47 W | 4 |    | X  | X  | X  |    |
| 0603 | northern California black | Juglans hindsii          | 47     | 4    |    |    |     |    |    |
| 0604 | walnut                   | Juglans californica      | 47     | 4    |    |    |     |    | X  |
| 0605 | Texas walnut              | Juglans microcarpa       | 41 E, 47 W | 4 |    | X  |    |    |    |
| 0606 | Arizona walnut            | Juglans major            | 43 E, 47 W | 4 |    |    |    |    |    |
| 0611 | sweetgum                 | Liquidambar styraciflua  | 34 E, 47 W | 3 |    | X  | X  |    |    |
| 0621 | yellow-poplar             | Liriodendron tulipifera  | 39     | 3    |    | X  |     | X  |    |
| 0631 | tanoak                   | Lithocarpus densiflorus  | 47     | 4    |    |    |     |    | X  |
| 0641 | Osage-orange              | Machura pomifera         | 43     | 4    |    | X  |     | X  |    |
| 0650 | magnolia spp.             | Magnolia spp.            | 41     | 3    |    | X  |     | X  |    |
| 0651 | cucumbertree              | Magnolia acuminata       | 41     | 3    |    | X  |     | X  |    |
| 0652 | southern magnolia         | Magnolia grandiflora     | 41     | 3    |    |    |     |    |    |
| 0653 | sweetbay                 | Magnolia virginiana      | 43     | 3    |    |    |     |    |    |
| 0654 | bigleaf magnolia          | Magnolia macrophylla     | 43     | 4    |    |    |     |    |    |
| 0655 | mountain or Fraser magnolia | Magnolia fraseri       | 41     | 3    |    | X  |     | X  |    |
| 0657 | pyramid magnolia          | Magnolia pyramidata      | 41 E, 47 W | 3 |    |    |    |    |    |
| 0658 | umbrella magnolia         | Magnolia tripetala       | 41 E, 47 W | 3 |    | X  | X  |    |    |
| 0660 | apple spp.                | Malus spp.               | 43 E, 47 W | 4 |    | X  | X  | X  |    |
| 0661 | Oregon crab apple         | Malus fusca              | 47     | 4    |    |    |     |    | X  |
| 0662 | southern crabapple        | Malus angustifolia       | 43 E, 47 W | 4 |    | X  | X  |    |    |
| 0663 | sweet crabapple           | Malus coronaria          | 43 E, 47 W | 4 |    | X  | X  |    |    |
| 0664 | prairie crabapple         | Malus ioensis            | 43 E, 47 W | 4 |    |    |    |    |    |
| 0680 | mulberry spp.             | Morus spp.               | 42     | 4    |    | X  |     | X  |    |
| 0681 | white mulberry            | Morus alba               | 42     | 4    |    | X  |     | X  |    |
| 0682 | red mulberry              | Morus rubra              | 42     | 4    |    |    |     | X  |    |
| 0683 | Texas mulberry            | Morus microphylla        | 42 E, 47 W | 4 |    |    |    |    |    |
| 0684 | black mulberry            | Morus nigra              | 43 E, 47 W | 4 |    |    |    |    |    |
| 0690 | tupelo spp.               | Nyssa spp.               | 35 E, 47 W | 3 |    | X  | X  |    |    |
| 0691 | water tupelo              | Nyssa aquatica           | 35     | 3    |    |    |     |    |    |
| 0692 | Ogeechee tupelo           | Nyssa ogeeche            | 43     | 4    |    |    |     |    |    |
### Occurrence by FIA work unit

| SPCD | COMMON NAME          | SCIENTIFIC NAME     | SPGRPCD | MAJGRP | NC | NE | PNW | RM | SO |
|------|----------------------|---------------------|---------|--------|----|----|-----|----|----|
| 0693 | blackgum             | Nyssa sylvatica     | 35      | 3      | X  | X  |     | X  |    |
| 0694 | swamp tupelo         | Nyssa biflora       | 35      | 3      | X  | X  |     | X  |    |
| 0701 | eastern hop hornbeam | Ostrya virginiana   | 43      | 4      | X  | X  |     | X  |    |
| 0711 | sourwood             | Oxydendrum arboreum | 43      | 4      | X  | X  |     | X  |    |
| 0712 | Paulownia, empress-tree | Paulownia tomentosa | 41      | 3      | X  | X  |     | X  |    |
| 0720 | bay spp.             | Persea spp.         | 43 E, 47 W | 3   | X  |     | X  |    |
| 0721 | redbay               | Persea borbonia     | 41      | 3      | X  | X  |     | X  |    |
| 0722 | water-elm, planertree| Planera aquatica    | 43      | 3      | X  | X  |     | X  |    |
| 0729 | Sycamore spp.        | Platanus spp.       | 41 E, 47 W | 3   | X  |     | X  |    |
| 0730 | California sycamore  | Platanus racemosa   | 47      | 3      |    |    |     |    |    |
| 0731 | American sycamore    | Platanus occidentalis | 41 E, 47 W | 3   | X  |     | X  |    |
| 0732 | Arizona sycamore     | Platanus wrightii   | 41 E, 47 W | 3   |    |    |    |    |
| 0740 | cottonwood and poplar spp. | Populus spp. | 37 E, 44 W | 3 | X | X | X |    |
| 0741 | balsam poplar        | Populus balsamifera | 37 E, 44 W | 3 | X | X | X |    |
| 0742 | eastern cottonwood   | Populus deltoides   | 37 E, 44 W | 3 | X | X | X |    |
| 0743 | bigtooth aspen       | Populus grandidentata | 37 | 3 | X | X |    | |
| 0744 | swamp cottonwood     | Populus heterophylla | 37 | 3 | X | X | | |
| 0745 | plains cottonwood    | Populus deltoides spp. monilifera | 37 E, 44 W | 3 | X | X | | |
| 0746 | quaking aspen        | Populus tremuloides | 37 E, 44 W | 3 | X | X | X | X |
| 0747 | black cottonwood     | Populus balsamifera spp. trichocarpa | 37 E, 44 W | 4 | X | X | | |
| 0748 | Fremont cottonwood   | Populus fremontii   | 37 E, 44 W | 4 | X | X | X | |
| 0749 | narrowleaf cottonwood| Populus angustifolia | 37 E, 44 W | 3 | X | X | X | |
| 0752 | silver poplar        | Populus alba        | 37      | 3      | X  | X  |     | X  |    |
| 0753 | Lombardy poplar      | Populus nigra       | 37 E, 44 W | 3 | X | X | X | |
| 0755 | mesquite spp.        | Prosopis spp.       | 48      | 4      |    |    |     |    |    |
| 0756 | honey mesquite       | Prosopis glandulosa | 48      | 4      | X  | X  |     | X  |    |
| 0757 | velvet mesquite      | Prosopis velutina   | 48      | 4      | X  | X  |     | X  |    |
| 0758 | screwbean mesquite   | Prosopis pubescens  | 48      | 4      | X  | X  |     | X  |    |
| 0760 | cherry and plum spp. | Prunus spp.         | 43 E, 47 W | 4 | X | X | X | |
| 0761 | pin cherry           | Prunus pensylvanica | 43      | 3      | X  | X  |     | X  |    |
| 0762 | black cherry         | Prunus serotina     | 41      | 3      | X  | X  |     | X  |    |
| 0763 | chokecherry          | Prunus virginiana   | 43 E, 47 W | 4 | X | X | X | |
| 0764 | peach                | Prunus persica      | 43 E, 47 W | 3 | X | X | | |
| 0765 | Canada plum          | Prunus nigra        | 43      | 4      | X  | X  |     | X  |    |
| 0766 | American plum        | Prunus americana    | 43      | 4      | X  | X  |     | X  |    |
| 0768 | bitter cherry        | Prunus emarginata   | 47      | 4      | X  | X  |     | X  |    |
| 0769 | Allegheny plum       | Prunus alleghaniensis | 43 E, 47 W | 3 | X | X | X | |
| 0770 | Chickasaw plum       | Prunus angustifolia | 43 E, 47 W | 3 | X | X | X | |
| 0771 | sweet cherry, domesticated | Prunus avium | 43 E, 47 W | 3 | X | X | X | |
| 0772 | sour cherry, domesticated | Prunus cerasus | 43 E, 47 W | 3 | X | X | X | |
| 0773 | European plum        | Prunus domestica    | 43 E, 47 W | 3 | X | X | X | |
| 0774 | Mahaleb cherry, domesticated | Prunus mahaleb | 43 E, 47 W | 3 | X | X | X | |
| 0800 | oak spp              | Quercus spp.       | 42 E, 48 W | 4 | X | X | X | X |
| 0801 | California live oak  | Quercus agrifolia  | 46      | 4      | X  | X  |     | X  |    |
| 0802 | white oak            | Quercus alba       | 25      | 4      | X  | X  |     | X  |    |
| 0803 | Arizona white oak    | Quercus arizonica  | 48      | 4      | X  | X  |     | X  |    |
| 0804 | swamp white oak      | Quercus bicolor    | 25      | 4      | X  | X  |     | X  |    |
| 0805 | canyon live oak      | Quercus chrysolepis | 46      | 4      |    |    |     |    |    |
| 0806 | scarlet oak          | Quercus coccinea   | 28      | 4      | X  | X  |     | X  |    |
| 0807 | blue oak             | Quercus douglasii  | 46      | 4      |    |    |     |    |    |
| 0808 | Durand oak           | Quercus sinuata var. sinuata | 25 | 4 | | | | | |
| 0809 | northern pin oak     | Quercus ellipsoidalis | 28 | 4 | X | X | | |
| 0810 | Emory oak            | Quercus emory      | 48      | 4      | X  | X  |     | X  |    |
| 0811 | Engelmann oak        | Quercus engelmannii | 46      | 4      | X  | X  |     | X  |    |
| 0812 | southern red oak     | Quercus falcata    | 28      | 4      | X  | X  |     | X  |    |
| SPCD | COMMON NAME            | SCIENTIFIC NAME | SPGRPCD | MAJGRP | NC | NE | PNW | RM | SO |
|------|------------------------|----------------|---------|--------|----|----|-----|----|----|
| 0813 | cherrybark oak        | Quercus pagoda  | 26      | 4      | X  | X  |     |    |    |
| 0814 | Gambel oak            | Quercus gambeli | 48      | 4      |    | X  |     |    |    |
| 0815 | Oregon white oak      | Quercus gambelia| 46      | 4      |    | X  |     |    |    |
| 0816 | scrub oak             | Quercus ilicifolia| 43     | 4      |    |    |     |    |    |
| 0817 | shingle oak           | Quercus imbricaria| 26     | 4      | X  | X  |     |    |    |
| 0818 | California black oak  | Quercus kelloggii| 26     | 4      |    |    |     |    |    |
| 0819 | turkey oak            | Quercus laevis  | 43      | 4      |    |    |     |    |    |
| 0820 | laurel oak            | Quercus laurifolia| 28     | 4      |    | X  |     |    |    |
| 0821 | California white oak  | Quercus lobata  | 46      | 4      |    |    |     |    |    |
| 0822 | overcup oak           | Quercus lyrata  | 27      | 4      | X  | X  |     |    |    |
| 0823 | bur oak               | Quercus macrocarpa| 25     | 4      | X  | X  |     |    |    |
| 0824 | black jack oak        | Quercus marilandica| 28     | 4      | X  | X  |     |    |    |
| 0825 | swamp chestnut oak    | Quercus michauxii| 25     | 4      | X  | X  |     |    |    |
| 0826 | chinkapin oak         | Quercus muehlenbergii| 25     | 4      | X  | X  |     |    |    |
| 0827 | water oak             | Quercus nigra   | 28      | 4      | X  | X  |     |    |    |
| 0828 | Texas red oak         | Quercus texana  | 27      | 4      |    |    |     |    |    |
| 0829 | Mexican blue oak      | Quercus oblongifolia| 48     | 4      |    |    |     |    |    |
| 0830 | pin oak               | Quercus palustris| 28     | 4      | X  | X  |     |    |    |
| 0831 | willow oak            | Quercus phellos | 28      | 4      | X  | X  |     |    |    |
| 0832 | chestnut oak          | Quercus prinus  | 27      | 4      | X  | X  |     |    |    |
| 0833 | northern red oak      | Quercus rubra   | 26      | 4      | X  | X  |     |    |    |
| 0834 | Shumard oak           | Quercus shumardii| 26     | 4      | X  | X  |     |    |    |
| 0835 | post oak              | Quercus stellata| 27      | 4      | X  |    |     |    |    |
| 0836 | Delta post oak        | Quercus similis | 27      | 4      | X  |    |     |    |    |
| 0837 | black oak             | Quercus velutina| 28      | 4      |    | X  |     |    |    |
| 0838 | live oak              | Quercus virginiana| 27     | 4      |    |    |     |    |    |
| 0839 | interior live oak     | Quercus wislizeni| 46     | 4      | X  |    |     |    |    |
| 0840 | dwarf post oak        | Quercus margaretiae| 27     | 4      |    |    |     |    |    |
| 0841 | dwarf live oak        | Quercus minima  | 27      | 4      |    |    |     |    |    |
| 0842 | bluejack oak          | Quercus incana  | 43      | 4      |    |    |     |    |    |
| 0843 | silverleaf oak        | Quercus hypoleucoides| 48     | 4      |    |    |     |    |    |
| 0844 | Oglethorpe oak        | Quercus oglethorpenisa| 27     | 4      |    |    |     |    |    |
| 0845 | dwarf chinkapin oak   | Quercus prinoides| 43     | 4      |    |    |     |    |    |
| 0846 | gray oak              | Quercus grisea  | 48      | 4      |    |    |     |    |    |
| 0847 | netleaf oak           | Quercus rugosa  | 43 E    | 48     | X  |    |     |    |    |
| 0851 | Chisos oak            | Quercus graciilloides| 26     | 4      |    |    |     |    |    |
| 8511 | Graves oak            | Quercus gravesii| 26      | 4      |    |    |     |    |    |
| 8512 | Mexican white oak     | Quercus polymorpha| 26     | 4      |    |    |     |    |    |
| 8513 | Buckley oak           | Quercus buckleyi| 26      | 4      |    |    |     |    |    |
| 8514 | Lacey oak             | Quercus laceyi  | 26      | 4      |    |    |     |    |    |
| 8522 | sea torchwood         | Amyris elemifera| 43 E    | 47     | X  |    |     |    |    |
| 8537 | pond-apple            | Annona glabra   | 43 E    | 47     | X  |    |     |    |    |
| 8543 | gumbo limbo           | Bursera simaruba| 43 E    | 47     | X  |    |     |    |    |
| 8558 | sheoak spp.           | Casuarina spp.  | 43 E    | 47     | X  |    |     |    |    |
| 8563 | gray sheoak           | Casuarina glauca| 43 E    | 47     |    |    |     |    |    |
| 8573 | belah                 | Casuarina lepidophloia| 43 E   | 47     | X  |    |     |    |    |
| 8583 | camphortree           | Cinnamomum camphora| 43 E   | 47     | X  |    |     |    |    |
| 8593 | Florida fiddlewood    | Citharexylum fraticosum| 43 E | 47     | X  |    |     |    |    |
| 8603 | citrus spp.           | Citrus spp.     | 43 E    | 47     | X  |    |     |    |    |
| 8613 | tietongue, pigeon-plum| Coccoloba diversifolia| 43 E | 47     | X  |    |     |    |    |
| 8623 | soldierwood           | Colubrina elliptica| 43 E   | 47     | X  |    |     |    |    |
| 8633 | longleaf geigertree   | Cordia sebestena| 43 E    | 47     |    |    |     |    |    |
| 8651 | Anacahuita Texas Olive| Cordia boissieri| 27      | 4      |    |    |     |    |    |
| 8662 | carrotwood            | Cupaniopsis anacardioides| 43 E  | 47     | X  |    |     |    |    |
| 8672 | bluewood              | Cordia hookeri  | 48      | 4      |    |    |     |    |    |
| 8682 | blackhead ebony       | Ebenopsis ebano | 42 E    | 47     | X  |    |     |    |    |
| 8693 | great leadtree        | Leucaena pulverulenta| 43     | 3      |    |    |     |    |    |
| 8703 | Texas sophora         | Sophora affinis | 42 E    | 4      |    |    |     |    |    |
| 8733 | red stopper           | Eugenia rhombea | 43 E    | 47     | X  |    |     |    |    |
| 8743 | butterbough, inkwood  | Exothea paniculata| 43 E   | 47     | X  |    |     |    |    |
| SPCD | COMMON NAME | SCIENTIFIC NAME       | SPGRPCD | MAJGRP | NC | NE | PNW | RM | SO |
|------|-------------|-----------------------|---------|--------|----|----|-----|----|----|
| 0876 | Florida strangler fig | Ficus aurea | 43 E, 47 W | 3   |     |    |     |    |    |
| 0877 | wild banyan tree, shortleaf fig | Ficus citrifolia | 43 E, 47 W | 3   |     |    |     |    |    |
| 0882 | beeftree, longleaf blolly | Guapira discolor | 43 E, 47 W | 3   |     |    |     |    |    |
| 0883 | manchinel | Hippomane manciella | 43 E, 47 W | 3   |     |    |     |    |    |
| 0884 | false tamarind | Lysiloma latissiliquum | 43 E, 47 W | 3   |     |    |     |    |    |
| 0885 | mango | Mangifera indica | 43 E, 47 W | 3   |     |    |     |    |    |
| 0886 | Florida poison tree | Metopium toxiferum | 43 E, 47 W | 3   |     |    |     |    |    |
| 0887 | fish poison tree | Piscidia piscipula | 43 E, 47 W | 3   |     |    |     |    |    |
| 0888 | octopus tree, schefflera | Schefflera actinophylla | 43 E, 47 W | 3   |     |    |     |    |    |
| 0890 | false mastic | Sideroxylon foetidissimum | 43 E, 47 W | 3   |     |    |     |    |    |
| 0891 | white bully, willow lustic | Sideroxylon latisiliquum | 43 E, 47 W | 3   |     |    |     |    |    |
| 0895 | paradise tree | Simarouba glauca | 43 E, 47 W | 3   |     |    |     |    |    |
| 0896 | Java plum | Syzygium cumini | 43 E, 47 W | 3   |     |    |     |    |    |
| 0897 | tamarind | Tamarindus indica | 43 E, 47 W | 3   |     |    |     |    |    |
| 0901 | black locust | Robinia pseudoacacia | 42 E, 47 W | 4   | X   | X   | X   |    |    |
| 0902 | New Mexico locust | Robinia neomexicana | 48   | 4   |     |    |     | X   |    |
| 0906 | Everglades palm, paurotis-palm | Acoelorraphe wrightii | 43 E, 47 W | 3   |     |    |     |    |    |
| 0907 | Florida silver palm | Coccolithrinax argentata | 43 E, 47 W | 3   |     |    |     |    |    |
| 0908 | coconut palm | Cocos nucifera | 43 E, 47 W | 3   |     |    |     |    |    |
| 0909 | royal palm spp. | Roystonea spp. | 43 E, 47 W | 3   |     |    |     |    |    |
| 0911 | Mexican palmetto | Sabal Mexicana | 41 E | 3   |     |    |     |    |    |
| 0912 | cabbage palmetto | Sabal palmetto | 43 E, 47 W | 3   |     |    |     |    |    |
| 0913 | key thatch palm | Thrinax morrisii | 43 E, 47 W | 3   |     |    |     |    |    |
| 0914 | Florida thatch palm | Thrinax radiata | 43 E, 47 W | 3   |     |    |     |    |    |
| 0915 | other palms | Family Arecaceae not listed | 43 E, 47 W | 3   |     |    |     |    |    |
| 0919 | western soapberry | Sapium sapovaria var. drummondii | 43 | 4   | X   |    |     |    |    |
| 0920 | willow spp. | Salix spp. | 43 E, 47 W | 3   | X   | X   | X   | X   |    |
| 0921 | peachleaf willow | Salix amygdaloides | 43 | 3   | X   |    |     |    |    |
| 0922 | black willow | Salix nigra | 41 E, 47 W | 3   | X   | X   |    |    |    |
| 0923 | Bebb willow | Salix bebbiana | 43 E, 47 W | 3   |     |    |     |    |    |
| 0924 | Bonpland willow | Salix bonplandiana | 41 E, 47 W | 3   |     |    |     |    |    |
| 0925 | coastal plain willow | Salix caroliniana | 43 E, 47 W | 3   | X   | X   |    |    |    |
| 0926 | balsam willow | Salix pyrifolia | 43 E, 47 W | 3   | X   |    |     |    |    |
| 0927 | white willow | Salix alba | 41 | 3   | X   |    |     |    |    |
| 0928 | Scouler’s willow | Salix scoulerianna | 41 E, 47 W | 3   | X   |    |     |    |    |
| 0929 | weeping willow | Salix sepulcralis | 41 E, 47 W | 3   | X   |    |     |    |    |
| 0931 | sassafras | Sassafras albidum | 41 | 3   | X   |    |     |    |    |
| 0934 | mountain-ash spp. | Sorbus spp. | 43 E, 47 W | 4   | X   |   |    |    |    |
| 0935 | American mountain-ash | Sorbus americana | 43 | 4   | X   |    |     |    |    |
| 0936 | European mountain-ash | Sorbus aucuparia | 43 | 4   | X   |    |     |    |    |
| 0937 | northern mountain-ash | Sorbus decora | 43 E, 47 W | 4   | X   |    |     |    |    |
| 0940 | West Indian mahogany | Swietenia mahagoni | 43 E, 47 W | 4   | X   |    |     |    |    |
| 0950 | basswood spp. | Tilia spp. | 38 | 3   | X   |    |     |    |    |
| 0951 | American basswood | Tilia americana | 38 | 3   | X   |    |     |    |    |
| 0952 | white basswood | Tilia americana var. heterophylla | 38 | 3   | X   |    |     |    |    |
| 0953 | Carolina basswood | Tilia americana var. caroliniana | 38 | 3   | X   |    |     |    |    |
| 0970 | elm spp. | Ulmus | 41 | 3   | X   |    |     |    |    |
| 0971 | winged elm | Ulmus alata | 41 | 4   | X   |    |     |    |    |
| 0972 | American elm | Ulmus americana | 41 E, 47 W | 3   | X   | X   |    |    |    |
| 0973 | cedar elm | Ulmus crassifolia | 41 | 3   | X   |    |     |    |    |
| 0974 | Siberian elm | Ulmus pumila | 41 E, 47 W | 3   | X   | X   |    |    |    |
| 0975 | slippery elm | Ulmus rubra | 41 | 3   | X   |    |     |    |    |
| 0976 | September elm | Ulmus serotina | 41 | 3   | X   |    |     |    |    |
| 0977 | rock elm | Ulmus thomasi | 42 | 4   | X   |    |     |    |    |
| 0981 | California-laurel | Umbellularia californica | 47 | 4   |   |    |     |    |    |
| 0982 | Joshua tree | Yucca brevifolia | 43 E, 47 W | 3   | X   |    |     |    |    |
| SPCD | COMMON NAME            | SCIENTIFIC NAME       | SPGPCD   | MAJGRP | Occurrence by FIA work unit |
|------|------------------------|-----------------------|----------|--------|----------------------------|
| 0986 | black-mangrove         | Avicennia germinans   | 43 E, 47 W | 4      | X                          |
| 0987 | button mangrove        | Conocarpus erectus    | 43 E, 47 W | 4      | X                          |
| 0988 | white-mangrove         | Laguncularia racemosa | 43 E, 47 W | 4      | X                          |
| 0989 | American mangrove      | Rhizophora mangle     | 43        | 4      | X                          |
| 0990 | desert ironwood        | Olneya tesota        | 43 E, 48 W | 4      | X                          |
| 0991 | saltcedar              | Tamarix spp.         | 43 E, 47 W | 3      | X X X                      |
| 0992 | melaleuca              | Melaleuca quinquenervia | 41 E, 47 W | 3      | X                          |
| 0993 | chinaberry             | Melia azedarach      | 43        | 4      | X X X                      |
| 0994 | Chinese tallowtree     | Triadica sebifera    | 43        | 4      | X                          |
| 0995 | tungoil tree           | Vernicia fordii      | 43        | 4      | X                          |
| 0996 | smoketree              | Cotinus obovatus     | 43        | 4      | X                          |
| 0997 | Russian-olive          | Elaeagnus angustifolia | 43 E, 47 W | 3      | X                          |
| 0998 | unknown dead hardwood  | Tree broadleaf       | 43 E, 47 W | 3      | X X X                      |
| 0999 | other or unknown live tree | Tree unknown   | 43 E, 47 W | 3      | X X X                      |
## Appendix G. Tree Species Group Codes

| Species group name                      | Code |
|----------------------------------------|------|
| **Softwood species groups**            |      |
| **Eastern softwood species groups**    |      |
| Longleaf and slash pines               | 1    |
| Loblolly and shortleaf pines           | 2    |
| Other yellow pines                     | 3    |
| Eastern white and red pines            | 4    |
| Jack pine                              | 5    |
| Spruce and balsam fir                  | 6    |
| Eastern hemlock                        | 7    |
| Cypress                                | 8    |
| Other eastern softwoods                | 9    |
| **Western softwood species groups**    |      |
| Douglas-fir                            | 10   |
| Ponderosa and Jeffrey pines            | 11   |
| True fir                               | 12   |
| Western hemlock                        | 13   |
| Sugar pine                             | 14   |
| Western white pine                     | 15   |
| Redwood                                | 16   |
| Sitka spruce                           | 17   |
| Engelmann and other spruces            | 18   |
| Western larch                          | 19   |
| Incense-cedar                          | 20   |
| Lodgepole pine                         | 21   |
| Western redcedar                       | 22   |
| Western woodland softwoods             | 23   |
| Other western softwoods                | 24   |
| **Hardwood species groups**            |      |
| **Eastern hardwood species groups**    |      |
| Select white oaks                      | 25   |
| Select red oaks                        | 26   |
| Other white oaks                       | 27   |
| Other red oaks                         | 28   |
| Hickory                                | 29   |
| Yellow birch                           | 30   |
| Hard maple                             | 31   |
| Soft maple                             | 32   |
| Beech                                  | 33   |
| Sweetgum                               | 34   |
| Tupelo and blackgum                    | 35   |
| Ash                                    | 36   |
| Cottonwood and aspen                   | 37   |
| Basswood                               | 38   |
| Yellow-poplar                          | 39   |
| Black walnut                           | 40   |
| Other eastern soft hardwoods           | 41   |
| Other eastern hard hardwoods           | 42   |
| Eastern noncommercial hardwoods        | 43   |
| **Western hardwood species groups**    |      |
| Cottonwood and aspen                   | 44   |
| Red alder                              | 45   |
| Oak                                    | 46   |
| Other western hardwoods                | 47   |
| Western woodland hardwoods             | 48   |
Appendix H. Damage Agent codes for PNW

Damage Agent is a 2-digit code with values 01 to 91. For Agent and Severity 1, 2 and 3: the agent and severity codes indicate the type of agents that were present on a tree and describe their severity. Several damaging agents are automatically of highest importance and should be coded before any other agents; these agents are grouped as Class I Agents. Class I insects, diseases, or physical injuries can seriously affect vegetation. Failure to account for these agents can result in large differences in predicted outcomes for tree growth, survival, vegetative composition and structure. Class II agents can be important in local situations; recording their incidence and severity provides valuable information for those situations. Class II agents are recorded when present but only after all Class I agents.

Agents and their severity ratings are grouped by broad category. Each category has a general agent and specific agents listed. The general codes should be used if there is any question as to the identity of the specific damaging agent.

### Class I Agents

| Code | Agent | Severity |
|------|-------|----------|
| 01   | General /other bark beetle | 1 Unsuccessful current attack |
| 02   | Mountain pine beetle | 2 Successful current attack |
| 03   | Douglas-fir beetle | 3 Last year’s successful attack |
| 04   | Spruce beetle | 4 Older dead |
| 05   | Western pine beetle | 5 Top kill |
| 06   | Pine engraver beetle | |
| 07   | Fir engraver beetle | |
| 08   | Silver fir beetle | |
| 09   | Red turpentine beetle | |
| 26   | Jeffrey pine beetle | |

### Defoliators:

| Code | Agent | Severity |
|------|-------|----------|
| 10   | General/other | 0 No detectable defoliation |
| 11   | Western blackheaded budworm | 1 Up to 33% of foliage (old and new missing/affected) |
| 12   | Pine butterfly | 2 34 to 66% of foliage missing/affected |
| 13   | Douglas-fir tussock moth | 3 67 to 100% of foliage missing/affected |
| 14   | Larch casebearer | |
| 15   | Western spruce or Modoc budworm | |
| 16   | Western hemlock looper | |
| 17   | Sawflies | |
| 18   | Needles and sheath miners | |
| 19   | Gypsy moth | |
## Class I Agents

| Code | Agent                          | Severity                                                                                     |
|------|--------------------------------|----------------------------------------------------------------------------------------------|
| 60   | General/other                  | 1. Tree is a live tally tree within 30 ft of a tree or stump that has a root disease to which the tally tree is susceptible |
| 61   | Annosus root disease           | 2. Live tally tree with signs or symptoms diagnostic for root disease such as characteristic decay, stain, ectotrophic mycelia, mycelial fans, conks or excessive resin flow at the root collar. No visible crown deterioration. |
| 62   | Armillaria root disease        | 3. Live tally tree with signs or symptoms diagnostic for root disease such as characteristic decay, stain, ectotrophic mycelia, mycelial fans, conks, or excessive resin flow at the root collar. Visible crown deterioration such as thinning chlorotic foliage, reduced terminal growth, and/or stress cones. |
| 63   | Black stain root disease       |                                               |
| 65   | Laminated root rot             |                                               |
| 66   | Port-Orford-cedar root disease |                                               |
| 36   | White pine blister rust        | 1. Branch infections located more than 2.0 feet from tree bole. |
|      |                                | 2. Branch infections located 0.5 to 2.0 feet from bole. |
|      |                                | 3. Bole infections present, Or: branch infections within 0.5 feet of bole |
| 31   | Sudden oak death symptoms      | 1. Bleeding present on bole |
|      |                                | 2. Bleeding present on bole and adjacent mortality present |
|      |                                | 3. Laboratory confirmed sudden oak death |

### White pine blister rust:

| Code | Agent                          |
|------|--------------------------------|
| 36   | White pine blister rust        |

### Sudden oak death (tanoak, coast live oak, black oak):
## Class II Agents

| Code | Agent                          | Code | Severity                                                                 |
|------|--------------------------------|------|--------------------------------------------------------------------------|
|      | **Other insects:**             |      |                                                                          |
|      |                                | 20   | General                                                                 |
|      |                                | 21   | Shoot moths                                                             |
|      |                                | 22   | Weevils                                                                  |
|      |                                | 23   | Wood borers                                                              |
|      |                                | 24   | Balsam wooly adelgid (aphid)                                             |
|      |                                | 25   | Sitka spruce terminal weevil                                             |
|      | **Stem-branch cankers:**       |      |                                                                          |
|      |                                | 33   | Diplodia blight                                                          |
|      |                                | 40   | General/other                                                            |
|      |                                | 41   | Western gall rust (*Pinus ponderosa, Pinus contorta*)                    |
|      |                                | 42   | Commandra blister rust (*Pinus ponderosa*)                              |
|      |                                | 43   | Stalactiform rust (*Pinus contorta*)                                     |
|      |                                | 44   | Atropellis canker (*Pinus spp.*)                                         |
|      |                                | 45   | Cytospora or Phomopsis (*Pseudotsuga menziesii, Abies spp.*)              |
|      | **Pitch canker:**              |      |                                                                          |
|      |                                | 32   | Pitch canker (*CA Pinus spp.*)                                           |
|      | **Stem decays:**               |      |                                                                          |
|      |                                | 46   | General/other                                                            |
|      |                                | 47   | Red ring rot (*Phellinus pini*)                                          |
|      |                                | 48   | Indian paint rot (*Echinodontium tinctorium*)                           |
|      |                                | 49   | Brown cubical rot (*Phaeolus schweinitzii*)                             |

1. Bottlebrush or shortened leaders, 0-2 forks on the tree's stem, Or: <20% of the branches affected, Or: <50% of the bole has visible larval galleries.
2. 3 or more forks on the tree's bole, Or: 20% or more of the branches are affected, Or: the terminal leader is dead, Or: ≥50% of the bole has visible larval galleries.
3. Branch infections present. <50% of the crown affected.
4. Branch infections present. ≥50% of the crown affected, Or: any infection on the bole.
5. No bole canker + <10 infected branch tips
6. No bole canker + ≥10 infected branch tips
7. 1 or more bole cankers + <10 infected branch tips
8. 1 or more bole cankers + ≥10 infected branch tips
9. 1 conk on the stem or present at ground level
10. 2 or more conks separated by <16 feet on bole
11. 2 or more conks separated by ≥16 feet on bole
12. No conks. Visible decay in the interior of the bole.
Class II Agents

| Code | Agent                  | Code             | Severity                                                                 |
|------|------------------------|------------------|--------------------------------------------------------------------------|
|      |                         | Class II Agents  |                                                                          |
|      |                         | Special agents   |                                                                          |
| 50   | Suppression            | Code             | No severity rating                                                       |
| 51   | Excessively deformed   | Agent            |                                                                          |
|      | sapling                | Severity         |                                                                          |
|      |                         | Foliar pathogens |                                                                          |
| 55   | General/other          | Code             |                                                                          |
| 56   | Rhabdocline (only on   | Agent            | 1  <20% of foliage affected, or <20% of                                   |
|      | Pseudotsuga menziesii) |                  | the crown contains brooms.                                               |
| 57   | Elytroderma (only on   |                  | 2  ≥20% of foliage affected, or ≥20% of                                   |
|      | Pinus ponderosa)       |                  | the crown contains brooms.                                               |
| 58   | Broom rusts (only on   |                  |                                                                          |
|      | Abies, Picea, and      |                  |                                                                          |
|      | Juniperus occidentalis |                  |                                                                          |
| 59   | Swiss needle cast      |                  |                                                                          |
|      | (only on               |                  |                                                                          |
|      | Pseudotsuga menziesii) |                  |                                                                          |
|      |                         | Animal agents     |                                                                          |
| 70   | Animal; general/unknown| Code             | 1  <20% of the crown is affected. Bole                                    |
| 71   | Mountain beaver        | Agent            | damage is restricted to less than half of circumference.                   |
| 72   | Livestock              |                  | 2  ≥20% of the crown is affected. Bole                                    |
| 73   | Deer or elk            |                  | damage to half or more of circumference.                                  |
| 74   | Porcupines             |                  |                                                                          |
| 75   | Pocket gophers, squirrels, mice, voles, rabbits, hares | Code             |                                                                          |
| 76   | Beaver                 |                  |                                                                          |
| 77   | Bear                   |                  |                                                                          |
| 78   | Human (not logging)    |                  |                                                                          |
|      | Weather agents         | Weather agents   |                                                                          |
| 80   | Weather; general/unknown| Code             | 1  <20% of the crown is affected.                                        |
| 81   | Windthrow or wind      | Agent            | 2  ≥20% of the crown is affected or any                                   |
|      | breakage               |                  | damage to the bole.                                                      |
| 82   | Snow/ice bending or    |                  |                                                                          |
|      | breakage               |                  |                                                                          |
| 83   | Frost damage on shoots |                  |                                                                          |
| 84   | Winter desiccation      |                  |                                                                          |
| 85   | Drought/moisture       |                  |                                                                          |
|      | deficiency             |                  |                                                                          |
| 86   | Sun scald              |                  |                                                                          |
| 87   | Lightning              |                  |                                                                          |
### Class II Agents

| Physical injury: | Code | Agent                                      | Severity |
|-----------------|------|--------------------------------------------|----------|
|                 | 90   | Other; general/unknown                     |          |
|                 | 91   | Logging damage                             |          |
|                 | 92   | Fire; basal scars or scorch                |          |
|                 | 93   | Improper planting                          |          |
|                 | 94   | Air pollution or other chemical damage     |          |

| Physical defect: | Code | Agent                                      | Severity |
|------------------|------|--------------------------------------------|----------|
|                  | 95   | Unspecified physical defect                |          |
|                  | 96   | Broken/missing top                         |          |
|                  | 97   | Dead top                                   |          |
|                  | 98   | Forks and crooks (only if caused by old top out or dead top) |          |
|                  | 99   | Checks/bole cracks                         |          |

| Code | Severity |
|------|----------|
| 1    | <20% of the crown is affected. |
| 2    | ≥20% of the crown is affected or any damage to the bole. |
| 0    | Severity is not rated |


Appendix I. FIA Inventories by State, Year, and Type

| State code | State name       | Date(s) of available periodic inventory data | Initiation of annual inventory |
|------------|------------------|---------------------------------------------|-------------------------------|
| 1          | Alabama          | 1972, 1982, 1990, 2000                      | 2001                          |
| 2          | Alaska           | 1998                                        | 2004                          |
| 4          | Arizona          | 1985, 1999                                  | 2001                          |
| 5          | Arkansas         | 1978, 1988, 1995                            | 2000                          |
| 6          | California       | 1994                                        | 2001                          |
| 8          | Colorado         | 1984                                        | 2002                          |
| 9          | Connecticut      | 1985, 1998                                  | 2003                          |
| 10         | Delaware         | 1986, 1999                                  | 2004                          |
| 12         | Florida          | 1970, 1980, 1987, 1995                      | 2003                          |
| 13         | Georgia          | 1972, 1982, 1989, 1987                     | 1997                          |
| 16         | Idaho            | 1991                                        | 2004                          |
| 17         | Illinois         | 1985, 1998                                  | 2001                          |
| 18         | Indiana          | 1986, 1998                                  | 1999                          |
| 19         | Iowa             | 1990                                        | 1999                          |
| 20         | Kansas           | 1981, 1994                                  | 2001                          |
| 21         | Kentucky         | 1988                                        | 1999                          |
| 22         | Louisiana        | 1974, 1984, 1991                            | 2001                          |
| 23         | Maine            | 1995                                        | 1999                          |
| 24         | Maryland         | 1986, 1999                                  | 2004                          |
| 25         | Massachusetts    | 1985, 1998                                  | 2003                          |
| 26         | Michigan         | 1980, 1993                                  | 2000                          |
| 27         | Minnesota        | 1977, 1990                                  | 1999                          |
| 28         | Mississippi      | 1977, 1987, 1994                           | 2006                          |
| 29         | Missouri         | 1989                                        | 1999                          |
| 30         | Montana          | 1989                                        | 2003                          |
| 31         | Nebraska         | 1983, 1994                                  | 2001                          |
| 32         | Nevada           | 1989                                        | 2004                          |
| 33         | New Hampshire    | 1983, 1997                                  | 2002                          |
| 34         | New Jersey       | 1987, 1999                                  | 2004                          |
| 35         | New Mexico       | 1987, 1999                                  |                               |
| 36         | New York         | 1993                                        | 2002                          |
| 37         | North Carolina   | 1984, 1990, 2002                            | 2003                          |
| 38         | North Dakota     | 1980, 1995                                  | 2001                          |
| 39         | Ohio             | 1991                                        | 2001                          |
| 40         | Oklahoma         | 1989 (central/west), 1976, 1986, 1993 (east) | 2008 (east)                   |
| 41         | Oregon           | 1992, 1999                                  | 2001                          |
| 42         | Pennsylvania     | 1989                                        | 2000                          |
| 44         | Rhode Island     | 1985, 1998                                  | 2003                          |
| 45         | South Carolina   | 1968, 1978, 1986, 1993                     | 1999                          |
| 46         | South Dakota     | 1980, 1995                                  | 2001                          |
| 47         | Tennessee        | 1980, 1989, 1999                            | 2000                          |
| 48         | Texas            | 1975, 1986, 1992                            | 2001                          |
| 49         | Utah             | 1993                                        | 2000                          |
| State code | State name       | Date(s) of available periodic inventory data | Initiation of annual inventory |
|------------|------------------|---------------------------------------------|-------------------------------|
| 50         | Vermont          | 1983, 1997                                  | 2003                          |
| 51         | Virginia         | 1977, 1985, 1992                            | 1998                          |
| 53         | Washington       | 1991, 2001                                  | 2002                          |
| 54         | West Virginia    | 1989, 2000                                  | 2004                          |
| 55         | Wisconsin        | 1983, 1996                                  | 2000                          |
| 56         | Wyoming          | 1984, 2000                                  |                               |
| 72         | Puerto Rico      | 2001, 2002, 2003, 2004                      |                               |
| 78         | US Virgin Islands| 2004                                        |                               |

1 insufficient funding to continue annual inventory after 2005
Appendix J. Biomass Estimation in the FIADB

In previous versions of the FIADB, a variety of regional methods were used to estimate tree biomass for live and dead trees in the TREE table. In FIADB 4.0, a new nationally consistent method of estimating tree biomass has been implemented. This new approach, called the component ratio method (CRM) (Heath and others 2009), involves calculating the dry weight of individual components before estimating the total aboveground or belowground biomass. The CRM approach is based on:

- converting the sound volume of wood (VOLCFSND) in the merchantable bole to biomass using a compiled set of wood specific gravities (Miles and Smith 2009) (see REF_SPECIES table for values)
- calculating the biomass of bark on the merchantable bole using a compiled set of percent bark estimates and bark specific gravities (Miles and Smith 2009) (see REF_SPECIES table for values)
- calculating the biomass of the entire tree (total aboveground biomass), merchantable bole (including bark), and belowground biomass, using equations from Jenkins and others (2003)
- calculating the volume of the stump (wood and bark) based on equations in Raile (1982) and converting this to biomass using the same specific gravities used for the bole wood and bark
- calculating the top biomass (tree tip and all branches) by subtracting all other biomass components from the total aboveground estimate
- calculating an adjustment factor by developing a ratio between bole biomass calculated from VOLCFSND to bole biomass using equations from Jenkins and others (2003)
- applying the adjustment factor to all tree components derived from both Jenkins and Raile

The CRM approach is based on assumptions that the definition of merchantable bole in the volume prediction equations is equivalent to the bole (stem wood) in Jenkins and others (2003), and that the component ratios accurately apply.

The tables in this appendix describe the equations used in FIADB 4.0 to estimate components of tree biomass, including stem wood (bole), top and branches combined, bark, stump, and coarse roots. Most of these components are estimated through a series of ratio equations as described by Jenkins and others (2003). Stem wood biomass is calculated directly from the sound cubic-foot volume of the tree bole, percentage of bark on the bole, and specific gravities of both wood and bark.

The individual component biomass values for bole, top, and stump are not available in FIADB for sapling-size timber tree species and all woodland tree species. Because saplings (trees from 1 to 4.9 inches in diameter) have no volume in FIADB, a ratio method was developed to compute a factor that is applied to saplings based on diameter and species, and the result is stored in DRYBIO_SAPLING. For woodland species (trees where diameter is measured at the root collar [DRC]), volume is calculated from the root collar to a 1½-inch top diameter. Because this volume accounts for a larger portion of the tree than timber species volume equations do, it was determined that the top and stump equations were not applicable to woodland species. Woodland tree volume is converted to biomass and stored in DRYBIO_WDLD_SPP, which is an estimate for total aboveground biomass, excluding foliage, the tree tip (top of the tree above 1½ inches in diameter), and a portion of the stump from ground to DRC. Therefore, only total aboveground and belowground biomass values are estimated for saplings and woodland species.
Definitions of each biomass component and the equations used to estimate the oven-dry weight in pounds are shown in appendix tables J-1 through J-4.

- Appendix table J-1 defines the columns that are stored in the TREE table, and clarifies the set of trees (species, dimensions, live or dead, etc) that are used in each calculation.

- Appendix table J-2 defines the Jenkins component equations and explains how the equation results are used to estimate biomass. The ‘Estimate name’ in this table is the same name found in the coefficient definitions described in the biomass-related columns 38 to 49 of the REF_SPECIES table.

- Appendix table J-3 contains the Jenkins equations used to estimate each biomass component. The equations use the exact coefficient column names found in the REF_SPECIES table (for example, JENKINS_TOTAL_B1 in appendix table J-3 is the column name in REF_SPECIES that holds the value of the coefficient needed in the total aboveground biomass equation). The Jenkins equations use the measured tree diameter to produce an estimate.

- Appendix table J-4 contains the actual equations used in the FIADB to estimate the biomass components stored in the TREE table. These equations are a blend of Jenkins ratios, calculated bole biomass (based on calculated volume from the TREE table), and adjustment factors. The adjustment factor is an important step because it relates measurement-based bole biomass (DRYBIO_BOLE) to generalized equation-based bole biomass to improve or adjust the computed results of the Jenkins equations.

For more information please consult the publication by Heath and others (2009), titled *Investigation into Calculating Tree Biomass and Carbon in the FIADB Using a Biomass Expansion Factor Approach*. 
### Appendix table J-1. Definition of Biomass Components stored in the TREE table.

| Component                          | Column name   | Biomass Component Definition (all are oven-dry biomass, pounds)                                                                                                                                                                                                 |
|------------------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Merchantable stem (bole)           | DRYBIO_BOLE   | Merchantable bole of the tree, includes stem wood and bark, from a 1-foot stump to a 4-inch top diameter. Based on VOLCFSND and specific gravity for the species. For timber species with a DIA $\geq$ 5 inches. Includes live and dead trees. (Note that VOLCFGRS or VOLCFNET might be used after adjustment based on national averages, if VOLCFSND is not available.) |
| Top                                | DRYBIO_TOP    | Top of the tree above 4 inches diameter and all branches; includes wood and bark and excludes foliage. For live and dead timber species with a DIA $\geq$ 5 inches.                                                                                                |
| Stump                              | DRYBIO_STUMP  | Stump of the tree, the portion of a tree bole from ground to 1 foot high, includes wood and bark. For live and dead timber species with a DIA $\geq$ 5 inches.                                                                                                |
| Belowground                        | DRYBIO_BG     | Coarse roots of trees and saplings with a DIA $\geq$ 1 inch. For timber and woodland species, and live and dead trees.                                                                                                                                           |
| Saplings                           | DRYBIO_SAPLING| Total aboveground portion of live trees, excluding foliage. For timber species with a DIA $\geq$ 1 inch and < 5 inches.                                                                                                                                         |
| Woodland tree species              | DRYBIO_WDLD_SPP| Total aboveground portion of a tree, excluding foliage, the tree tip (top of the tree above 1½ inches in diameter) and a portion of the stump from ground to DRC. For live and dead woodland species with a DIA $\geq$ 1 inch. Woodland species can be identified by REF_SPECIES.WOODLAND = X, TREE.DIAHTCD = 2, or TREE.WDLDSTEM > 0 |
Appendix table J-2. Jenkins Biomass Component Equation Definitions (Refer to the REF_SPECIES table for equation coefficients and adjustment factors).

| Component               | Estimate name                          | Definition                                                                 |
|-------------------------|----------------------------------------|---------------------------------------------------------------------------|
| Total aboveground biomass | total_AG_biomass_Jenkins               | Total biomass (oven-dry, pounds) of the aboveground portion of a tree. Includes stem wood, stump, bark, top, branches, and foliage. |
| Stem wood biomass ratio  | stem_ratio                             | A ratio that estimates biomass of the merchantable bole of the tree by applying the ratio to total_AG_biomass_Jenkins. Includes wood only. This is the portion of the tree from a 1-foot stump to a 4-inch top diameter. |
| Stem bark biomass ratio  | bark_ratio                             | A ratio that estimates biomass of the bark on the merchantable bole of the tree by applying the ratio to total_AG_biomass_Jenkins. |
| Foliage biomass ratio    | foliage_ratio                          | A ratio that estimates biomass of the foliage on the entire tree by applying the ratio to total_AG_biomass_Jenkins. |
| Coarse root biomass ratio| root_ratio                             | A ratio that estimates biomass of the belowground portion of the tree by applying the ratio to total_AG_biomass_Jenkins. |
| Stump biomass           | stump_biomass                          | An estimate of the stump biomass of a tree, from the ground to 1 foot high. Uses a series of equations that first estimates the inside and outside bark diameters, then estimates inside and outside bark volumes (Raile 1982). Wood and bark volumes are converted to biomass using specific gravity for the species. |
| Sapling biomass adjustment | JENKINS_SAPLING_ADJUSTMENT              | An adjustment factor that is used to estimate sapling biomass for the tree by applying the factor to the total aboveground estimate, excluding foliage. The adjustment factor was computed as a national average ratio of the DRYBIOT (total dry biomass) divided by the Jenkins total biomass for all 5.0-inch trees, which is the size at which biomass, based on volume, begins. This is used on timber and woodland species. |
Appendix table J-3. Jenkins Biomass Equations (Actual B1 and B2 coefficients and adjustment factors are stored in the REF_SPECIES table.) Note: these equations are used in appendix table J-4 to estimate the biomass components stored in the TREE table.

| Component                        | Equation                                                                 |
|----------------------------------|--------------------------------------------------------------------------|
| total_AG_biomass_Jenkins         | \[= \exp(\text{JENKINS\_TOTAL\_B1} + \text{JENKINS\_TOTAL\_B2} \times \ln(\text{DIA} \times 2.54)) \times 2.2046\] |
| stem_ratio                       | \[= \exp(\text{JENKINS\_STEM\_WOOD\_RATIO\_B1} + \text{JENKINS\_STEM\_WOOD\_RATIO\_B2} / (\text{DIA} \times 2.54))\] |
| bark_ratio                       | \[= \exp(\text{JENKINS\_STEM\_BARK\_RATIO\_B1} + \text{JENKINS\_STEM\_BARK\_RATIO\_B2} / (\text{DIA} \times 2.54))\] |
| foliage_ratio                    | \[= \exp(\text{JENKINS\_FOLIAGE\_RATIO\_B1} + \text{JENKINS\_FOLIAGE\_RATIO\_B2} / (\text{DIA} \times 2.54))\] |
| root_ratio                       | \[= \exp(\text{JENKINS\_ROOT\_RATIO\_B1} + \text{JENKINS\_ROOT\_RATIO\_B2} / (\text{DIA} \times 2.54))\] |
| stem_biomass_Jenkins             | \[= \text{total\_AG\_biomass\_Jenkins} \times \text{stem\_ratio}\] |
| bark_biomass_Jenkins             | \[= \text{total\_AG\_biomass\_Jenkins} \times \text{bark\_ratio}\] |
| bole_biomass_Jenkins             | \[= \text{stem\_biomass\_Jenkins} + \text{bark\_biomass\_Jenkins}\] |
| foliage_biomass_Jenkins          | \[= \text{total\_AG\_biomass\_Jenkins} \times \text{foliage\_ratio}\] |
| root_biomass_Jenkins             | \[= \text{total\_AG\_biomass\_Jenkins} \times \text{root\_ratio}\] |
| stump_biomass                    | Volumes of wood and bark are based on diameter inside bark (DIB) and DOB equations from Raile 1982.  |
|                                 | \[\text{DIB} = (\text{DIA} \times \text{RAILE\_STUMP\_DIB\_B1}) + (\text{DIA} \times \text{RAILE\_STUMP\_DIB\_B2} \times (4.5-\text{HT}) / (\text{HT}+1))\] |
|                                 | \[\text{DOB} = \text{DIA} + (\text{DIA} \times \text{RAILE\_STUMP\_DOB\_B1} \times (4.5-\text{HT}) / (\text{HT}+1))\] |
|                                 | Volume is estimated for 0.1ft (HT) slices from ground to 1 foot high (HT), and summed to compute stump volume.  |
|                                 | Bark_volume = Volume_outside_bark – Volume_inside_bark  |
|                                 | Bark and wood volumes are multiplied by their respective specific gravities and added together to estimate biomass  |
| top_biomass_Jenkins              | \[= \text{total\_AG\_biomass\_Jenkins} – \text{stem\_biomass\_Jenkins} – \text{bark\_biomass\_Jenkins} – \text{foliage\_biomass\_Jenkins} – \text{stump\_biomass\_Jenkins}\] |
Appendix table J-4. Equations used to calculate Biomass Components stored in the TREE table

| Column name          | Equation (refer to Appendix table J-3 for details on variables found in equations below) |
|----------------------|----------------------------------------------------------------------------------------|
| AdjFac               | \( \text{AdjFac} = \frac{\text{DRYBIO\_BOLE}}{\text{bole\_biomass\_Jenkins}} \)               |
| AdjFac_woodland      | \( \text{AdjFac\_woodland} = \frac{\text{DRYBIO\_WDLD\_SPP}}{\text{(total\_AG\_biomass\_Jenkins} - \text{foliage\_biomass\_Jenkins})} \) |
| DRYBIO\_BOLE         | \( \text{VOLUME} = \text{VOLCFSND} \) (or \( \text{VOLCFGRS, VOLCFNET} \) that are adjusted for the percent sound) Volume = includes the volume of wood from a 1-foot stump to a 4-inch top diameter \( = (\text{VOLUME} \times (\text{BARK\_VOL\_PCT} / 100.0) \times (\text{BARK\_SPGR\_GREENVOL\_DRYWWT} \times 62.4)) + (\text{VOLUME} \times (\text{WOOD\_SPGR\_GREENVOL\_DRYWWT} \times 62.4)) \) |
| DRYBIO\_TOP          | \( \text{DRYBIO\_TOP} = \text{top\_biomass\_Jenkins} \times \text{AdjFac} \)               |
| DRYBIO\_STUMP        | \( \text{DRYBIO\_STUMP} = \text{stump\_biomass} \times \text{AdjFac} \)                 |
| DRYBIO\_SAPLING      | \( \text{DRYBIO\_SAPLING} = (\text{total\_AG\_biomass\_Jenkins} - \text{foliage\_biomass\_Jenkins}) \times \text{JENKINS\_SAPLING\_ADJUSTMENT} \) |
| DRYBIO\_WDLD\_SPP    | \( \text{DRYBIO\_WDLD\_SPP} = \text{WOODLAND species are identified by REF\_SPECIES.WOODLAND} = \text{X, TREE.DIAHTCD} = 2, \) and/or \( \text{TREE.WDLDSTEM} > 0 \) Woodland species are identified by \( \text{REF\_SPECIES.WOODLAND} = \text{X, TREE.DIAHTCD} = 2, \) and/or \( \text{TREE.WDLDSTEM} > 0 \) \( \text{VOLUME} = \text{VOLCFSND} \) (or \( \text{VOLCFGRS, VOLCFNET} \) that are adjusted for the percent sound) Volume = includes the volume of wood, bark, and branches \( \text{VOLUME} = \text{includes the volume of wood, bark, and branches} \) \( = (\text{VOLUME} \times (\text{BARK\_VOL\_PCT} / 100.0) \times (\text{BARK\_SPGR\_GREENVOL\_DRYWWT} \times 62.4)) + ((\text{VOLUME} - (\text{VOLUME} \times (\text{BARK\_VOL\_PCT} / 100.0))) \times (\text{WOOD\_SPGR\_GREENVOL\_DRYWWT} \times 62.4)) \) For trees with a DRC \( \geq 5 \) inches: \( \text{VOLUME} = \text{VOLCFSND} \) (or \( \text{VOLCFGRS, VOLCFNET} \) that are adjusted for the percent sound) Volume = includes the volume of wood, bark, and branches \( \text{VOLUME} = \text{includes the volume of wood, bark, and branches} \) \( = (\text{VOLUME} \times (\text{BARK\_VOL\_PCT} / 100.0) \times (\text{BARK\_SPGR\_GREENVOL\_DRYWWT} \times 62.4)) + ((\text{VOLUME} - (\text{VOLUME} \times (\text{BARK\_VOL\_PCT} / 100.0))) \times (\text{WOOD\_SPGR\_GREENVOL\_DRYWWT} \times 62.4)) \) For trees with a DRC \( <5 \) inches: \( \text{DRYBIO\_SAPLING} = (\text{total\_AG\_biomass\_Jenkins} - \text{foliage\_biomass\_Jenkins}) \times \text{JENKINS\_SAPLING\_ADJUSTMENT} \)
| Column name       | Equation (refer to Appendix table J-3 for details on variables found in equations below)                                                                 |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| DRYBIO_BG         | = root_biomass_Jenkins * AdjFac  (for timber spp ≥5 inches DBH)                                                                         |
|                   | = root_biomass_Jenkins * JENKINS_SAPLING_ADJUSTMENT  (for timber species <5 inches DBH)                                                |
|                   | = root_biomass_Jenkins * AdjFac_woodland  (for woodland species ≥1 inch DRC)                                                          |

Note:
- If DIA ≥ 5.0 and VOLCFSN < 0 then VOLUME = VOLCFSN
- If DIA ≥ 5.0 and VOLCFSN = (0 or null) and VOLCFGRS > 0 then VOLUME = VOLCFGRS * Percent Sound
- If DIA ≥ 5.0 and VOLCFSN and VOLCFGRS = (0 or null) then VOLUME = VOLCFNET * (Average ratio of cubic foot sound to cubic foot net volume, calculated as national averages by species group and diameter)
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