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FOREST INVENTORY METHODS

Strategic Model

The Forest Inventory and Analysis (FIA) program of the Northern Research Station (NRS-FIA) is part of the national enhanced FIA program that focuses on a set of six strategic objectives (McRoberts 2005):

- A standard set of variables with nationally consistent meanings and measurements
- Field inventories of all forested lands
- Nationally consistent estimation
- Adherence to national precision standards
- Consistent reporting and data distribution
- Credibility with users and stakeholders

To ensure that these objectives are achieved, 10 strategic approaches have been prescribed:

- A national set of prescribed core variables with a national field manual that prescribes measurement procedures and protocols for each variable
- A nationally consistent plot configuration
- A nationally consistent sampling design
- Estimation using standardized formulas for sample-based estimators
- A national database of FIA data with core standards and user-friendly public access
- A national information management system
- A nationally consistent set of tables of estimates of prescribed core variables
- Publication of statewide tables with estimates of prescribed core variables at 5-year intervals
- Documentation of the technical aspects of the FIA program including procedures, protocols, and techniques
- Peer review and publication of the technical documentation for general access

The result of the strategic objectives and approaches is an inventory program with identifiably new features and a nationally consistent plot configuration, a nationally consistent sampling design for all lands, annual measurement of a proportion of plots in each state, nationally consistent estimation techniques and algorithms, and integration of the ground sampling components of the FIA inventory and the detection monitoring by the U.S. Forest Service's Forest Health Monitoring (FHM) program.

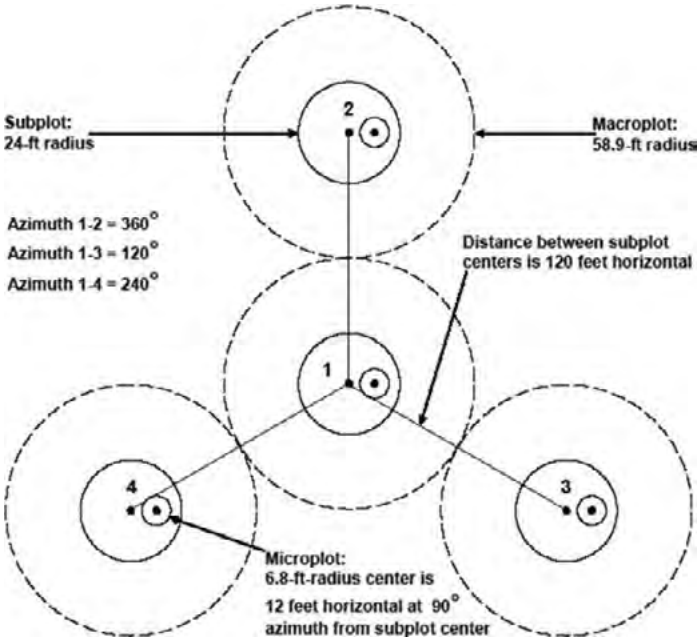

Figure 73.—National Forest Inventory and Analysis plot design.

Plot Configuration

The national FIA plot design consists of four 24-foot-radius subplots (1/24th acre) configured as a central subplot and three peripheral subplots (Fig. 73). Centers of the peripheral subplots are located at distances of 120 feet from the central subplot at azimuths of 0°, 120°, and 240° from the center of the central subplot. Each tree with a diameter at breast height (d.b.h.) of 5 inches or greater is measured on these subplots. Each subplot contains a 6.8-foot-radius microplot with center located 12 feet east of the subplot center on which each tree with d.b.h. between 1 and 5 inches is measured. Forest conditions that occur on any of the four subplots are identified and recorded. If the area of the condition is 1 acre or greater, the condition is mapped on the subplot. Factors that differentiate forest conditions include forest type, stand-size class, stand origin, land use, ownership, and density.

Sample Design

Based on historic sampling errors, a sampling intensity of approximately one plot per 6,000 acres is necessary to satisfy national FIA precision guidelines. Therefore, FIA divided the area of the United States into nonoverlapping, 5,937-acre hexagons and has established a sample plot location in each hexagon. This array of field plots is designated the federal base sample and is considered an equal probability sample; its measurement is funded by the Federal government.

The federal base sample is divided into five interpenetrating panels or subsamples, each of which provides complete, systematic coverage of a state. Each year, plots in a single panel are measured and panels are selected on a 5-year, rotating basis (McRoberts 1999) that is the plots measured in 2008 were measured again in 2013 and the plots measured in 2004 were measured again in 2009. For estimation purposes, the measurement of each panel of plots is considered an independent, equal probability sample of all lands in a state and the remeasurement of a panel is considered an equal probability sample of change occurring on all lands in a state.

Three-phase Inventory

FIA conducts inventories in three phases. Phase 1 (P1) uses remotely sensed data to obtain initial plot land cover observations and to stratify land area in the population of interest to increase the precision of estimates. In Phase 2 (P2), field crews visit the physical locations of permanent field plots to measure traditional inventory variables such as tree species, diameter, and height. In Phase 3 (P3), field crews visit a subset of P2 plots to obtain measurements for an additional suite of variables associated with forest and ecosystem health. The three phases of the enhanced FIA program are discussed in greater detail in the following sections.

Phase 1

Aerial photographs, digital orthoquads (DOQs: digitally scanned aerial photographs), and satellite imagery are used for initial plot measurement and stratification. P1 plot measurement consists of observations of conditions at the plot locations using aerial photographs or DOQs. Analysts determine a digitized geographic location for each field plot, and a human interpreter assigns the plot a land cover/ use. Lands satisfying FIA's definition of forest land include commercial timberland, some pastured land with trees, forest plantations, unproductive forested land, and reserved, noncommercial forested land. In addition, forest land requires minimum stocking levels, a 1-acre minimum area, and a minimum bole-to-bole width of 120 feet with continuous canopy. Forest land excludes wooded strips and windbreaks less than 120 feet wide and idle farmland or other previously nonforest land that currently is below minimum stocking levels. All plot locations that could possibly contain forest land, plus any additional plots that contained forest land at the previous measurement are selected for further measurement via field crew visits in P2.

The combination of natural variability among plots and budgetary constraints prohibits measurement of a sufficient number of plots to satisfy national precision standards for most inventory variables unless the estimation process is enhanced using ancillary data. Thus, the land area is stratified by using remotely sensed data to facilitate stratified estimation.

Currently, NRS-FIA uses canopy density classes to derive strata. Canopy density data are derived from the 2011 National Land Cover Database (NLCD 2011) (Homer et al. 2015), U.S. Forest Service Tree Canopy cartographic dataset (TCC 2011) that was produced through a cooperative project conducted by the Multi-Resolution Land Characteristics (MRLC) Consortium (www.mrlc.gov). TCC 2011 is the NLCD tree canopy cover product that covers the CONUS at a medium spatial resolution (30 m). It was produced by the U.S. Forest Service Remote Sensing Applications Center (RSAC) using a Random Forests™ regression algorithm (Breiman 2001). The layer consists of a single raster layer, percent tree canopy cover with file pixels that characterize subtle variations of forest canopy density as a percentage estimate of forest canopy cover (0 to 100 percent) within every 30 m pixel over the United States; i.e., each individual value represents the area or proportion of that 30 m cell covered by tree canopy. All data are projected to the U.S. Geologic Survey Albers Conical Equal Area using the NAD83 Datum, GRS 1980 Spheroid.

The NLCD 2011 database philosophy and methodology is presented in Homer et al. (2015). Coulston et al. (2012) describe the methodology used to map canopy density for TCC 2011. Data are free to download and are available at: http://www.mrlc.gov/nlcd2011.php. Additional information about this product is found in the metadata file provided as part of the download package.

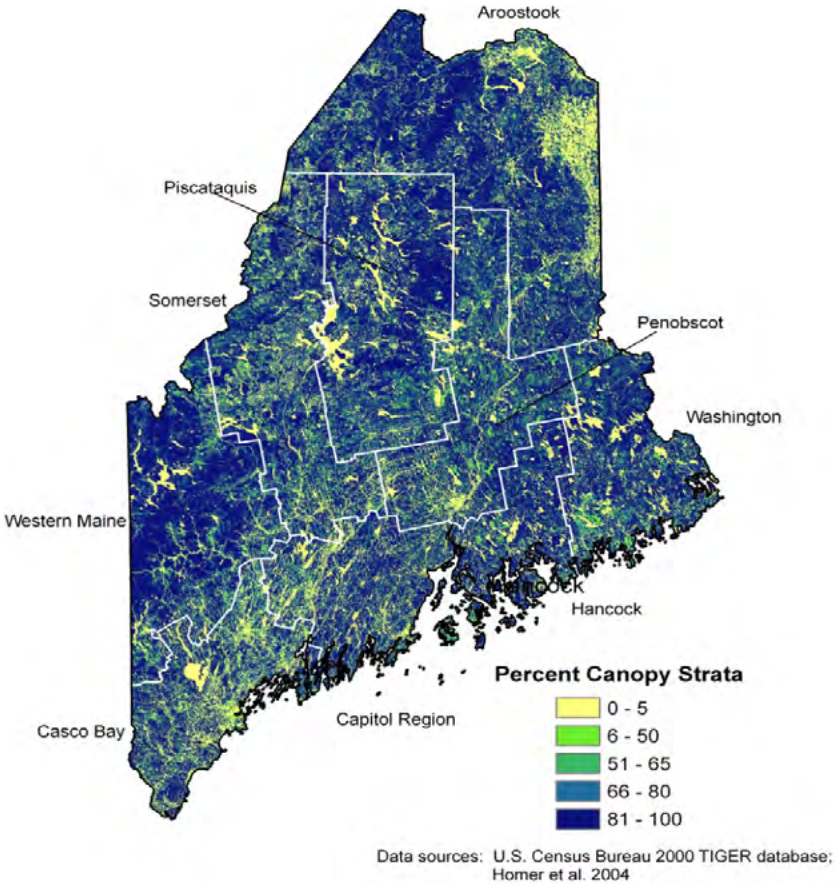

Figure 74.—Maine percent canopy strata groups.

Strata Construction

The current strata categorizations we employ are applied consistently across the entire Northern FIA region. Using plot location information (center of the center subplot), a percent canopy density value is assigned to each plot. Plots are then aggregated into one of five strata based on the center of the center subplot. The percent canopy cover stratification scheme consists of five groupings: (1) 0-5 percent, (2) 6-50 percent, (3) 51-65 percent, (4) 66-80 percent, and (5) 81-100 percent (Fig. 74). These groupings were based on observed natural clumping of pixel values.

In addition to the classification of every pixel into one of the five canopy cover classes, every pixel was also assigned to an ownership class (Fig. 75). The Protected Areas Database (Conservation Biology Institute 2010) was initially used and then state-specific data were added. The largest ownership class, based on pixel counts, was private ownership at nearly 16.5 million acres in Maine. Every pixel was also assigned to a county based on the location of the pixel center. If there were not a sufficient number of plots within a canopy cover class/ownership class/county for valid estimation purposes then specific collapsing rules were used to combine classes until sufficient sample sizes were obtained. These collapsed classes defined the strata used in the estimation. NRS-FIA required a minimum of 10 plots per stratum. Stratified estimation requires that two tasks be accomplished. First, each plot must be assigned to a stratum. Next, the proportion of the total area in each stratum must be calculated. The first task is accomplished by assigning each plot to the stratum assigned for the pixel containing the center of the center subplot.

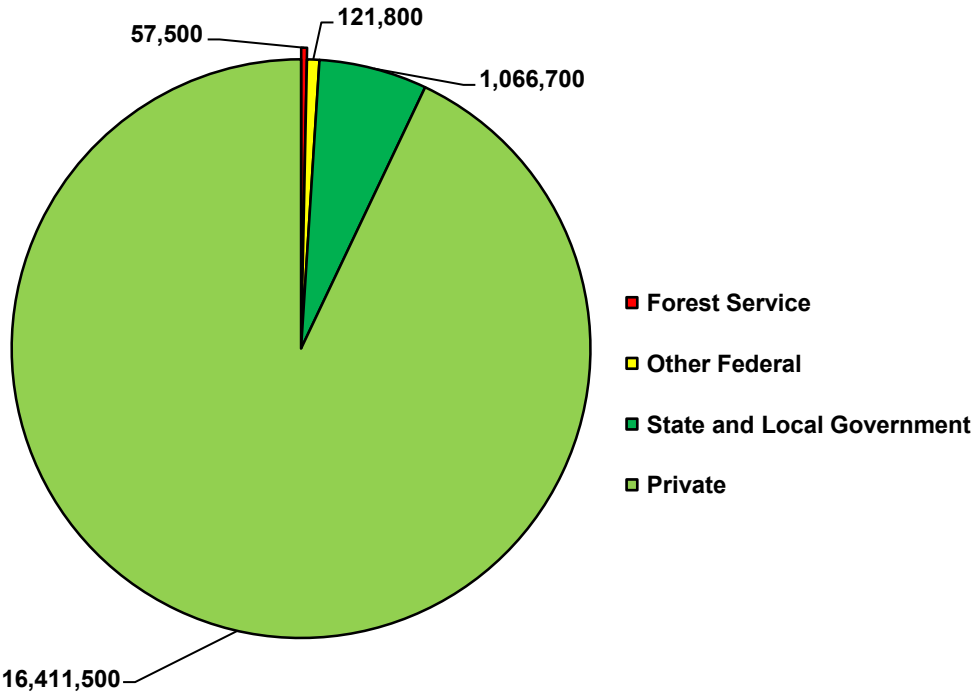

Figure 75.—Ownership class acreages based on pixel counts.

The second task is accomplished by calculating the proportion of pixels in each stratum. The population estimate for a variable is calculated as the sum across all strata of the product of each stratum's observed proportion (from P1) and the variable's estimated mean per unit area for the stratum (from P2). Details of the stratum assignments used are presented in the estimation section of this report that follows the P2 and P3 descriptions.

Phase 2

In Phase 2, field crews record a variety of data for plot locations determined in P1 to determine whether a field visit is required, i.e., forested plots last time regardless of current forest land use. Before visiting plot locations, field crews consult county land records to determine the ownership of plots and then seek permission from private landowners to measure plots on their lands. Once they are at the plot locations, the field crews determine the location of the geographic center of the center subplot using global positioning system (GPS) receivers. They record condition-level observations that include land cover, forest type, stand origin, stand age, stand-size class, site-productivity class, history of forest disturbance, and land use for every condition (major land use of forest stand at least 1 acre in size) that occurs on the plot. They also record information on condition boundaries when multiple conditions are found on a plot. For each tree, field crews record a variety of observations and measurements, including condition, species, live/dead status, lean, diameter, height, crown ratio (percent of tree height represented by crown), crown class (dominant, codominant, suppressed), damage, and decay status. All trees measured in the previous measurement of the plot are remeasured or otherwise accounted for and any new trees that have grown onto the plot are measured. Office staff use statistical models based on field-crew measurements to calculate values for additional variables, including individual-tree volume, volume, and biomass by plot, condition, species group, and live/dead status. The remeasurement of every tree enables the calculation of components of change including growth, mortality, and removals. Details of the data collection procedures used in P2 are available in U.S. Forest Service (2012a).

Phase 3 (2004-2010) and Phase 2+ (2012-ongoing)

The third phase of the enhanced FIA program focuses on forest health. P3 is administered cooperatively by the FIA program, other Forest Service programs, other Federal agencies, State natural resource agencies, and universities, and it is partially integrated with the Forest Health Monitoring (FHM) program. The FHM program consists of four interrelated and complementary activities: detection monitoring, evaluation monitoring, intensive site ecosystem monitoring, and research on monitoring techniques. Detection monitoring consists of systematic aerial and ground surveys designed to collect baseline information on the current condition of forest ecosystems and to detect changes from those baselines over time. Evaluation monitoring studies examine the extent, severity, and probable causes of changes in forest health identified through the detection monitoring surveys. The intensive site ecosystem monitoring program conducts research into regionally specific ecological processes at a network of sites located in representative forested ecosystems. Research on monitoring techniques focuses on developing and refining indicator measurements to improve the efficiency and reliability of data collection and analysis at all levels of the program.

The ground survey portion of the FHM detection monitoring program was integrated into the FIA program as P3 in 1999. The P3 sample consists of a 1:16 subset of the P2 plots with one P3 plot for approximately every 96,000 acres. P3 measurements are obtained by field crews during the growing season and include an extended suite of ecological data: soil quality (erosion, compaction, and chemistry), vegetation diversity and structure, and down woody material. The incidence and severity of ozone injury for selected bioindicator species also are monitored as part of an associated sampling scheme. All P2 measurements are collected on each P3 plot at the same time as the P3 measurements. For additional information on the collection procedures used in P3 see U.S. Forest Service (2011).

P3 variables are selected to address specific criteria outlined by the Montreal Process Working Group for the conservation and sustainable management of temperate and boreal forests (Montreal Process Working Group 1995) and are based on the concept of indicator variables. Observations of an indicator variable represent an index of ecosystem functions that can be monitored over time to assess trends. Indicator variables are used in conjunction with each other, P2 data, data from FHM evaluation monitoring studies, and ancillary data to address ecological issues such as vegetation diversity, fuel loading, regional air-quality gradients, and carbon storage. The P2 and P3 data of the enhanced FIA program are a primary source of reporting data for the Montreal Process criteria and indicators (for more information, see Woodall et al. 2011).

For most forest health indicators, P2+ is a more refined and statistically powerful version of P3, collecting only the more important attributes and sampling a greater number of plots. The P3 sample included approximately 6.3 percent of the P2 plots. Since 2012, P2+ protocols have been completed on approximately 12.5 percent of the P2 plots (including the historical P3 plots) and may be completed on up to approximately 25 percent of the plots depending upon future funding. The soils indicator is the one exception which will remain with the 6.3 percent sample intensity using the historical P3 plots and sampling protocol. The field guide for collecting attributes on P2+ plots (U.S. Forest Service 2016) includes details on sampling sapling length, advance tree seedling regeneration (ATSR), vegetation profiles, invasive plants, down woody materials (DWM), soils, and tree crowns. Besides an invasive plants inventory, P3 and P2+ were not implemented in 2011.

Estimation

The FIA sample includes 3,562 plots selected across Maine. These plots are located within 30 unique strata (Table A) defined by combinations of the five P1 canopy cover classes: (1) 0 to 5 percent, (2) 6 to 50 percent, (3) 51 to 65 percent, (4) 66 to 80 percent, and (5) 81 to 100 percent, a land ownership classification created from the Protected Areas Database (Conservation Biology Institute 2010), and county groups (FIA units). Nationally consistent algorithms were used to assign forest type and stand-size class to each condition observed on a plot. For NRS-FIA, panels are measured on an annual basis so that five panel estimates are equivalent to 5-year moving average estimates. Field plot measurements are combined with P1 estimates in the compilation process and table production. Procedures described in Bechtold and Patterson (2005) for stratified estimation with observed stratum areas were used in conjunction with the strata presented in Table A to produce all estimates. Table A shows the total area and number of plots within each stratum.

Integration with Previous Inventories

In 2013, FIA completed the third full annual inventory of plots within Maine. The 2013 panels, along with those surveyed in 2009, 2010, 2011, and 2012, comprise the dataset for the second annual inventory referred to as the 2013 annual inventory of Maine. Previous forest inventories in Maine were completed in 1959 (Ferguson and Longwood 1960), 1971 (Ferguson and Kingsley 1972), 1982 (Powell and Dickson 1984), 1995 (Griffith and Alerich 1996), 2003 (McWilliams et al. 2005), and 2008 (McCaskill et al. 2011).

Data from new inventories often are compared with data from earlier inventories to determine trends in forest resources. However, for the comparisons to be valid, the procedures used in the two inventories must be similar. Identical classification procedures were used for the 2008 and 2013 inventories; therefore comparisons made between these inventories are relatively uncomplicated.

Comparisons with the earlier inventories are more problematic as there were changes in plot design, measurements taken, and classification methods between each of these inventories. For the sake of consistency, a new, national plot design was implemented by all nine regional FIA programs in 1999. The new design uses fixed-radius subplots exclusively. In Maine, this design was used in the 1999 and later inventories. Prior to this new plot design, fixed and variable-radius subplots were used. Both designs have strong points, but they often produce different classifications for individual plot characteristics. Procedures for assigning condition attributes such as forest type, stand age, and stocking changed significantly with the introduction of the new annual plot design. Unpublished FIA research comparing these plot designs, however, showed no noticeable difference in volume and tree-count estimates.

For additional information on the sample protocols and estimation procedures for the first two phases of the FIA program, see Bechtold and Patterson (2005). For additional information on P3 indicator sampling protocols, see the Phase 3 Version 5.1 field guides (U.S. Forest Service 2011).

Quality of the Estimates

The four primary sources of error common to all sample-based estimates are sampling, measurement, prediction, and nonresponse error. For each of these sources of error, a definition within the context of the FIA inventory is provided along with a discussion of methods used to quantify and reduce this error.

Sampling Error

The process of sampling (selecting a random subset of a population and calculating estimates from this subset) causes estimates to contain error they would not have if every member of the population had been observed. The 2013 FIA inventory of Maine is based upon a sample of 3562 plots across the State (a total surface area of 21.2 million acres), a sampling rate of about one plot for every 5,952 acres.

The procedures for statistical estimation outlined in the previous section and described in detail in Bechtold and Patterson (2005) provide the estimates of the population totals and means presented in this report. Along with every estimate is an associated sampling error that is typically expressed as a percentage of the estimated value but that can also be expressed in the same units as the estimate or as a confidence interval (the estimated value plus or minus the sampling error). This sampling error is the primary measure of the reliability of an estimate. A sampling error can be interpreted to mean that had a 100-percent inventory been taken using these methods, the chances are two out of three that the results would have been within the limits indicated (i.e., 68-percent confidence interval).

The sampling errors for State-level estimates of the major attributes presented in this report are shown in Table B. Table ME-65[1] presents sampling errors for these estimates at the inventory unit and county group levels.

Estimates for classifications smaller than the State totals presented in Table B will have larger sampling errors. For example, Table ME-65 shows that the sampling error for timberland area in any county is higher than that for total timberland area in the State. To compute an approximate sampling error for an estimate that is smaller than a State total, use the following formula:

$$E = \frac{(SE)\sqrt{(State\,total\,estimate)}}{\sqrt{(Smaller\,estimate)}} \qquad (1)$$

where:

E = approximate sampling error for smaller estimate

SE = sampling error for State total estimate (percent)

[1] Tables labeled with the State abbreviation (ME) followed by a number (e.g., Table ME-1) are located in a supplementary file titled "Maine forest inventory summary tables" located at http://dx.doi.org/10.2737/NRS-RB-103. Tables labeled with letters (e.g., Table A) are located on pages 23-31.

For example, to compute the approximate error on the area of National Forest System forest land in the State, proceed as follows:

The total National Forest System forest land area in the State from Table ME-2 is estimated at 58,200 acres.

The total area of all forest land in the State from Table ME-2 is 17,636,000 acres.

The State total error for forest land area from Table B is 0.40 percent.

Using formula (1):

$$Sampling\ error = E = \frac{(0.40)\sqrt{(17,636,000)}}{\sqrt{(58,200)}} = 7.0\ percent$$

This approximation works well for estimates of area, volume, number of trees, and biomass. It is less effective for estimates of growth, removals, or mortality. Individuals seeking more accurate sampling errors should use the estimation tools available at http://www.fia.fs.fed.us/tools-data.

The estimators used by FIA are unbiased under the assumptions that the sample plots are a random sample of the total population and the observed value for any plot is the true value for that plot. Deviations from these basic assumptions are not reflected in the computation of sampling errors. The following sections on measurement, prediction, and nonresponse error address possible departures from these basic assumptions.

Measurement Error

Errors associated with the methods and instruments used to observe and record the sample attributes are called measurement errors. On FIA plots, attributes such as the diameter and height of a tree are measured with different instruments, and other attributes such as species and crown class are observed without the aid of an instrument. On a typical FIA plot, 30 to 70 trees are observed with 15 to 20 attributes recorded on each tree. In addition, many attributes that describe the plot and conditions on the plot are observed. Errors in any of these observations affect the quality of the estimates. If a measurement is biased (such as tree diameter consistently taken at an incorrect place on the tree), then the estimates that use this observation (such as volume) will reflect this bias. Even if measurements are unbiased, high levels of random error in the measurements will add to the total random error of the estimation process.

To ensure that all FIA observations are made to the highest standards possible, a regular program of quality assurance and quality control is an integral part of all FIA data collection efforts. This program begins with the documentation of protocols and procedures used in the inventory followed by intensive crew training. To assess the quality of the data collected by these trained crews, a random sample of at least 4 percent of all plots are measured independently by a different expert crew. These independent measurements are referred to as blind checks. The purpose of these blind checks is to assess the quality of field measurements. The second measurement on these blind check plots is done by a Quality Assurance (QA) crew. In all cases, QA crews have as much or more experience and training in FIA field measurements than standard FIA crews.

The quality of field measurements is assessed nationally through a set of measurement quality objectives (MQOs) that are set for every data item we collect. Each MQO consists of two parts: a tolerance or acceptable level of measurement error, and an objective in terms of the percent of measurements within tolerance. The blind check measurements are used to observe how often individual field crews are meeting these objectives and to assess the overall compliance among all crews. Table C shows the compliance rates for various measurements used to compute the estimates included in this report and in other NRS-FIA reports. The columns labeled *Maine* comes from blind check measurements of plots used in this report, and the columns labeled All NRS- FIA States come from all measurements made by FIA crews within the entire 24-state area where the Northern Research Station implemented the FIA program in 2009 through 2013. Training and supervision of crews is a regional effort and crews often work in more than one state. Regional data quality observations reflect the overall measurement quality of all data collected by FIA in the NRS region.

In addition to the percent compliance to measurement quality objectives, the blind check observations were used to test for relative bias in the field crew measurements. Relative bias is defined here as a tendency for the standard field crew measurements to be higher or lower than those measurements taken by the QA crews. The estimated relative bias and limits of 95-percent confidence intervals (based on parametric bootstrap estimates) for the relative bias are presented in Table D.

The blind check measurements do not provide direct observations of true bias in field measurements (average difference between field measurements and true values) because they are paired observations of two field measurements. The QA crew in these blind checks typically has more training and experience with FIA field measurements than the first crew, but both crews use the same methods and instruments to obtain the measurements. These methods were the best available and were selected for use nationwide by FIA; they are commonly used by other similar natural resource inventories. A basic assumption is that the methods, when correctly applied, provide unbiased observations of the attribute they are designed to measure. Under this assumption, relative bias observations in Table D provide observations of bias due to the difference in experience and training between the field and QA crews. In most cases there is no significant bias.

Prediction Error

Errors associated with using mathematical models (such as volume models) to provide observations of the attributes of interest based on sample attributes are referred to as prediction errors. Area, volume, biomass, growth, removals, and mortality are the primary attributes of interest presented in this report. Area and number of trees estimates are based on direct observation and do not involve the use of prediction models; however, FIA estimates of volume, biomass, growth, removals, and mortality use model-based predictions in the estimation process. Models are used to predict volume and biomass estimates of individual trees. Change estimates such as growth, mortality, and removals are based on these model-based predictions of volume from both the current plot measurements and the measurements taken in the previous inventory.

In comparing FIA estimates to other data sources, users need to be aware of the prediction models used in both estimates. If both estimates are based on the same prediction models with matching fitted parameter values, then the prediction bias of one estimate should

cancel out that of the other estimate. If the estimates are based on different prediction models, then the user should be aware of the prediction error of both models.

Nonresponse Error

Nonresponse error refers to the error caused by not being able to observe some of the elements in the sample. In FIA, nonresponse occurs when crews are unable to measure a plot (or a portion of a plot) at a selected location. Nonresponse falls into the following three classes:

Denied access—Entire plots or portions of plots where the field crew is unable to obtain permission from the landowner and is therefore unable to measure the trees on the plot.

Hazardous/inaccessible—Entire plots or portions of plots where the conditions present prevent a crew from safely getting to the plot or measuring the trees on the plot.

Other—Plots where the field crew is unable to obtain a valid measurement for a variety of reasons other than those stated above.

Nonresponse has two effects on the sample. First, it reduces the sample size. The reduced sample size is reflected in the sampling errors discussed in that section. Second, nonresponse can bias the estimates if the portion of the population not being sampled differs from the portion being sampled. In FIA, unlike many survey samples, nonresponse rates are relatively low.

In the 2013 Maine inventory, 3,329 sample plots were selected to be field visited while the other 233 were deemed to be nonforest based on aerial photography. Of the total sample plots selected for field visit there were 44 plots where crews were unable to obtain owner permission to measure the plot or where hazardous conditions prevented the crew from measuring the plot.

Even though an overall response rate of 98 percent is high, there can be bias if not properly accounted for in the testing. The major source of nonresponse is denied access to plots. Denied access plots primarily occur on lands in private ownership. Also, the observations needed for plots on nonforest and water land classes do not usually require crews to physically enter the land and permission is not needed to obtain the observation because it can be obtained from aerial photos or other remotely sensed information sources.

The stratified estimation process used by FIA with strata defined by three ownership classes (inland census water, public, and private) and five canopy cover classes reduces the possible effects of bias caused by nonresponse. Under the stratified estimation process used by FIA, nonresponses are removed from the sample, and stratum estimates are obtained from only those plots with valid observations. The nonresponse rate in one stratum does not affect the estimate in other strata. The response rate within each stratum is presented in Table E for the Maine 2013 inventory and for all FIA inventories conducted by the Northern Research Station over the same period.

The nonresponse plots in this inventory were not permanently removed from the FIA system of plots. In future inventories, we will again attempt to measure these plots. At that time we may be able to obtain permission to access these plots, the hazardous conditions may have changed, or other circumstances that caused us to drop plots from estimation for a specific inventory cycle will probably be different.

GLOSSARY

Accretion: The estimated net growth on trees that were measured during the previous inventory (divided by the number of growing seasons between surveys to produce average annual accretion). It does not include growth on trees cut during the period or those trees that died. This component uses the incremental change in volume between two inventories.

Average annual mortality of growing stock: The average annual change in cubic-foot volume of sound wood in growing-stock trees that died over a defined measurement cycle.

Average annual mortality of sawtimber: The average annual change in board-foot volume of sound wood in sawtimber trees that died over a defined measurement cycle.

Average annual net growth of growing stock: The average annual change in cubic-foot volume of sound wood in live growing-stock trees, and the total volume of trees entering diameter classes greater than 5.0 inches d.b.h., through ingrowth, less volume losses resulting from natural causes. Natural causes include mortality except that due to logging damage, timber stand improvement, or conversion to a nonforest land use.

Average annual net growth of sawtimber: The average annual change in the board-foot volume of live sawtimber trees, and the total volume of trees reaching sawtimber size, less volume losses resulting from natural causes. Natural causes include mortality except that due to logging damage, timber stand improvement, or conversion to a nonforest land use.

Average annual removals from growing stock: The average cubic-foot volume of wood in live growing- stock trees removed annually for roundwood forest products, in addition to the volume in logging residues or mortality due to logging damage (harvest removals). This component of change also includes the volumes of growing-stock trees removed due to land use changes (other removals).

Average annual removals from sawtimber: The average board-foot volume of wood in live sawtimber trees removed annually for roundwood forest products, in addition to the volume of logging residues or mortality due to logging damage (harvest removals). This component of change also includes the volumes of sawtimber trees removed due to land use changes (other removals).

Basal area: Tree area in square feet of the cross section at breast height of a single tree. When the basal areas of all trees in a stand are summed, the result is usually expressed as square feet of basal area per acre.

Bioindicator species: A tree, woody shrub, or nonwoody herb species that responds to ambient levels of ozone pollution with distinct visible foliar symptoms that is easy to diagnose.

Board foot: A unit of lumber measuring 1 foot long, 1 foot wide, and 1 inch thick, or its equivalent. International ¼-inch rule is used as the U.S. Forest Service standard log rule in the eastern United States.

Bulk density: The mass of soil per unit of volume. A measure of the ratio of pore space to solid materials in a given soil. It is expressed in units of grams per cubic centimeter of oven-dry soil.

Census water: Lakes, reservoirs, ponds, and similar bodies of water 4.5 acres in size or larger; and rivers or canals more than 200 feet wide (U.S. Census definition).

Coarse woody debris (CWD): Dead branches, twigs, and wood splinters 3.0 inches in diameter and larger measured at the smallest end.

Commercial species: Tree species currently or prospectively suitable for industrial wood products; excludes species of typically small size, poor form, or inferior quality, e.g., hawthorn and sumac.

Compacted live crown ratio: The percent of the total length of the tree that supports a full, live crown. To determine compacted live crown ratio for trees that have uneven length crowns, lower branches are visually transferred to fill holes in the upper portions of the crown, until a full, even crown is created.

Condition: A delineation of a land area based upon land use, forest type, stand size, regeneration status, reserved status, tree density, and owner class.

Corporate: An ownership class of private lands owned by corporations.

County and municipal: A class of public lands owned by counties or local public agencies, or lands leased by these governmental units for more than 50 years.

Cropland: Land under cultivation within the last 24 months, including cropland harvested, crop failures, cultivated summer fallow, idle cropland used only for pasture, orchards, active Christmas tree plantations indicated by annual shearing, nurseries, and land in soil improvement crops, but excluding land cultivated in developing improved pasture.

Crown: The part of a tree or woody plant bearing live branches or foliage.

Crown dieback: Recent mortality of branches with fine twigs, which begins at the terminal portion of a branch and proceeds toward the trunk. Dieback is considered only when it occurs in the upper and outer portions of the tree. When whole branches are dead in the upper crown, without obvious signs of damage such as breaks or animal injury, it is assumed the branches died from the terminal portion of the branch. Dead branches in the lower portion of the live crown are assumed to have died from competition and shading.

Cull decrement: The net volume of rough and rotten cull trees in the previous inventory that are classified as growing-stock trees in the current inventory (divided by the number of growing seasons between inventories to compute average annual cull decrement).

Cull increment: The net volume of growing-stock trees in the previous inventory that are classified as rough and rotten cull trees in the current inventory (divided by the number of growing seasons between inventories to compute average annual cull increment).

Cull tree: A live tree, 5.0 inches in d.b.h. or larger, that is unmerchantable for saw logs now or prospectively because of rot, roughness, or species. (See definitions for rotten and rough trees.)

Decay class: Qualitative assessment of stage of decay (five classes) of coarse woody debris based on visual assessments of color of wood, presence/absence of twigs and branches, texture of rotten portions, and structural integrity.

Diameter at breast height (d.b.h.): The diameter outside bark of a standing tree measured 4.5 feet above the ground.

Diameter at root collar (d.r.c.): The diameter outside bark of a bole measured at the root collar of a shrub or tree. Also called basal diameter.

Diameter class: A classification of trees based on diameter outside bark measured at breast height (4.5 feet above ground). With 2-inch diameter classes, the 6-inch class, for example, includes trees 5.0 through 6.9 inches diameter at breast height (d.b.h).

Dry ton: A unit of measure of dry weight equivalent to 2,000 pounds or 907.1848 Kg.

Dry weight: The weight of wood and bark as it would be if it had been oven dried; usually expressed in pounds or tons.

Down woody material (DWM): Woody pieces of trees and shrubs that have been uprooted (no longer supporting growth) or severed from their root system, not self-supporting, and lying on the ground.

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

Effective cation exchange capacity (ECEC): The sum of cations that a soil can adsorb in its natural pH. Expressed in units of centimoles of positive charge per kilogram of soil.

Federal: An ownership class of public lands owned by the U.S. Government.

Fiber products: Products derived from wood and bark residues, such as pulp, composition board products, and wood chips.

Fine materials: Wood residues not suitable for chipping, such as planer shavings and sawdust.

Fine woody debris (FWD): Dead branches, twigs, and wood splinters 0.1 to 2.9 inches in diameter.

Forest industry: An ownership class of private lands owned by companies or individuals operating wood- using plants.

Forest land: Accessible land that has at least 10 percent crown cover by live trees or formerly had such tree cover and is not currently developed for a nonforest use. In general, the minimum area for classification as forest land is 1 acre and 120 feet wide measured stem to stem from the outer-most edge. The components that make up forest land are timberland and all noncommercial forest land.

Forest type: A classification of forest land based on the species presently forming a plurality of the live-tree stocking.

Forest-type group: A combination of forest types that share closely associated species or site requirements and are generally combined for brevity of reporting. The major forest-type groups for the eastern United States are:

> **White/red/jack pine:** Forests in which eastern white pine, red pine, or jack pine, singly or in combination, comprise a plurality of the stocking. Common associates include hemlock, aspen, birch, and maple.
>
> **Oak/pine:** Forests in which hardwoods (usually upland oaks) comprise a plurality of the stocking, but in which pine or eastern redcedar comprises 25 to 50 percent of the stocking. Common associates include gum, hickory, and yellow-poplar.
>
> **Oak/hickory:** Forests in which upland oaks or hickory, singly or in combination, comprise a plurality of the stocking except where pines comprise 25 to 50 percent, in which case the stand is classified as oak-pine. Common associates include yellow-poplar, elm, maple, and black walnut.
>
> **Oak/gum/cypress:** Bottomland forests in which tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, comprise a plurality of the stocking except where pines comprise 25 to 50 percent, in which case the stand is classified as oak-pine. Common associates include cottonwood, willow, ash, elm, hackberry, and maple.
>
> **Elm/ash/cottonwood:** Forests in which elm, ash, or cottonwood, singly or in combination, comprise a plurality of the stocking. Common associates include willow, sycamore, beech, and maple.
>
> **Maple/beech/birch:** Forests in which maple, beech, or yellow birch, singly or in combination, comprise a plurality of the stocking. Common associates include hemlock, elm, basswood, and white pine.
>
> **Aspen/birch:** Forests in which aspen, balsam poplar, paper birch, or gray birch, singly or in combination, comprise a plurality of the stocking. Common associates include maple and balsam fir.
>
> **Spruce/fir:** Forests in which balsam fir, red spruce, northern white-cedar or white spruce, singly or in combination, comprise a plurality of the stocking. Common associates include black spruce, tamarack, aspen, birch, and maple.

Fuel class: Categories of forest fire fuels defined by the approximate amount of time it takes for moisture conditions to fluctuate. Large coarse woody debris pieces take longer to dry out than smaller fine woody pieces.

> *1,000-hour fuels:* Coarse woody debris with a transect diameter ≥ 3.0 inches and ≥ 3.0 feet long.

100-hour fuels: Fine woody debris with a transect diameter between 1.0 and 2.9 inches.

10-hour fuels: Fine woody debris with a transect diameter between 0.25 and 0.9 inches.

1-hour fuels: Fine woody debris with a transect diameter < 0.24 inches.

Gross growth: The sum of accretion and ingrowth.

Growing stock: A classification of timber inventory that includes live trees of commercial species meeting specified standards of quality or vigor. Cull trees are excluded. When associated with volume, this includes only trees 5.0 inches d.b.h. and larger.

Growing-stock volume: Net or gross volume in cubic feet of growing-stock trees 5.0 inches and larger d.b.h. measured from the 1-foot stump to a minimum 4.0- inch top diameter outside bark on the central stem, or to the point where the central stem splits into limbs. Net volume equals gross volume minus deduction for cull defects.

Hardwood: A dicotyledonous tree, usually broad-leaved and deciduous.

Soft hardwoods: A category of hardwood species with wood generally of low specific gravity (less than 0.5). Notable examples include red maple, paper birch, quaking aspen, and American elm.

Hard hardwoods: A category of hardwood species with wood generally of high specific gravity (greater than 0.5). Notable examples include sugar maple, yellow birch, black walnut, and oaks.

Industrial wood: All commercial roundwood products except fuelwood.

Ingrowth: The estimated net volume of trees that became 5.0 inches and larger d.b.h. during the period between inventories (divided by the number of growing seasons between surveys to produce average annual ingrowth). Also, the estimated net volume of trees 5.0 inches and larger d.b.h. that are growing on land that was reclassified from noncommercial forest land or nonforest land to timberland.

Introduction: The intentional or unintentional escape, release, dissemination, or placement of a species into an ecosystem as a result of human activity. "Introduced" is not synonymous and should not be confused with the term "invasive" (USDA definition).

Invasive species: Those species whose introduction does, or is likely to, cause economic or environmental harm or harm to human health. For the purpose of this policy only, a plant species is considered "invasive" only when it occurs on the Federal or State-specific noxious weed list or a list developed by the State-specific Department of Agriculture with their partners and approved by the State Technical Committee that prohibits or cautions its use due to invasive qualities (USDA definition).

Land area: The area of dry land and land temporarily or partly covered by water, such as marshes, swamps, and river flood plains; streams, sloughs, estuaries, and canals less than 200 feet wide; and lakes, reservoirs, and ponds less than 4.5 acres in area.

Land use: A classification of land that indicates the primary use at the time of the inventory. Major categories are forest land and nonforest land.

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

Live aboveground biomass: The aboveground volume of live trees (including bark but excluding foliage) reported in dry tons (dry weight). Biomass has four components:

Bole: Biomass of a tree from 1 foot above the ground to a 4-inch top outside bark or to a point where the central stem breaks into limbs.

Tops and limbs: Total biomass of a tree from a 1-foot stump minus the bole.

Saplings: Total aboveground biomass of a tree from 1.0 to 4.9 inches d.b.h.

Stump: Biomass of a tree 5 inches d.b.h. and larger from the ground to a height of 1 foot.

Live cull: A classification that includes live, cull trees. When associated with volume, it is the net volume in live, cull trees that are 5.0 inches d.b.h. and larger.

Logging residues: The unused portions of growing- stock and non-growing-stock trees cut or killed by logging and left in the woods.

Merchantable: Refers to a pulpwood or saw log section that meets pulpwood or saw log specifications, respectively.

National Forest: An ownership class of Federal lands, designated by Executive order or statute as National Forests or purchase units, and other lands under the administration of the Forest Service including experimental areas.

Net cubic-foot volume: The gross volume in cubic feet less deductions for rot, roughness, and poor form. Volume is computed for the central stem from a 1-foot stump to a minimum 4.0-inch top diameter outside bark, or to the point where the central stem breaks into limbs.

Net board-foot volume: The gross volume in board feet less the deductions for rot, roughness, and poor form. Volume is computed from the 1-foot stump to a minimum 7.0-inch diameter outside bark for softwoods and a minimum 9.0-inch outside bark for hardwoods on the central stem. This estimate includes all softwoods 9.0 inches d.b.h. and larger, and all hardwoods 11.0 inches d.b.h. and larger.

Noncensus water: Streams or rivers 120 to 200 feet wide and bodies of water 1 to 4.5 acres in size, where the U.S. Bureau of the Census classifies such water as land.

Noncommercial species: Tree species of typically small size, poor form, or inferior quality, which normally do not develop into trees suitable for industrial wood products.

Nonforest land: Land that has never supported forests and lands formerly forested where use of timber management is precluded by development for other uses. (Note: Includes area used for crops, improved pasture, residential areas, city parks, improved roads of any

width and adjoining clearings, powerline clearings of any width, and 1- to 4.5-acre areas of water classified by the U.S. Bureau of the Census as land. If intermingled in forest areas, unimproved roads and nonforest strips must be more than 120 feet wide, and clearings, etc., must be more than 1 acre in area to qualify as nonforest land.)

Nonindustrial private: An ownership class of private lands where the owner does not operate wood-using plants.

Nonnative species: Within a particular ecosystem, any species (including its seeds, eggs, spores, or other biological material capable of propagating that species;) that is not native to that ecosystem (USDA definition).

Nonstocked areas: Timberland less than 10 percent stocked with all live trees.

Ownership unit: A classification of ownership encompassing all types of legal entities having an ownership interest in land, regardless of the number of people involved. A unit may be an individual; a combination of persons; a legal entity such as a corporation, partnership, club, or trust; or a public agency. An ownership unit has control of a parcel or group of parcels of land.

Owner class: A classification of land into categories of ownership.

> *Forest industry:* Land owned by private companies that operate primary wood-using mills.
>
> *Nonindustrial private:* Land owned by other corporate, individuals, or trusts (NGOs) that do not operate primary wood-using mills.
>
> *Other corporate:* Land owned by timber investment or real estate companies.
>
> *Public:* Land owned by federal, state, county, or municipal government.

Ozone: A regional, gaseous air pollutant produced primarily through sunlight-driven chemical reactions of nitrogen dioxide and hydrocarbons in the atmosphere and causing foliar injury to deciduous trees, conifers, shrubs, and herbaceous species.

Ozone bioindicator site: An open area used for ozone injury evaluations on ozone-sensitive species. The area must meet certain site selection guidelines on size, condition, and plant counts to be used for ozone injury evaluations in FIA.

Physiographic class: A measure of soil and water conditions that affect tree growth on a site. The physiographic classes are:

> *Xeric:* Very dry soils where excessive drainage seriously limits both growth and species occurrence. These sites are usually on upland and upper half slopes.
>
> *Xeromesic:* Moderately dry soils where excessive drainage limits growth and species occurrence to some extent. These sites are usually on the lower half slopes.
>
> *Mesic:* Deep, well-drained soils. Growth and species occurrence are limited only by climate. These include all cove sites and bottomlands along intermittent streams.
>
> *Hydromesic:* Moderately wet soils where insufficient drainage or infrequent flooding limits growth and species occurrence to some extent.

Hydric: Very wet sites where excess water seriously limits both growth and species occurrence.

Poletimber trees: Live trees at least 5.0 inches d.b.h. but smaller than sawtimber trees.

Primary wood-using mill: A mill that converts roundwood products into other wood products. Common examples are sawmills that convert saw logs into lumber and pulp mills that convert pulpwood into paper.

Productivity class: A classification of forest land in terms of potential annual cubic-foot volume growth per acre at culmination of mean annual increment in fully stocked natural stands.

Pulpwood: Roundwood, whole-tree chips, or wood residues used for the production of wood pulp.

Reserved forest land: Forest land withdrawn from timber utilization through statute, administrative regulation, or designation without regard to productive status. Examples include national forest wilderness areas, national parks, and national monuments.

Residues: Bark and woody materials that are generated in primary wood-using mills when roundwood products are converted to other products. Examples are slabs, edgings, trimmings, miscuts, sawdust, shavings, veneer cores and clippings, and pulp screenings. Includes bark residues and wood residues (both coarse and fine materials) but excludes logging residues.

Rotten tree: A live tree of commercial species that does not contain a saw log now or prospectively primarily because of rot (that is, when rot accounts for more than 50 percent of the total cull volume).

Rough tree: (a) A live tree of commercial species that does not contain a saw log now or prospectively primarily because of roughness (that is, when sound cull due to such factors as poor form, splits, or cracks accounts for more than 50 percent of the total cull volume); or (b) a live tree of noncommercial species.

Roundwood products: Logs, bolts, and other round timber generated from harvesting trees for industrial or consumer use. Roundwood products include saw logs, veneer, cooperage logs, bolts, pulpwood logs, fuelwood, pilings, poles posts, ties, mine timbers, and various other round or split products.

Salvable dead tree: A downed or standing dead tree considered currently or potentially merchantable by regional standards.

Saplings: Live trees 1.0 inch through 4.9 inches d.b.h.

Saw log: A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight, and with a minimum diameter inside bark of 6 inches for softwoods and 8 inches for hardwoods, or meeting other combinations of size and defect specified by regional standards.

Sawtimber tree: A live tree of commercial species containing at least a 12-foot saw log or two noncontiguous saw logs 8 feet or longer, and meeting regional specifications for freedom from defect. Softwoods must be at least 9.0 inches d.b.h. Hardwoods must be at least 11.0 inches diameter outside bark (d.o.b.).

Sawtimber volume: Net or gross volume in board-foot (International ¼-inch rule) or cubic-foot of the saw log portion of live sawtimber trees measured from the 1-foot stump to a minimum 7.0-inch top diameter outside bark (for softwoods) or a 9.0-inch top diameter outside bark (for hardwoods), on the central stem, or to the point where the central stem splits into smaller limbs. Net volume equals gross volume minus deduction for rough and rotten cull.

Seedling: Live tree smaller than 1.0 inch d.b.h./d.r.c. and at least 6.0 inches in height for softwoods and 12.0 inches in height for hardwoods.

Site index: An expression of forest site quality based on the height of a free-growing dominant or codominant tree of a representative species in the forest type at age 50.

Snag: A standing dead tree. In the current inventory, a snag must be 5.0 inches d.b.h./d.r.c. and 4.5 feet tall, and have a lean angle less than 45 degrees from vertical. A snag may be either self-supported by its roots or supported by another tree or snag.

Softwood: A coniferous tree, usually evergreen, having needles or scale-like leaves.

Sound dead: The net volume in salvable dead trees.

Species group: A combination of tree species that share closely associated understory plants or site requirements.

Stand: A group of trees on a minimum of 1 acre of forest land that is stocked by forest trees of any size.

Standing dead tree: A standing dead tree must be at least 5 inches d.b.h. or larger, at least 4.5 feet in height, and have a lean of less than 45 degrees from the vertical. A snag should be self-supported or supported by another tree.

Stand-size class: A classification of forest land based on the size class of live trees in the area. The classes are:

> *Nonstocked:* Forest land stocked with less than 10 percent of full stocking with live trees. Examples are recently cutover areas or recently reverted agricultural fields.
>
> *Sapling-seedling:* Forest land stocked with at least 10 percent of full stocking with live trees with half or more of such stocking in seedlings or saplings or both.
>
> *Poletimber:* Forest land stocked with at least 10 percent of full stocking with live trees with half or more of such stocking in poletimber or sawtimber trees or both, and in which the stocking of poletimber exceeds that of sawtimber.
>
> *Sawtimber:* Forest land stocked with at least 10 percent of full stocking with live trees with half or more of such stocking in poletimber or sawtimber trees or both, and in which the stocking of sawtimber is at least equal to that of poletimber.

State: An ownership class of public lands owned by states or lands leased by states for more than 50 years.

Stocking: The degree of occupancy of land by trees, measured by basal area or number of trees by size and spacing, or both, compared to a stocking standard; that is, the basal area or number of trees, or both, required to fully utilize the growth potential of the land.

Stocking class: At the tree level, stocking is the density expressed as a percent of total tree density required to fully utilize the growth potential of the land. At the stand level it is expressed as the sum of the stocking values of all trees sampled. The classes include:

Overstocked: Forest stand with stocking ≥100 percent.

Fully stocked: Forest stand that contains 60 to 99 percent of full stocking.

Moderately stocked: Forest stand that contains 35 to 59 percent of full stocking.

Poorly stocked: Forest stand that contains only 10 to 34 percent of full stocking.

Nonstocked: Forest stand with less than 10 percent of full stocking.

Sum06: The sum of all hourly average ozone concentrations greater than or equal to 0.06 ppm that occur between June 1 and August 31. It is a widely recognized threshold for ozone injury to sensitive plants.

Timberland: Forest land that is producing or is capable of producing crops of industrial wood and not withdrawn from timber utilization by statute or administrative regulation. (Note: Areas qualifying as timberland are capable of producing in excess of 20 cubic feet per acre per year of industrial wood in natural stands. Currently inaccessible and inoperable areas are included.)

Timber products output: All timber products cut from roundwood and byproducts of wood manufacturing plants. Roundwood products include logs, bolts, or other round sections cut from growing-stock trees, cull trees, salvable dead trees, trees on nonforest land, noncommercial species, sapling-size trees, and limbwood. Byproducts from primary manufacturing plants include slabs, edging, trimmings, miscuts, sawdust, shavings, veneer cores and clippings, and screenings of pulp mills that are used as pulpwood chips or other products.

Tree: A woody plant usually having one or more erect perennial stems, a stem diameter at breast height of at least 3 inches, a more or less definitely formed crown of foliage, and a height of at least 15 feet at maturity.

Tree class: A classification of tree quality or condition of the tree for saw log production. Tree class for sawtimber-size trees is based on current conditions. Tree class for poletimber-size trees is based on the prospected determination or forecast of the potential tree quality when the tree reaches sawtimber size.

Tree size class: A classification of trees based on diameter at breast height, including sawtimber trees, poletimber trees, saplings, and seedlings.

Tops: The wood of a tree above the merchantable height (or above the point on the stem 4.0 inches diameter outside bark (d.o.b.) or to the point where the central stem breaks into limbs). It includes the usable material in the uppermost stem.

Total live tree biomass: The total mass of live trees and associated saplings expressed in pounds or tons (dry weight) per unit area. The total tree and sapling biomass (excluding foliage) has five components:

Bole: Biomass of a tree from 1 foot above the ground to a 4-inch top outside bark or to a point where the central stem splits into smaller limbs. This includes protruding twigs from the central stem.

Tops and limbs: Total biomass of a tree from the 12-inch stump minus the bole. This does not include any twigs protruding from the central stem below the 4-inch top.

Sapling trees: Total biomass of a tree from 1 to 4.9 inches diameter measured at the root collar (d.r.c.) or at breast height (d.b.h.)

Stump: Total biomass of a tree 5 inches d.b.h. and larger from the ground to a height of 1 foot.

Belowground: Total biomass of the belowground portion of the stump and the coarse roots of all trees and saplings.

Urban forest land: Land that would otherwise meet the criteria for timberland but is in an urban-suburban area surrounded by commercial, industrial, or residential development and not likely to be managed for the production of industrial wood products on a continuing basis. Wood removed would be for land clearing, fuelwood, or esthetic purposes. Such forest land may be associated with industrial, commercial, residential subdivision, industrial parks, golf course perimeters, airport buffer strips, and public urban parks that qualify as forest land.

Unreserved forest land: Forest land not withdrawn from harvest by statute or administrative regulation. Includes forest lands that are not capable of producing in excess of 20 cubic feet per acre per year of industrial wood in natural stands.

Veneer log: A roundwood product from which veneer is sliced or sawn and that usually meets certain standards of minimum diameter and length and maximum defect.

Weight: The weight of wood and bark, oven-dry basis (approximately 12 percent moisture content).

TABLES

Tables labeled with the State abbreviation followed by a number (e.g., Table ME-1) report estimates of forest characteristics collected during this inventory period, including estimates of forested area, number of trees, volume, growth, etc. These tables can be found in a supplemental file labeled "Maine Forests, 2013, Summary Tables" at http://dx.doi.org/10.2737/NRS-RB-103.

Tables A through E referenced in this report are published in this document on subsequent pages. These tables report data related to sampling, measurement variables, and measurement quality objectives.

Table A.—Area and number of plots in each stratum used for stratification and estimation, Maine, 2013.

Table B.—State-level estimates of major forest resource attributes and their sampling errors, Maine, 2013.

Table C.—Compliance to measurement quality objectives (MQO) tolerances of variables based on blind check plots, Maine, 2013.

Table D.—Observed relative bias values (Average [field crew—QA crew]) for measurement variables, blind check plots, Maine, 2013.

Table E.—FIA nonresponse by strata, Maine, 2013.

Table A.—Area and number of plots in each stratum used for stratification and estimation, Maine, 2013

Unit[a]	Ownership[b]	Stratum description[c]	Acres[d]	Selected[e]	Nonforest office plots[f]	Field check plots[g]	Field check plots measured[h]	Forest plots measured[i]	Plots measured for change[j]	Field measured for change	Plots not measured[k]
1	Inland Census Water Unit 1	Canopy cover 0 - 100	222973	32	30	2	2	2	26	2	0
1	Private Unit 1	Canopy cover 0 - 5	168208	26	4	22	22	22	26	22	0
1	Private Unit 1	Canopy cover 6 - 50	101301	17	2	15	14	14	17	15	1
1	Private Unit 1	Canopy cover 51 - 65	120385	20	0	20	20	20	20	20	0
1	Private Unit 1	Canopy cover 66 - 80	279976	52	0	52	52	52	51	51	0
1	Private Unit 1	Canopy cover 81 - 100	890795	152	0	152	152	152	150	150	0
1	Public Unit 1	Canopy cover 0 - 100	83148	12	0	12	12	12	12	12	0
2	Inland Census Water Unit 2	Canopy cover 0 - 100	100584	16	10	6	6	4	14	6	0
2	Private Unit 2	Canopy cover 0 - 5	608976	100	34	66	66	62	100	66	0
2	Private Unit 2	Canopy cover 6 - 50	197225	28	2	26	26	26	28	26	0
2	Private Unit 2	Canopy cover 51 - 65	286379	46	0	46	46	46	46	46	0
2	Private Unit 2	Canopy cover 66 - 80	677693	117	0	117	116	116	116	116	1
2	Private Unit 2	Canopy cover 81 - 100	2342609	400	0	400	400	400	398	398	0
2	Public Unit 2	Canopy cover 0 - 100	156500	30	1	29	29	29	29	28	0
3	Inland Census Water Unit 3	Canopy cover 0 - 100	102639	13	9	4	4	4	12	4	0
3	Private Unit 3	Canopy cover 0 - 5	238828	32	8	24	24	21	32	24	0
3	Private Unit 3	Canopy cover 6 - 50	161118	31	1	30	30	30	31	30	0
3	Private Unit 3	Canopy cover 51 - 65	176528	28	1	27	26	26	27	26	1
3	Private Unit 3	Canopy cover 66 - 80	395598	58	0	58	56	56	58	58	2
3	Private Unit 3	Canopy cover 81 - 100	1115162	197	0	197	191	191	193	193	6
3	Public Unit 3	Canopy cover 0 - 100	86000	20	0	20	20	20	20	20	0
4	Inland Census Water Unit 4	Canopy cover 0 - 100	192153	38	36	2	2	1	34	2	0
4	Private Unit 4	Canopy cover 0 - 5	107650	11	5	6	6	6	11	6	0
4	Private Unit 4	Canopy cover 6 - 65	119199	14	0	14	14	14	14	14	0
4	Private Unit 4	Canopy cover 66 - 80	140679	28	0	28	27	27	27	27	1
4	Private Unit 4	Canopy cover 81 - 100	572471	101	0	101	100	100	101	101	1
4	Public Unit 4	Canopy cover 0 - 100	76142	10	0	10	10	9	10	10	0
5	Inland Census Water Unit 5	Canopy cover 0 - 100	263157	37	35	2	2	2	35	2	0
5	Private Unit 5	Canopy cover 0 - 5	216025	47	2	45	44	44	46	44	1
5	Private Unit 5	Canopy cover 6 - 50	95658	21	0	21	21	21	20	20	0
5	Private Unit 5	Canopy cover 51 - 65	156718	19	0	19	19	18	19	19	0
5	Private Unit 5	Canopy cover 66 - 80	431299	66	0	66	66	66	65	65	0
5	Private Unit 5	Canopy cover 81 - 100	1278078	228	0	228	228	228	223	223	0
5	Public Unit 5	Canopy cover 0 - 100	360512	64	0	64	62	62	62	62	2
6	Inland Census Water Unit 6	Canopy cover 0 - 100	177561	26	21	5	5	2	18	4	0
6	Public Private Unit 6	Canopy cover 0 - 5	290556	49	26	23	22	18	49	23	1
6	Public Private Unit 6	Canopy cover 6 - 50	90091	20	1	19	19	19	20	19	0
6	Public Private Unit 6	Canopy cover 51 - 65	114249	13	1	12	12	11	13	12	0
6	Public Private Unit 6	Canopy cover 66 - 80	274029	45	0	45	44	44	44	44	1
6	Public Private Unit 6	Canopy cover 81 - 100	779245	134	0	134	128	127	131	131	6

continued

Table A.—continued

Unit [a]	Ownership [b]	Stratum description [c]	Acres [d]	Selected [e]	Nonforest office plots [f]	Field check plots [g]	Field check plots measured [h]	Forest plots measured [i]	Plots measured for change [j]	Field measured for change	Plots not measured [k]
7	Inland Census Water Unit 7	Canopy cover 0 - 100	108080	13	12	1	1	1	13	1	0
7	Private Unit 7	Canopy cover 0 - 5	346263	61	5	56	55	53	61	56	1
7	Private Unit 7	Canopy cover 6 - 50	135904	16	1	15	13	12	15	14	2
7	Private Unit 7	Canopy cover 51 - 65	190511	32	0	32	32	31	32	32	0
7	Private Unit 7	Canopy cover 66 - 80	482087	82	0	82	81	81	82	82	1
7	Private Unit 7	Canopy cover 81 - 100	1235836	223	0	223	221	221	219	219	2
7	Public Unit 7	Canopy cover 0 - 100	121984	18	0	18	18	17	18	18	0
8	Inland Census Water Unit 8	Canopy cover 0 - 100	189409	29	28	1	1	1	26	1	0
8	Public Private Unit 8	Canopy cover 0 - 5	382996	63	30	33	32	27	62	32	1
8	Public Private Unit 8	Canopy cover 6 - 50	107880	18	3	15	15	14	18	15	0
8	Public Private Unit 8	Canopy cover 51 - 65	121678	15	0	15	15	14	15	15	0
8	Public Private Unit 8	Canopy cover 66 - 80	303982	58	0	58	57	56	58	58	1
8	Public Private Unit 8	Canopy cover 81 - 100	712113	128	2	126	123	123	126	124	3
9	Inland Census Water Unit 9	Canopy cover 0 - 100	92002	14	11	3	3	1	13	2	0
9	Private Unit 9	Canopy cover 0 - 5	187281	26	8	18	18	16	26	18	0
9	Private Unit 9	Canopy cover 6 - 65	198783	35	0	35	33	32	34	34	2
9	Private Unit 9	Canopy cover 66 - 80	377062	58	0	58	56	56	57	57	2
9	Private Unit 9	Canopy cover 81 - 100	1464021	256	0	256	251	251	250	250	5
9	Public Unit 9	Canopy cover 0 - 100	140069	22	0	22	22	22	22	22	0
9	White Mountain NF	Canopy cover 0 - 100	52761	18	0	18	18	18	7	7	0
State Totals	All Ownerships	All Strata	21,200,000	3562	233	3329	3308	3160	3307	21	44

[a] The following table lisits the counties in each group used to define the estimation strata used here.

Unit Number	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9
County Group Name	Washington	Aroostook	Penobscot	Hancock	Piscataquis	Capitol	Somerset	Casco Bay	Western
County Name	Washington	Aroostook	Penobscot	Hancock	Piscataquis	Kennebec	Somerset	Androscoggin	Franklin
						Knox	Knox	Cumberland	Oxford
						Lincoln	Lincoln	Sagadahoc	
						Waldo	Waldo	York	

[b] Ownership layer - Classification based on Protected Areas Database

[c] Classified NLCD layer - Classification based on the 2011 NLCD classification and 2-pixel edge zones.

dArea (Acres) - Total area defined by the intersection of the ownership and classified NLCD layers within the group of counties specified.

[e] Selected - Total number of plots selected to be sampled.

[f] Nonforest Office Plots - Selected plots who's observed classification as nonforest is based upon examination of aerial photos or digital orthoquads.

[g] Field Check Plots - Selected plots that required field measurement.

[h] Field Checked Plots Measured - Field check plots where the measurement was successful.Excludes field plots that were hazardious or denied access.

[i] Forest Plots Measured - Field checked plots where the forest condition was found to be present on the plot and the measurement was completed in the 2009-2013 inventory.

[j] Forest Plots Measured for Change - Field checked plots measured in both the 2008 inventory and the 2013 inventory where forest condition was found to be present on the plot and the measurement was completed Components of change are assessed on these plot.

[k] Plots Not Measured - Plots selected for field measurement, but not measured due to hazardious conditions or denied access.

Table B.—State-level estimates of major forest resource attributes and their sampling errors, Maine, 2013

Item	State Total	Sampling Error
Growing stock on timberland	*million cubic feet*	*percent*
Volume	23,570	1.3
Average annual net growth	710	1.9
Average annual removals	528	5.3
Average annual mortality	227	3.5
Sawtimber on timberland	*million board feet*[a]	
Volume	60,680	1.9
Average annual net growth	2021	2.5
Average annual removals	1454	6.1
Average annual mortality	534	5.7
Area	*thousand acres*	
Forest land	17,636	0.4
Timberland	17,022	0.5
Biomass (aboveground live trees)	*million dry tons*	
Forest land	694	1.0
Timberland	669	1.0

[a] International ¼-inch Rule.

Table C.—Compliance to measurement quality objectives (MQO) tolerances of variables based on blind check plots, Maine, 2013

Variable	Tolerance	Objective	Maine		All NRS States	
			Data within tolerance	Observations	Data within tolerance	Observations
Plot Level		-------- *percent* --------		*numbers*	*percent*	*numbers*
Distance to Road	No Tolerance	90.0	88.5	122	81.7	2,420
Water on Plot	No Tolerance	90.0	85.2	122	86.7	2,420
Elevation	±50 feet	99.0	90.6	117	87.9	2,197
Latitude - decimal degrees	±0.0001 degree	99.0	100.0	117	100.0	2,201
Longitude - decimal degrees	±0.0001 degree	99.0	91.5	117	87.5	2,201
Condition Level						
Condition Status	No Tolerance	99.0	98.1	160	99.1	4,141
Reserve Status	No Tolerance	99.0	99.4	160	99.5	4,141
Owner Group	No Tolerance	99.0	98.5	136	98.7	2,889
Forest Type (Type)	No Tolerance	95.0	92.6	136	90.6	2,889
Forest Type (Group)	No Tolerance	99.0	94.9	136	95.3	2,889
Stand Size	No Tolerance	99.0	97.8	136	91.2	2,889
Regeneration Status	No Tolerance	99.0	99.3	136	98.5	2,889
Tree Density	No Tolerance	99.0	98.5	136	97.7	2,889
Owner Class	No Tolerance	99.0	93.4	136	95.9	2,889
Owner Status	No Tolerance	99.0	97.8	136	99.2	2,889
Regeneration Species	No Tolerance	99.0	98.5	136	98.4	2,889
Stand Age	±10 percent	95.0	94.9	136	87.2	2,889
Disturbance 1	No Tolerance	99.0	93.3	134	90.4	2,868
Disturbance 2	No Tolerance	99.0	100.0	13	89.0	547
Disturbance 3	No Tolerance	99.0	.	.	97.3	75
Treatment 1	No Tolerance	99.0	99.3	134	97.7	2,868
Treatment Year 1	±1 year	99.0	100.0	24	94.9	156
Treatment 2	No Tolerance	99.0	88.0	25	83.9	218
Treatment Year 2	±1 year	99.0	100.0	14	97.6	41
Treatment 3	No Tolerance	99.0	81.3	16	94.5	73
Treatment Year 3	±1 year	99.0	100.0	1	80.0	5
Physiographic Class	No Tolerance	80.0	85.3	136	84.9	2,889
Present Nonforest Use	No Tolerance	99.0	98.1	160	94.6	4,141
Boundary Level						
Boundary Change	No Tolerance	99.0	97.4	38	81.8	868
Constrasting Condition	No Tolerance	99.0	100.0	38	95.5	868
Left Azimuth	±10 degrees	90.0	97.4	38	87.1	868
Corner Mapped	No Tolerance	90.0	100.0	38	94.8	868
Corner Azimuth	±10 degrees	90.0	100.0	5	92.8	83
Corner Distance	±1 foot	90.0	100.0	5	91.6	83
Right Azimuth	±10 degrees	90.0	100.0	38	87.1	868
Subplot Level						
Subplot Center Condition	No Tolerance	99.0	99.6	492	98.3	10,100
Microplot Center Condition	No Tolerance	99.0	99.6	492	98.1	10,100
Slope	±10 percent	90.0	99.8	464	98.8	8,565
Aspect	±10 degrees	90.0	99.1	457	94.7	8,360
Snow/Water Depth	±0.5 foot		80.0	464	67.7	8,604

continued

Table C.—continued

Variable	Tolerance	Objective	Maine		All NRS States	
			Data within tolerance	Observations	Data within tolerance	Observations
Tree Level		-------- *percent* --------		*numbers*	*percent*	*numbers*
DBH	±0.1 inch per 20 inches	95.0	97.6	2,163	95.6	37,635
DRC	±0.1 inch per 20 inches	95.0	.	.	73.9	69
Azimuth	±10 degrees	90.0	99.4	2,505	99.3	42,172
Horizontal Distance	±0.2 foot per 1.0 foot	90.0	98.9	2,505	98.7	42,172
Species	No Tolerance	95.0	99.1	2,573	98.4	42,475
Tree Genus	No Tolerance	99.0	99.5	2,573	99.6	42,433
Tree Status	No Tolerance	95.0	98.9	2,573	98.9	42,481
Rotten/Missing Cull	±10 percent	90.0	98.0	1,368	98.4	27,670
Total Length	±10 percent	90.0	71.2	1,354	79.7	27,368
Actual Length	±10 percent	90.0	53.3	195	74.0	3,340
Compacted Crown Ratio	±10 percent	80.0	76.0	1,992	83.0	35,071
Uncompacted Crown Ratio (P3)	±10 percent	90.0	78.9	90	78.2	1,984
Crown Class	No Tolerance	85.0	80.1	1,992	81.8	35,071
Decay Class	±1 class	90.0	92.8	418	96.0	6,211
Cause of Death	No Tolerance	80.0	87.1	418	83.6	6,211
Condition	No Tolerance	99.0	99.8	2,573	98.3	42,481
Crown Position	No Tolerance		60.0	55	95.1	1,622
Crown Light Exposure	±1 class	85.0	90.0	90	98.0	1,984
Sapling Crown Vigor Class	No Tolerance	85.0	100.0	35	95.0	362
Crown Density	±10 percent	90.0	60.0	55	92.4	1,622
Crown Dieback	±10 percent	90.0	98.2	55	98.0	1,622
Transparency	±10 percent	90.0	69.1	55	98.2	1,622
Tree Class	No Tolerance	90.0	91.5	2,188	92.4	38,026
Damage Agent 1	No Tolerance	90.0	91.3	1,992	90.2	35,071
Damage Agent 2	No Tolerance	90.0	80.4	337	78.2	6,760
Tree Grade	No Tolerance	90.0	72.7	344	74.8	8,251
DBH-Live & Trees with Decay Code 1 or 2	±0.1 inch per 20 inches	95.0	97.5	2,017	95.4	35,903
DBH-Trees with Decay Codes 3, 4 or 5	±1 inch per 20 inches	95.0	98.6	146	99.5	1,732
Total Length-trees 40 feet and greater	±10 percent	90.0	73.9	925	81.4	21,658
Total Length-trees less than 40 feet	±10 percent	90.0	65.3	429	73.1	5,710
Total Length-trees less than 5 inches DBH	±10 percent	90.0	33.3	3	70.8	349
Seedling Level						
Species	No Tolerance	85.0	98.1	636	92.5	8,648
Genus	No Tolerance	90.0	99.4	636	96.8	8,648
Seedling Count	±20 percent	90.0	74.5	636	63.1	8,648
Seedling Count (coded)	No Tolerance	90.0	80.5	636	69.3	8,648
Site Tree Level						
Condition List	No Tolerance	99.0	100.0	26	93.1	2,775
Diameter	±0.1 inch per 20 inches	95.0	100.0	26	98.0	2,775
Species	No Tolerance	95.0	100.0	26	99.3	2,775
Genus	No Tolerance	99.0	100.0	26	100.0	2,775
Azimuth	±10 degrees	90.0	100.0	26	99.1	2,775
Distance	±5 feet	90.0	100.0	26	99.3	2,775
Total Length	±10 percent	90.0	96.2	26	98.5	2,775
Diameter Age	±5 years	95.0	92.3	26	98.0	2,775

Table D.—Observed relative bias values (Average [field crew—QA crew]) for measurement variables, blind check plots, Maine, 2013

Variable	Unit of measure	Maine				All NRS states			
		Relative bias	95% CI limits		Number of Observations	Relative bias	95% CI limits		Number of Observations
			Lower	Upper			Lower	Upper	
Plot Level					*number*				*number*
Elevation	foot	-4.09	-8.90	1.10	117	225.42	46.68	449.57	2,197
Latitude - decimal degrees	degree	0.00	0.00	0.00	117	0.00	0.00	0.00	2,201
Longitude - decimal degrees	degree	-0.00	-0.01	0.00	117	-0.00	-0.01	-0.00	2,201
Condition Level									
Stand Age	year	-1.57	-3.13	-0.43	136	-0.25	-0.82	0.43	2,889
Treatment Year 1	year	0.00	0.00	0.00	24	0.13	0.02	0.24	156
Treatment Year 2	year	-0.43	-0.64	-0.14	14	-0.15	-0.39	0.07	41
Treatment Year 3	year	-1.00	-1.00	-1.00	1	-0.60	-1.40	0.00	5
Boundary Level									
Constrasting Condition	cond	0.00	0.00	0.00	38	0.01	-0.00	0.03	868
Left Azimuth	degree	0.63	0.07	1.68	38	0.08	-2.44	2.66	868
Corner Azimuth	degree	0.00	0.00	0.00	5	6.00	-0.62	18.80	83
Corner Distance	foot	0.00	0.00	0.00	5	-0.10	-0.50	0.19	83
Right Azimuth	degree	-0.32	-0.97	0.22	38	1.61	-1.10	4.59	868
Subplot Level									
Slope	percent	0.00	-0.11	0.11	464	0.04	-0.05	0.13	8,565
Aspect	degree	0.25	-0.33	1.14	457	0.29	-0.33	0.92	8,360
Snow/Water Depth	foot	-0.65	-1.14	-0.19	464	-0.28	-0.39	-0.17	8,604
Tree Level									
DBH	inch	0.00	-0.01	0.01	2,163	-0.00	-0.00	0.00	37,635
DRC	inch					0.06	-0.10	0.23	69
Azimuth	degree	0.00	-0.32	0.31	2,505	-0.03	-0.09	0.03	42,172
Horizontal Distance	foot	-0.00	-0.02	0.01	2,505	-0.00	-0.01	0.00	42,172
Rotten/Missing Cull	percent	-0.17	-0.38	0.06	1,368	-0.15	-0.20	-0.11	27,670
Total Length	foot	-0.32	-0.96	0.35	1,354	0.21	0.09	0.33	27,368
Actual Length	foot	-6.23	-8.15	-4.01	195	-1.46	-2.62	-0.50	3,340
Compacted Crown Ratio	percent	-0.63	-1.09	-0.18	1,992	0.11	-0.01	0.20	35,071
Uncompacted Crown Ratio (P3)	percent	-1.46	-3.98	0.70	90	-3.07	-3.80	-2.24	1,984
Crown Density	percent	-10.45	-16.32	-4.55	55	-0.87	-1.17	-0.50	1,622
Crown Dieback	percent	-1.18	-2.45	0.55	55	-0.19	-0.48	0.11	1,622
Transparency	percent	-6.00	-9.09	-2.82	55	-0.69	-1.00	-0.38	1,622
DBH-Live & Trees with Decay Code 1 or 2	inch	0.01	0.00	0.02	2,017	0.00	-0.00	0.00	35,903
DBH-Trees with Decay Codes 3, 4 or 5	inch	-0.08	-0.23	0.01	146	-0.02	-0.05	-0.01	1,732
Total Length-trees 40 feet and greater	foot	0.96	0.26	1.63	925	0.70	0.58	0.83	21,658
Total Length-trees less than 40 feet	foot	-3.09	-4.26	-1.94	429	-1.67	-2.00	-1.39	5,710
Total Length-trees less than 5 inches DBH	foot	-14.80	-30.00	-3.35	3	-1.53	-2.82	-0.05	349
Seedling Level									
Seedling Count	number	-12.90	-17.79	-7.92	633	-12.53	-14.37	-10.94	8,496
Seedling Count (coded)	number	-0.08	-0.13	-0.00	636	-0.00	-0.02	0.02	8,648
Site Tree Level									
Diameter	inch	0.00	0.00	0.00	26	0.00	-0.01	0.01	2,775
Azimuth	degree	0.00	0.00	0.00	26	0.14	-0.18	0.47	2,775
Distance	foot	0.00	0.00	0.00	26	0.04	-0.00	0.08	2,775
Total Length	foot	-0.91	-2.73	0.00	26	-0.04	-0.22	0.13	2,775
Diameter Age	year	-0.58	-1.19	0.00	26	0.00	-0.09	0.11	2,775

Table E.—FIA nonresponse by strata, Maine, 2013

Owner	Strata	Plots Selected	Observed	Denied Access	Hazardous	Other	Response Rate
Inland Census Water Unit 1	12345	32	32	0	0	0	100
Inland Census Water Unit 2	12345	16	16	0	0	0	100
Inland Census Water Unit 3	12345	13	12.75	0	0.25	0	98.08
Inland Census Water Unit 4	12345	38	38	0	0	0	100
Inland Census Water Unit 5	12345	37	37	0	0	0	100
Inland Census Water Unit 6	12345	26	26	0	0	0	100
Inland Census Water Unit 7	12345	13	13	0	0	0	100
Inland Census Water Unit 8	12345	29	28.75	0	0.25	0	99.14
Inland Census Water Unit 9	12345	14	14	0	0	0	100
Private Unit 1	1	26	24.96	0.29	0.75	0	95.99
Private Unit 1	2	17	15.75	1	0.25	0	92.65
Private Unit 1	3	20	19.75	0	0.25	0	98.75
Private Unit 1	4	52	51.38	0	0.62	0	98.8
Private Unit 1	5	152	152	0	0	0	100
Private Unit 2	1	100	100	0	0	0	100
Private Unit 2	2	28	27.75	0	0.25	0	99.11
Private Unit 2	3	46	46	0	0	0	100
Private Unit 2	4	117	116	1	0	0	99.15
Private Unit 2	5	400	399.75	0	0.25	0	99.94
Private Unit 3	1	32	32	0	0	0	100
Private Unit 3	2	31	29.5	0	1.5	0	95.16
Private Unit 3	3	28	26.75	1	0.25	0	95.54
Private Unit 3	4	58	56	2	0	0	96.55
Private Unit 3	5	197	191	6	0	0	96.95
Private Unit 4	1	11	11	0	0	0	100
Private Unit 4	4	28	27	1	0	0	96.43
Private Unit 4	5	101	99.5	1	0.5	0	98.51
Private Unit 4	23	14	14	0	0	0	100
Private Unit 5	1	47	45.75	0	1.25	0	97.34
Private Unit 5	2	21	20.67	0	0.33	0	98.41
Private Unit 5	3	19	18.25	0	0.75	0	96.05
Private Unit 5	4	66	65.5	0	0.5	0	99.24
Private Unit 5	5	228	227	0.25	0.75	0	99.56
Private Unit 7	1	61	60	1	0	0	98.36
Private Unit 7	2	16	14	2	0	0	87.5
Private Unit 7	3	32	31.75	0	0.25	0	99.22
Private Unit 7	4	82	80.75	1	0.25	0	98.48
Private Unit 7	5	223	220.75	2	0.25	0	98.99
Private Unit 9	1	26	26	0	0	0	100
Private Unit 9	4	58	56	2	0	0	96.55
Private Unit 9	5	256	250	4.25	1.75	0	97.66
Private Unit 9	23	35	32.25	2	0.75	0	92.14
Public Private Unit 6	1	49	48	1	0	0	97.96
Public Private Unit 6	2	20	20	0	0	0	100

continued

Table E.—continued

Owner	Strata	Plots Selected	Observed	Denied Access	Hazardous	Other	Response Rate
Public Private Unit 6	3	13	13	0	0	0	100
Public Private Unit 6	4	45	43.5	1	0.5	0	96.67
Public Private Unit 6	5	134	127.75	6	0.25	0	95.34
Public Private Unit 8	1	63	61.5	1	0.5	0	97.62
Public Private Unit 8	2	18	18	0	0	0	100
Public Private Unit 8	3	15	14.75	0	0.25	0	98.33
Public Private Unit 8	4	58	56.75	1	0.25	0	97.84
Public Private Unit 8	5	128	124.5	3.5	0	0	97.27
Public Unit 1	12345	12	11.93	0	0.07	0	99.41
Public Unit 2	12345	30	30	0	0	0	100
Public Unit 3	12345	20	20	0	0	0	100
Public Unit 4	12345	10	9.75	0	0.25	0	97.5
Public Unit 5	12345	64	62	0	2	0	96.88
Public Unit 7	12345	18	17.75	0	0.25	0	98.61
Public Unit 9	12345	22	21.13	0	0.87	0	96.07
White Mountain NF	12345	18	18	0	0	0	100
Total Sampled	12345	3583	3524.57	41.29	17.14	0	98.2