

Periodic Mapped-plot Design Inventory Terminology

Interior West Forest Inventory and Analysis (IWFA) Program
USDA Forest Service, Rocky Mountain Research Station, Ogden, Utah

The following terminology is based on those terms/procedures used at the time of the Forest Inventory and Analysis (FIA) mapped-plot design baseline inventory. This inventory was conducted in the following States for the years specified. **Note:** This document also applies to all National Forest and National Park inventories conducted within these States for the inventory period specified.

<u>State</u>	<u>Inventory period</u>
Arizona	1995-1998
Colorado	1997
Idaho	1998-2002
Montana	1999-2001
New Mexico	1996-2000
South Dakota	1999
Washington	2001
Wyoming	1998-2001

The FIA periodic mapped-plot design inventory was implemented using the traditional FIA inventory grid, but differed from previous baseline inventories (old design) with the addition of condition mapping on sample locations (see “mapped-plot design and “old design” below), modification to the field location subplot layout, and adoption of fixed-radius tally procedures. Some terms and sampling techniques were also updated. As a result of new mandates, all future FIA inventories will be implemented using the core FIA national inventory procedures with “Regional add-ons” (initiated in Utah in 2000). This is the new annual inventory system, which will replace the periodic inventories as more states are implemented.

Annual mortality volume—See “Volume.”

Basal area (BA)—The cross-sectional area of a tree stem/bole (trunk) at the point where diameter is measured, inclusive of bark. BA is calculated for trees 1.0-inch and larger in diameter, and is expressed in square feet. For timber species the calculation is based on diameter at breast height (DBH); for woodland species it is based on diameter at root collar (DRC).

Biomass—The quantity of wood fiber, for trees 1.0-inch DBH/DRC and larger, expressed in terms of oven-dry weight. Includes above-ground portions of trees: bole/stem (trunk), bark, and branches. Biomass estimates can be computed for live and/or dead trees.

Board-foot volume—See “Volume.”

Bole—A trunk or main stem of a tree (primarily timber species); seedlings and saplings are usually specified as having stems rather than boles (The Dictionary of Forestry, Society of American Foresters, 1998). Woodland trees, which are extremely variable in form, are usually referenced as having a single stem/bole or multiple stems (a multistemmed woodland tree).

Bolt—See “Logging residue/products.”

Census water—See “Water.”

Christmas tree grade—A rating system to classify live pinyon trees (12 feet or shorter in height) based on quality to function as Christmas trees using the following guidelines:

- **Premium** – Excellent conical form with no gaps in branches and a straight stem/bole.
- **Standard** – Good conical form with small gaps in branches and stem/bole slightly bent or malformed.
- **Utility** – Conical in form with branches missing and stem/bole bent or malformed.
- **Cull** – Not meeting one of the above classifications. Poor conical form; large gaps in branches; may have more than one stem.

Condition (stand)—Generally defined as an area of relatively uniform ground cover, such as homogeneous vegetative cover, meeting minimum size requirements. A **condition class** is a categorization of the condition based on several defining variables: Ground Cover Class, Land Use. See “Condition criteria (below),” “Ground cover class,” and “Land use.”

Condition criteria—At the most basic level, a condition is an area of forest land or nonforest land, at least 1 acre in size and 120-feet wide, or an area of water, at least 30-feet wide and 1 acre in size. Forest land conditions can be further subdivided into separate condition classes if there are distinct variations in forest type, stand-size class, stand origin, and stand density, given that each distinct area meets minimum size requirements. Microsites or inclusions within a condition, smaller than 1 acre in size or less than 120-feet wide, are not considered separate from the surrounding condition. **Note:** Exceptions to the minimum condition size criteria (1 acre and 120-feet wide) are improved roads, and rights-of-way of all powerlines, pipelines, transmission lines, and operating railroads; these can be any width. See “Forest land,” “Nonforest land,” and “Water.”

Condition proportion—The fraction of plot area sampled on each condition. The sum of all condition proportions for a plot equals 1.00.

Cord—A stack of wood equivalent to 128 cubic feet of wood and air space, having standard dimensions of 4 by 4 by 8 feet.

Crown class—A classification of trees based on dominance in relation to adjacent trees in the stand as indicated by crown development and amount of sunlight received from above and the sides.

Crown cover (Canopy cover)—The percentage of the ground surface area covered by a vertical projection of plant crowns. Tree crown cover for a sample site includes the combined cover of timber and woodland trees 1.0-inch DBH/DRC and larger. Maximum crown cover for a site is 100 percent; overlapping cover is not double counted.

Cubic-foot volume (merchantable)—See “Volume.”

Cull tree—A live timber species tree that fails to meet the specifications of a sound (growing-stock) tree, now or prospectively. See “Tree class - Rotten tree and Rough tree.”

Cull deductions—Percent volume loss (tree cull) due to rotten/missing material, sound dead wood, and/or form defect. Cull deductions are based on field crew estimation (using Regional seen-defect guidelines), and are limited to the merchantable portion of a tree bole/stem (except for timber species saplings—see below). Tree sections not qualifying as the merchantable portion, or sections below the place(s) of diameter measurement on a woodland tree, are not included in volume loss estimation. For timber species saplings, cull deductions are based on the area between a 1-foot stump and a 1.0-inch top. **Note: Beginning in 2000, cull deductions and percent volume loss was discontinued for timber species saplings.** Seedlings are not evaluated for volume loss. Form defect estimates are restricted to timber species. Tree sections with form defect and rotten or sound dead volume are not “double counted.” Rotten and sound dead estimates take precedence over form defect. See “Merchantable portion” and “Volume.”

Culmination of mean annual increment—See “Mean annual increment.”

Developed forest land—See “Forest land.”

Diameter at breast height (DBH)—For all timber species: the diameter of a tree bole/stem (trunk) measured at breast height (4.5 feet above ground), measured outside the bark. The point of diameter measurement may vary for abnormally formed trees.

Diameter at root collar (DRC)—For woodland trees: the diameter of a tree stem(s) measured at root collar or at the point nearest the ground line (whichever is higher) that represents the basal area of the tree, measured outside the bark. For multitemmed woodland trees, DRC is calculated from an equation that incorporates the individual stem diameter measurements. The point of diameter measurement may vary for woodland trees with stems that are abnormally formed. With the exception of seedlings, woodland stems qualifying for measurement must be at least 1.0-inch in diameter or larger and at least 1.0-foot in length.

Diameter class—A grouping of tree diameters (DBH or DRC) into classes of a specified range. For some diameter classes, the number referenced (e.g., 4”, 6”, 8”) is designated as the midpoint of an individual class range. For example, if 2-inch classes are specified (the range for an individual class) and even numbers are referenced, the 6-inch class would include trees 5.0- to 6.9-inches in diameter.

Diameter outside bark (DOB)—Tree diameter measurement inclusive of the outside perimeter of the tree bark. DOB may be taken at various points on a tree (e.g., breast height, tree top) or log, and is sometimes estimated.

Distance to road—See “Improved road.”

Downed tree— For timber species (1.0-inch diameter or larger), a tree is classified as down if the main stem/bole is broken below 6.0 feet above ground, or not attached at the base or ground level for support. For a down-dead timber species to be tallied, the center of the stem at the diameter measurement point must be above the duff layer. Down trees that no longer have a cylindrical form do not qualify for tally.

For woodland species (1.0-inch DRC or larger), a downed tree is one with no stems 1.0-inch DRC or larger standing. See “Tree class - Hard dead tree and Soft dead tree.”

Established seedling—A live tree smaller than 1.0-inch DBH/DRC, having a root system in mineral soil, and at least 4.0-inches tall for softwoods, or 12.0-inches tall for hardwoods. A seedling is not considered established if it will not survive due to form defects, insect infestation, or disease.

Farmer/rancher-owned land—See “Private lands.”

Fenceposts—See “Posts.”

Field plot/location—A reference to the sample site or plot; an area containing the field location center (LC) and all sample points, distributed over an area approximately 2.5 acres in size. A field location consists of four subplots and four microplots.

- **Subplot** – A 1/24-acre fixed-radius area (24-foot horizontal radius) used to sample trees 5.0-inches DBH/DRC and larger and understory vegetation.
- **Microplot** – A 1/300-acre fixed-radius plot (6.8-foot radius), located at the center of each subplot, used to inventory seedlings and saplings. Note: Beginning in 2001, all microplot centers are offset from subplot center at an azimuth of 90 degrees and at a horizontal distance of 12 feet.

Fixed-radius plot—A circular sample plot of a specified horizontal radius: 1/300 acre = 6.8-foot radius (microplot); 1/24 acre = 24.0-foot radius (subplot).

Forest industry lands—See “Private lands.”

Forest land—Land that is at least 10 percent stocked with live tally tree species (timber or woodland species), including land that formerly had such stocking and that may be regenerated naturally or artificially. The minimum area for classification of forest land is 1 acre and 120-feet wide. Unimproved roads, trails, streams, and openings in forest areas are classified as forest land if they are less than 120-feet wide or 1 acre in size. For field use, sufficient tree crown cover (5 percent cover of tally tree species), or the presence of sufficient reproduction (40 tally tree species seedlings/saplings per acre), is used to represent 10 percent stocking. See “Tally trees,” “Timber species,” “Woodland species.”

- **Timberland** – A subset of forest land where the designated forest type is derived from timber species. See “Forest type.”
- **Woodland** – A subset of forest land where the designated forest type is derived from woodland species. See “Forest type.”
- **Nonstocked forest land** – Formerly stocked forest land that currently has less than 10 percent stocking, but has the potential to again become 10 percent stocked. For example, recently harvested, burned, or windthrow-damaged areas.
- **Developed forest land** – Forest land that probably will not be managed for wood production because of development for recreational, residential, or other uses, but where human activity on the site does not preclude natural succession of the stand.
- **Undeveloped forest land** – Forest land that does not have buildings, dwellings, or other human-made developments.

Forest type (historic IW-FIA method)—A classification of forest land based on and named for the tree species presently forming a plurality of live-tree stocking. Stocking is an expression of the extent to which growing space is effectively utilized by live trees. Some exceptions to the single predominant species concept used for classifying forest type apply to sites where (1) hardwoods and softwoods occur together in a stand, or (2) when Engelmann spruce and subalpine fir occur together in a stand, and in combination they compose the predominant live-tree stocking.

When hardwoods (for example, maple, oak or aspen trees) and softwoods (for example, Douglas-fir or ponderosa pine trees) occur together within a stand, forest type is determined as follows: First, the stocking percents of all softwoods are summed as a group, and then again for hardwoods, in order to determine which of the two overall groups has the most live-tree stocking. Next, the individual tree species from the group with the majority of stocking is selected as the forest type.

When Engelmann spruce and subalpine fir (or corkbark fir) occur together in a stand, and in combination they constitute the predominant live-tree stocking, forest type is computed using the following criteria: First, all stocking percents are adjusted from an absolute base to a relative base, where the sum of all percents are equal to 100 percent maximum. Next, a stand is classified as an Engelmann spruce type if Engelmann spruce individually is greater than or equal to 20 percent relative stocking, and subalpine fir is less than 20 percent relative stocking. For all other stands where subalpine fir and Engelmann spruce together have plurality, the stand is classified as the spruce-fir type.

When there is insufficient data to compute forest type, sometimes the field-recorded value is used for reporting.

Gross annual growth—See “Growth.”

Ground cover class—The general classification of an area into forest land, nonforest land, or water.

Growing stock—A term often used in cubic foot volume tables to describe which trees are included in net volume, annual growth, and annual mortality estimates. Includes growing-stock trees 5.0 inches DBH and greater (excludes all woodland species).

Growing-stock tree—See “Tree class – Sound tree.”

Growth—

- **Gross annual growth**—The average annual increase in the volume of live trees (less deductions for cull volume).
- **Net annual growth**—Gross annual growth minus average annual mortality volume.

Hard dead tree (Salvable dead tree)—See “Tree class.”

Hardwood trees—Trees that are usually broad-leaved and deciduous.

Humus—See “Litter.”

Improved road—All roads graded or otherwise regularly maintained for long-term use. **Distance to road** is a term that refers to the “straight-line” distance from a location center to the nearest improved road.

Indian Trust lands—See “Private lands.”

Industrial wood—See “Logging residue/products.”

Land use—The classification of a land condition by use or type.

Large tree stands (Sawtimber stands)—See “Stand-size class.”

Large trees (Sawtimber trees)—See “Tree-size class.”

LC—A reference for the field location center. When established on the ground, it becomes the center point of the field location, and the center of subplot 1 on the field location layout.

Litter—The uppermost layer of organic debris on a forest floor; that is, essentially the freshly fallen, or only slightly decomposed material, mainly foliage, but also bark fragments, twigs, flowers, fruits, and so forth. **Humus** is the organic layer, unrecognizable as to origin, immediately beneath the litter layer from which it is derived. Litter and humus together are often termed **duff**.

Logging residue/products—

- **Bolt** – A short piece of pulpwood; a short log.
- **Industrial wood** – All commercial roundwood products, excluding fuelwood.

- **Logging residue** – The unused sections within the merchantable portions of sound (growing-stock) trees cut or killed during logging operations.
- **Mill or plant residue** – Wood material from mills or other primary manufacturing plants that is not utilized for the mill's or plant's primary products. Mill or plant residue includes bark, slabs, edgings, trimmings, miscuts, sawdust, and shavings. Much of the mill and plant residue is used as fuel and as the raw material for such products as pulp, palletized fuel, fiberwood, mulch, and animal bedding. Mill or plant residue includes bark and the following components:
 - **Coarse residue** – Wood material suitable for chipping, such as slabs, edgings, and trim.
 - **Fine residue** – Wood material unsuitable for chipping, such as sawdust and shavings.
- **Primary wood-processing plants** – An industrial plant that processes roundwood products, such as sawlogs, pulpwood bolts, or veneer logs.
- **Pulpwood** – Roundwood, whole-tree chips, or wood residues that are used for the production of wood pulp.
- **Roundwood** – Logs, bolts, or other round sections cut from trees.

Mapped-plot design—A sampling technique that identifies (maps) and separately classifies distinct “conditions” on the field location sample area. Each condition must meet minimum size requirements. At the most basic level, condition class delineations include forest land, nonforest land, and water. Forest land conditions can be further subdivided into separate condition classes if there are distinct variations in forest type, stand-size class, stand origin, and stand density, given that each distinct area meets minimum size requirements. See “Condition,” “Condition criteria,” “Field location,” “Forest land,” “Nonforest land,” and “Water.”

Mean annual increment (MAI)—The total increment of a tree or stand up to a given age divided by that tree/stand age (The Dictionary of Forestry, Society of American Foresters, 1998). MAI indicates the average increment per year that has been attained up to the age specified. For FIA reporting, MAI is generally expressed in terms of volume at the stand or tree level. MAI is sometimes referred to as “Yield.”

Medium tree stands (Poletimber stands)—See “Stand-size class.”

Medium trees (Poletimber trees)—See “Tree-size class.”

Merchantable bole—See “Merchantable portion.”

Merchantable portion—For timber species 5.0-inches DBH and larger, the merchantable portion (or “merchantable bole”) includes the part of the tree bole from a 1-foot stump to a 4.0-inch top (DOB).

For woodland species, the merchantable portion includes all qualifying segments above the place(s) of diameter measurement for any tree with a single 5.0-inch stem or a

cumulative (calculated) DRC of at least 5.0 inches; sections below the place(s) of diameter measurement are not included. Qualifying segments are stems or branches that are a minimum of 1 foot in length and at least 1.0 inches in diameter; portions of stems or branches smaller than 1.0 inches in diameter, such as branch tips, are not included in the merchantable portion of the tree. **Note:** For woodland species, the area defined as the merchantable portion has application when field crews are evaluating a tree for percent volume loss (see “Cull deductions”).

Microplot—See “Field location.”

Mill or plant residue— See “Logging residue/products.”

Miscellaneous Federal lands—See “Public lands.”

Mortality tree—A standing or downed tree, 1.0–inch DBH/DRC and larger, that was live within the past 5 years.

Mortality volume (annual)—See “Volume.”

National Forest System (NFS) lands—See “Public lands.”

National Park lands—See “Public lands.”

Net annual growth—See “Growth.”

Net board-foot volume—See “Volume.”

Net cubic-foot volume—See “Volume.”

Noncensus water—See “Water.”

Nonforest land—For the FIA mapped design baseline inventory, nonforest land includes three main categories; (1) Nontree land, (2) Nonsampled Tree Land, and (3) Other tree land.

- **Nontree land** – This is land that (1) has never supported tree cover/stocking sufficient for classification as forest land (e.g., barren, alpine tundra), or (2) was formerly tree land, but has been converted to a nontree land status (e.g., cropland, improved pasture).

Other examples of nontree land are improved roads of any width, graded or otherwise regularly maintained for long-term use, and rights-of-way of all powerlines, pipelines, other transmission lines, and operating railroads. If intermingled in forest areas, unimproved roads and nonforest strips must be at least 120-foot wide and 1 acre in size to qualify as nontree land.

This category also includes formerly stocked woodland areas if they are currently nonstocked due to a treatment (e.g., chaining, other land clearing). These areas are treated to eliminate woodland trees for the purpose of enhancing or providing for nonwood commodities or uses (e.g., increasing herbage production).

- **Nonsampled tree land** – This is land that currently meets the cover or stocking requirements for forest land, but human activity on the site will preclude the natural succession of the stand (areas that might be included in this category are golf courses, cemeteries, picnic grounds, orchards, Christmas tree plantations, and home yards with mowed lawns).
- **Other tree land** – Land that is 10 percent stocked with trees defined as “other tree species” (nontally tree species) but has less than 10 percent stocking or 5 percent cover in tally tree species. Examples would include land stocked with tree species such as paloverde, tamerisk, or Russian olive. See “Other tree species.”

Nonsampled tree land—See “Nonforest land.”

Nontree land—See “Nonforest land.”

Nonindustrial private lands—See “Private lands.”

Nonreserved forest land—Forest land not withdrawn from management for production of wood products through statute or administrative designation.

Nonsalvable dead tree—See “Tree class .”

Nonstocked forest land—See “Forest land.”

Old design— An older sampling technique that used a 5-point bowtie cluster design with alternate satellite point locations to sample one distinct condition. See “Mapped-plot design.”

Other private lands—See “Private lands.”

Other public lands—See “Public lands.”

Other removals—See “Removals.”

Other tree land—See “Nonforest land.”

Other tree species (Nontally species)—All species classified as trees (Little, Elbert L. Jr. 1979. Checklist of United States Trees. U.S. Dep. Agric. Agriculture Handbook No. 541), but that have not at this time been designated nationally by FIA as tally tree species. For the purposes of classifying forest land, other tree species are not used to determine if minimal stocking requirements have been met. Other tree species include turbinella oak, Russian olive, acacia, etc. See “Nonforest land – Other tree land.”

Poletimber-size trees (Medium trees)—See “Tree-size class.”

Poletimber stands (Medium tree stands)—See “Stand-size class.”

Posts (fence)—Juniper and oak species are evaluated for fence post potential using the following criteria:

- **Line Post** – A 7-foot minimum length with a 5- to 7-inch diameter butt, 2.5-inch minimum small-end diameter, and reasonably straight and solid.
- **Corner Post** – An 8-foot minimum length with a 7- to 9-inch diameter butt, 2.5-inch minimum small-end diameter, and reasonably straight and solid.

Primary wood-processing plants—See “Logging residue/products.”

Private lands—

- **Forest industry** – Land owned by a company or an individual(s) operating a primary wood-processing plant.
- **Indian Trust** – American Indian lands held in fee, or trust, by the Federal Government, but administered for tribal groups or as individual trust allotments.
- **Nonindustrial private** – All private ownerships except forest industry.
- **Other private** – Privately owned lands other than forest industry or Indian Trust.

Productivity—Developed for timber species, the potential yield capability of a stand calculated as a function of site index (expressed in terms of cubic-foot growth per acre per year at age of culmination of MAI). Productivity values for forest land provide an indication of biological potential. Timberland stands are classified by the potential net annual growth attainable in fully stocked natural stands. Woodland stands are given a default value of 10 cubic feet per acre per year. For FIA reporting, **Productivity Class** is a variable that groups stand productivity values into categories of a specified range. Productivity is sometimes referred to as “Yield” or “Mean annual increment (MAI).”

Public lands—

- **Miscellaneous Federal** – Public lands administered by Federal agencies other than the Forest Service, U.S. Department of Agriculture, or the Bureau of Land Management, U.S. Department of the Interior.
- **National Forest System (NFS)** – Public lands administered by the Forest Service, U.S. Department of Agriculture, such as National Forests, National Grasslands, and some National Recreation Areas.
- **National Park** – Public lands administered by the Park Service, U.S. Department of the Interior, such as National Parks, National Monuments, National Historic Sites (such as National Memorials and National Battlefields), and some National Recreation Areas.
- **Other public** – Public lands administered by agencies other than the Forest Service, U.S. Department of Agriculture. Includes lands administered by other

Federal, State, county, and local government agencies, including lands leased by these agencies for more than 50 years.

Pulpwood—See “Logging residue/products.”

Removals—The net volume of sound (growing-stock) trees removed from the inventory by harvesting or other cultural operations (such as timber-stand improvement), by land clearing, or by changes in land use (such as a shift to wilderness).

Reserved land—Land withdrawn from management for production of wood products through statute or administrative designation. Examples include Wilderness areas and National Parks and Monuments.

Residue—See “Logging residue/products.”

Rotten tree—See “Tree class.”

Rough tree—See “Tree class.”

Roundwood—See “Logging residue/products.”

Sapling and seedling stands—See “Stand-size class.”

Saplings—See “Tree-size class.”

Salvable dead tree—See “Tree class.”

Sawlog portion (timber species)—That part of the bole of sawtimber-size trees between a 1-foot stump and the sawlog top.

Sawlog top (timber species)—The point on the bole of sawtimber-size trees above which a sawlog cannot be produced. The minimum sawlog top is 7 inches DOB for softwoods, and 9 inches DOB for hardwoods.

Sawtimber— A term often used in board foot volume tables to describe which trees are included in net volume, annual growth, and annual mortality estimates. Includes growing-stock trees 9.0 inches DBH and greater for softwoods, and 11.0 inches DBH and greater for hardwoods.

Sawtimber-size trees (Large trees)—See “Tree-size class.”

Sawtimber stands (Large tree stands)—See “Stand-size class.”

Seedlings—See “Tree-size class.”

Site index—A measure of forest productivity for a timberland tree/stand. Expressed in terms of the expected height (in feet) of site trees at an index age of 50 (or 80 for aspen and cottonwood). Calculated from height-to-age equations.

Site productivity—See “Productivity.”

Site tree—A timber species tree used to provide an index of site quality. Timber species selected for site index calculations must meet specified criteria with regards to age, diameter, crown class, and damage.

Soft dead tree (Nonsalvable dead tree)— See “Tree class.”

Snag—A standing-dead tree. See “Standing tree” and “Tree class.”

Softwood trees—Coniferous trees, usually evergreen, having needle- or scale-like leaves.

Sound tree (Growing-stock tree)—See “Tree class.”

Stand—A community of trees that can be distinguished from adjacent communities due to similarities and uniformity in tree and site characteristics, such as age-class distribution, species composition, spatial arrangement, structure, etc. See “Condition criteria.”

Stand density— A relative measure that quantifies the relationship between trees per acre, stand basal area, average stand diameter, and stocking of a forested stand. **Stand density index (SDI)**, a widely used measure developed by Reineke (1933), is an index that expresses relative stand density based on a comparison of measured stand values with some standard condition; **relative stand density** is the ratio, proportion, or percent of absolute stand density to a reference level defined by some standard level of competition (The Dictionary of Forestry, Society of American Foresters, 1998).

For FIA reporting, the SDI for a site is usually presented as a percentage of the maximum SDI for the forest type. Site SDI values are sometimes grouped into SDI classes of a specified percentage range. Maximum SDI values vary by species and region.

Standard error—An expression that denotes the precision of an estimate, obtained by statistical sampling methods. For established standards see Forest Service Handbook 4809.11 (Forest Survey Handbook chapter).

Standing tree—For timber species (1.0-inch DBH and larger), a tree is classified as standing if the main stem/bole is at least 6.0 feet tall and is self-supported. A standing woodland tree (1.0-inch DRC and larger) must have at least one standing stem 1.0-inch DRC or larger that is self-supported.

Stand-size class—A classification of forest land based on the predominant diameter size of live trees presently forming the plurality of live-tree stocking. Classes are defined as follows:

- **Sawtimber stand (Large-tree stand)** – A stand at least 10 percent stocked with live trees, in which half or more of the total stocking is from live trees 5.0-inches or larger in diameter, and with sawtimber (large tree) stocking equal to or greater than poletimber (medium tree) stocking.
- **Poletimber stand (Medium-tree stand)** – A stand at least 10 percent stocked with live trees, in which half or more of the total stocking is from live trees 5.0-

- inches or larger in diameter, and with poletimber (medium tree) stocking exceeding sawtimber (large tree) stocking.
- **Sapling/seedling stand** – A stand at least 10 percent stocked with live trees, in which half or more of the total stocking is from live trees less than 5.0-inches in diameter.
 - **Nonstocked stand** – A formerly stocked stand that currently has less than 10 percent stocking, but has the potential to again become 10 percent stocked. For example, recently harvested, burned, or windthrow-damaged areas.

Stockability (Stockability factor)—An estimate of the stocking potential of a given site; for example, a stockability factor of 0.8 for a given site indicates that the site is capable of supporting only about 80 percent of “normal” stocking as indicated by yield tables (Forest Habitat Types of Montana, Pfister and others, 1977). Stockability factors (maximum site value of 1.0) are assigned to sites based on habitat type/plant associations.

Stocking—An expression of the extent to which growing space is effectively utilized by live trees.

- **Periodic mapped-plot design** – Tree stocking values are assigned using national FIA algorithms.
- **Old design** – Tree stocking values are assigned using RMRS FIA basal area standard algorithms.

Stocking condition class— A classification of forest land used to provide an indication of the extent to which a site is being utilized by live trees (including all live timber and woodland species, and live cull trees, present on the site condition). Site conditions are assigned an absolute stocking value and then categorized into one of the following stocking condition classes (see “Forest land – Timberland and Woodland”):

- **Timberland classes:**
 - **Overstocked** – sites with a stocking value greater than or equal to 100 (maximum value of 120).
 - **Fully stocked** – sites with a stocking value of 60 to less than 100.
 - **Medium to fully stocked (Moderately stocked)** – sites with a stocking value of 35 to less than 60.
 - **Poorly stocked** – sites with a stocking value of 10 to less than 35.
 - **Nonstocked** – sites with a stocking value less than 10.
- **Woodland class** – all woodland sites.

Subplot—See “Field location.”

Suppression—The process whereby certain trees, shrubs, etc., in a community become weakened and/or stunted, essentially due to competition by surrounding trees, shrubs, etc., in the immediate environment (natural suppression). Suppression may also be the result of human intervention (e.g., selective lopping, girdling, cutting back) or selective browsing by animals (artificial suppression).

Tally trees—Tree species that have been selected to be included in the field inventory/sample, usually because they occur in tree growth form throughout much of their range. Tally tree species are categorized as “timber” or “woodland” trees. Tally trees are evaluated for a variety of items (e.g., crown class, crown ratio, damage, rotten/missing material, form defect), and measurements (e.g., diameter, height) are taken on each tally tree. This information is used to obtain estimates of volume, growth, and mortality for the sample location. Tally tree data can also be used to obtain estimates for other site variables, such as site quality and health. See “Field location,” “Timber species,” and “Woodland species.”

Timber species—Tally tree species traditionally used for industrial wood products. These include all species of conifers, except pinyon and juniper. **Note: Western juniper is the only juniper considered a timber species.** Hardwoods included are aspen, box elder, cottonwood (*Populus* spp.), and paper birch. In addition, beginning in 1999, hardwoods included hackberry, green ash, Bur oak, and Chinkapin oak. Timber species are measured for diameter at breast height. See “Diameter at breast height, DBH.”

Timber stand improvement—A term comprising all intermediate cuttings or treatments, such as thinning, pruning, release cutting, girdling, weeding, or poisoning, made to improve the composition, health, and growth of the remaining trees in the stand.

Timberland—See “Forest land.”

Tree class—A classification system (below) for live or dead trees based on a tree’s physical characteristics. See “Merchantable portion.”

- **Live trees** are classified for Tree Class as follows; timber species are classified as either a sound tree (also referred to as a growing-stock tree), rough tree, or rotten tree:
 - **Sound tree (Growing-stock tree)** – A live timber species, 5.0-inches DBH or larger, with less than 2/3 (67 percent) of the merchantable volume cull, and containing at least one solid 8-foot section, now or prospectively, reasonably free of form defect, on the merchantable portion of the tree.

A live timber species sapling (1.0- to 4.9-inches DBH) is also included in this category if it is expected to become a sound live tree, 5.0-inches DBH or larger, with good form and vigor.

- **Rough tree** – A live timber species, 5.0-inches DBH and larger, with 2/3 (67 percent) or more of the merchantable volume cull, and more than half of this cull is due to sound dead wood volume loss, or severe form-defect volume loss (e.g., severe sweep, crook, forks).

Also, a live timber species sapling (1.0- to 4.9-inches DBH) that is not expected to become a sound (growing-stock) tree due to defect, or a timber species (5.0-inches DBH and larger) that does not now, or prospectively, have at least one solid 8-foot section, reasonably free of form defect, on the merchantable portion.

- **Rotten tree** – A live timber species, 5.0-inches DBH and larger, with 2/3 (67 percent) or more of the merchantable volume cull, and more than half of this cull is due to rotten and/or missing material.
- **Live woodland tree**
- **Dead trees** (timber or woodland species) are classified for Tree Class as follows:
 - **Hard dead tree (Salvable dead tree)** – A standing dead tally tree, 1.0-inch DBH/DRC or larger, that has a minimum of 1/3 of the original merchantable volume sound (less than 2/3 rotten and/or missing material). Also, a down-dead tally tree, 1.0-inch DBH/DRC or larger, with a minimum of 1/3 of the original merchantable volume sound and intact. See “Downed tree” and “Standing tree.”
 - **Soft dead tree (Nonsalvable dead tree)** – A standing dead tree, 1.0-inch DBH/DRC or larger, that has less than 1/3 of the original merchantable volume sound (more than 2/3 rotten/missing material). Also, a down-dead tree, 1.0-inch DBH/DRC or larger, with less than 1/3 of the original merchantable bole sound and intact. See “Downed tree” and “Standing tree.”

Tree history—A classification to identify a sample tree as either live or dead.

Tree land—Land that is at least 10 percent stocked, or formerly stocked and capable of becoming stocked again, by species classified as trees (Little, Elbert L. Jr. 1979. Checklist of United States Trees. U.S. Dep. Agric. Agriculture Handbook No. 541), and where the forest condition covers an area at least 1 acre in size and 120-feet wide. For field use, sufficient tree crown cover (5 percent cover) or the presence of sufficient reproduction (40 seedlings/saplings per acre) is used to represent stocking. Areas stocked with tree species designated for tally are classified as “forest land.” Areas with other tree species, but insufficient stocking in tally tree species, are classified as “other tree land,” a subcategory of nonforest land. See “Condition criteria,” “Forest land,” and “Nonforest land.”

Tree-size class—A classification of trees based on the diameter measurement. **Note:** For woodland trees, with the exception of seedlings, stems qualifying for measurement must be at least 1.0-inch in diameter or larger and at least 1.0 foot in length:

- **Seedling** – An established tree smaller than 1.0-inch DBH for timber species or 1.0-inch DRC for woodland trees. See “Established seedling.”
- **Sapling** – A timber species 1.0- to 4.9-inches DBH; also, a single-stemmed woodland tree 1.0- to 4.9-inches DRC, or a multistemmed woodland tree with a cumulative DRC of 1.0- to 4.9-inches.
- **Poletimber-size tree or medium tree** – A timber species at least 5.0-inches DBH, but smaller than 9.0-inches DBH for a softwood, and smaller than 11.0-inches DBH for a hardwood. A woodland tree 5.0- to 8.9-inches DRC (single stem measurement or computed multistem measurement) is also included in this category.

- **Sawtimber-size tree or large tree** – A timber species that is at least 9.0-inches DBH for a softwood, and at least 11.0-inches DBH for a hardwood. A woodland tree 9.0-inches DRC and larger (single stem measurement or computed multistem measurement) is also included in this category.

Undeveloped forest land—See “Forest land.”

Upper-stem portion—That part of the main stem or fork of sawtimber-size trees above the sawlog top to a minimum top diameter of 4-inches DOB.

Volume for Timber Species—

- **Annual mortality volume**—The net volume contained in timber species (standing or down) that have died over a 1-year period of time. This estimate is based on a 5-year average. Mortality volume for timber species can be calculated in terms of cubic feet or board feet. See “Mortality tree.”
- **Board-foot volume**— A board-foot is a unit of measure indicating the amount of wood contained in an unfinished board 1-foot wide, 1-foot long, and 1-inch thick. Board-foot volume is computed for the sawlog portion of a sawtimber-size tree; the sawlog portion includes the part of the bole on sawtimber-size tree from a 1-foot stump to a minimum sawlog top of 7-inches DOB for softwoods, or 9-inches DOB for hardwoods. **Net board-foot volume** is calculated as the gross board-foot volume in the sawlog portion of a sawtimber-size tree, less deductions for cull (note: board-foot cull deductions are limited to rotten/missing material and form defect – referred to as the **merchantability factor -- board-foot**). Board-foot volume estimates are computed in both Scribner and International ¼-inch rule, and can be calculated for live and/or dead (standing or down) trees. See “Cull deductions.”
- **Cubic-foot volume (merchantable)**—A cubic-foot is a unit of measure indicating the amount of wood contained in a cube 1x1x1 foot. Cubic-foot volume is computed for the merchantable portion of a timber species tree; the merchantable portion includes that part of a bole from a 1-foot stump to a minimum 4-inch top, DOB. **Net cubic-foot volume** is calculated as the gross cubic-foot volume in the merchantable portion of a tree, less deductions for cull (note: cubic-foot cull deductions are limited to rotten/missing material – referred to as the **merchantability factor -- cubic-foot**). Merchantable cubic-foot volume estimates can be calculated for live and/or dead (standing or down) trees. See “Cull deductions.”

Volume for Woodland Trees—

- **Annual mortality volume**—The net volume contained in woodland trees (standing or down) that have died over a 1-year period of time. This estimate is based on a 5-year average. Mortality volume for woodland trees is calculated in cubic feet. See “Mortality tree.”

- **Cubic-foot volume**—A cubic-foot is a unit of measure indicating the amount of wood contained in a cube 1x1x1 foot. Woodland cubic-foot volume is computed for trees 5.0 inches and larger in diameter.
 - **Dead volume**—For dead woodland trees, this volume is equal to gross cubic-foot volume. For live woodland trees, dead volume is calculated as gross cubic-foot volume times the field crew estimate of percent sound dead volume loss. Cull deductions are limited to the merchantable portion of a tree. See “Cull deductions” and “Merchantable portion.”
 - **Net volume**—The gross cubic-foot volume of live woodland trees, less deductions for rotten and missing material. This estimate includes volume for dead material on live trees. Cull deductions are limited to the merchantable portion of a tree. See “Cull deductions” and “Merchantable portion.”

Water—In terms of Ground Cover Classification, water includes streams, sloughs, estuaries, and canals more than 30 feet in width; and, lakes, reservoirs, and ponds more than 1 acre in size. Ephemeral and intermittent streams are classified as land. Water is further classified as “census water” or “noncensus” water as follows:

- **Census water** – Rivers, streams, sloughs, estuaries, and canals, more than 200 feet wide and 4.5 acres and larger in size; only portions of rivers and streams meeting the definition criteria are considered census water. Other census water includes lakes, reservoirs, and ponds more than 4.5 acres and larger in size. Portions of braided streams meeting the census water definition criteria and more than 50 percent water at normal high-water level are also considered census water.
- **Noncensus water** – Portions of rivers, streams, sloughs, estuaries, and canals that are 30 to 200 feet wide and at least 1 acre in size; and lakes, reservoirs, and ponds 1 to 4.5 acres in size. Portions of rivers and streams not meeting the criteria for census water, but at least 30 feet wide and 1 acre in size, are considered noncensus water. Portions of braided streams not meeting the criteria for census water, but at least 30 feet in width and 1 acre in size, and more than 50 percent water at normal high-water level are also considered noncensus water.

Wilderness—An area of undeveloped land currently included in the Wilderness System, managed to preserve its natural conditions and retain its primeval character and influence.

Woodland—See “Forest land.”

Woodland species—Tally tree species that are not usually converted into industrial wood products. Common uses of woodland trees are fuelwood, fenceposts, and Christmas trees. These species include pinyon, juniper (except Western juniper), mesquite, locust, mountain-mahogany (*Cercocarpus* spp.), Rocky Mountain maple, bigtooth maple, desert ironwood, and most oaks (note: Bur oak and Chinkapin oak

are classified as timber species). Because most woodland trees are extremely variable in form, diameter is usually measured at the root collar.