



Forest Terminology for Multiple-Use Management ¹



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William Hubbard, Christopher Latt, Alan Long ²

Like all specialized fields, forestry has gradually accumulated a large body of technical terms as well as commonly used words given a new forestry twist. The increased emphasis on multiple-use management and even newer management philosophies has also brought important new terms into the realm of forestry, words formerly used mainly by wildlife biologists, ecologists, environmental scientists, agroforesters, and other non-forestry experts. Such a wealth of terms invites confusion. This glossary is designed to cut through some of the confusion by providing, in one place, definitions for many of the terms commonly used in modern forestry. Traditional forestry terms still dominate, as one would expect of a forestry glossary, but the addition of definitions from other fields accommodates today's multidisciplinary approach to forest management. Hopefully, the glossary will prove useful to small forest landowners and professional natural resource managers alike.

At the same time, we hope a glossary that encompasses a range of forest resource uses and values, will draw attention to the broad scope of management possibilities. Good forest stewardship balances economic considerations with concern for the myriad processes and organisms that shape a forest ecosystem. Most forestland owners highly value a forest's non-timber values: wildlife, recreation, scenic beauty, clean water. This glossary acknowledges and encourages a multiple-use perspective.

Many of the definitions in this glossary are based on our own experiences in the field of forestry. Many others are based sometimes closely, sometimes loosely on definitions we have come across in various extension and non-extension books and publications. Since our list of definitions was assembled gradually over time, it is no longer possible to say which definitions are based on printed sources and which are based on our own experiences and education. More than any other reference, we consulted the Society of American Foresters (SAF) 370-page book, *Terminology of Forest Science Technology, Practice, and Products*.

Abney level : a hand-held instrument used to determine slopes, elevations, and heights.

Advance regeneration : tree seedlings already established on a site before the overstory trees are harvested.

Afforestation : planting or seeding trees in an area previously devoid of trees, for example, pastures and agricultural fields.

Agroforestry : the intentional growing of trees on the same site as agricultural crops and/or livestock in order to increase the total yield of products, generate short-term income, and improve environmental benefits (for example, erosion control).

Alleycropping : an agroforestry system in which crops are grown on strips of land between widely spaced rows of trees.

Altimeter : an instrument used to determine altitudes and elevations, or the height of a tree.

Annual rings : see "growth rings."

Artificial regeneration : planting or purposefully seeding trees in a previously harvested area.

Bark gauge : an instrument for measuring bark thickness; this measurement is used in computations of tree growth.

Basal area (BA) : the area of a cross-section of a tree, including bark, at breast height. Basal area of a forest stand is the sum of the basal areas of all individual trees in the stand, usually reported as square feet per acre or square meters per hectare.

Bedding : use of a special disk to build up low ridges of soil during site preparation on poorly drained sites. Bedding improves conditions for seedlings planted on the ridges by raising their roots above high water tables and concentrating top soil and organic matter in the root zone. "Double bedding" is a second pass along the beds, usually several months later, to decrease competing vegetation and better form the beds.

Biltmore stick : a tool resembling a yardstick, calibrated to measure the diameter of a tree at breast height, when held at arm's length against the tree.

Biodiversity : the variety, distribution and abundance of living organisms in an ecosystem. Maintaining biodiversity is believed to promote stability, sustainability and resilience of ecosystems.

Blaze : to mark a tree, usually by painting and/or cutting the bark. Blazing is frequently used to mark the boundaries of forest properties, borders of timber management units, or locations of trails.

Blowdown : see "windthrow."

BMP (Best Management Practices) : a series of guidelines or minimum standards for proper application of forestry operations, designed primarily to prevent soil erosion and water pollution, and to protect certain wildlife habitat values in riparian and wetland areas.

Board foot : a unit of unfinished wood 1 inch thick, 12 inches long, and 12 inches wide. A traditional

unit for measuring and selling solid wood products (e.g., lumber). One board foot contains 144 cubic inches of wood.

Bole : the main stem of a tree.

Border plantings : trees and/or shrubs planted at the edges of agricultural fields, for example, along field boundaries, the banks of waterways, and roads. These can provide wood products, protection from wind erosion, wildlife cover, and wildlife travel corridors.

Breast height : 4.5 feet above ground level. See "dbh."

Broadleaf : see "hardwood" and "deciduous."

Browse : vegetation that animals use for food, especially buds, twigs, sprouts, leaves, fruit and flowers of woody plants.

Buck : to cut trees into shorter lengths, such as logs or cordwood.

Buffer strip : a belt of relatively undisturbed planted or natural vegetation maintained along streams to reduce erosion and siltation, or along roads and field edges to reduce poaching and wind erosion, and to improve scenery. Buffer strips also provide wildlife travel corridors and habitat.

Butt log : the log cut from the section of bole immediately above a stump.

Caliper : an instrument used to measure the diameter of a tree.

Canopy : the more or less continuous cover of leaves and branches in a forest, usually formed by the crowns of the dominant and codominant trees.

Carrying capacity : the maximum number of individuals of a given species that a site can support during the most unfavorable time of year, without causing deterioration of the site. For example, the maximum number of deer that can be supported on a site without depleting browse.

Chain : a unit of linear measure used in forestry and surveying, equal to 66 feet (or approximately 20 meters).

Chemical site preparation : the use of herbicides to reduce competition from weeds, grasses and trees that compete with newly planted seedlings.

Chip-n-saw : timber marketed to produce dimensional lumber, with wood chips as a secondary product. The production of chips makes it economically feasible to use smaller logs for lumber.

Chopper : a large cylindrical drum (which may be partially filled with water) with cutting blades mounted parallel to its axis. A tractor or skidder pulls it across a logging site to break up slash and crush shrubby vegetation.

Chopping : a site preparation technique in which slash, brush and logging debris are broken into smaller pieces following harvest. It is often followed by a prescribed burn. See "chopper."

Clearcut : a regeneration or harvest method in which the entire stand of trees is cleared from an area at one time, followed by seeding or tree planting to create a new, even-aged stand.

Climax : the final stage in ecological succession; the persistent community of species that will develop on a site in the absence of disturbance. In forests, the climax ecosystem is dominated by tree species capable of reproducing in their own shade. Periodic disturbances, however, can prevent the formation of a climax ecosystem and maintain a site at an earlier successional stage. For example, the longleaf pine-wiregrass association, which is maintained by periodic fires, historically dominated much of the Southeast's forest lands. In the absence of fire, shade tolerant hardwoods compose the climax vegetation in this region.

Clinometer : an instrument used to determine ground slope or tree height.

Codominant tree : a tree with its crown in the upper level of the canopy of surrounding trees, and receiving direct sunlight from above and comparatively little sunlight from the sides. See also "dominant" and "suppressed."

Commercial forestland : any forested area capable of producing 20 cubic feet of timber per acre per year, which has not been withdrawn from timber harvest by law or statute.

Commercial treatments : forestry operations, such as thinning or other timber harvest, that generate income from the sale of removed trees or other products.

Community : an assemblage of species, dependent on each other, and constituting an organized system through which energy, nutrients, and water are cycled.

Community type : a unique combination of plants and animals that occur in a particular location and are adapted to similar environmental conditions.

Compartment : a land area that is managed as a unit because of geographic or ownership boundaries (for example, roads, streams, fencelines) and/or because of similar characteristics within the area (for example, soil types, vegetation, productivity, topography).

Competition : the process in which organisms with similar requirements contend for resourceslight, water, nutrients, and spacethat are in limited supply.

Conifer : any tree that produces seeds in cones, with no fruit structure around the seed. Leaves are usually needles, scales, or narrow and linear in shape, and evergreen. See "softwood."

Conk : the hard or stiff fruiting body of certain wood-decay fungi, for example, the "shelf fungus" associated with heart rot.

Containerized seedling : a seedling grown in a small container in a nursery (as opposed to a bareroot seedling). The seedling is extracted from the container before planting. Their use may improve survival rates for certain species and extend the planting season.

Coppice system : a regeneration system in which new crop trees originate from the stump sprouts and root suckers of harvested trees.

Cord : a pile of wood 4 feet high, 4 feet wide, and 8 feet long, with a volume of 128 cubic feet. Actual volume of solid wood in a cord will vary from 60 to 100 cubic feet, depending on size of individual pieces, bark thickness, and orderliness of stacking. See "face cord."

Cordwood : small diameter and/or low quality wood suitable for firewood, pulp or chips, but not for sawlogs.

Cost-sharing : incentive programs in which the government reimburses landowners for a certain percentage or amount of the expenses they incur for management practices that advance the objectives of the particular program. See CRP, EQIP, FIP, SIP, WHIP.

County Forester : a professional forester employed by a state agency (the Division of Forestry in Florida) to assist county landowners and others with forest management questions and problems.

Cover : the protective element within an animal's habitat, which provides concealment from, or for, predators and shelter from the weather. Takes many forms, for example, patches of dense brush, tall grasses, slash or brush piles, the forest canopy, or other landscape features.

Crook : a tree defect characterized by a sharp bend in the main stem.

Crop tree : a tree of desirable species, with the potential to grow straight, tall, and vigorously, and/or to produce merchantable products.

Crown : the portion of an individual tree above the main stem, consisting of live branches and foliage.

Crown classes : a system of classifying trees based on their crown positions relative to the crowns of adjacent trees. See "dominant," "codominant," "intermediate," "overtopped," and "suppressed."

Crown cover or crown closure : the percentage of a given ground area that is covered by the vertical projection of the crowns of trees.

Crown ratio or live-crown ratio : the length of a tree's crown divided by the total height of the tree. In Southern pines, tree vigor and growth will be promoted if this ratio is maintained at 35% (or 0.35) or higher.

C.R.P. (Conservation Reserve Program) : a U.S. Department of Agriculture program that provides agricultural producers with annual rental payments and cost-share assistance for establishing protective cover on suitable farm property to protect and improve air, water, soil quality, and wildlife habitat. "Suitable" property is usually defined as being marginal for agricultural crops, and/or erodible.

Cruise : surveying a forest stand to determine the species present, and to estimate tree volume, quality, and stocking. Usually, representative plots are sampled to obtain estimates.

Cubic foot : a unit of measure for the volume of wood products, equivalent to the volume of a cube that measures one foot on each side.

Cubic meter : a unit of measure for the volume of wood products, equivalent to the volume of a cube that measures one meter on each side. See "metric system."

Cull : a tree of such poor quality that it has no merchantable value in terms of the product being cut.

Cutting cycle : the planned time interval between major harvest operations in a stand, usually with reference to uneven-aged management.

Cypress dome : a cypress stand with a characteristic dome-shape (tall in the center, shorter on the edges) that occurs in stillwater swamps.

dbh : diameter of a tree at breast height, or 4.5 feet above ground level, the accepted point of diameter measurement for most trees. The abbreviation generally is written without capital letters or periods.

Deciduous : the annual loss of all leaves, characteristic of trees such as maple, ash, cherry, and cypress.

Defects : characteristics of a tree that reduce its quality and utilization potential. See "crook," "fork," "rot," "sweep," and "wolf tree."

Dendrology : the scientific study of trees and their identifying characteristics.

Density : a measure used in plant and animal ecology to indicate the number of individuals of an organism within a given area. See "stand density."

Den tree : a tree with cavities that provide shelter and nesting sites for various wildlife species.

Diameter class : a grouping of diameter measurements used to simplify tallying of trees during a cruise. If 1-inch size classes are used, all trees with a dbh between 7.6 and 8.5 inches would be recorded as 8-inch trees, and all trees with a dbh between 8.6 and 9.5 inches would be recorded as 9-inch trees. Two-inch size classes are used frequently. For a 2-inch size class, all trees between 7.0 and 8.99 inches dbh would be recorded as 8-inch trees.

Diameter-limit sale : a timber sale in which all trees less than a specified dbh may not be cut. Such sales often result in high grading. See "high grading."

Diameter tape : a tape measure, calibrated to determine the diameter of a tree by measuring its circumference.

dib : diameter inside bark. Measurements for log grading are taken inside the bark at the log's small end. The abbreviation generally is written without capital letters or periods.

Dibble : See "planting bar."

Dimension lumber : timber cut to specified widths, thicknesses and lengths. Hardwood dimension lumber is cut to the approximate sizes needed in the manufacture of furniture or other products. Softwood dimension lumber consists of boards with thicknesses of one to five inches. The boards are generally used in construction and are sold in various standard sizes, e.g., 2x4, 4x8, or 2x10.

Disk : a piece of machinery that contains a number of round, concave-shaped, metal plates (disks) held perpendicular to the ground, and free to rotate. It is pulled across a site by a tractor or skidder. See

"disking."

Disking : pulling an offset disk over a site to control vegetation, correct soil compaction, or till the soil before seeding or planting.

DOF (Division of Forestry) : the Florida state agency responsible for protection of forestlands, management of state forestlands, and technical assistance to private forestland owners.

Dominant tree : a tree with its crown extending above the general level of the canopy of surrounding trees, and receiving full sunlight from above and partly from the sides.

Doyle Rule : one of several log rules designed to estimate the lumber yield from logs. The Doyle Rule tends to underestimate the board-foot volume in small logs and overestimate volumes in large logs, compared to other log rules. See "log rule."

Ecological succession : the natural process, following a disturbance, in which one community of plants and animals gradually replaces another, in response to changing environmental conditions.

Ecology : the study of the interactions of living organisms with each other and with their environment.

Ecosystem : a complex of interacting organisms (plants, animals, fungi, bacteria, etc.) together with its physical environment, considered as a unit.

Ecosystem management : resource management systems designed to produce essential commodities and other values to meet human needs and desires, and to maintain or enhance soil productivity, gene conservation, biodiversity, landscape patterns, and the array of ecological processes common to healthy ecosystems.

Ecotone : a transition zone between two distinct communities.

Edge : the zone or ecotone where two habitat types come together, for example, open land and woodland, or forest stands of different ages or species. Both habitat types contribute plants and animals to the transition zone, making edge more valuable to wildlife than either habitat type alone. Creating substantial edge during a timber harvest can also reduce the visual impact of the harvest.

Edge effect : the increased richness of plants and animals that occurs in areas where two or more habitat types come together.

Epicormic branches : branches growing from the main stem or branches of a tree, and arising from dormant buds under the bark, rather than from terminal and axillary buds on twigs. Severe epicormic branching increases knottiness, so reduces the quality of lumber.

E.Q.I.P. (Environmental Quality Incentives Program) : a U.S. Department of Agriculture program, created by the 1996 Farm Bill, that provides technical, financial and educational assistance to farmers and ranchers to reduce soil erosion and water quality problems associated with agricultural operations, and to enhance wildlife habitat. The program provides cost-shares for certain environmental protection practices. EQIP replaces the Agricultural Conservation Program which was heavily used by forest landowners.

Even-aged stand : a stand of trees in which the age difference between the oldest and youngest trees is less than 20 percent of the stand age when mature. Even-aged stands are produced by cutting all trees within a relatively short period, or by natural disturbances that eliminate most vegetation in the previous stand.

Evergreens : plants retaining foliage year-round.

Face cord : a unit of wood 4 feet high, 8 feet long, and less than 4 feet wide. See "cord."

Feller-buncher : a tractor equipped with hydraulic shears or a saw, with the ability to cut and accumulate several trees before laying them together on the ground for pick-up by a skidder.

Felling : the cutting of standing trees.

Filter strips : belts of vegetation grass, shrubs, and/or trees maintained along streams or on the contours insloping fields to trap sediment and agricultural chemicals before they enter waterways.

F.I.P. (Forestry Incentives Program) : a cost sharing program for reforestation and forest management activities, administered by the U.S.D.A. Natural Resources Conservation Service.

Firebreak : a strip of land maintained clear of trees and woody fuel, to stop or control the spread of fire.

Flatwoods : a site with flat to gently-sloping topography, and relatively poorly drained, sandy soils which often have standing water during wet weather. This is the most extensive group of forest soils in Florida.

Food plot : an area sown or planted with grains, legumes, berries, mast-producing woody species, or other plants to provide food for wildlife; or openings that are mowed or otherwise cultivated to maintain natural herbaceous vegetation.

Forage : herbaceous (non-woody) vegetation e.g., grasses and forbs that is eaten by wildlife and/or livestock.

Forb : a non-grasslike herbaceous plant; a broadleaved herb.

Forest : a biological community of plants and animals which is dominated by trees and other woody plants.

Forest cover type : a descriptive classification of forestland, based on the tree species that presently occupy a site, and named after the predominant tree species. This method of classification, based on present occupancy of a site, contrasts with other classification methods that are based on the *potential* climax plant community for an area. "Forest cover type" is often used interchangeably with "forest type," "cover type," and "association." The Society of American Foresters recognizes about 150 forest cover types, for example, "longleaf pine," "slash pine," "longleaf pine-slash pine," and "longleaf pine-scrub oak." Forest cover types with similar characteristics are lumped together into broader categories or **forest type groups**. Examples of SAF type groups are "southern yellow pines," "oak-pine," and "bottomland." For similar forest cover types, the U.S. Forest Service uses type groups such as "longleaf-

slash pine," "loblolly-shortleaf pine," "oak-pine," "oak-hickory," and "oak-gum-cypress."

Forest floor : fresh and decomposing organic litter which forms the surface layer of a soil under forest vegetation.

Forest fragmentation : the splitting of forestlands into smaller, detached areas as a result of road building, farming, suburban development, and other activities. This can isolate wildlife populations, and may result in forested areas too small to meet the habitat requirements of some species. Wildlife corridors help remedy this problem.

Forestry : the science of establishing, cultivating, and managing forests and their attendant resources.

Forest stewardship : environmentally and socially responsible use, management and development of forest resources in order to maintain and enhance the value of the forest for present and future generations.

Forest Stewardship Program : a program funded by the USDA Forest Service to encourage private forest landowners to practice sustainable, multiple-use land management. Cost-share assistance is available for approved conservation practices (see "S.I.P."). In Florida, the program is administered by the Florida Division of Forestry, IFAS Cooperative Extension Service, Florida Game and Fresh Water Fish Commission, and USDA Natural Resources Conservation Service.

Forest wetland : an area characterized by woody vegetation over 20 feet tall, where soil is at least periodically saturated with or covered by water. See "wetland."

Fork : a defect characterized by division of the main stem or bole of a tree into two or more stems.

Form class : trees with similar taper of the trunk, expressed as a ratio of the diameter at the top of the first log, to the diameter at breast height (dbh). See "taper."

Frilling : a method of killing trees by inflicting a series of cuts around a stem and applying a herbicide to the wounds. Frilling or girdling of trees is used to reduce stand density or kill individual undesirable trees.

Fusiform rust : a fungus-caused disease which produces spindle-shaped swellings or cankers on the branches and main stem of pines. Infections can kill young trees and deform older trees, resulting in wind breakage at the canker and reduced tree value at harvest. Slash and loblolly pines are the most susceptible species; longleaf is somewhat resistant. The fungus requires two host trees pine and oak; it cannot spread from pine to pine.

Girdling : a method of killing unwanted trees by making continuous incisions, through the bark and underlying living tissues, completely around the tree stem. Girdling "starves" roots by depriving them of sugars produced in the leaves.

G.I.S. (Geographic Information Systems) : computer-based methods of recording, analyzing, combining, and displaying geographic information such as roads, streams, stand or habitat types, sensitive areas, soil types, or any other feature that can be mapped on the ground. G.I.S. are especially useful in management planning and land-use decisions on a landscape scale.

Ground cover : all herbaceous plants and low-growing shrubs in a forest or open area.

Group selection : a harvest method in which patches (generally less than one to two acres) of selected trees are removed to create openings in the forest canopy and to encourage the reproduction and development of uneven-aged stands.

Growth rings : layers of wood produced around a tree's stem and branches during each growing season; also called annual rings. The number of annual rings indicates a tree's age, while the thickness of rings provides an estimate of a tree's growth rate. Rings are frequently visible when a tree is cut, or can be examined on wood cores extracted with an increment borer.

Habitat diversity : the variety of wildlife habitat features and types in a specific area. Habitat diversity takes many forms: the variety of plants and animals on a site; structural diversity or the vertical arrangement of vegetation from canopy to forest floor; horizontal diversity or the distribution of habitat types across the landscape; and temporal diversity or habitat changes over time. Generally, areas with substantial habitat diversity will support more wildlife species than areas with less habitat diversity. See "wildlife habitat."

Hacks : unjoined cuts made in the bole of a tree to permit application of a herbicide into the woody part of the stem.

Hardpan : a hardened soil layer caused when soil particles are cemented together by organic matter or other materials. Hardpans may inhibit root growth, and trap water resulting in a waterlogged soil layer.

Hardwood : tree species in the angiosperm group (the flowering plants, that produce seeds enclosed in a fruit). Hardwood trees are characterized by broad leaves (as opposed to needles) and are usually deciduous, although in Florida there are numerous evergreen hardwoods including live oak, holly, and magnolia. See "softwood."

Hardwood hammock : an "island" of primarily hardwood trees and associated understory plants growing on an elevated, well-drained site, surrounded by vegetation characteristic of lower, wetter surroundings. The term "hammock" is also used to describe any of the temperate hardwood forests in Florida, which may include dry, mesic, and wet sites.

Harvest : cutting and gathering a tree crop. In a forest harvest, trees are felled and moved to a central location (landing) for final transport by trucks.

Heart rot : fungus-caused decay of a tree's heartwood (interior wood). Trees are infected when fungal spores enter tree wounds or dead branch stubs, and encounter conditions favorable for spore germination. See "conk."

Hectare : a metric measure of area (10,000 square meters), equal to 2.471 acres. See "metric system."

Herbaceous vegetation : non-woody plants, for example, grasses, forbs, wildflowers and ferns.

Herbicide : a chemical for killing unwanted plants. Herbicides that are used in forestry have been extensively tested for effectiveness and toxicity, and are legally approved by the Federal government for forest use.

High grading : removing all mature, good quality trees from a stand, while leaving inferior trees and less desirable species uncut. Natural regeneration from the retained trees will likely produce a poor-quality stand. High grading should be distinguished from uneven-aged management wherein some (but not all) trees in all diameter classes are removed in order to create a high-quality stand. See "uneven-aged management."

Home range : the area an animal uses to satisfy its normal requirements for food, water, and cover.

Hypsometer : any of several tools or instruments for measuring the height of trees. Examples include the altimeter, abney level, clinometer, and relascope, all of which can also be used to measure other tree or environmental characteristics.

Improved : seedlings, trees, seeds, etc. that have been genetically selected and/or bred to increase growth potential, disease resistance, or other desirable characteristics.

Improvement cut : the elimination of less valuable trees, by harvesting or precommercial thinning, to providegrowing space for more valuable trees in stands of pole-size or larger trees.

Increment borer : an auger-like tool that is drilled into the stem of a tree to extract a radial cylinder of wood. The age and growth rate of a tree can be determined from the annual growth rings visible on the cylinder of wood.

Indicator species : an organism that occurs only in areas with specific environmental conditions. Because of their narrow ecological tolerance, the presence or absence of these species on a site is a good indicator of environmental conditions. Foresters often use the distribution of indicator understory plants to get a quick estimate of site conditions, for example, drainage and fertility. Biologists may use indicator species to evaluate the health of an ecosystem. For example, the decline of mussels in a stream may indicate deteriorating water quality and a threat to other stream organisms and the species that feed on them.

Integrated Pest Management (IPM) : the use of different techniques in combination to control pests, with an emphasis on methods that are least injurious to the environment and most specific to the particular pest. For example, pest resistant plant varieties, regular monitoring for pests, pesticides, natural predators of the pest, and good stand management practices may be used singly or in combination to control or prevent particular pests.

Intermediate crown class : trees with crowns extending into the middle canopy, and largely overtopped by the dominant and codominant trees. Crowns are generally small and crowded on all sides. These trees receive little direct sunlight from above and none from the sides.

Intermediate treatments : silvicultural operations performed in existing forest stands between regeneration and harvest. Such treatments e.g., thinning, weeding, and improvement cuts are designed to improve quality and growth potential of the trees left in the stand.

International Rule : one of several log rules designed to estimate the lumber yield from logs. Of the three main log rules in the South (Doyle, Scribner, and International), the International Rule estimates the most volume for a given log. See "log rule."

Intolerance : the inability of a tree species to survive in the shade of other trees. See "shade tolerance."

J-root : roots that are bent into a J-shape by improperly planting seedlings in holes that are too shallow or narrow.

Keystone species : an organism that has a greater role in maintaining ecosystem function than would be predicted based on its abundance. For example, in longleaf pine sandhill communities, the gopher tortoise is considered a keystone species because it digs burrows which provide refuge for many other wildlife species which, in turn, play important roles in the community. All would be disrupted if the gopher tortoise disappeared. Named after the wedge-shaped keystone that holds together the parts of an arch. If removed, the arch collapses.

KG Blade : a vehicle-mounted blade, usually with serrated teeth, which shears off small trees and piles harvest debris in windrows or piles.

Landing : a central location where logs are gathered for transport to the mill. Also called a "ramp."

Legume : a plant of the Leguminosae (also called Fabaceae) family, with the characteristic ability to fix atmospheric nitrogen in root nodules (see "nitrogen fixation"). Legumes help maintain soil fertility and provide nutritious food for wildlife and/or livestock. Examples include clover, alfalfa, lespedezas, field beans and peas.

Litter : the uppermost layer of organic debris on a forest floor, composed mainly of fresh or slightly decomposed leaves, bark, twigs, flowers, fruits, and other vegetable matter.

Live crown ratio : see "crown ratio."

Loblolly-shortleaf pine association : a forest type in which 50% or more of the trees in a stand are loblolly, shortleaf, and other southern pines (excluding longleaf or slash). Other species in the association may include oak, hickory, and gum.

Log : section of the main stem of a harvested tree. Standard logs measure 16 feet long. Half logs are 8 feet long.

Log rule : a table of numbers used to estimate the amount of lumber that can be sawn from logs of various lengths and diameters. Such tables may have specific names. See, for example, "Doyle Rule," "International Rule," and "Scribner Rule."

Longleaf-slash pine association : a forest type in which 50% or more of the trees in a stand are longleaf and slash pine, singly or in combination. Other southern pines, oak, and gum are common components of such stands.

Lump-sum sale : a timber sale wherein the buyer and seller agree on a total price for marked standing trees, or for trees within a defined area, before the wood is removed. The timber is usually paid for before harvesting begins. See also "per-unit sale."

Main stem : the portion of a tree between ground level and the point of division into major branches. Usually called the bole.

Marking timber : indicating which trees in a stand are to be cut or otherwise treated. Prior to timber

sales it is advisable to mark with paint each tree to be harvested. With a clearcut, only the boundary trees need to be marked. One spot of paint at eye level and one on the stump portion will help landowners determine whether unmarked trees have been cut.

Mast : the flowers, fruits or seeds of plants, especially of trees and shrubs, that are eaten by animals. Hard mast includes hard-shelled seeds such as acorns and hickory nuts. Soft mast includes flowers, and seeds with a fleshy cover, for example berries, wild cherries and maple seeds.

Mature : generally refers to financial maturity, or the point in time when the growth rate of a tree (or stand) begins to slow, and the incidence of decay begins to increase at a rate that affects value. Average age at maturity varies widely among species and on different sites.

MBF : abbreviation signifying 1000 board feet. See "board feet."

Mechanical site preparation : the use of machinery after timber harvest to remove or relocate logging debris, remove competing vegetation, or modify soil conditions prior to the establishment of a new stand. See "chopping," "disking," and "shearing, raking, and piling."

Mechanical thin : the removal of entire rows of trees (for example, every third row) in a forest stand, usually with mechanized harvesting equipment.

Merchantable height : the height of a tree stem from ground level to the point at which it is too thin to meet the diameter limit requirements for a certain product. Limits are: for sawlog trees, the point at which the stem is less than 8 inches in diameter (dib); for pulpwood trees, the point at which the stem is less than 3 or 4 inches (dib); for trees with defects, the point at which a defect is found that cannot be removed during processing.

Mesic : refers to sites characterized by intermediate moisture conditions neither decidedly wet nor decidedly dry.

Meter : see "metric system."

Metric system : a system of measurements in which all units are based on multiples of 10. For example, a meter multiplied by 1000 is a kilo meter, or a meter divided by 100 is a centi meter. The metric system is the international standard of measurement, and is also widely used in the United States. Much U.S. forest research is now conducted using metric measures.

Some metric equivalents (rounded to four digits):

Distance

1 centimeter (cm) = 0.3937 inches

1 meter (m) = 3.2808 feet or 1.0936 yards

1 kilometer (km) = 0.6214 miles

Area

1 square centimeter (cm²) = 0.1550 square inches

1 square meter (m²) = 10.7639 square feet or 1.1960 square yards

1 hectare (ha) = 2.4710 acres

Volume

1 cubic centimeter (cm³) = 0.0610 cubic inches

1 cubic meter (m³) = 35.3147 cubic feet or 1.3079 cubic yards

Weight

1 gram (g) = 0.0353 ounces

1 kilogram (kg) = 2.2046 pounds

1 metric ton = 1.1023 tons

Forest Measurement Conversions

trees/acre = (trees/ha 0.404686)

trees/ha = (trees/acre 2.47105)

tons/acre = (metric tons/ha 0.446090)

metric tons/ha = (tons/acre 2.24170)ft²/acre = (m²/ha 4.3560)m²/ha = (ft²/acre 0.229568)

Mulch : materials such as pine straw, wood chips, bark, and leaves that are loosely spread on the soil surface to reduce water loss and weed growth.

Multiple-use forestry : managing a forested area to simultaneously provide more than one of the following resource objectives: fish and wildlife, wood products, recreation, aesthetics, grazing, watershed protection, and historic or scientific values.

Mycorrhizae : the symbiotic association of beneficial fungi with the small roots of some plants, including pines. Mycorrhizae may improve the water and nutrient uptake of trees, especially of immobile nutrients such as phosphorus. See "symbiosis."

Natural regeneration : young plants produced from natural seed fall or from stump or root sprouting in openings formed after existing plants are cut, burned or blown over.

Naval stores : the products distilled from raw pine gum: turpentine, rosin, and pine oils. In the days of sailing ships, pitch and tar were used to caulk ships and waterproof rigging. Today, the same raw products are manufactured into hundreds of useful items.

Niche : the unique environment or set of ecological conditions in which a specific plant or animal species occurs, and the function the organism serves within that ecosystem.

Nitrogen-fixation : the conversion of atmospheric nitrogen to forms that can be used by plants. *Symbiotic nitrogen-fixation* is accomplished by bacteria and related organisms in the root nodules of some plants, and by blue-green algae in some lichens. *Nonsymbiotic nitrogen-fixation* occurs in the soil and is accomplished by bacteria and related organisms which do not require host plants. See "symbiosis," and "legumes."

Nonindustrial private forestland (NIPF) : forestland owned by a private individual, group, or corporation not involved in wood processing.

Non-point source (NPS) pollution : effluent sediments or chemicals that enter a water body in a diffuse manner (e.g., runoff or leaching from farms, forestry operations, or urban areas), rather than from a specific point such as a pipe. Use of BMPs or filter strips helps prevent NPS pollution.

Oak-gum-cypress association : bottomland forests consisting of 50% or more tupelo, blackgum, sweetgum, oak, and cypress, and less than 25% southern pines. Common associates include cottonwood, willow, ash, elm, hackberry, and maple.

Oak-pine association : forests in which hardwoods, usually upland oaks, comprise 50% or more of the stand, with pines providing 25% to 50% of the stand.

Old growth : individual trees that are beyond the age of biological maturity, or stands that contain old growth trees as well as some large snags, and logs on the ground.

Organism : a living being.

Oriented strand board (OSB) : panel products manufactured by gluing and high-temperature pressing of layers of thin wood chips, with each layer oriented at a right angle to adjacent layers.

Overmature : the stage at which trees exhibit a decline in growth rate, vigor, and soundness as a result of old age.

Overstocked : a stand in which trees are so closely spaced that they are competing for required resources, resulting in less than full growth potential for individual trees.

Overstory : the trees in a forest of more than one story that form the upper canopy layer. See "story."

Overtopped : trees that are growing beneath the canopy of other trees, and which receive little or no direct sunlight. Overtopped trees without shade-tolerance are suppressed, lose vigor and die.

Peeler log : a high-quality, large-diameter log from which veneer is peeled for the manufacture of plywood. See "veneer."

Permanent opening : an area within a forest that is maintained without trees. These may be ramp areas, wide firebreaks, access roads, or planned openings, and can be planted with grasses and non-woody plants, or maintained in natural vegetation. They benefit wildlife by increasing habitat diversity, food sources, and nesting sites. See "food plot."

Per-unit sale : a timber sale wherein the buyer and seller negotiate a set price per unit of harvested wood, usually based on wood volume or weight, and product class. The buyer pays for timber after it has been cut and the weight or volume has been determined. Also called "pay-by-scale" and "pay-as-cut." See also "lump-sum sale."

Pesticide : a chemical used to control insects, fungi, or rodents when they become pest problems.

Pine straw : fallen pine needles, primarily of longleaf and slash pines, that are raked, baled, and removed from the forest stand for sale as landscaping mulch.

Plant association : a distinctive community of plants that have ecologically similar requirements. The association is named after the dominant species, for example, "longleaf," "longleaf-slash pine," "loblolly-shortleaf pine," "oak-gum-cypress," and "oak-hickory." The term is often used interchangeably with "forest type," "forest cover type" and "community type." See "forest cover type."

Planting bar : an iron bar with a wedge- or cylinder-shaped blade, used to plant bareroot or containerized tree seedlings. Depending on site conditions, about 800 to 1500 seedlings per day can be planted with one of these tools.

Plywood : panel products manufactured by gluing together layers of veneer with the grain of alternate layers oriented at right angles to provide strength.

Pole timber : trees 4 to 10 inches in diameter at breast height.

Population : a community of individuals of the same plant or animal species that inhabit the same area, potentially interbreed, and share the same gene pool.

Precommercial operations : silvicultural treatments that produce no immediate income for example, weeding, or cutting trees that are too small to have commercial value in order to improve species composition and quality of a forest stand, and to increase the growth and vigor of the remaining trees.

Prescribed burn : the controlled application of fire to naturally occurring vegetative fuels, under specified environmental conditions and following appropriate precautionary measures, to achieve specific silvicultural objectives, such as brush and hardwood control, production of high quality browse, exposure of mineral soil for pine seed germination, or reduction of fuel hazards.

Prescription : a schedule of activities for a stand or forest property which, when carried out, should produce the outcome desired by the landowner. Prescriptions have three elements: (1) land-type classification location, soils, species, stocking, etc.; (2) activity schedule timing of operations, methods, etc.; and (3) projections of growth and yield for current and subsequent stands. Prescriptions can apply to individual stands and/or to the entire forest property.

Prism cruising : using a glass wedge prism of a known thickness to estimate basal area of a stand of timber. Volumes can then be estimated.

Prospectus : a timber sale notice sent to potential bidders, and containing the following information: location of the property, type and timing of the sale, marking guides for trees and boundaries, and other general or specific contract provisions. A listing of the number of trees, diameter class, volume estimates, and other parameters for each species is optional.

Provenance : the geographic area and physical environment from which a supply of seeds or pollen was obtained. Seedlings will generally grow best in locations similar to their native region.

Pruning : removal of side branches to reduce the number of knots in outer layers of wood, provide clear, high-quality lumber, and/or improve the visual quality of a forest stand.

Pull : fibers pulled from the butt log of a tree when it is felled, generally appearing as splinters sticking out of a stump.

Pulpwood : trees and wood suitable for manufacturing paper, purified cellulose products (such as absorbents, filters, rayon and acetate), and oleoresin products (such as pine oils, fragrances, cosmetics, and thinners).

Ramp : see "landing."

Reforestation : the planting or seeding of trees in an area that previously contained forest.

Regeneration : the replacement or renewal of a forest stand by natural or artificial means. Also, the term "regeneration" may refer to the young tree crop itself. See "artificial regeneration," "afforestation," and "natural regeneration."

Regeneration cut : a timber harvest designed to promote and enhance the establishment of a new forest stand. Even-aged stands are perpetuated by seed tree, shelterwood, and clearcut systems. Uneven-aged stands are perpetuated by the selection and harvest of individual trees or small groups of trees.

Relascope : hand-held instrument used to measure tree height, tree basal area, stem diameter at various heights, form class, and distance.

Release : freeing a tree or group of trees from competition by removing trees or shrubs that overtop or crowd them.

Residual stand : trees remaining uncut following any cutting operation. **Riparian zone** : the land and vegetation bordering flowing or standing water (streams, rivers, lakes and ponds).

Ripper : a skidder or bulldozer equipped with one or more heavy tines for breaking up compacted soils, hardpans, and stumps. Also used on old pastures and agricultural lands to break up hardpans.

Roller chopping : see "chopping."

Root rake : bulldozer or skidder blade with multiple tines for excavating stumps and roots while minimizing soil movement.

Rot : a defect characterized by decay of wood in a standing tree or log. See "heart rot."

Rotation age : the number of years an even-aged stand is allowed to grow between the time it is regenerated and the time it is harvested.

Roundwood products : logs, bolts, fenceposts, or other round sections cut from trees for industrial or consumer use.

Salvage cut : the harvest of dead, damaged, or diseased trees with the intent of recovering maximum value prior to deterioration.

Sandhill : a site characterized by pure sand deposits (may be 30 or more feet deep). Lack of available water and nutrients limits tree growth on these sites, but sand pine may grow successfully.

Sanitation cut : the harvest of dead, damaged, and susceptible trees to prevent the spread of pests and disease within a stand.

Sapling : a general term for a tree that is no longer a seedling but not yet a pole, usually referring to trees at least 4.5 feet tall and 2 to 4 inches in diameter.

Sawtimber : trees, or logs cut from trees, with a minimum dbh of 8 inches, and with stem quality suitable for conversion to lumber. Small sawlog trees (dbh 8 to 14 inches) and large sawlog trees (dbh over 14 inches) sometimes are distinguished. "Sawtimber" and "sawlog" are used interchangeably.

Scale : measurement of log diameter, length and quality, either on a truck or at a mill, to determine merchantable (useful) volume. The term is also used to refer to weight measurements to determine timber sale payments.

Scarification : loosening top soil or breaking up the forest floor to improve conditions for seed germination or tree planting. Also refers to nicking or abrading the hard seed coat of some species to aid germination.

Scribner Rule : one of several log rules designed to estimate lumber yield from logs. See "log rules."

Sedimentation : see "siltation."

Seedling : a young tree grown from seed, from germination to the sapling stage. See "sapling."

Seed orchard : a plantation of selected trees grown specifically to produce genetically improved seeds for nurseries and regeneration operations.

Seed tree system : a regeneration method in which 10 to 15 high-quality trees per acre are left after logging to provide seed for the establishment of the next stand.

Selection system : a regeneration method designed to create and perpetuate an uneven-aged stand. Trees are harvested singly or in small groups, taking care not to damage residual trees. Poor quality trees and a predetermined number of merchantable trees in each diameter class are removed. Effective for shade-tolerant tree species.

Shade tolerance : the ability of a tree species to survive in relatively low light conditions, although it may not thrive.

Shearing, raking, and piling : mechanical site preparation operations that are often performed together. Shearing knocks down residual vegetation with a blade mounted on a bulldozer. Roots and stumps are removed with a large rake mounted in place of the blade. Debris is then pushed into piles or windrows. These procedures cause significant soil disturbance and are generally used only to control large competing vegetation or to clear a site.

Shelterbelt : single or multiple rows of trees and/or shrubs planted along roads and field borders to protect open fields from wind and sun. Can benefit wildlife by providing habitat and corridors for movement between habitat patches. See "windbreak."

Shelterwood system : a regeneration method in which overstory trees are removed in a series of cuts spaced several years apart, always retaining high quality trees as a seed source. Gradual reduction of stand density protects understory trees, and provides favorable conditions for stand regeneration. Usually, all remaining overstory trees are removed after a good stand of seedlings has been established.

Siltation : the filling-in of lakes and stream channels with soil particles, usually as a result of erosion

on adjacent land. Also called "sedimentation."

Silviculture : the art, science, and practice of establishing, tending, and reproducing forest stands with desired characteristics.

Silvipastoral : agroforestry systems that include forage plants, controlled livestock grazing, and trees. In Southeastern slash pine stands, it has been called "pine-and-pasture" and "cattle-under-pine." See "agroforestry."

S.I.P. (Stewardship Incentives Program) : a program funded by the USDA Forest Service that provides cost-share assistance to private forest landowners for approved conservation practices, such as the development of a Forest Stewardship Management Plan, reforestation, forest and agroforest improvement, soil and water protection, riparian and wetland protection, and enhancement of aquatic habitat, wildlife habitat and forest recreation. See "Forest Stewardship Program."

Site : the combination of biotic, climatic, topographic, and soil conditions of an area.

Site index (SI) : a measure of forest site quality (i.e., the actual or potential productivity of a site) based on the height of dominant trees at a specified age. Twenty-five years is often used for Southern pines.

Site preparation : treatment of an area prior to afforestation or reforestation. Site preparation may include mechanical clearing, bedding, burning, or chemical (herbicide) vegetation control.

Size class : See "diameter class."

Skidder : specialized logging equipment used to slide logs from stump to landing. Most logging in Florida uses rubber-tired skidders, which are modified tractors equipped with either cable and winch, or a hydraulic grapple.

Skidding : moving trees from the felling site to a loading area or landing, using tractors, horses, or specialized logging equipment.

Slash : branches, tree tops, bark, cull trees and other debris left on the ground following a harvest.

Snag : a standing dead or dying tree that has lost most of its branches, or the standing portion of a broken-off tree. Snags provide cavities for nesting, perches, and feeding sites for wildlife.

Softwood : any tree in the conifer group, including pines, hemlock, cypress, larch, spruce, fir and junipers. So named because many of the species have wood that is less dense than that of many angiosperm trees. See "hardwood."

Soil compaction : compression of the soil resulting in: reduced soil pore space (the spaces between soil particles); decreased movement of water and air into and within the soil; decreased soil water storage; and increased surface runoff and erosion. The use of heavy machinery during forest operations contributes to soil compaction.

Spodosol : a soil type characteristic of moist climates, with dense subsurface layers of organic matter,

aluminum and iron. In Florida, these soils are common in poorly drained flatwoods.

Stand : a group of trees sufficiently uniform in species composition, size, age, structure, spatial arrangement, and condition to be distinguished from surrounding stands and managed as a single unit.

Stand density : a quantitative measure of how completely a stand of trees occupies a site, usually expressed in terms of number of trees, or tree basal area per acre or per hectare. See "basal area" and "stocking."

Stem : the aboveground portion of a tree that supports the branches; also called the bole.

Stocking : a ratio that compares the density of a forest stand to a reference stand having the "ideal" density for best growth and management. For example, if a stand has a basal area of 60 and the "ideal" fully stocked stand has a basal area of 120, our stand would be 50% stocked. Stands may be described as well stocked, understocked, or overstocked. Our example is understocked for timber production (although it may be ideal for other objectives).

Story : a roughly horizontal layer (or strata) of vegetation in a plant community; in forests these generally correspond to canopy layers. See "overstory" and "understory."

Stratification : division of a forest, or any ecosystem, into distinct layers (or strata) of vegetation. See "canopy," "herbaceous vegetation," and "understory."

Structure : the presence, size, and physical arrangement of vegetation in a stand. Vertical structure refers to the variety of plant heights, from the canopy to the forest floor. Horizontal structure refers to the types, sizes, and distribution of trees and other plants across the land surface. Forestlands with substantial structural diversity provide a variety of niches for different wildlife species.

Stumpage : the sale value of the uncut trees in a forest.

Stump height : the distance between ground level and the top of a stump. Good logging practice dictates stumps be as low as possible (preferably less than 12 inches) to reduce waste of good wood, as well as to minimize visual impact on the logging site.

Succession : see "ecological succession."

Suppressed : trees with crowns below the general level of the canopy, and receiving no direct sunlight. Suppressed trees are characterized by low growth rate and low vigor due to competition with overtopping trees. See "overtopped."

Sustainable : generally refers to land management practices that provide goods and services from an ecosystem without degradation of the site quality, and without a decline in the yield of goods and services over time.

Sustained yield : forest management objective, wherein the volume of wood harvested is equal to the amount of new wood being grown within the forest as a whole. Wood harvest in one stand is balanced by wood growth in the forest's remaining stands.

Sweep : a tree defect resulting from a gradual curve in the main stem of the tree.

Symbiosis : the intimate association of two kinds of organism. If both organisms benefit from the association, it is called "mutualism.". See "nitrogen-fixation" and "mychorrizae."

Tally : a system of recording trees counted during a timber cruise.

Taper : the gradual decrease in the diameter of a tree stem or log from the base upwards. See "form class."

Thinning : harvest of some trees to provide growing space for better quality trees, and/or to remove dead or dying trees to reduce pest problems.

Timber cruise : see "cruise."

Timber stand improvement (TSI) : intermediate treatments, including the removal of brush and cull trees, that leave a stand of good quality trees of the desired species.

Tolerance : the ability of an organism to subsist under particular environmental conditions. In forestry, tolerance generally refers to the capacity of trees to develop and grow in the shade of surrounding trees (see "shade tolerance"). Intolerant trees are "light demanders"; tolerant trees are "shade bearers." For wildlife, tolerance refers to a species' ability to adjust to different conditions or disturbed habitats.

Treatment : any silvicultural practice or procedure applied to a stand.

Tree injector : an instrument used to inject a chemical into the wood of a tree. The injected substance may be a herbicide to kill unwanted trees, or a chemical to control disease.

Tree scale : a rule used to measure the board foot volume of a standing tree. See "scale."

Trim allowance : an extra two or three inches of length left on a log during bucking, so the logs can be trimmed to standard lumber lengths at the mill.

TSI : see "timber stand improvement."

Understocked : a stand of trees so widely spaced that, even when trees realize their full growth potential, crown closure (i.e., full site occupancy, as indicated by the crowns of adjacent trees forming a relatively continuous canopy) will not occur.

Understory : trees and other woody species that grow beneath the overstory of a forest stand.

Uneven-aged management : periodic thinning to create or maintain an uneven-aged stand, by removing trees from all diameter classes, and by retaining high quality trees in all diameter classes.

Uneven-aged stand : a group of trees of a variety of ages and sizes, and often of different species.

Unit : a unit of measurement for wood products, usually pulpwood. Equal to 1.315 standard cords.

Veneer : thin (usually less than 3/16 inch) sheets of wood produced by spinning a log against a long lathe blade. See "peeler log" and "plywood."

Virgin forest : undisturbed natural forest, virtually uninfluenced by human activities, and usually containing old-growth trees if the site has been free of natural disturbances.

Volume table : a table of numbers used to estimate the volume of wood contained in a standing tree, based on dbh and merchantable height.

Water bar : a ditch or hump constructed diagonally across trails or roads to reduce soil erosion by diverting surface water runoff into adjacent ditches or vegetation.

Watershed : the total land area from which water drains into a particular stream or river.

Weeding : removal or suppression of undesirable tree and shrub species, or poorly formed individual trees, to reduce competition in a stand of seedlings or sapling-sized trees. In stands older than sapling stage, this operation is called an improvement cut.

Well stocked : the stand density at which trees are spaced widely enough to prevent competition, yet closely enough to fully use site resources.

Wetlands : lowlands covered with shallow, and sometimes temporary, water. The frequency and duration of inundation is sufficient to support plant communities that typically are adapted for life in saturated soils.

W.H.I.P. (Wildlife Habitat Incentive Program) : a program, created by the 1996 Farm Bill and administered by the Natural Resource Conservation Service, which provides cost-share incentives and technical assistance for the development, enhancement, and restoration of wildlife habitats, for both game and non-game species.

Wildlife corridors : strips of trees, shrubs and understory vegetation that provide cover and habitat for wildlife, and serve as travel lanes for movement across open areas and between isolated patches of habitat. They provide wildlife with access to the different types of habitat they require, and can foster recolonization of forest fragments.

Wildlife habitat : the arrangement of food, water, cover, and space required to meet the biological needs of an animal. Different wildlife species have different requirements, and these requirements vary over the course of a year. Also, different plants provide fruit and food in different seasons. Maintaining a variety of habitats generally benefits wildlife. See "habitat diversity."

Windbreak : a strip of living trees and/or shrubs maintained to protect farmsteads from wind and sun. In contrast, shelterbelts are maintained to protect *fields* . See "shelterbelt."

Windrow : slash that has been gathered into an elongated pile.

Windthrow : a tree pushed over by wind. Most common among shallow-rooted species on sites with shallow soils, and in areas where cutting has reduced the density of a stand, exposing residual trees to the wind and depriving them of the accustomed support of neighboring trees.

Wolf tree : a large, broad-crowned, excessively branchy tree which occupies more space than is justified by its timber value, although it may have high aesthetic and wildlife value. Wolf trees often provide abundant cover and heavy mast crops for animals.

Woodland : a forest with low tree densities, often defined as less than 20% to 30% crown cover when trees are mature.

Yield : the cumulative growth of a forest during a specific period of time; or the volume of wood available for harvest at the end of a rotation period.

By necessity, this glossary is incomplete, covering only those terms that are most commonly encountered in forestry practice. Hundreds of definitions had to be left out. For readers who need a more comprehensive list of forestry and natural resources terms, we highly recommend the following books:

The Dictionary of Forestry . 1998. John A. Helms (editor). 210 pages. The Society of American Foresters, 5400 Grosvenor Lane, Bethesda, MD 20814.

[This book is a revision of the 1971 SAF publication, *Terminology of Forest Science Technology, Practice, and Products* , which was cited in the introduction of this paper.]

Dictionary of Natural Resource Management . 1996. Julian and Katherine Dunster. 363 pages. UBC Press, University of British Columbia, 6344 Memorial Road, Vancouver, BC V6T 1Z2, Canada.

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2 .*William Hubbard, Christopher Latt, Alan Long: Regional Extension Forester, Athens, Georgia, and Assistant in Forestry Extension and Assistant Professor, School of Forest Resources and Conservation, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, 32611.*

[Go to top](#)