

White Papers Nos. 4 and 11 Explanation of Key Terms

Note: Terms listed and defined in this glossary are in **boldface**. Terms which may be of particular interest to the reader in a given context, but are not listed in the glossary, are in *italics*.

Artificial regeneration: Method for producing a new **stand** of trees following **harvesting**, in which tree seedlings (or more rarely, seeds) are planted. Most often used in **even-aged silvicultural** systems.

Basal area: A measure of forest stand density. The basal area of an individual tree is measured as the surface area of the stump if the tree was harvested at 4.5" off the ground. Basal area is generally measured on a per acre basis averaged across the stand. Thus, basal area per acre is measured as the cumulative area per acre of all tree stems 4.5" above the ground.

Bedding: A **site-preparation** technique in which soil is raised from a few inches to a few feet high to provide an elevated planting or seed bed; used primarily in wet areas to improve drainage and aeration for seeding.

Best Management Practices or BMPs: In this report, forestry practices specified in state-level forest management guidelines or legislation. BMPs encompass the practices required by the mandatory forest practice acts in some states as well as the voluntary or quasi-regulatory BMP programs in other states.

Biodiversity: Most broadly, biodiversity encompasses the diversity of life on the planet. Biodiversity includes *genetic diversity*, the diversity of information encoded in genes within a species; **species diversity**, the diversity and relative abundance of species; and community/**ecosystem** diversity, the diversity of **natural communities**.

Biomass: Mass of organic matter. E.g., the "biomass removed in **harvesting**" refers to the amount of organic matter -- mostly wood in trees, but also twigs and leaves -- removed at harvest.

Broad-based dip: A surface drainage structure specifically designed to drain water from an access road while vehicles maintain normal travel speeds.

Buffer strip: See **streamside management zone**.

Cable logging: System of transporting logs from stump to **landing** by means of steel cables and winch. This method is usually preferred on steep slopes, in wet areas, and for erodible soils where tractor logging cannot be carried out effectively.

Chopping: Mechanical **site preparation** treatment whereby remaining vegetation is concentrated near the ground and incorporated into the soil to facilitate burning or establishment of seedlings.

Clean Water Act: Federal statute that gives the U.S. Environmental Protection Agency the authority to regulate discharges of pollutants from all sources into the waters of the United States. The purpose of the statute is to restore and maintain the chemical, physical and biological integrity of the nation's waters. 33 U.S.C. 1251 *et seq.*

Clearcutting: **Harvesting/regeneration** method in which all **merchantable** trees (*commercial clearcutting*) or all trees (*silvicultural clearcutting*) in a **stand** are harvested in one operation. Clearcutting is also used in **even-aged silviculture** to regenerate an even-aged stand of desired **shade-intolerant** trees. In practice, most clearcuts are commercial clearcuts.

Coarse woody debris: Also called *large woody debris*. Downed large wood on the forest floor, such as fallen trees and limbs. When such debris falls into streams, it creates waterfalls and pools -- important physical structures for fish habitat and other stream functions. In natural forests of some regions (e.g., the Pacific Northwest), coarse woody debris on the forest floor also provides important functions as it slowly decays, returning **nutrients** to the soil, storing water for use in dry periods, and providing animal habitat. Coarse woody debris develops naturally in unmanaged forests, as trees die and decay, and may also be created by forest management (see also **Logging debris**).

Coastal Zone Management Act: Federal statute that requires states to formulate programs to reduce water pollution from nonpoint sources impacting coastal waters, including forestry activities. States' management measures can include land use management restrictions and control measures similar to the **Best Management Practices** developed under the authority of the **Clean Water Act**. 16 U.S.C. 1451 *et seq.*

Commercial thinning: **Silvicultural** practice performed in **even-aged** forests in which some **merchantable** trees are harvested, usually for **pulpwood**, to provide greater light, soil moisture and **nutrients** to the remaining **stand**.

Community: Collection of animal and plant species present in a given location; generally viewed as also encompassing the interactions between different species.

Cruise: A survey of timber volume, species mix or other characteristic of a timber stand.

Culvert: A metal, wooden, plastic or concrete conduit through which surface water can flow under or across roads.

Cumulative effect: Impact on the environment that results from the incremental impact of an action when added to other past, present and reasonably foreseeable future actions.

Cutting cycle: In **uneven-aged management**, the period of time between stand entry for harvests.

Disking: Also called *harrowing*. Mechanical **site preparation** method of **scarifying** the soil (i.e., scraping to expose **mineral soil**) to reduce competing vegetation and to prepare a site to be seeded or planted.

Ecosystem: Ecosystems encompass plant and animal communities and also include nonliving components, both structural (soil types) and functional (processes such as disturbance patterns and energy flows in and out of the ecosystem).

Endangered Species Act: The federal statute that seeks to protect plants and animals in danger of extinction (*endangered species*) or likely to become so (*threatened species*). It requires all federal agencies, including federal forestland managers, to ensure that their actions not jeopardize the continued existence of any endangered or threatened species. It also prohibits all persons (including public and private land owners) from "taking" any protected species, either directly or indirectly by destroying the habitat upon which the species depends. 16 U.S.C. 1531 *et seq.*

Even-aged management: Class of **silvicultural** systems that maintains **even-aged stands** by periodically removing the **forest canopy** in a single operation and regenerating a new stand at one time. **Harvesting/regeneration** methods used in even-aged management include **clearcutting**, the **seed-tree method** and the **shelterwood method**.

Fertilizer: Plant **nutrients** applied to forest soils, usually in chemical forms that are readily taken up by plants (e.g., phosphorus is applied as phosphate).

Forest canopy: Topmost layer of tree vegetation, also called the **overstory**.

Fuelwood: Wood used for conversion to some form of energy, primarily residential use.

Group selection: Method of **harvesting** in which small groups of **merchantable** trees are cut periodically. **Natural regeneration** is typically relied on to fill in the resulting gaps.

Growing stock: Classification of timber inventory that includes live trees of commercial species meeting specified standards of quality or vigor; cull trees are excluded. When associated with volume, includes only trees 5.0" in diameter at breast height (d.b.h.) and larger.

Hardwood: Technically, a dicotyledonous tree. Hardwoods typically have broad leaves and are often deciduous (they lose their leaves during winter); e.g., maple, oak, aspen, cherry and ash.

Harvesting: In this book, the process of felling trees for removal and use. More broadly, may also be used to include related activities, such as the **skidding**, processing, loading and transporting of forest products.

Herbaceous plants: Plants that lack woody stems: wildflowers, grasses, and so on.

Herbicide: One of a group of chemicals used to kill or suppress unwanted vegetation, usually **hardwood** competition or brush.

Insecticide: One of a group of chemicals used to kill or control populations of unwanted insects.

Intensive management: While forests can be intensively managed for any of a number of objectives, including wildlife habitat or recreation (e.g., hunting), “intensity” in the context of wood production relates to the extent to which specific yield-enhancing practices are employed. Intensity can characterize use of a particular practice, as well as the combination of practices that comprise the overall management system. It spans a spectrum from essentially unmanaged to highly intensive. At the latter end of the spectrum are **softwood plantations** which employ **even-aged management** and a suite of **site preparation, artificial regeneration** and stand-tending practices. **Uneven-aged management** systems may also vary in intensity with respect to, for example, the frequency of entries and the extent of removal of **biomass** at each entry.

Intermittent stream: Watercourse that flows in a well-defined channel only in direct response to precipitation; such a stream is dry for a large part of the year.

Landing: Also called log *deck* or *yard*. Place in or near the forest where logs are gathered for further processing or transport.

Leaching: Downward movement of a soluble material through the soil as a result of water movement.

Logging debris: Also called **slash**. Accumulation of woody material, such as large limbs, tops, cull logs and stumps, that remains as forest residue after stem-only timber **harvesting** (as opposed to **whole-tree harvesting**). Logging debris is typically removed, displaced into piles, chopped, or burned during **site preparation**.

Logging residues: In this book, the portion of **logging debris** that is **merchantable** and that is removed from the site to be chipped for **pulpwood** or other uses. Logging residues typically make up a small fraction of total pulpwood supply.

Marking: Designating particular trees in a stand for harvest. Not used when the harvest method is clearcutting.

Mature forest: Stage in forest development in which the original dominant trees in the **forest canopy** begin to die and fall, creating canopy gaps that allow **understory** trees to grow, and providing **coarse woody debris** on the forest floor. Corresponds roughly to *understory regeneration* stage. Sometimes used more broadly to include **old-growth forest**.

Merchantable: Commercially valuable; merchantable timber has potential for sale as **sawtimber, pulpwood, fuelwood** or other wood products.

Mineral soil: Soil free of organic matter that contains rock less than 2" in maximum dimension.

Natural community: Discrete assemblage of interacting plants and animals, often referred to by their dominant plant associations: e.g., longleaf pine-wiregrass savanna; oak-hickory forest; beech-maple forest.

Natural disturbance: Naturally occurring events that disturb the forest by killing or felling one or more trees. *Natural disturbance regimes* -- the typical natural disturbance patterns in a given region and forest type -- vary by scale (individual tree mortality vs. wildfire over hundreds of acres), severity (light disturbance of the forest soil in a low-intensity fire vs. landslides that remove massive amounts of soil and organic matter, along with trees and vegetation), and frequency. Natural disturbance regimes typically determine the dominant forest types (which in turn help determine natural disturbance regimes): e.g., longleaf pine-wiregrass savannas in the southeast are maintained by and help to propagate frequent low-intensity ground fires.

Natural regeneration: Method for replacing trees removed through **harvesting**, in which new trees sprout from cut stumps or roots, or germinate from seeds present in the upper soil layer. May be used in both **even-aged** and **uneven-aged silvicultural** systems.

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

Non-industrial private landowners: Private timberland owners other than forest-products companies and their subsidiaries.

Nutrients: Chemical elements required by plants for their growth and existence. Various nutrients are used for countless basic functions, such as manufacturing proteins and plant cells. The best-known plant nutrients include nitrogen and phosphorus. Low levels of key nutrients in soils can substantially limit plant growth and productivity. Nutrients may be added to soils in **fertilizer** to make up for inherent soil deficiencies.

Old-growth forest: The fourth and final stage of **stand** development, following **mature forest**, in which the **forest canopy** is generally composed of scattered remaining trees that assumed dominance following **natural disturbance** along with newly dominant, shade-tolerant trees. Other characteristics of old-growth forest may include accumulated **coarse woody debris**, **snags** and canopy gaps created by fallen trees. Because of these features, and the presence of an **understory**, old-growth forests generally exhibit complex **stand** vegetation, and provide habitat for many species. Development of old-growth forest generally takes from 100 to 200 years, with variation depending on forest type. The last remaining sizable area of old-growth forest in the contiguous U.S. lies in the Pacific Northwest; only a few small and isolated patches of old-growth remain in eastern forests. However, as a stage in stand development, old-growth forest could also develop in eastern forests (and was present in presettlement forests).

Overstory: See **forest canopy**.

Patch cutting method: A harvesting/regeneration method, similar to clearcutting, in which all merchantable trees are harvested over a specified area at one time. "Patch cuts" are generally smaller than clearcuts but larger than group selection cuts.

Perennial stream: Watercourse that flows throughout most of the year in a well-defined channel.

Persistence: Ability of a **pesticide** to remain active over a period of time.

Pesticides: Chemicals used in **silviculture** to control unwanted insects (**insecticides**) or unwanted vegetation (**herbicides**).

Plantation: Planted **stand** of trees.

Pocosin: Freshwater evergreen shrub or forested bog found in the Atlantic coastal plain of the southeastern U.S., primarily in the Carolinas. The term is taken from the Algonquin Indian word meaning "swamp on a hill." Pocosins are generally found on flat, slightly elevated and very poorly drained areas between rivers, with either organic or acidic mineral soils.

Precommercial thinning: Stand-tending method, performed relatively early in the **rotation**, in which a **stand** is thinned by cutting down poor-quality trees and unwanted species (usually left in the forest). Precommercial thinning is done to reduce competition among trees for soil moisture, **nutrients**, light and space.

Prescribed burning: Managed application of low-intensity fire in a carefully prescribed area. Prescribed burning is done to control **hardwoods** and other brush in managed pine forests, including **plantations**.

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

Regeneration: Establishment and early development of new tree seedlings. In unmanaged forests, regeneration takes place on a variety of scales -- from individual trees to large areas of forest leveled by large-scale **natural disturbance**, such as wildfire. In managed forests, regeneration may be **natural** or "**artificial**" (performed through planting), and may occur at the level of an individual tree or small group of trees (following **selection harvests** in **uneven-aged silviculture**) or at the level of a **stand** (following **clearcutting** or other **harvesting** methods in **even-aged silviculture**).

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

Riparian zone: See **streamside management zone**.

Rotation: In **even-aged silviculture**, the period of time between harvests. (Related terms: *rotation age*, referring to the age at which a **stand** is harvested, and *rotation length*, the length in years of the rotation.) Where production of solid wood or fiber is the management objective, the rotation age is generally timed to maximize the net economic return from the stand, allowing for considerations such as mill supply and demand. Rotation ages for **pulpwood** management are significantly shorter than for **sawtimber** (although **pulpwood** may also be harvested from forests managed on sawtimber rotations, in the form of logs too small or otherwise unsuitable for use as **sawtimber**). Rotation lengths vary depending on tree species, desired product, site quality and region.

Roundwood products: Logs, bolts and other round timber generated from **harvesting** trees for industrial or consumer use. In this volume, which follows the conventions of the USDA Forest Service and other federal agencies, roundwood includes so-called **logging residues**, which are wood chips made from wood that would otherwise be left on-site.

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

Sawtimber: Classification of timber inventory that is composed of sawlog-sized trees of commercial species. Sawlogs are logs meeting minimum standards of diameter, length and defect; they include logs at least 8 feet long that are sound and straight, and with a minimum diameter inside the bark of 6" for **softwoods** and 8" for **hardwoods**; other combinations of size and defect may be specified by regional standards.

Scouring: The rare but severe physical damage to a stream channel that may potentially result from large increases in water flow and sediment -- for example, following a landslide.

Sedimentation: Deposition of eroded soil into streams or bodies of water. Depending on stream flow and other site conditions, deposited sediment can settle on the stream floor, burying gravels in the streambed and degrading spawning habitat for fish. Elevated sediment concentrations in water can also harm filter-feeding organisms and may interfere with the functioning of the gills of some organisms.

Seed-tree method: **Even-aged harvesting/regeneration** method in which all of the **merchantable** timber in a **stand** is removed in one cutting, except for a limited number of **seed trees** left singly or in small groups as a seed source to facilitate **natural regeneration**. These trees typically are harvested after the stand has successfully regenerated.

Selection method: **Harvesting/regeneration** method used in uneven-aged **silviculture** in which mature trees are removed, individually (**single-tree selection**) or in small groups (**group selection**), from a given tract of forestland over regular intervals of time.

Shade-intolerant species: Tree species (or, more broadly, plant species) that are generally outcompeted in shaded conditions but grow vigorously in full sunlight. Many commercially valuable species, such as loblolly pine and Douglas fir, are shade-intolerant. Because of their preference for light, shade-intolerant species are usually managed using **even-aged systems**.

Shearing: Site preparation method that involves the cutting of brush, trees or other vegetation at ground level using tractors equipped with angles or V-shaped cutting blades.

Shelterwood method: Removal of the mature timber from a **stand** in a series of cuttings (usually two) that extend over a relatively short portion of the **rotation**, in order to encourage the establishment of essentially **even-aged** reproduction under the shelter of a partial canopy. In *irregular shelterwood*, the period between the first and second cutting is extended to allow the development of a two-aged stand.

Silviculture: The art and science of establishing, tending, protecting and **harvesting** a **stand** of trees.

Single-tree selection: Method of **harvesting** in which individual **merchantable** trees are removed periodically. **Natural regeneration** is typically relied on to fill in the resulting gaps.

Site index: A measure of site productivity for tree growth. Site index is measured as the average height of the dominant and codominant trees in a forest stand at a chosen base age. The base age can range from 25-100 years depending on the species and region.

Site preparation: Silvicultural activity to remove unwanted vegetation and other material, and to cultivate or prepare the soil for **regeneration**.

Skid trail: Temporary, non-structural pathway over forest soil used to drag felled trees or logs to the **landing**.

Skidding: Short-distance moving of logs or felled trees from the stump to a point of loading.

Slash: See **logging debris**.

Snags: Dead but still standing trees. Snags are important habitat for many species of wildlife: an abundance of invertebrates; birds that construct or nest in cavities and/or feed on the invertebrates; and small mammals that live in the cavities.

Softwood: Coniferous usually evergreen tree that has needles or scale-like leaves; e.g., pine, Douglas fir and spruce.

Soil expectation value: An economic measure of the value of bare land for forest management. Soil expectation value is calculated as the maximum value of a particular

site for forest management over infinite future rotations. Foresters attempt to maximize the soil expectation value of a stand by selecting the management inputs and rotation age which results in the greatest discounted net returns from infinite rotations.

Species diversity: Measure of the abundance and relative frequency of species in a specified area. Species diversity is often used with respect to animal or plant populations in a single **stand**, but can also be thought of on regional and global scales. For the purposes of **biodiversity** conservation, spatial scales of species diversity are hierarchical: global diversity is a higher conservation priority than regional diversity, and both are more important than local or stand-level diversity.

Stand: Contiguous group of trees sufficiently uniform in species composition, arrangement of age classes and condition to be a homogenous and distinguishable unit; also the area defined by the extent of those trees.

Stem-exclusion stage: The second stage of **stand** development in a forest, in which the **forest canopy** closes and the arrival (or *recruitment*) of new seedlings halts. Because a closed canopy limits the amount of light reaching the forest floor, **understory** growth is limited, stand vegetation is simpler and **species diversity** tends to be lower than in other stages.

Streamside management zone (SMZ): May also be called **buffer strips** or *riparian management areas*. Zone of forest along a forest stream where management practices that might affect water quality, fish or other aquatic resources are modified. Properly designed SMZs effectively filter and absorb sediments, maintain shade, protect aquatic and terrestrial riparian habitats, protect channels and streambanks and promote floodplain stability. State Best Management Practices generally recommend SMZs, although restrictions and key parameters (e.g., SMZ width) vary.

Stumpage: Trees “on the stump.” Landowners sell these trees to loggers for which they are paid a given price (*stumpage price*).

Succession: With respect to forest development, succession refers to the changes over time as a forest proceeds from one developmental stage to the next: thus *early-successional stands* describe **stands** in the years just after **regeneration**, while *late-successional stands* refer to stands in **mature** or **old-growth forests**.

Understory: Level of vegetation between the ground and the **forest canopy**, or **overstory**.

Uneven-aged management: Class of **silvicultural** systems that maintain several age classes of trees simultaneously in a forest. In a managed **uneven-aged** forest, the objective of management is to create and maintain a certain distribution of trees: many more trees are in small size (age) classes than in large ones. The **selection method**, either **single-tree** or **group selection**, is the **harvesting/regeneration** method used in uneven-aged management.

Water bar: A diversion and/or hump installed across a trail or road to divert runoff from the surface before the flow gains enough volume and velocity to cause soil movement and erosion, and deposit the runoff into a dispersion area. Water bars are most frequently used on retired roads, trails, and landings.

Wetlands: Areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include *swamps, marshes, bogs* and similar areas. (This definition is taken verbatim from regulations of the Environmental Protection Agency, published in the *Code of Federal Regulations*, Volume 40, Part 230.3(t). The U.S. Army Corps of Engineers, which shares authority over wetlands with EPA, uses the identical definition. *Code of Federal Regulations*, Volume 33, Part 323.2(c).)

Whole-tree harvesting: Practice of removing entire trees at **harvest**, including tops, limbs, branches, twigs and leaves. In many cases, these trees are chipped whole on site to produce *whole-tree chips*.

Windrowing: **Silvicultural** activity, associated with intensive **site preparation**, that removes **logging debris** and unmerchantable woody vegetation into rows or piles to decompose or be burned.

Yarding: Method of transport from harvest area to storage **landing**.