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13 Glossary of Terms

Listed in alphabetical order below are terms and definitions that appear in this and other DWSP land management plans. Most of those that relate to forests and forestry are derived from “Terminology of Forest Science, Technology, Practice and Products” (Society of American Foresters, 1971).

age class: one of the intervals, commonly 10 years, into which the age range of tree crops (and sometimes other vegetation) is divided for classification.

advance regeneration: in silvicultural terms, young trees that have become established naturally in a forest, in advance of regeneration cutting; may become established following “preparatory” cuts.

area inch; acre inch: used to describe changes in water yield from a given area of land. For instance, if a change in vegetation results in an increase of one acre inch in water yield, this translates to 43,560 sq ft per acre x 1/12 ft yield = 3,630 cubic feet per acre; 3,630 cu ft / 7.5 gals per cu ft = 484 gallons additional yield per acre.

basal area: the area in square feet of the cross section of a tree taken at 4.5 feet above the ground.

basin; subbasin: the land area from which all water flows to a single, identified water source, such as a stream, a river, or a reservoir. Subbasin is used to refer to the basin of a tributary, or lower *order* stream (the higher the order, the greater the area drained).

“beaver pipe”; flow control pipe: generally a length of culvert that is extended into a beaver pond at or near the top of the beaver dam, in order to maintain the pond level at a particular level.

Best Management Practices (BMPs) or Conservation Management Practices (CMPs): in natural resources management, a set of standards that have been designed for an activity, and often a region, to protect against degradation of resources during management operations.

biological diversity (biodiversity): a measure, often difficult to quantify, of the variety and abundance of plant and animal species within a specified area, at the genetic, species, and landscape level of analysis. The 1992 UN Convention on Biological Diversity defined biodiversity as “the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.”

biomass: the total quantity, at a given time, of living organisms of one or more species per unit area (species biomass) or of all the species in a community (community biomass)

Conservation Management Practices: Canadian term used synonymously with “best management practices”. See definition above for Best Management Practices.

conservation restriction; conservation easement: a legal agreement between a landowner and another party whereby, for a consideration, the landowner deeds certain specified rights (such as development of the property) to the other party, but retains ownership of the land and other specified rights to its use. Individual agreements vary, but the general result is protection of land from conversion to new uses, without transfer of ownership. When the Division purchases conservation restrictions, it also limits or retains the right to approve certain agricultural and silvicultural practices.

Continuous Forest Inventory (C.F.I.): a method of forest inventory in which trees on permanent sample plots are remeasured at periodic intervals to provide data used to estimate forest growth and condition. The Division's Continuous Forest Inventory on the Ware River and Quabbin watersheds is composed of 1/5-acre permanent plots located on a ½-mile grid and is remeasured every 10 years.

cutting cycle: the frequency with which silvicultural cuttings are conducted in any given area. Cutting cycle is a subunit of “rotation,” which is determined either by the maximum life of the existing overstory, or by a predetermined maximum age imposed on the area.

***Cryptosporidium*:** a coccidian protozoan parasite found in humans and various wild and domestic animals that can be transmitted via water and often causes serious intestinal illness. While the epidemiology and transmission of *Cryptosporidium* are similar to *Giardia*, its cysts are smaller than the cysts of other protozoa, and thus may be more difficult to remove from water supplies.

diameter at breast height; DBH: the diameter of a tree, outside the bark, taken at 4.5' above the ground, generally in inches and fractions.

diverse; diversity: in this plan, the term is most often used to refer to forest composition, and refers to both height or size diversity in trees, seeking a minimum of three distinct layers (understory, midstory, and overstory), and to diversity of species composition, with a general goal of avoiding monocultures and working to include a range of site-suited species throughout the forest.

disturbance-sheltered: areas that are physically (based on slope and aspect) “sheltered” from the influence of a catastrophic New England hurricane blowing from the southeast, based on a model developed at the Harvard Forest. The most sheltered areas are steep slopes facing northwest.

edge effect: this term has traditionally been used to describe the increased richness of flora and fauna found where two habitat types or communities meet. More recently, the term has also been used to refer to the increased nest predation and parasitism that often occurs near these boundaries.

endogenous disturbance: disturbance that originates within the ecological community. For example, a single tree that succumbs to a root-rot fungus and falls to the ground, breaking off several other trees on the way, creates an endogenous disturbance. While the proximal cause of the treefall may be wind or accumulation of snow and ice, the primary cause is still considered endogenous in this instance. (See “exogenous disturbance.”)

even-aged: an area of forest composed of trees having no, or relatively small, differences in age. By convention the maximum difference admissible is generally 10 to 20 years, though with rotations of 100 years or more, differences up to 30% of the rotation may be admissible.

exogenous disturbance: disturbance that originates from forces outside of the ecological community. For example, storms that carry high winds can cause large-scale treefall well in advance of normal senescence and decay. The cause of the disturbance is therefore considered exogenous. (See “endogenous disturbance.”)

feller-buncher; feller-buncher-processor: logging machines that grasp a tree to be cut or “felled,” sever it at the stump with either a saw or hydraulic shears, and directionally drop it to the ground. Some machines can accumulate, or “bunch” several trees before releasing them. The most complex machines are also capable of delimbing and sawing trees into predetermined lengths (processing).

forest canopy: the more or less continuous cover of branches and foliage formed collectively by the crowns of adjacent trees and other woody growth.

forest fragmentation: the separation of a previously contiguous forested area into smaller, discontinuous patches or “fragments.” This can isolate wildlife populations and may result in forested areas too small to meet the habitat requirements of some species.

forwarder: a logging machine used to “forward” logs from the woods to a landing. A forwarder differs from a skidder in that the logs are hydraulically loaded onto the machine and carried, rather than skidded, through the woods.

group selection: a regeneration 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.

G.I.S.; Geographic Information System: a computer-based analysis and mapping system for spatially-linked data sets.

Giardia: A protozoan parasite found in humans and various wild and domestic animals that can be transmitted via water and often causes serious intestinal illness.

hurricane exposure (“exposed,” “intermediate,” “sheltered”): generally used in Division land management plans to mean physical exposure of a site to catastrophic hurricane winds. Research at the Harvard Forest in Petersham, MA provides a predictive model of the impact of a typical New England hurricane, based upon site, slope, and aspect. Damage from an actual hurricane depends upon many factors, including the type and size of vegetation present.

intermediate cut: cutting of trees in a stand during the period between establishment and maturity. Objectives may include the improvement of vigor by reducing competition or the manipulation of species composition. Regeneration may occur following intermediate cuts, but it is incidental to the objectives.

irregular shelterwood: similar to the shelterwood silvicultural system except that overstory removals are protracted, taking as long as half the rotation, so that the resulting new stand is quite uneven-aged (wide intervals between the oldest and youngest trees) and mimics the multi-storied effect of strictly uneven-aged systems.

log landing: a clearing of variable size to which logs, pulp, and/or firewood are skidded or forwarded during a logging operation, in order to facilitate their processing or further transport by truck.

mast: the fruit and seeds of trees and shrubs. Mast constitutes an important food source for many wildlife species. Hard mast includes hard-shelled seeds such as acorns and hickory nuts. Soft mast includes seeds with a fleshy cover such as berries.

milacre: one one-thousandth of an acre. Milacre plots are used in the collection of some data on the Division watersheds; for example, regeneration inventory is taken on circular, milacre plots, which are 89.4 inches in diameter.

mineral soil: any soil consisting primarily of mineral material (sand, silt, and clay) rather than organic matter.

multi-storied forest; multi-layered forest: a forest containing a distinct understory, midstory, and

overstory. From a watershed perspective, these layers provide, respectively: immediate response to disturbance, vigorous uptake of nutrients, and deep filtration of air-borne and precipitative pollutants.

naturally managed: the results of a decision to allow natural disturbances and processes to prevail by adopting a minimal management approach that protects forests from development or other land use changes and possibly human-caused fire, but which includes vegetation management only where it clearly counteracts a negative result from previous human disturbances.

preparatory cutting: removing trees near the end of a rotation so as to open the canopy and enlarge the crowns of seed bearers, with a view to improving conditions for seed production and the establishment of natural regeneration.

protected: refers to areas of the watershed that, according to the Harvard Forest model of hurricane disturbance, would suffer minimal damage from the recurrence of a hurricane similar to that of 1938, due primarily to topography and orientation.

protection forest: an area, wholly or partly covered with woody growth, managed primarily to regulate stream flow, maintain water quality, minimize erosion, stabilize drifting sand, or to exert any other beneficial forest influences.

regeneration: the replacement or renewal of a forest stand by natural or artificial means; also, the young tree crop itself. 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. Artificial regeneration: planting or purposefully seeding trees in a previously harvested area.

regeneration cut: any removal of trees intended to assist regeneration already present or to make regeneration possible.

riparian: pertaining to the bank of a stream or other water body. Riparian vegetation grows in close proximity to a watercourse, lake, swamp, or spring, and is often dependent upon its roots reaching the water table.

rotation: in even-aged silviculture, rotation is the planned number of years between the formation or regeneration of a crop or stand and its final cutting at a specified stage of maturity. If it has been established, the maximum age to which trees are grown in an uneven-aged system, or the average age to which trees are grown before cutting, might be considered the stand's rotation age. But there is no point in the life of a stand under uneven-aged management at which all trees are deliberately regenerated at once.

salvage; salvage cutting: the removal of trees damaged by fire, wind, insects, disease, fungi, or other injurious agents before their timber becomes worthless. In some situations, the motivation for removal is the reduction of fuel loading and fire hazard.

sanitation cutting: a proactive removal of diseased or highly susceptible trees in order to slow or halt the spread of a disease or other destructive agent.

seep: a wet area, generally associated with groundwater seepage, that is important to wildlife because it remains unfrozen, and generally uncovered, during periods when the ground is otherwise snow-covered, which makes it easier for wildlife to forage.

selection system: a regeneration method designed to create and perpetuate an uneven-aged stand. Trees are harvested singly or in small groups. A predetermined number of trees in each diameter class is removed at each harvesting entry in order to maintain a particular age-distribution across the stand.

sere; seral: the series of successional stages in an ecosystem, from the pioneer stage through the climax. (See "succession.")

shelterwood: term generally refers to a variety of even-aged silvicultural systems in which, in order to provide a source of seed, protection for regeneration, or a specific light regime, the overstory (the shelterwood) is removed in two or more successive shelterwood cuttings. The first is ordinarily the seed cutting (though it may be preceded by a preparatory cutting) and the last is the final cutting, while any intervening cuttings are termed removal cuttings. Where adequate regeneration is already present, the overstory may be removed in one cutting, resulting in a method referred to as a one-cut shelterwood. Some applications of the shelterwood leave a portion of the stocking indefinitely and develop two or more age classes as a result. These are sometimes referred to as uneven-aged methods (see "irregular shelterwood" definition above).

silviculture: generally, the science and art of cultivating (i.e., growing and tending) forest crops, based on a knowledge of silvics. Silvics is the study of the life history and general characteristics of forest trees and stands, with particular reference to environmental factors affecting growth and change. More particularly, silviculture is the theory and practice of controlling the establishment, composition, constitution, and growth of forests.

site: in forestry, the combination of environmental factors that affect the ability of a species to grow and persist, including soil characteristics, aspect, altitude and latitude, and local climate.

site index: the ability of a given site to grow a given species. As height growth is generally not density dependent, a common forestry site index is the height to which a given species will grow on the site in fifty years (so that a site with a red oak site index of 65 will grow red oak to that height in fifty years).

site preparation: in silviculture, any of a variety of treatments of a site that are intended to enhance regeneration success. A common goal of these treatments is to remove enough of the accumulated organic layers above the mineral soil so as to expose that soil and enhance the ability of seeds that fall on it to germinate and grow. The skidding of logs during a harvesting operation is often sufficient site preparation.

site-suited: species that have evolved to take advantage of a particular type of site. Where species are planted on other sites, they may succumb prematurely to disturbance or disease. Red pine grows and persists well on deep, sandy soils, where root rots are less common, but may become excessively prone to wind and/or root rotting diseases on the moist agricultural soils on which they were typically planted on Division properties.

skidder: logging machine used to "skid" logs from the woods to a landing or a forwarder road. Logs are either winched by cable to the skidder (cable skidder), or lifted on one end by a hydraulic grapple (grapple skidder), and then dragged.

stand: a community of trees possessing sufficient uniformity as regards composition, age, spatial arrangement, or condition to be distinguishable from adjacent communities, and therefore forming a distinct silvicultural or management entity.

stocking: in forestry, the extent to which a site is occupied by trees compared to the maximum theoretical occupation possible at a given stand age; a relative measure of stand density. Most commonly measured as basal area per acre, stocking is often related directly to crown closure, as a site is considered fully occupied when crown closure is complete. As crowns can be of very different sizes among species and tree ages within stands, average diameter (dbh) and total number of trees of a “fully stocked” site is variable.

stream order: a classification of streams within watersheds. Small streams at the uppermost level of stream systems are labeled “first-order”; two first-order streams join to form a “second-order” stream; two second-order streams join to form a “third-order” stream, etc.

structures: 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, as well as a measure of resistance and resilience in the face of natural disturbances.

succession: the gradual supplanting of one community of plants by another, the sequence of communities being termed a “sere” and each stage “seral.” Succession is “primary” (by “pioneer species”) on sites that have not previously borne vegetation, “secondary” after the whole or part of the original vegetation has been supplanted, “allogenic” when the causes of succession are external to and independent of the community (e.g., a storm or climate change), and “autogenic” when the developing vegetation is itself the cause. “Early succession” generally refers to the pioneer stages and species that follow disturbance, while “late succession” refers to stages and species that occur as an area continues to develop undisturbed for long periods.

thinning: an intermediate silvicultural treatment, generally with the goal of altering the forest composition and/or improving the growing conditions for the residual trees, regardless of associated regeneration effects.

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.

turbidity: a water quality measure that is most commonly derived by measuring the proportion of a given amount of light that is deflected by suspended/dissolved sediments in a water sample, giving an indirect measure of these sediments. Most common unit is the Nephelometric Turbidity Unit, NTU.

uneven-aged: a forest, crop, or stand composed of intermingling trees that differ markedly in age. By convention, a minimum difference between tree ages of 25% of the maximum age to which trees are grown is generally accepted. Some texts require a minimum of three distinct age classes for a stand to qualify as “uneven-aged.”

vernal pool: a temporary body of fresh water that is or becomes isolated while containing water, is utilized by indicator species, and has a wet-dry cycle that precludes permanent populations of fish. The absence of fish populations is critical to the breeding success of some species that utilize vernal pools. Vernal pools in Massachusetts support a number of rare or endangered animal species, and are therefore important habitats that receive regulatory protection once certified. The Division provides this protection to all identified pools, whether or not they have been certified.

watershed protection forest: an area, wholly or partly covered with woody growth, managed primarily to maintain water quality, regulate stream flow, minimize erosion, or exert any other beneficial forest influences.

wetland: generally refers in the Division land management plans to areas defined as “wetlands” by MGL ch.131, s 40 (the “Wetlands Protection Act”) and 310 CMR 10.00 (the “Wetlands Protection Regulations”). The Division definitions of wetlands will be updated as these statewide regulations are revised.