

advance growth

see advance regeneration

advance regeneration

Young trees under existing stands capable of becoming the next crop. Regeneration established before logging that has survived the logging operation. (NRC 1995).

aerial seed bank

see seed bank

age class

A distinct group of trees or portion of growing stock recognized on the basis of age (NRC 1995).

all-aged

Of a forest, crop or stand that contains trees of all, or almost all age classes, including those of exploitable age (NRC 1995).

apical dominance

A phenomenon in most higher plants whereby the growing apical bud inhibits, to varying degrees, the growth of lateral (axillary) buds (Taiz and Zeiger 1991).

artificial regeneration

The establishment of a tree crop by direct seeding or planting seedlings or cuttings (NRC 1995).

autecology

The study of environmental factors and their effects on individual plants (adapted Barnes *et al.* 1998).

auxin

A plant hormone having a wide variety of effects on plant growth and morphogenesis, including the promotion of cell division in stems and the inhibition of cell division in lateral buds (adapted Taiz and Zeiger 1991).

available nutrient

That portion of any element or compound in the soil that can be readily absorbed and assimilated by growing plants (Brady and Weil 1999).

band application

Applying pesticides and/or fertilizers in a linear strip on or along crop rows rather than over the entire ground area (NRC 1995).

bareroot stock

Seedlings that are planted with their roots bare of soil (NRC 1995).

barren and scattered

Productive forest land which, because of natural or artificial disturbance, contains only scattered trees or no trees at all with either shrub cover or bare soil, but no significant amount of regeneration (adapted NRC 1995).

basal bark treatment

A treatment for killing trees and brush in which a herbicide is applied, by sprayer or brush, to a band of bark encircling the basal portion of the stem (NRC 1995).

basal injection

A treatment consisting of forcing a liquid or an encapsulated herbicide into the basal portion of a tree (NRC 1995).

binding

A form of manual site preparation or tending where stems are bound together to suppress non-crop (particularly mountain maple) vegetative competition.

biodiversity

Variation in the biotic community. Used synonymously with the term biological diversity. There are many measures of biodiversity: genetic diversity, local species richness and evenness, and local diversity in community structure (alpha diversity); variation in species richness and community structure across the local landscape (beta diversity); and changes over time in these measures of biodiversity (temporal diversity). All of these measures can occur within one landscape unit. Landscape (physical or ecological) diversity provides a framework for regional biodiversity (gamma diversity) (Kimmins 1997).

biological control

A cleaning method that involves the use of naturally occurring fungi, bacteria, viruses or herbivorous insects, or phytotoxins to suppress or reduce plant populations (Wagner *et al.* 2001).

biological legacy

A tree, downed log, snag, or other components of the forest stand left after a stand-initiating disturbance (Franklin *et al.* 1997). Includes reproductive structures of various crop and competitive species on a site after disturbance.

blading

Using the straight blade of a crawler tractor or similar equipment to remove coarse woody debris and thick duff off the site to create planting (or seeding) spots (NRC 1995).

block cutting

Removal of the crop in blocks in one or more operations, generally for wildlife management purposes, encouraging regeneration, or protecting fragile sites (NRC 1995). A spatial variation of the conventional clearcut harvest method.

blowdown

see windfall

boreal mixedwood site

A boreal mixedwood site is an area with climatic, topographic, and edaphic conditions that favour the production of closed canopies dominated by trembling aspen (*Populus tremuloides*) or white birch (*Betula papyrifera*) in early successional stages, black spruce (*Picea mariana*) or white spruce (*Picea glauca*) in mid-successional stages, and balsam fir (*Abies balsamea*) in late successional stages. Boreal mixedwood sites have a moisture regime in the range two to five (adapted MacDonald and Weingartner 1995).

boreal mixedwood stand

A boreal mixedwood stand is a tree community on a boreal mixedwood site in which no single species exceeds 80 percent of the basal area (MacDonald and Weingartner 1995).

broadcast application

Applying pesticides and/or fertilizers with relative uniformity over the entire ground area (NRC 1995).

broad soil group

For the purpose of this guide, broad soil groups are groupings of soil textures that are believed to respond consistently to silvicultural intervention.

canker

A depressed area on a tree stem that results from lack of stem enlargement in a diseased area (canker fungi cause death of a localized stem area, thereby interrupting the production and maintenance of functional phloem) (adapted Manion 1991).

canopy (canopy layer)

The more or less continuous cover of branches and foliage formed collectively by the crowns of adjacent trees (NRC 1995).

canopy closure

1. The progressive reduction of space between crowns as they spread laterally, increasing canopy density.
2. The point in time when crowns in a young stand begin to touch and interact (NRC 1995).

canopy transition stage

The stage of stand development immediately following the stem exclusion stage, when intense competition among stems comes to an end. As canopy trees start to decline and die because of longevity or damage from non-stand replacing disturbances, shade tolerant coniferous trees from the understorey and intermediate canopy (where present) take over the main canopy. New individuals can also be established in gaps created



by tree mortality. Structural characteristics of this stage include canopy gaps as well as a potentially stratified canopy. This stage of stand development ends when all of the individuals from the initial cohort have died (adapted Chen and Popadiouk 2002).

claybelt

A large physiographic region located within northeastern Ontario and northwestern Québec (approximately 1250,000 km²). Topography is nearly level; the claybelt features vast lowlands of poorly drained clay soils, the result of lacustrine deposits from glacial Lake Barlow-Ojibway. The poor drainage together with the cold, wet climate has resulted in the development of organic soils that cover a large portion of the region (adapted Lefort *et al.* 2002).

cleaning

An operation to free favoured trees from undesirable individuals of similar age or size which overtop them or are likely to do so (adapted OMNR 1996).

clearcut

Area harvested under the clearcut silvicultural system (OMNR 1996).

clearcut system

A silvicultural system that typically involves the regeneration of an even-aged forest stand in which new seedlings become established in fully exposed microclimates after most or all of the existing trees have been removed. Regeneration can originate naturally or artificially. Associated harvest methods include conventional, with standards, seed tree, and two-stage. Two-stage harvesting can sometimes result in an uneven-aged stand. Clearcutting may be done in blocks, strips, or patches (adapted OMNR 1996).

clearcut with standards

A clearcut harvest method that involves the removal of all but a few mature aspen stems from throughout an aspen dominated or aspen leading stand in an attempt to reduce aspen suckering.

clone

All plants reproduced asexually from a common ancestor and having identical genotypes.

closed canopy

see canopy closure

cluster planting

Planting clusters of spruce with natural regeneration of hardwoods in the areas around the clusters. A hardwood-free zone is maintained around each cluster to maximize spruce growth (BCMof 2000).

coarse woody debris

The standing and downed dead wood in a forest (NRC 1995).

co-dominant crown class

see crown class: co-dominant

cohort

An aggregation of trees that starts as a result of a single disturbance (Smith *et al.* 1997).

commercial thinning

see thinning: commercial

community

The assemblage of living organisms (plants, animals, microbes) that interact with each other in energy flow and nutrient cycling processes in an ecosystem. The biotic component of a particular ecosystem (Kimmins 1997).

competition

A process that occurs when two different species attempt to utilize the same resource when that resource is in limited supply (Kimmins 1997).

composition

The proportion of each tree species in a stand expressed as a percentage of the total number, basal area, or volume of all tree species in the stand (NRC 1995).

competition threshold

The level of vegetation abundance where there is an abrupt increase or decrease in the rate-of-change in tree growth or survival (Wagner *et al.* 1989).

compositional treatment

Alteration of overstorey stand species composition to meet compositional and/or structural objectives. Site occupancy must be maintained.

coppice

Natural regeneration originating from stump sprouts, stool shoots, or root suckers (NRC 1995).

cover crop

A suitable herbaceous crop grown to reduce erosion, increase soil fertility, reduce invasion of more competitive vegetation, provide wildlife habitat or protect a site; it can be dug or ploughed-in while succulent, with or without supplementary fertilizers (NRC 1995).

crop rotation

A planned sequence of crops growing in a regularly recurring succession on the same area of land, as contrasted to continuous culture of one crop or growing different crops in a haphazard order (Brady and Weil 1999).

crop tree

Any tree selected to become or forming a component of the final crop (NRC 1995).

crown

The part of a tree bearing live branches and foliage (Hayden *et al.* 1995).

crown class

A coding system that defines the crown position of an individual tree (Hayden *et al.* 1995).

emergent

When the tree crown extends well above the general level of the crown layer and receives full light from above and from the sides. A tree in this

class is much larger than the neighbouring trees and has a more fully developed crown (Hayden *et al.* 1995).

dominant

When the tree crown extends above the general level of the crown layer and receives full light from above and partial light from the side (Hayden *et al.* 1995).

co-dominant

When the tree crown forms a part of the general level of the crown layer and receives full light from above but little light from the sides. This class applies when two or more trees of equal size are adjacent to one another (Hayden *et al.* 1995).

intermediate

When a tree that is shorter than its neighbours has a crown that extends into the neighbouring trees and receives direct light from above but not from the side. Trees in this class usually have small-crowned crowns on the side (Hayden *et al.* 1995).

overtopped/suppressed

When the tree crown is entirely below the general level of the crown layer and receives no direct light either from above or from the sides. Trees in this class normally display restricted height growth and may have elongated lateral branches, leaning terminal growth, or flat-topping (Hayden *et al.* 1995).

understorey

A general term used to describe a layer of trees developing under an overstorey.

open understorey

When a tree previously classified as overtopped/suppressed, or understorey has been released due to stand breakup, windthrow, etc. Trees in this class receive full light from the top and sides. This category includes trees growing where no trees have grown before (Hayden *et al.* 1995).



crown closure

The available crown space between trees; 100 percent crown closure is the time at which all available crown space is fully occupied (NRC 1995) .

crown cover

The ground area covered by the crowns of trees or woody vegetation as delineated by the vertical projection of crown perimeters and commonly expressed as a percentage of total ground area (NRC 1995).

crown fire

Rapidly-moving fire burning through the crowns of woody vegetation, frequently leaving stems and much of the forest floor relatively untouched (Kimmins 1997).

cull

Trees or logs or portions thereof that are of merchantable size but are rendered unmerchantable by defects (NRC 1995).

cutover

An area of forest land from which some or all timber has recently been cut (NRC 1995).

cut-stump treatment

see stump treatment.

dieback

Used to describe a category of diseases caused by an interacting set of factors (more than one agent). Also called decline (Hayden *et al.* 1995)

direct seeding

see seeding: direct

dominant crown class (dominance)

see crown class: dominant

downed woody debris

The downed dead wood in a forest (NRC 1995).

ecodistrict

Ecodistricts lie within ecoregions and are delineated based on their differing surficial geology while sharing broad microclimate features with ecoregions they occur within. They occur at a scale of 1:250,000 to 1:500,000 and are used for strategic planning at sub-regional levels, watershed planning, and for policy (Taylor *et al.* 2000).

ecological land classification (ELC)

A hierarchical approach to classifying land which is based on a consistent framework of landscape and site-level ecosystems by combinations of geologic, climatic, vegetative, soil, and landform features (OMNR 1996).

ecoregion

An ecological landscape unit (ranging in resolution from hundreds of thousands to tens of thousands of square kilometres) characterized by distinct patterns of responses to climate as expressed by soils, hydrology, vegetation (species ranges and productivity), and fauna (OMNR 1996). Ecoregions lie within ecozones, thus sharing a common bedrock geology. (Crins *et al.*, in prep).

ecosite (synonyms: general standard site types, site type)

An ecological landscape unit (ranging in resolution from thousands to hundreds of hectares) comprised of relatively uniform geology, parent materials, soils, topography, and hydrology, occupied by a consistent complex of successional-related vegetation conditions (OMNR 1996).

northeast ecosite

Ecosites are mappable, management-oriented groupings of vegetation on specific ranges of soil conditions. Ecosites occur at spatial scales ranging from 1:10,000 to 1:50,000. Ecosites have relatively uniform parent material, soils, hydrology and vegetation structure, and composition. A single ecosite may be comprised of a number of

vegetation types and soil types. The mapping scales associated with ecosites are appropriate for forest management prescriptions (Taylor *et al.* 2000).

northwest ecosite

The ecosite (also known as site type) is primarily a mapping unit integrating a consistent set of environmental factors and vegetation conditions. Ecosites are composed of ecoelements that describe common assemblages of both abiotic (soil depth, texture, moisture regime, hydrology, and nutrient regime) and biotic (plant community structure and composition) components. Mapped ecosites may vary in size from a normal minimum polygon size of five to eight hectares to hundreds of hectares. Appropriate mapping scales vary from 1:10,000 to 1:50,000 (Racey *et al.* 1996).

edge effects

Environmental, biological, and anthropogenic factors occurring within the ecotone between two habitat types. In a forested landscape, edge effects may extend from disturbed habitat into undisturbed habitat, making it less suitable for species adapted to interior stand conditions but more suitable for “edge loving” species (OMNR 2001b).

emergent crown class

see crown class: emergent

establishment

The process of developing a crop to the stage at which the young trees may be considered established, i.e. safe from juvenile mortality and no longer in need of special protection or special tending and only routine cleaning, thinning, and pruning (NRC 1995).

establishment period

The time elapsing between the initiation of a new crop and its establishment (NRC 1995).

even-aged management

Silvicultural systems in which stands have an even-aged structure (e.g. clearcut and shelterwood systems) (OMNR 1996).

even-aged structure

A forest, stand, or forest type in which relatively small age differences exist between individual trees. The difference in age is usually 10 to 20 years; if the stand will not be harvested until it is 100 to 200 years old, larger differences up to 25 percent of the rotation age may be allowed (OMNR 1996).

exposed

see open-grown

fill planting

The planting of trees in areas of inadequate stocking to achieve the desired level of stocking, either in plantations or areas of natural regeneration (NRC 1995).

fire cycle

The normal length of time between fire events for different types of forest (OMNR 2001b).

fire intensity

The length of the flame or amount of energy generated (Barnes *et al.* 1998)

fire regime

The kind(s) of fire and the prominent immediate effects of fire that characterize an area. A fire regime is typically characterized by the following features: type, frequency, intensity, severity, size, and timing (season of burning).

fire severity

The effect of fire on the soil or the vegetation (seedbank, mortality of plants) (Barnes *et al.* 1998).

fire return interval

The average number of years between successive fires; may be expressed for a given point or for an area (Barnes *et al.* 1998).



forest ecosystem

An ecosystem dominated by trees in which the microclimate, soils, hydrology, nutrient cycling, biomass creation, storage and turnover, and food chain processes reflect the dominance by large, long-lived woody plants (Kimmins 1997).

forest ecosystem classification (FEC)

A system used to classify ecological conditions in the Central, Northeast, and Northwest Regions of OMNR (Hayden *et al.* 1995).

forest management plan

A document containing pertinent information and prescriptions by means of which forest policy, aims, and objectives are translated into a continuity of specific treatments on a management unit for a specified period of years (OMNR 1996).

forest resource inventory (FRI)

A resource inventory conducted for each management unit on average every 20 years. The FRI divides the area into a number of components, such as water, non-forested, non-productive forest, and productive forest; and further classifies each component by ownership/land use categories. The FRI provides descriptive information about the timber resource on each management unit (e.g. stand age, stand height, species composition, stocking level) in the form of interpreted aerial photographs, forest stand maps, and a set of standard inventory ledgers referred to as reports (OMNR 1996).

forest stand dynamics

The study of changes in forest stand structure with time, including stand behaviour during and after disturbance (Oliver and Larson 1996).

forest unit

Forest units are aggregations of forest stands which normally have similar species composition, develop in a similar manner (both naturally and in response to silvicultural treatments), and are managed under the same silvicultural system. In Ontario, determination of forest units is based

on considerations such as site, economics, and product requirements (OMNR 1996).

free-to-grow

Stands that meet stocking, height, and/or height growth rate, as specified in the ground rules and are judged to be essentially free from competing vegetation (OMNR 1996).

full-tree logging

The removal of the whole tree to the roadside where limbing and topping occurs (OMNR 1997c).

fully stocked

Productive forest land stocked with trees of merchantable species. These trees by number and distribution or by average dbh, basal area, or volume are such that at rotation age they will produce a timber stand that occupies the potentially productive ground. They will provide a merchantable timber yield according to the potential of the land. The stocking, number of trees, and distribution required to achieve this will be determined from regional or local yield tables or by some other appropriate method (NRC 1995).

gap dynamics stage

The stage of stand development immediately following the canopy transition stage. Trees established through self-perpetuation dominate the stand. Growing space is available in all strata because of the death of individual trees or groups of trees. This stage is structurally characterized by a mosaic canopy, generally dominated by shade-tolerant species, usually spruce and fir. Gaps are occupied by shade-intolerant and (or) shade-tolerant trees and (or) shrubs such as mountain maple, beaked hazel, speckled alder, raspberries, and willows, depending on local site conditions (Chen and Popadiouk 2002).



general standard site type (synonyms: ecosite, site type)

A coding or labelling system in the silvicultural guide to allow for referencing of site description information on similar sites across the province. Regional ecosites are the working units of General Standard Site Types (OMNR 1996).

genetic diversity

The amount of genotypic variation in a population (Maynard 1996).

genetic gain

The difference in the performance of offspring derived from selected parents and the average performance of the original, unselected parental population (OMNR 1987).

girdling

Making more or less continuous incisions around a living stem, through at least both bark and cambium, generally with the object of killing the tree. Sometimes termed mechanical girdling, to distinguish it from herbicide girdling when herbicide is added. Making a series of close downward and upward, i.e. V-shaped, incisions into the sapwood is termed notch-girdling.

Also applies to the destruction of tissue, particularly living tissue, by insects, rodents, etc., in a rough ring around a stem, branch, or root (after NRC 1995).

granular application

A general process by which fertilizers or herbicides in the form of grains are applied to a given area (NRC 1995).

green striping

Band application of herbicides at the stand initiation stage to remove overtopping and lateral non-crop vegetation surrounding planted conifers.

group selection method

A method of regenerating and maintaining uneven-aged stands in which trees are removed in small groups (NRC 1995).

high-grading

A partial harvest removing only the most valuable species or trees of desirable size and quality, without regard for the condition of the residual stand (NRC 1995).

high (crown) thinning

see thinning: high crown thinning

humus form

A soil classification for the upper organic horizons of a soil (Hayden *et al.* 1995).

moder

A forest floor type in which there is a distinct litter (L) and decomposing (F) layer, and a humus (H) layer that grades into and is partly mixed with the underlying mineral soil (i.e. there is an Ah layer). Unlike a mor forest floor, the F layer is loose and friable, with little matting caused by fine roots and fungal mycelia, and it often has abundant soil animal activity. The Ah layer is less than 10 centimetres thick (Kimmins 1997).

mor

A forest floor type in which there are distinct litter (L), decomposing (F), and humus (F) layers, and a sharp transition between the organic forest floor and the underlying mineral soil. Dominated by fungi and having little or no animal mixing, the F layer is densely matted with fine roots and fungal mycelium. Generally acidic. Characteristic of sites with slow decomposition of litter and low fertility (Kimmins 1997).

mull

A forest floor type in which there is a thin layer of fresh or recent litter (L layer), virtually no F layer, and an Ah layer (a surface mineral soil horizon enriched with organic matter) that grades slowly into the underlying mineral soil. The Ah layer is more than 10 centimetres thick. Associated with productive, moist, and fertile sites, and abundant soil animal activity that mixes the organic forest floor material with the upper mineral soil (zooenous Ah; rhizogenous Ah horizons can be formed by rapid turnover of fine roots in



the upper mineral soil). Also characteristic of grassland soils (Kimmins 1997).

inbreeding

Producing offspring from the mating of relatives (OMNR 1987).

insular residual patches

Living internal patches, consisting of distinct islands greater than 0.25 hectare, retained on clearcut areas to provide vertical forest structure, relic patches of old growth, wildlife habitat and future sources of downed woody debris (OMNR 2001b).

intermediate crown class

see crown class: intermediate

**intermediate stand treatment
(synonym: tending)**

Any treatment in a stand during that portion of the rotation not included in the final harvest or regeneration period (NRC 1995).

juvenile spacing

The espacement of crop trees at the stand initiation stage.

layering

The rooting of an undetached branch that is lying on or partially buried in the soil and is capable of independent growth after separation from the parent plant (Hayden *et al.* 1995).

leave strip

A strip of timber left standing between two clearcut areas (NRC 1995).

liberation treatment

The release of young trees, not past the sapling stage, from the competition of distinctly older, overtopping trees (Smith 1997).

live crown ratio

A rough but convenient index of the ability of the crown of a tree to nourish the remaining part

of the tree; it is the percentage of length of stem having living branches (NRC 1995).

logging method

A term which indicates the process used to move wood products from stump to roadside during a harvesting operation. Types of logging methods include full-tree, tree-length, and shortwood (OMNR 1996).

low thinning

see thinning: low thinning

mechanical thinning

see thinning; mechanical thinning

merchantable

A tree or stand that has attained sufficient size, quality, and/or volume to make it suitable for harvesting. Does not imply accessibility, economic or otherwise (NRC 1995).

multiple-cohort stand

see uneven-aged stand

natural regeneration

Renewal of a tree crop by natural seeding, sprouting, suckering or layering (OMNR 1996).

natural selection

Natural elimination of individuals on the basis of their phenotypic inability to survive or produce offspring under a particular set of environmental conditions (Wright 1976).

nutrient cycling

The continual, cyclic exchange of chemicals (nutrients) between the biota and the physical environment within an ecosystem (Kimmins 1997).

open-grown (synonym. exposed)

Trees with crowns receiving full light from all sides due to the openness of the canopy (NRC 1995).

open-pollinated

Pollination occurring due to wind or insects (Maynard 1996).

open understorey crown class

see crown class: open understorey

overmature

In even-aged management, those trees or stands past the mature stage (OMNR 1996).

overstorey removal

A final harvest in which the cutting releases advance regeneration (NRC 1995).

overstorey retention

The enhanced retention of a portion of the overstorey when the primary objective is the promotion of an uneven-aged stand with maximum vertical and horizontal structure (Franklin *et al.* 1997). Overstorey retention is applicable with the shelterwood and selection systems. Retention level depends on diversity objectives.

overtopped/suppressed crown class

see crown class: overtopped/suppressed

paludification

Formation of mire systems (e.g. bogs and fens) over previously forested land, grassland, or even bare rock, due to climatic or autogenic processes. The literal meaning is “swamping” (adapted Gore 1983).

partial canopy retention

Retention of selected trees in a stand.

partial harvest

Any cutting in which only part of the stand is harvested (NRC 1995).

patch cutting

The removal of stands in an irregularly-shaped, spaced, and sized cut area (OMNR 1997c). A spatial variation of the conventional clearcut harvest method.

pathogen

A microscopic organism or virus directly capable of causing disease (NRC 1995).

peninsular residual patches

Portions of live peninsular patches connected to harvest block perimeters of clearcut areas that are retained to provide vertical forest structure, relic patches of old growth, wildlife habitat, and future sources of downed woody debris (OMNR 2001b).

percent cover

The percentage of the ground area covered by a vertical projection of the crown of the plant over the ground (Hayden *et al.* 1995).

phenotype

The appearance of an individual; a composite of the genotype and the environment and their interaction (OMNR 1997).

pioneer species

A species adapted to the early stage of natural forest succession or growth on newly available sites (NRC 1995).

post gap-phase (shrubland)

see barren and scattered

pre-commercial thinning

see thinning: pre-commercial

pre-harvest silviculture prescription (synonym: pre-harvest assessment)

A site-specific, integrated plan developed prior to cut block layout. These plans incorporate many site-related factors and detail specific measures for achieving resource management objectives. These prescriptions allow resource managers to develop and apply forest management practices that are more ecologically appropriate (Bidwell *et al.* 1996).

pre-harvest treatment

Any appropriate treatment directed at establishing a new crop before final felling of the existing stand.



prescribed burn

The knowledgeable application of fire to a specific land area to accomplish predetermined forest management or other land management objectives (OMNR 1996).

primary succession

Successional development of an ecosystem beginning after a disturbance that has removed all of the modifications to microclimate and the geological substrate produced by the previous succession. Succession on bare rock, in shallow lakes, or on parent soil materials (Kimmins 1997).

productive forest land

All forest areas which are capable of growing commercial trees, irrespective of planning decisions, and which are further sub-divided into “protection forest” and “production forest.” (OMNR 1996).

propagation

see vegetative reproduction

protection of advance growth

An operational practice where advance growth less than 10 centimetres dbh is protected during the removal of the main canopy.

pruning

1. The removal of live branches from standing trees (green pruning) or of dead branches (dry pruning).
2. Removal of live or dead branches from ground level to as high as a person's reach (2.0 to 2.5 metres) in a young stand, known as brashing; above a person's reach (e.g. with a ladder), high pruning. If only crop trees are high pruned, the operation is called selective high pruning. Pruning or lopping that increases the clearance under a tree is sometimes termed lifting the canopy (NRC 1995).

pure species stand

A stand in which a single tree species comprises more than 80 percent of the total basal area.

regeneration

The establishment of a tree crop by natural (self-sown seed or by vegetative means) or artificial means (direct seeding and planting). Regeneration may also be used to describe the young crop itself (OMNR 1996).

reinitiation

Removal of most or all stems in a regenerating stand and the application of silvicultural treatments to establish a healthy and productive forest community which will meet the planned future forest condition.

release

Freeing a tree or group of trees from more immediate competition by cutting or otherwise eliminating growth that is overtopping or closely surrounding them (NRC 1995).

renewal

Silvicultural operations undertaken to promote the establishment of desired future forest stands. Forest renewal usually includes the activities of site preparation and regeneration (OMNR 1996).

reproduction method

The procedure by which a stand is established or renewed, including removal of the existing stand and establishment of the new one (Smith *et al.* 1997).

residual tree

Individual living trees or snags retained on a site (OMNR 2001a).

rhizome

A horizontal stem that bears roots and leafy shoots (OMNR 1997c).

rotation

The planned number of years between the formation or regeneration of a crop or stand and its final cutting at a specified stage or maturity (NRC 1995).

rutting

The creation of trenches or furrows in the ground by breaking through the forest floor (slash, litter, and humus layers) and compacting or displacing mineral or organic soil. Ruts are the result of having exerted ground pressures in excess of the weight-bearing capacity of the soil. They are normally associated with the use of heavy wheeled or tracked logging equipment (Archibald *et al.* 1997).

sapling

A general term for a young tree no longer a seedling but not yet a pole, about 1 to 2 metres high and 2 to 4 centimetres in dbh, typically growing vigorously and without dead bark on more than an occasional dead branch. Also, a young tree having a dbh greater than 1 centimetre but less than the smallest merchantable diameter (NRC 1995).

satisfactorily stocked

Productive forest land that has been regenerated naturally or artificially to at least a minimum number of well-established, healthy trees of merchantable species that are free-from-noncrop-competition and sufficient to produce a merchantable timber at rotation age (NRC 1995).

S-type

see soil type

scarification

Loosening the topsoil of open areas or breaking up the forest floor to assist the germination of natural seed from either standing trees or slash or to promote the occurrence of coppice or sucker growth (NRC 1995).

seed bank

The assemblage of viable but ungerminated seeds present in the soil, or held in closed cones in the canopy, which will germinate if the present vegetation is killed or removed (Kimmins 1997).

seed tree

A tree selected, and often reserved, for seed collection or provision of seed for natural regeneration (NRC 1995).

seed tree harvest method

A method of harvesting and regenerating a forest stand in which all trees are removed from the area except for a small number of seed-bearing trees that are left singly or in small groups or strips for regeneration purposes. The objective is to create an even-aged stand (OMNR 1996).

seed year

In Ontario, a year when 75 to 100 percent of the trees have a seed crop that exceeds more than half of the maximum yield per tree (OMNR 1977).

seed zone

An area within which seed can be collected from any natural stand and planted in any new site without fear of mal-adaptation (Maynard 1996).

seedbed

natural regeneration

The soil or forest floor on which seed falls.

nursery practice and in the field

A prepared area over which seed is sown (NRC 1995).

seeding – direct

The sowing of seeds by manual or mechanical means (NRC 1995). Direct seeding can include:

broadcast seeding

The sowing of seeds more or less evenly over a whole area on which a forest stand is to be established (NRC 1995).

precision seeding

The systematic sowing of seeds by manual or mechanical means in an area on which a forest stand is to be grown (OMNR 1997c).

spot seeding

Precision seeding in small, prepared patches throughout a site (NRC 1995).



drill seeding

Precision seeding in shallow furrows across a site (NRC 1995).

seeding – natural

The dispersal by natural agents of seeds from standing trees or from cone-bearing slash. Seeds may be dispersed by wind, birds, mammals, gravity, or flowing water or be released by fire from serotinous cones (NRC 1995).

seedling

A young tree, grown from seed, from the time of germination to the sapling stage, having a dbh of no more than 1 centimetres and a height of no more than 1.5 metres (NRC 1995).

selection system

An uneven-aged silvicultural system where mature and/or undesirable trees are removed individually or in small groups over the whole area, usually in the course of a cutting cycle. Regeneration is generally natural (OMNR 1996).

self-pruning

The inherent ability of a tree species to shed dead branches at their junction with the live stem (NRC 1995).

self-thinning

Tree mortality from the effect of the competition arising between trees on the same site (NRC 1995).

sensitive sites

Those sites which have a high probability of one or more types of damage occurring if managed according to standard operating practices (Archibald *et al.* 1997).

seral stage

The identifiable stages in the development of a sere, from an early pioneer stage, through various early and mid-seral stages, to large seral, subclimax, and climax stages. The stages are identified by different plant associations (different species composition and/or community

structure), different stages of the dominant vegetation (usually related to differences in structure), and by different microclimatic, soil, and stand condition (Kimmins 1997).

shade tolerance (tolerant)

The ability of a plant to germinate, establish, survive, compete for resources, and grow in the shade of other plants. A complex characteristic of plants involving seed size, physiological and morphological adaptations to low light intensity, root-shoot ratios, disease resistance, and the ability to compete for soil resources at low light levels. Shade tolerance of trees often varies with their age. Shade-tolerant tree species often grow best in full sunlight or very light shade (Kimmins 1997).

shortwood (cut-to-length) logging

The limbing, topping, and cutting to length of trees at the stump, followed by removal of the logs to roadside (Richardson and Makkonen 1994).

silvicultural system

A planned program of silvicultural treatments that extends throughout the life of a stand for the purpose of controlling stand establishment, composition and growth, and includes a reproduction method as well as any tending and intermediate stand treatments (Smith *et al.* 1997).

silvicultural treatment

An activity, whether biological or managerial, through which a forest operations prescription is met (OMNR 1996).

silvicultural treatment package

The range of acceptable treatments (harvest, renewal, tending) for the appropriate forest unit and site type combination which can be undertaken at various intervals throughout the life of a forest stand to achieve the desired future stand condition (OMNR 1996).

silviculture

The scientific, creative, and practical use of silvics at the site level to control species establishment, composition, growth, and stand structure (Smith *et al.* 1997).

site preparation

The disturbance of the forest floor and upper soil horizons (and/or vegetation) to create suitable conditions for regeneration through the use of manual or motor-manual techniques, mechanical equipment, chemical (herbicide) application, prescribed burning, or a combination of these approaches (after OMNR 1996).

Mechanical site preparation methods include (Sutherland and Foreman 1995):

screefing

The removal or displacement of the organic layer to expose or scarify the underlying mineral soil. Includes blading, shearblading, scalping, and raking.

inverting

Flipping over parts of the forest floor organic layer, with or without the underlying mineral soil, onto the adjacent undisturbed forest floor.

mounding

The creation of raised planting spots.

trenching

Removing and mixing of both the mineral soil and organic layers into berms on top of the adjacent, undisturbed forest floor.

mixing

Incorporation of the organic layer and fine debris into the underlying mineral soil.

Chemical site preparation methods include:

broadcast spraying

Chemical treatment of an entire block using aerial or ground-based equipment.

band spraying

Aerial or ground application of herbicide in bands of predetermined width.

ground selective application

Chemical treatment of individual targeted stems or a small specific area using ground-based equipment.

site quality

The productive capacity of a site; usually expressed as volume production of a given species per unit area (cubic metres per hectare) or per unit of time (cubic metres per year) (NRC 1995).

site type (synonyms: ecosite, general standard site type)

see ecosite, general standard site type

slenderness coefficient

Ratio of tree height to dbh; characterizes stem taper and serves as an index of tree stability (Navratil 1995).

slash

The residue left on the ground after felling and tending and/or accumulating there as a result of storm, fire, girdling, or treatment with herbicide. It includes unutilized logs, uprooted stumps, broken or uprooted stems and the heavier branchwood (heavy slash), lighter tops and branchwood, twigs, leaves, bark, and chips (light slash) (NRC 1995).

snag

A standing dead tree from which the leaves and most of the branches have fallen (NRC 1995).

soil organic matter

All of the carbon-containing substances in the soil, except carbonates; a mixture of plant and animal residues in various stages of decomposition, the bodies of living and dead microorganisms, and substances synthesized from breakdown products of the above (Fisher and Binkley 2000).



soil parent material

The unconsolidated inorganic material from which mineral soil is formed by action of physical, chemical, and biological processes acting over time (Kimmins 1997).

soil profile

A vertical section of soil that extends through all its horizons (Hayden *et al.* 1995).

soil texture

The relative proportions of soil particles like sand, silt, and clay (Hayden *et al.* 1995).

soil type

A designation for soil classification that is used in FEC systems in Ontario. Soil types are groups of forest soil profiles based on specific ranges of texture, depth, moisture regime, calcareousness (not a factor in the Northwest Region of Ontario) and forest humus form. They occur at the ecoelement level of the ELC hierarchy and at spatial scales ranging from 1:1,000 to 1:20,000 (Taylor *et al.* 2000).

spacing

noun

The distance between trees in a plantation, a thinned stand, or a natural stand (NRC 1995).

verb

see juvenile spacing

species composition

The makeup of species occupying a given site, based on percentage of total basal area (Hayden *et al.* 1995).

species diversity

The variety of different biological species present in an ecosystem. Generally, high diversity is marked by many species with few individuals in each (Brady and Weil 1999).

species richness

The number of different species present in an ecosystem, without regard for the distribution of

individuals among those species (Brady and Weil 1999).

spot application

Applying pesticides and/or fertilizers onto patches (NRC 1995).

stand (synonym: forest stand)

A community of trees possessing sufficient uniformity in composition, constitution, age, arrangement, or condition to be distinguishable from adjacent communities (OMNR 1996).

standard

A tree selected to remain standing, after the rest of the stand has been felled over a younger or a new crop, for some special purpose, e.g. shelter, seeding, production of a special quality or size of timber (NRC 1995).

stand composition

see composition

stand composition type

A category of stand classification used to describe tree species composition for boreal mixedwood management.

stand condition

1. Specifically, in this guide, refers to the combination of stand composition type and stage of stand development.
2. In a general sense, refers to various characteristics and attributes associated with a stand (e.g. health, vigour, density, etc.).

stand development

1. The growth of a stand through its various developmental stages – from seedling or coppice through thicket, sapling, and pole to the tree stage, i.e. to maturity, and finally to overmaturity (NRC 1995).
2. The part of stand dynamics concerned with changes in stand structure over time (Oliver and Larson 1996).

stand dynamics

see forest stand dynamics

stand establishment

see establishment

stand initiation stage

Colonization of the available free-growing space by trees following a stand-replacing disturbance (e.g. fire). In the boreal forest, trees that initially dominate the site are typically pioneer species such as aspen and birch, although this is not always the case (Chen and Popadiouk 2002).

stem exclusion stage

The stage of stand development immediately following the stand initiation stage. All available growing space in the canopy is fully occupied by trees. Inter- and intra-species competition occurs as individual trees expand in size. Vertical canopy stratification often takes place at a later phase of this stage (Chen and Popadiouk 2002).

stem injection (tree injection)

The deliberate introduction, by pressure or simple absorption, of a chemical – generally a water-soluble salt in solution – into the sapstream of a living tree (NRC 1995).

stocking

An expression of the adequacy of tree cover on an area, in terms of crown closure, percentage of stocked quadrats, number of trees, basal area, or volume, in relation to a pre-established managerial norm (OMNR 1996).

fully stocked

Productive forest land stocked with trees of merchantable species. These trees by number and distribution or by average dbh, basal area, or volume are such that at rotation age they will produce a timber stand that occupies the potentially productive ground. They will provide a merchantable timber yield according to the potential of the land. The stocking, number of trees, and distribution required to achieve this

will be determined from regional or local yield tables or by some other appropriate method (NRC 1995).

partially stocked

Productive forest land stocked with trees of merchantable species insufficient to utilize the complete potential of the land for growth such that they will not occupy the whole site by rotation age without additional stocking. Explicit definition in stems per hectare, crown closure, relative basal area, etc., is locally or regionally defined and is site-specific (NRC 1995).

satisfactorily stocked

Productive forest land that has been regenerated naturally or artificially to at least a minimum number of well-established, healthy trees of merchantable species that are free-from-noncrop-competition and sufficient to produce a merchantable timber yield at rotation age (NRC 1995).

strip cutting

Removal of the crop in strips in more than one operation, generally for encouraging natural regeneration or protecting fragile sites. A spatial variation of the conventional clearcut harvest method (NRC 1995).

structure

The distribution of trees in a stand or group by age, size, or crown classes (e.g. all-aged, uneven-aged, regular, and irregular structures (NRC 1995).

structural diversity

One of the measures of biological diversity in forest ecosystems. It refers to the variation in tree size and canopy layering, the variety of different life forms of vegetation (trees, herbs, shrubs, mosses, climbers, epiphytes, etc.), and the relative size and abundance of standing dead trees (snags) and decaying logs on the ground (coarse woody debris). Structural diversity refers to these features within ecosystems across the local landscape (beta structural diversity) (Kimmins 1997).



stump treatment

Application of herbicides to, or near, hardwood stumps to prevent coppicing. Also, fungicides or paint can be applied to prevent fungal infection (NRC 1995).

subcanopy

Stand stratum consisting of trees of intermediate, overtopped/suppressed, open understorey, and understorey crown classes (Popadiouk *et al.*, in press).

succession

Changes in species composition in an ecosystem over time, often in a predictable order (OMNR 1996).

supplemental regeneration

The establishment of target or acceptable trees in areas of inadequate stocking to achieve the prescribed minimum density, stocking, or distribution of stems, either in plantations or areas of natural regeneration.

suppressed tree (synonym: overtopped)

Trees with crowns entirely below the general level of the canopy of even-aged groups of trees, receiving no direct light either from above or the sides (NRC 1995).

suppression

The process whereby certain trees, shrubs, etc., in a community become weakened, essentially through the competition of neighbours but also by extension, through human intervention and selective browsing by livestock (NRC 1995).

surface fire

Fires with generally low intensity and severity and rapid rate of spread that burn litter and dead herbs and shrubs. Surface fires generally do little damage to live trees and soil where they occur frequently and there has been little accumulation of fuels (Kimmins 1997).

tending

Any operation that is carried out to improve the survival, growth or quality of a young to mid-rotation forest stand, including cleaning, thinning, liberation treatment, pruning, or fertilization (adapted OMNR 1996).

thinning

A cutting made in an immature crop or stand primarily to accelerate diameter increment but also, by suitable selection, to improve the average form of the trees that remain. The removal of trees may be from the dominant and codominant crown classes to favour the best trees of those same crown classes (known as crown thinning), or the removal of trees may be to control stand spacing and favour desired trees using a combination of thinning criteria without regard to crown position (known as free thinning) (OMNR 1996).

commercial thinning

The partial removal of overstorey trees in well-stocked stands where some portion of the trees have reached a merchantable size and where the sale of the timber will potentially earn a positive financial return (adapted OMNR 1996). The primary objective is to enhance the growth response (and perhaps form and quality) of the remaining stems while maintaining the original overstorey species composition.

low thinning

The removal of trees from the lower crown classes to favour those in the upper crown classes (NRC 1995).

high (crown) thinning

The removal of trees from the dominant and codominant crown classes to favour the best trees of those same crown classes (NRC 1995).

mechanical thinning

Thinning involving mechanical removal of trees in rows or strips, or by using fixed spacing intervals (NRC 1995).

pre-commercial thinning

A thinning at the stem exclusive stage that does not yield trees of commercial value, and is usually designed to improve crop spacing without altering the species composition of the future stand. In Ontario, the term pre-commercial thinning is generally used in relation to even-aged management only. Pre-commercial thinning in uneven-aged management is referred to as “improvement cutting” or stand improvement (after OMNR 1996).

trampling

A form of manual site preparation or tending where stems are trampled to suppress non-crop (particularly mountain maple) competition.

tree-length logging

The removal of only the merchantable length of the tree to the roadside. Limbing and topping occurs at the stump (OMNR 1997c).

tree improvement

The control of parentage combined with other silvicultural activities (such as site preparation) to improve the overall yield and quality of products from forest lands (OMNR 1996).

tree marking

Selection and indication, usually by marking with paint on the stem, of trees to be felled or retained (NRC 1995).

two-stage harvesting

A clearcutting harvest method where harvesting occurs in two distinct stages (Navratil *et al.* 1994). The (typically intolerant hardwood) overstorey is carefully harvested in the first pass with protection of the (typically conifer) understorey. The second pass harvests the released understorey decades later when it matures.

understorey crown class

see crown class; understorey

underplanting

Planting young trees under the canopy of an existing stand (NRC 1995).

undesirable species

Species that conflict with, or do not contribute to, the management objectives (NRC 1995).

uneven-aged stand

A forest or stand that contains at least three age classes intermingled intimately on the same area (Smith *et al.* 1997).

uneven-aged management

Silvicultural systems in which stands have an uneven-aged structure (e.g. selection systems) (after OMNR 1996).

uneven-aged structure

A forest, stand, or forest type in which intermingling trees differ markedly in age. The difference in age in an uneven-aged stand is usually greater than 10 to 20 years (OMNR 1996).

unmerchantable

A tree or stand that has not attained sufficient size, quality, and/or volume to make it suitable for harvesting (NRC 1995).

vegetation management

Management of the interactions between crop and noncrop vegetation to manipulate succession (Kimmins 1997).

V-type

see vegetation type

vegetation type

A designation for vegetation classification that is used in FEC systems in Ontario. Vegetation types are mature forest plant communities based on specific ranges of plant species compositions and abundance. They occur at the ecoelement level of the ELC hierarchy and at spatial scales ranging from 1:1,000 to 1:20,000 (Taylor *et al.* 2000).



vegetative reproduction (propagation)

Reproduction by a root, leaf, or some other primary vegetative part of a plant (OMNR 1997c). Includes root suckering and stump sprouts.

veteran

A tree that has escaped logging, windthrow, or fire, and occupies a dominant position in the stand (NRC 1995).

windbreak

A small-scale shelterbelt or other barrier, natural or artificial, maintained against the wind (NRC 1995).

windfall

1. A tree or trees thrown down or with their stems broken off or other parts blown down by the wind.
2. Any area on which the trees have been thrown down or broken by the wind (NRC 1995).

windfirm

Of trees, able to withstand strong winds, i.e. to resist windthrow, windrocking, and major breakage. Such trees may not remain upright but show wind lean, or wind bend, or both (NRC 1995).

whip

Any slender tree that the wind causes to lacerate the crowns of its neighbours (NRC 1995).

windrow

Slash, brushwood, etc., concentrated along a line so as to clear the intervening ground between two of them (NRC 1995).

windthrow

1. Uprooting by the wind.
2. Tree or trees so uprooted (NRC 1995).