

SILVICULTURE TERMINOLOGY REVIEW

*This list is not all encompassing. However, a review of these basic terms will be helpful and useful for the Adaptive Silviculture for Climate Change (ASCC) Driftless site development.

Basic Terms

Silviculture

Applied forest ecology (Smith et al. 1997)

The science and art of growing and tending forest crops – classic definition (Nyland 1996)

The art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values (objectives) of landowners and society on a sustainable basis (Dictionary of Forestry, 1998)

Silvics

The biological characteristics of individual trees and communities of them

The study of how trees grow and reproduce, as well as ways that the physical environment influences their physiology, and the general interactions of the character of a forest community and the physical environment

Understory tolerant

A forest tree that can survive and prosper under a forest canopy

Understory intolerant

A forest tree that can thrive only in the main canopy or in the open

Silvicultural System

A conceptual framework that describes the long-term plan for managing an individual stand to sustain a particular set of values of interest (Nyland 1996). This planned series of treatments includes tending, harvesting, and re-establishing a stand. The name of the system is based on the number of age classes (even-aged, two-aged, uneven-aged) or the regeneration method (shelterwood, group selection, etc.)

Disturbance

Any relatively discrete event in time that disrupts ecosystem, community, or population structure and changes resources, substrate availability, or the physical environment (Dictionary of Forestry 1998)

Succession

The process whereby one plant community replaces another, with conditions of the physical environment, growth characteristics of the different plants, effects of herbivory and other biologic factors, and the available sources of regeneration determining the species that become established and eventually dominate a site (Nyland 1996)

Ecological succession – the process by which a series of different plant communities and associated animals and microbes successively occupy and replace each other over time in a particular ecosystem or landscape location following a disturbance to that ecosystem. Includes the accompanying change in the nonliving environment (soil and microclimate) (Kimmins 1997)

Vegetation (stand) dynamics

The development of vegetation (stands) over time

Stand

A spatially contiguous group of trees and associated vegetation having similar structures and growing under similar soil and climatic conditions (Oliver and Larson 1996)

Communities or groups of trees that grow together at a particular place, and that foresters can effectively manage as a unit (Nyland 1996)

Communities or groups of trees with some unique vegetal characteristic that landowners can maintain by a particular series of treatments (Nyland 1996)

Forest

An extensive area, landscape, or ecosystem dominated by trees and other woody vegetation growing closely together (Nyland 1996) -- in other words, a collection of stands

Age class

A collection of trees that grow in a single stand, and that have about the same age (Nyland 1996)

Cohort

A group of trees developing after a single disturbance, commonly consisting of trees of similar age, although it can include a considerable range of trees that predate the disturbance (Dictionary of Forestry 1998)

Growing space

The physical area available to and utilized by a tree.

That portion of the resources of the site (light, water, nutrients, etc.) available and utilized by a tree – **note:** growing space is not usually directly measurable but often represented from crown projection or leaf area or as an area allocation obtained using various mathematical techniques (Dictionary of Forestry 1998)

Stand density

This is a discrete number. A quantitative measure of stocking expressed either absolutely in terms of number of trees, basal area, or volume per unit area or relative to some standard condition.

A measure of the degree of crowding of trees within stocked areas commonly expressed by various growing space ratios, e.g., height/spacing

Stocking

This is a qualitative descriptor. An indication of growing space occupancy relative to a pre-established standard. Common indices include basal area, relative density, stand density index (SDI), and crown competition factor

Site

An area's potential for tree growth, usually incorporating an area's soil and climatic conditions (Oliver and Larson 1996)

Site quality

The productive capacity of a site, usually expressed as volume production of a given species (Dictionary of Forestry 1998)

Site Index

A species-specific measure of actual or potential forest productivity expressed in terms of the average height of trees included in a specified stand component at a specified index or base age. Used as an indicator of site quality (Dictionary of Forestry 1998)

Stand structure

The physical and temporal distribution of trees and other plants in a stand (Oliver and Larson 1996)

The horizontal and vertical distribution of components of a forest stand including the height, diameter, crown layers, and stems of trees, shrubs, herbaceous understory, snags, and down woody debris (Dictionary of Forestry 1998)

Crown class

A category of tree based on its crown position relative to those of adjacent trees (Dictionary of Forestry 1998)

Dominant – trees with crowns extending above the general level of the crown cover and receiving full light from above and partly from the sides; larger than the average trees in the stands and with crowns well developed but possibly somewhat crowded on the sides.

Codominant – trees with crowns forming the general level of the crown cover and receiving full light from above but comparatively little from the sides; usually with medium-sized crowns more or less crowded on the sides

Intermediate – trees shorter than those in the two preceding classes but with crowns extending into the crown cover formed by codominant and dominant trees; receiving a little direct light from above but none from the sides; usually with small crowns considerably crowded on the sides.

Overtopped (suppressed) – trees with crowns entirely below the general level of the crown cover, receiving no direct light either from above or from the sides.

Stratum

(strata is plural) – a distinct layer of vegetation within a forest community – also called a canopy layer

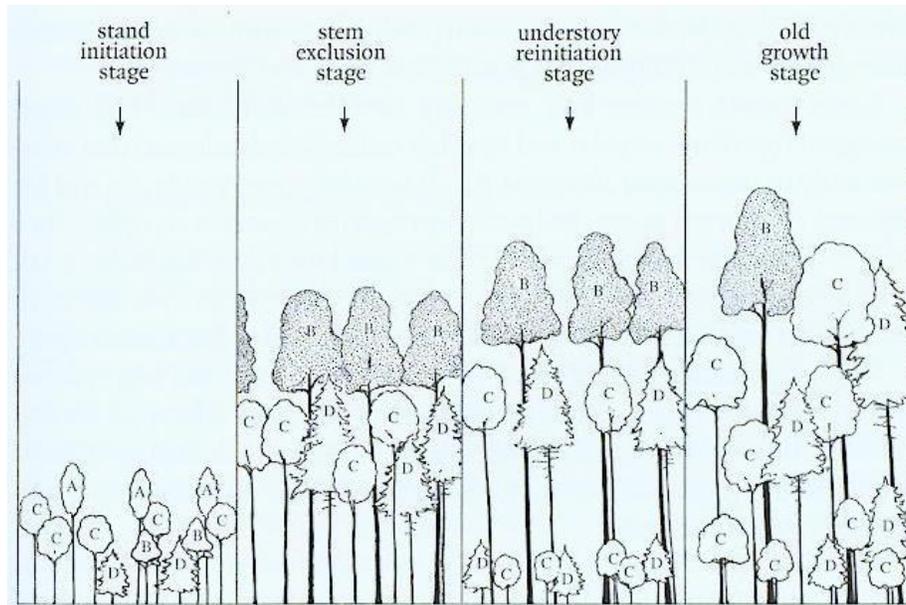
Stages of Stand Development (Following Oliver and Larson 1996)

Stand initiation – After a disturbance, new individuals and species continue to appear for several years.

Stem exclusion – After several years, new individuals do not appear and some of the existing ones die. The surviving ones grow larger and express differences in height and diameter; first one species and then another may appear to dominate the stand.

Understory reinitiation – Later, forest floor herbs and shrubs and advance regeneration again appear and survive in the understory, although they grow very little.

Old-growth – Much later, overstory trees die in an irregular fashion, and some of the understory trees begin growing to the overstory.



Advance Regeneration

Seedlings or saplings that develop or are present in the understory (Dictionary of Forestry 1998)

Artificial Regeneration

A group or stand of young trees created by direct seeding or by planting seedlings or cuttings

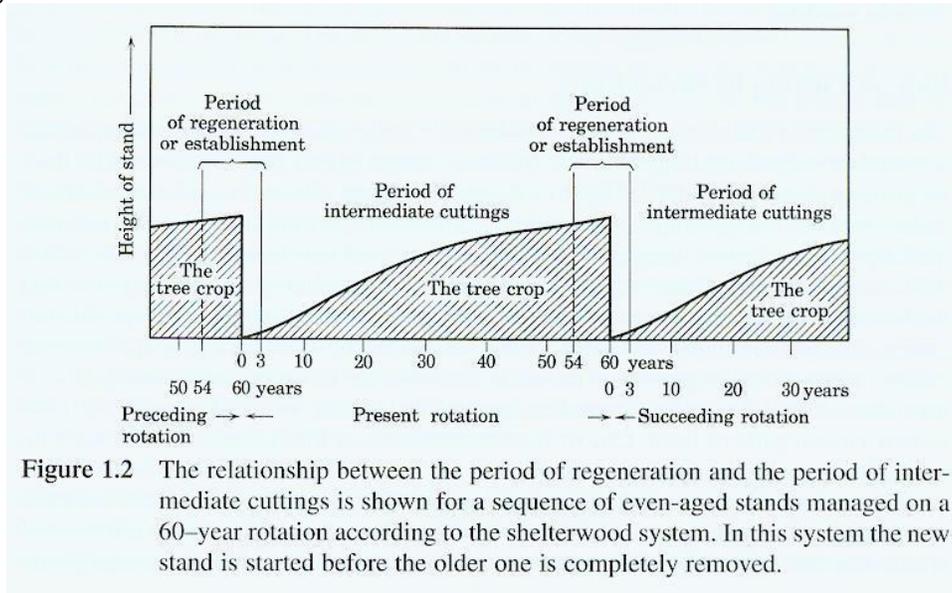
Natural Regeneration

The establishment of a plant or a plant age class from natural seeding, sprouting, suckering, or layering

Regeneration cutting methods

Rotation

The planned number of years between the time a stand regenerates, and its final cutting at a specified stage of maturity (Nyland 1996)



EVEN-AGED

A stand of trees composed of a single age class in which the range of tree ages is usually ± 20 percent of the intended rotation (Dictionary of Forestry 1998). Can also be referred to as a single-cohort stand.

Clearcut

A stand in which essentially all trees have been removed in one operation, producing a fully exposed microclimate for the development of a new age class. Cutting may be done in groups or patches, and reserve trees may or may not be left on the site.

Seed Tree

The cutting of all trees except for a small number of widely dispersed trees retained for seed production and to produce a new age class in a fully exposed microenvironment. Seed trees are usually removed after regeneration is established.

Shelterwood

The cutting of most trees, leaving those needed to produce sufficient shade to produce a new age class in a moderated environment. The sequence of treatments can include three types of cutting: a) an optional preparatory cut to enhance conditions for seed production; b) an establishment cut to prepare the seed bed and to create a new age class; and c) a removal cut to release established regeneration from competition with the overstory.

Vegetative Reproduction (low forest regen methods)

Coppice

All trees in the previous stand are cut and the majority of regeneration is from stump sprouts or root suckers. Also called "low-forest" regeneration method.

Coppice with reserves

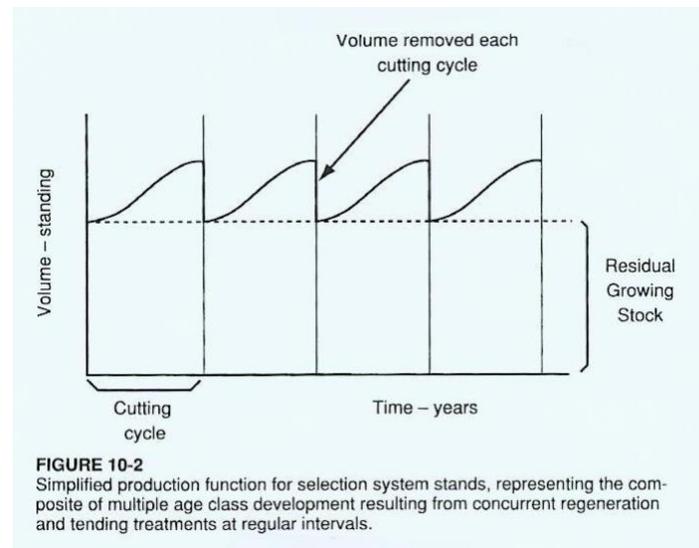
Reserve trees are retained to attain goals other than regeneration. Also called coppice with standards.

UNEVEN-AGED

A stand with trees of three or more distinct age classes, either intimately mixed or in small groups (Dictionary of Forestry 1998)

Cutting cycle

The planned interval between partial harvests in an uneven-aged stand (Dictionary of Forestry 1998)



Group Selection

Trees are removed and new age classes are established in small groups usually 1/20 to 1/2 acre in size
→ typically appropriate for more mid-tolerant species

Individual Tree Selection

Individual trees of all size classes are removed more or less uniformly throughout the stand, to promote growth of remaining trees and to provide space for regeneration
→ typically appropriate for more shade tolerant species

Other common terminology related to regeneration methods

Multiaged (multicohort)

A stand with two or more age classes or cohorts represented

Two-aged

A growing area with trees of two distinct age classes separated in age by more than ± 20 percent of rotation. Often the result of not removing the overstory trees after a seed tree or shelterwood regeneration treatment.

All-aged

A stand with trees of all or almost all age classes, including those of exploitable age (Dictionary of Forestry 1998)

Mixed stand (mixed species stand)

Composed of two or more prominent species

Pure stand (single species stand)

A stand composed of essentially a single species, conventionally at least 80 percent based on numbers, basal areas, or volumes

Intermediate treatments

Treatments done in young or mature stands – prior to the time of final harvest – to improve species composition, growth rate, and tree quality

Crop Trees

Trees that are selected in even-aged stands and favored because they are expected to grow for the entire rotation.

Precommercial Thinning

Reduction in stand density, primarily to increase growth rate of the best dominant/codominant crop trees of desirable species. These thinnings are made purely as investments in the future growth of stands so young that none of the felled trees are extracted and utilized.

Commercial Thinning

Removal of merchantable products done at a profit with the goal of decreasing stand density and accelerating growth of the remaining trees.

There are 5 main types of thinning:

Low Thinning – removal of trees in the lower crown classes to increase growth of dominant and codominant trees (German thinning, thinning from below)

Crown Thinning – removal of poorer quality codominants and occasional dominants to increase the growth of high quality dominants and codominants (French thinning, thinning from above, high thinning)

Selection Thinning – removal of all dominant trees to increase the growth of codominants and intermediates which will become crop trees of the future (thinning of dominants)

Geometric (Mechanical) Thinning – removal of trees based on spacing or a specified geometric pattern without regard for crown class or tree quality, e.g., strict 12-ft spacing, every other tree, every other row in a plantation, etc.

Free Thinning – any combination of two or more of the above kinds of thinning

Other types of treatments

Pre-salvage

Designed to anticipate damage by removing highly vulnerable trees

Sanitation

The removal of trees to improve stand health by stopping or reducing the actual or anticipated spread of insects and disease

Salvage

The removal of dead trees or trees damaged or dying because of injurious agents other than competition, to recover economic value that would otherwise be lost