

DSE 1 : NATURAL RESOURCE MANAGEMENT

UNIT – 3

Land

(Part – 8)

Silvicultural land utilization

Definition of Silviculture :

Silviculture is the applied science of forest ecology and management. The foundation is based on silvics, which is concerned with the development and growth of trees and forests. The practice of silviculture is rooted in a broad understanding of forested ecosystems, which includes biometeorology, hydrology, geology and ecology. This knowledge is then applied to assess, maintain, and manage forestland for a specific value or product, whether that is for timber, aesthetics, habitat, watershed management, or another objective. The main purpose of silviculture is one where “natural processes are deliberately guided to produce forests that are more useful than those of nature.

Silviculture has been widely accepted as the art and science of forest farming. The three basic operations contained are regeneration, tending, and harvesting of the forest. In the traditional context, silvicultural refers only to the methods of raising forest crops and their care up to the time of harvest.

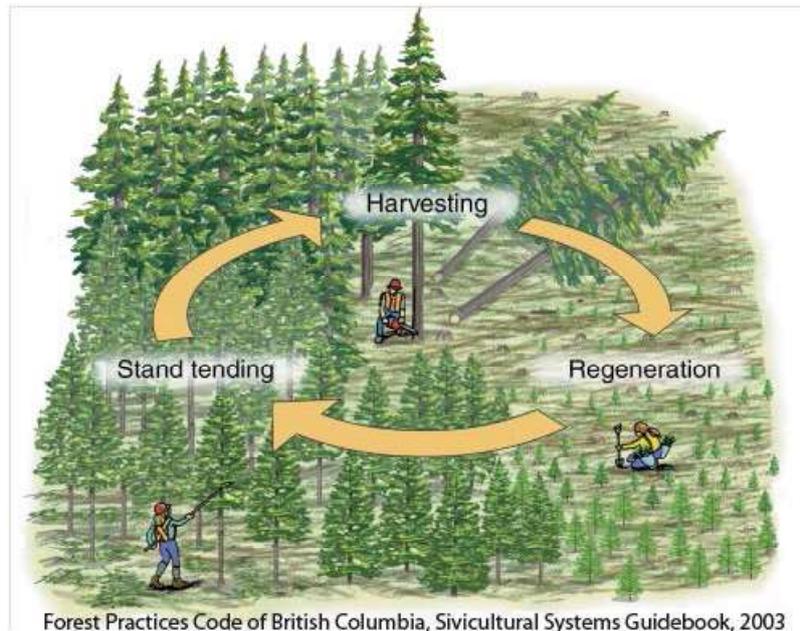
What is a Silviculturist?

The silviculturist is a forester with detailed knowledge of silviculture and related sciences. At the same time, the silviculturist is a generalist with a working knowledge of a wide range of virtually all other components of natural resources management, including ecological, social, and economic issues. Framed within management direction, the silviculturist needs to be able to analyze site, vegetation and other variables, and develop action plans in the form of treatment prescriptions.

Silvicultural systems and their application

A silvicultural system is a planned series of treatments for tending, harvesting, and re-establishing a stand to meet management objectives. These treatments are applied throughout the life of the stand and are combinations of *regeneration methods* and stand tending, called *intermediate treatments*.

Sound silvicultural treatments must be biologically feasible, socially acceptable and economically possible. Numerous items such as tribal goals and objectives, past disturbance patterns, forest health, site attributes, stand attributes, plant communities, economics, and the desired resource(s) emphasis should be considered. Determination of the best silvicultural system must first rely upon sound ecological principles.



All silvicultural systems include three basic component treatments or functions: timely regeneration, tending and harvest in a stand.

A systematic approach to silviculture should:

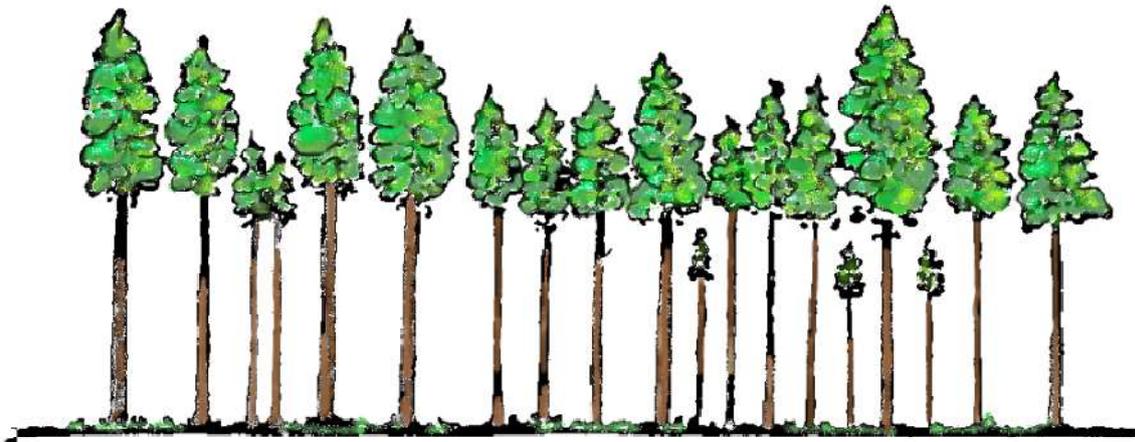
- Harmonize with the goals and specific objectives of the tribe;
- Provide for timely regeneration of the desired species;
- Effectively and efficiently use growing space and site productivity, making wise use of forest capital;
- Manage forest pathogens and damaging agents within acceptable limits;
- Protect soil and water resources;
- Balance between ecological and economic concerns to ensure a sustainable ecosystem.

Areas considered for treatment must fall within the above-listed guidelines and follow Forest Management Plan (FMP) criteria. Once a decision is made that treatment is desirable, the first question should be: “What *system* is appropriate here, and why?”

A. Even-aged (EA) Systems :

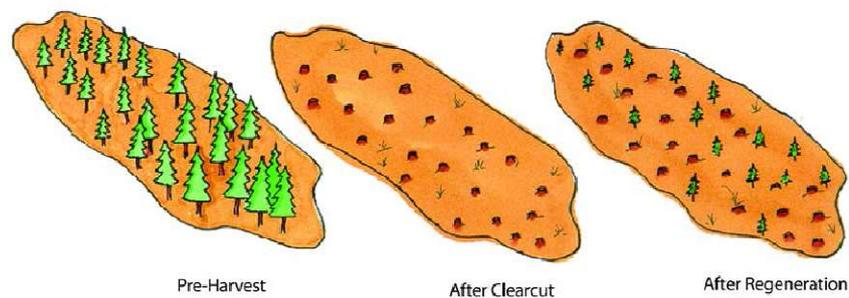
These result from regeneration methods designed to regenerate a stand with relatively uniform sizes in a single primary age class (See Figure 3.0). The range of

tree ages is usually less than 20% of the rotation. Methods that produce even-aged structures include clearcutting, seed tree, shelterwood, and coppice.



Regeneration Methods

1. **Clearcutting (CC)** is a method of regenerating an even-aged stand in which a cohort, or new age class of seedlings, develops in a fully-exposed microenvironment after removal, in a single cutting, of all trees in the previous stand.



2. **The seed-tree method (ST)** is an even-aged regeneration method in which a new age class develops from seeds that germinate in virtually a fully-exposed microenvironment after removal of the entire stand except for a small number of widely dispersed trees retained for seed production. Seed trees are usually removed after regeneration is established.



3. **The shelterwood (SW)** is a method of regenerating an even-aged stand in which a new cohort, or age class of seedlings, develops in a moderated microenvironment beneath the residual trees. The sequence of treatments can include three distinct types of cuttings:
 - a. an optional **preparatory cut** to set the stage for regeneration
 - b. an **establishment cut or shelterwood seed cut** to prepare the seed bed and to create the new stand; and
 - c. The final **removal cut** to release the established regeneration from competition with the seed and shelter trees.



4. **Coppice** is a method of regenerating a stand in which all trees in the previous stand are cut, knocked over, or injured at the root and the majority of regeneration is from stump sprouts or root suckers. This is primarily used in hardwood stands; however, coastal redwoods may also be regenerated using this method.

B. Two-aged Systems :

Two-aged systems are relatively new additions to silvicultural terminology. A two-aged regeneration system is designed to maintain and regenerate a stand with two

age classes by borrowing from both even- and uneven-aged silviculture. The resulting stand may be two-aged or tend towards an uneven-aged condition as a consequence of both an extended period of regeneration establishment and the retention of reserve trees that may represent one or more age classes. Foresters subdivide the even-aged systems into the clearcutting, shelterwood, seed-tree, or coppice cutting methods, the uneven-aged systems are subdivided into the single-tree or group selection cutting methods, and the two aged systems are the clearcut/shelterwood/seed tree/coppice with reserves and the leave-tree cutting methods.

C. Uneven-aged Systems. Uneven-aged (UEA) methods of reproduction (selection methods) are methods of perpetually regenerating a forest stand in order to maintain trees of three or more distinct age classes by removing some trees in all size classes either singly or in small groups while maintaining an uneven-aged structure. Uneven-aged regeneration methods include single-tree selection, group selection, and group selection with reserves.

