

Appendix D

Management Systems and Harvest Methods

Management systems are long-term strategies to regulate inventories and harvest outputs in forest stands. The major systems are even-aged, uneven-aged and two-aged management. Harvest methods are the means used to implement these strategies. They refer to the methods used to foster stand development, including structure, species, and growth rates, and to encourage reproduction in the stand.

Even-aged management consists of growing stands of a single age class for an identified time period, known as a rotation. This mimics the way many species grow naturally. At the end of a rotation a new stand is initiated either by a single removal cut (clearcut) or a series of cuts over a relatively short time (shelterwood or seedtree). Seedtree and shelterwood cuttings involve leaving a scattered layer of mature trees to provide seed or shelter for new regeneration. In the White Mountain National Forest, where seed is usually abundant and most of the hardwood species sprout from the stump when cut, clearcutting is the most efficient evenaged regeneration method. This method is most efficient regarding the short time frame that is required to re-establish a new stand that maximizes utilization of the site in terms of growth or volume production.

Uneven-aged management creates a stand where several different age or size classes occupy the same stand and perhaps the same acre. Each harvest in the stand is a regeneration harvest creating space for new seedlings. It also releases the residual trees from competition, allowing them to increase growth and vigor. Under uneven-age management, the stand is harvested more frequently than with an evenaged system, usually about every 15 years.

Harvest Method

Harvest method refers to the selection of numbers of trees and species of trees to be removed from a stand, and over a specified time period. The harvest methods (or silvicultural prescriptions) proposed for this sale are listed below.

Clearcutting - In a clearcutting operation the entire stand is cleared so that a (generally) single-aged generation of trees can colonize the site under full sunlight. White Mountain National Forest Plan standards require a quarter to half acre reserve patch for every ten acres clearcut. Following a clearcut harvest, the new stand of trees can originate from any combination of wind-born seed (most species except oak and beech), animal deposited seed (e.g., oaks and beech), seed accumulations in the soil (e.g., pin cherry), re-sprouting from stumps (e.g. many hardwood species, no local conifers) and advanced (pre-existing) regeneration of any species (very common in conifer stands and with shade-tolerant hardwoods). The new generation of trees usually forms a closed-canopy seedling layer in five to seven years. Clearcutting can be used to address growth repression resulting from advancing age, excessive crowding, and disease or disturbance history. Clearcutting is also the primary method for producing early successional wildlife habitat.

Seed tree - A seed tree cut is a regeneration harvest very much like a clearcut except that a certain amount of trees are retained throughout the opening to provide a seed source. The "seed trees" enhance regeneration chances of selected species, especially species such as oak, which have relatively large heavy seeds. These seed trees may be removed at the end of five to ten years, or simply left.

Commercial Thinning - Thinning is a silvicultural treatment done in younger stands where the density of trees is greater than needed to utilize the site and often too great to maximize individual tree growth and vigor. The operation consists of harvesting individual trees in a regular pattern throughout the stand. Trees selected for cutting are either surplus to stocking needs or undesirable from the standpoint of species or growth potential. The residual stand is moderately stocked and consists of individual trees with an above-average capacity for growth. Growing space and site resources of light, water and nutrients that once supported the entire stand are more available to the remaining trees. Tree growth may accelerate or continue at about the same rate, depending on the degree of crowding prior to the cutting. Relief from crowding improves the merchantable volume, overall quality and market value of the residual trees in the stand. Regeneration is not a goal of thinning. Improving the species composition and wood quality of a stand for potential future harvest is a goal of thinning.

Single-Tree Selection - Individual trees are removed in a regular pattern throughout the stand; but unlike thinning, some trees are removed from each merchantable size class, from each age class, and from each level of the stand canopy. The selection cuttings are repeated at intervals of ten to twenty years. Growing space and productivity are influenced in two ways. Tree removals create gaps throughout the stand canopy. Larger canopy gaps made by the removal of one-to-several dominant and co-dominant trees will allow light to reach the forest floor and provide growing space for reproduction. These openings are from 1/100th to 1/10th acre in size. Single-tree selection results in approximately one sixth of the unit in openings following treatment. Gaps of all sizes made by removal of individual upper and mid-canopy trees create growing space for crown and root expansion of neighboring trees. This results in their increased growth and vigor. Regeneration is a continuous process, with new generations of trees initiated in a regular pattern throughout the stand with each subsequent harvest entry.

Group Selection - This method appears as a pattern of small openings throughout a stand, usually covering about one-sixth of the land area in the stand. The cuttings are repeated at intervals of 15-20 years. In practice, individual openings average one-half acre in size, though Forest Plan definition allows for openings up to two acres. Reproduction is a continuous process, with new generations of trees colonizing each successive opening. The distinction between group selection openings and clearcuts is the pattern and size of the cleared area. A larger percentage of exposed ground in a group selection unit is shaded by adjacent trees, favoring shade-tolerant and intermediate species.

Shelterwood - Using this harvest method, a stand is harvested down to 20-30 Basal Area per acre, an estimated 25 trees per acre, under which understory regeneration is allowed to establish. The two "stories" of the stand are then allowed to develop, resulting in a "two-aged" condition. Some of the overstory could be harvested once the understory becomes well established. In this project, the intent is to open the stand sufficiently to allow for low intensity underburning that is expected to foster the development of oak regeneration. Oak is a pioneering species that will compete with other pioneering species provided the seedlings and saplings are able to get adequate sunlight.