

Forest Silvicultural Systems

Silviculture is the art and science of managing and regenerating forests to control their composition, structure, and growth. Forests are frequently managed in smaller units called stands. A stand is a group of trees similar enough in species composition, condition, and age distribution to be considered a unit. Stands may be even-aged (trees are of relatively the same age) or uneven-aged.

A forest manager can choose among several systems of silviculture to harvest and grow new trees within a forest stand. These include the clearcutting, seed-tree, shelterwood, and single tree and group selection systems.

In the **clear-cutting system**, most trees in a stand are harvested at once, with the expectation that a new, even-aged stand becomes established. The clear-cut system works well for establishing trees that grow best in full sunlight. The new stand is most commonly developed by planting seedlings. In other cases, a clear-cut area is regenerated by seeds from nearby stands, from seeds stored in the forest floor, or from stump or root sprouts of cut trees.

The **seed-tree system** requires leaving a few good seed-producing trees on each stand when the mature stand is harvested. These trees provide the seeds needed to regenerate a new, even-aged stand. The seed trees are sometimes harvested after a crop of new, young trees has become established.

The **shelterwood system** involves a series of partial cuttings over a period of years in the mature stand. Early cuttings improve the vigor and seed production of remaining trees and prepare the site for new seedlings. The remaining trees produce seeds and shelter young seedlings. Later, cuttings will harvest shelter-



wood trees and allow regeneration to develop as an even-aged stand.

The **single-tree selection system** differs from the other systems by creating and maintaining an uneven-aged stand. Foresters examine a stand and judge each tree on its individual merit. Trees are harvested as they mature. Seedlings or sprouts grow in the spaces created. Periodic thinning and harvesting results in a stand that contains trees of many ages and sizes. Because relatively few trees are harvested at any one time, and because the forest floor is generally shaded, this system favors species that thrive in low light.

The **group selection system** requires harvest of small groups rather than individual trees. The openings created resemble miniature clear-cuts, or gaps, with the major difference being that the resulting regeneration occupies too small an area to be considered an even-aged stand. As in the single-tree system, both thinning and harvest cuttings are done at the same time. The new trees that grow in these small openings are regarded as parts of a larger stand containing trees of many ages. In either singletree or group selection systems, frequent harvests are needed to maintain a balance of tree ages, classes, and sizes.