FOREST MANAGEMENT: SOME BASICS

ECOLOGICAL PRINCIPLES AND PROCESSES

- Forest ecology is the study of the forest as a biological community, with emphasis on the interrelationships among the various trees and other organisms constituting the entire community, and on the interrelationships between these organisms and the physical environment in which they exist.

- The forest ecosystem is dynamic- as in all living systems, change is inevitable. The science of Forest Management works with, rather than prevents, natural changes occurring in the ecosystem.

- The art and science of manipulating the pace of nature in the forest and controlling forest establishment, composition, structure, and individual tree growth is called ***silviculture***.

SILVICULTURAL PRACTICES

- The goals of silviculture include the application of ecological principles to effect the improvement and successful renewal of a forest community.

- Classic silvicultural practices include **intermediate treatments** and **regeneration methods.** Hybrid methods have recently evolved; these include the **crop tree selection method.**

TIMBER HARVESTING, A TOOL FOR SILVICULTURE

- Timber harvesting is a vital tool in renewing or enhancing and improving the vigor, diversity, and beauty of the forest while providing benefits to society.

- When properly planned and executed, timber harvests can promote the growth of desirable trees and other plants, stimulate regeneration, and alter wildlife habitat to favor certain species.

Intermediate Treatments

Intermediate treatments are implemented while the forest is still growing to economic or biological maturity so that the residual *stand* will be able to respond to the increased light, water, and nutrients resulting from reduced competition. A *stand* is an area of forest with similar species composition, age, and site conditions. A forest is the sum of its *stands*.

- **Cleanings**, also called **weedings**, occur early in the life of a forest stand. They favor species desired by the landowner by removing non-merchantable, undesirable herbaceous and woody species, including invasive, non-native species. As **cleanings** and **weedings** do not have an immediate payoff, they are regarded as an investment toward the future health and productivity of the forest stand.

- **Thinnings** and **improvement cuts** control stand density, increase tree vigor, and select the species and individuals that will make up the future forest. They are conducted in the latter stages of forest growth and frequently yield merchantable wood products. **Thinning** takes tree spacing into account, focusing on removing trees that are judged to be poor competitors. **Improvement cuts**, while not ignoring individual trees' competitive abilities, focus on removing trees of undesirable species or form to concentrate growth potential on the most desirable species and individuals.

Regeneration Methods

Regeneration methods are designed to mimic the creation of openings in the forest by natural disturbances. The most important goal of the regeneration process is to re-establish a healthy forest.

- The **single-tree selection method** and **group selection methods** mimic the natural processes of single trees or relatively small groups of trees dying and falling or being blown down by localized wind bursts. Both methods favor the regeneration of ***shade-tolerant*** species. ***Shade tolerance*** is the ability of a tree to become established and survive at relatively low levels of sunlight. The **single-tree selection method** removes individually selected trees throughout all diameter classes, creating small gaps in the canopy to facilitate regeneration. The **group selection method** removes trees in a number of 0.1- to 1-acre areas to create openings in the forest canopy.

- **Shelterwood**, **seed tree**, and **clear-cut methods** mimic nature's more catastrophic processes such as wildfires, tornadoes, and hurricanes, which can bring down multiple acres of trees at one time. These methods favor the regeneration of ***shade-intolerant*** species. ***Shade intolerance*** is the inability of a tree to become established and survive at relatively low levels of sunlight. The **shelterwood method** leaves a large number of trees standing long enough to establish and protect "advanced regeneration" sites until the new seedlings are well established. After the regeneration is well established, the sheltering trees are harvested, permitting the advanced regeneration to fully occupy the site. The **seed tree method** leaves a few of the best trees standing to become the parent trees of the new forest. This method has limited application in Connecticut forests. The **clear-cut method**, in its pure form, removes all the trees in a multi-acre area in a single harvest. In Connecticut forests, advanced regeneration must be present before a successful clear-cut can be implemented. In modified clear-cuts, that include multiple objectives, some larger trees may be reserved in the interest of biodiversity, wildlife habitat, or aesthetics. Clear-cutting may be the best way to promote early successional forests that are essential for numerous plant and wildlife species.

Crop Tree Selection Method

The crop tree selection method is a relatively new method that combines features of both intermediate treatments and regeneration methods. At present the crop tree selection method is being used to release trees selected for retention to meet landowner's objectives. Regeneration may become established as openings around the crop trees are created. This regeneration will be released when the crop trees are harvested in the future.

*** Adapted for Connecticut from "Best Management Practices for Pennsylvania Forests", Penn State, Shelby E. Chunko, editor.**