TIMBER HARVESTING TECHNIQUES
PART II: FINAL HARVESTS

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As discussed in "Part 1: Intermediate Harvests," I recommend that all harvesting efforts be coordinated by a written forest management plan and by employing the services of a qualified consulting forester. The forest management plan should be prepared by a competent resource professional and should be customized to meet the individual landowner's unique combination of objectives and resources. In this article, we will focus on the types of final harvests available to forest landowners.

FINAL HARVESTS

The timing and method of final harvest is arguably the most important decision that a landowner will make during the life of their forest stand. The final harvest usually yields more revenue than intermediate harvests and the type of final harvest will determine the age structure of the following stand. Foresters refer to this age structure as a silvicultural management system. Silvicultural management systems are classified as either even age or uneven age.[1]

EVEN AGE

Under the even age management system, most of the trees in the upper canopy are the same or almost the same age. Forests in Alabama tend to occur naturally in even age systems. Natural disturbances such as wildfire, windstorms, or pests will occasionally destroy all or most of the forest canopy. Trees that originate from seed, seedlings already in place, or sprouts then "battle it out" to determine which trees will

This is damage from the 2011 tornado that hit both Hackleburg and Phil Campbell. The destruction that it caused to the canopy of the forest resulted in an even age forest that was over a mile wide in some places and up to 125 miles long.

occupy the canopy of the next forest. The trees that have the best combination of genetic capability and site quality will be the ones that win this race. Trees that do not have the genetic potential to grow fast or out-compete other trees for sunlight do not survive or become suppressed. Over time, this method has the potential to improve both the quantity and quality of wood present within a forest. Forests managed under even age systems also tend to yield higher rates of return on investment than those managed as uneven aged. Therefore, most landowners in Alabama will harvest their timber in a manner that imitates these natural disturbances.

There are three types of harvesting used to establish an even age system: 1) clearcut, 2) seed tree, and 3) shelterwood.

1. Clearcut—A clearcut occurs when the entire overstory in a stand is removed in one cutting. Clearcutting is by far the most common method of final harvest used in Alabama. This method is used to produce high yielding timber stands and to create habitat for wildlife. A silvicultural clearcut occurs when all trees larger than 1 inch in diameter are removed to facilitate regeneration of the next stand. A commercial clearcut occurs when only the merchantable products are harvested. However, with improved utilization, enough trees are normally removed during most commercial clearcuts to facilitate regeneration of the next stand.

2. Seed tree—Under this type of harvest, the old stand is removed in one cutting, except for a small number of seed trees evenly distributed across the landscape. This method is most often used to regenerate Southern Yellow Pine species or other light-seeded species. Six to 10 of the best trees per acre are retained to establish seedlings and a prescribed burn is usually conducted to prepare the seedbed. Seed trees are usually retained for two to four years or until an adequate stand of seedlings is established, at which time they are removed. The advantage of this method of regeneration is that it has no direct establishment cost. However, there are indirect costs associated with the seed tree method such as the loss of seed trees to lightning and wind throw. It is also impossible to control the stocking of the seedlings that become established, and money must often be spent to conduct a pre-commercial thin to reduce the number of seedlings per acre.

3. Shelterwood—This method is like the seed tree harvest with the exception that the old stand is removed in a series of three to four cuts. While shelterwood harvests have been successfully employed in South-

This stand of 15-year-old pine in Lamar County was killed by wildfire. Forest ecologists believe that wildfire was the primary agent of change in Alabama prior to the arrival of man. Catastrophic wildfires have the ability to kill the overstory of trees and result in the establishment of an even age forest stand.

A commercial clear-cut most imitates the natural forces of change which result in even age stands. The removal of the canopy permits genetically superior trees to out-compete their less fortunate neighbors. In general, this process improves both the quantity and quality of wood over time.

ern Yellow Pine, it is most often implemented in the establishment of bottomland oaks. The U.S. Forest Service has utilized shelterwood harvests for loblolly pine establishment in Crossett, Arkansas while the Wheeler Wildlife Refuge in North Alabama has experienced success with establishing Nuttall oak using this method.

UNEVEN AGE

With this silvicultural management system, the mature timber is removed— usually the oldest or largest trees — either as single scattered individuals or in small groups. Harvests must remove trees in each diameter class in proper proportions at relatively short intervals and be repeated indefinitely. This results in the continuous establishment of reproduction, and an uneven aged stand is maintained. Landowners using this method of management should seek the assistance of a professional forester who is familiar with this technique to mark the trees to be removed and monitor the harvesting activities.

Stands managed under the uneven aged system will typically yield lower timber revenues and will incur greater costs over the life of the stand. All of this adds up to a lower rate of return on investment compared to even age management systems. If economic rate of return is not a primary objective and a landowner has access to a professional forester who is familiar with this type of management system, uneven aged stands can be established and successfully maintained in most areas of Alabama.

While attempting to establish an uneven aged stand, landowners should be cautious of the "diameter limit" method of harvest. Under this method, only trees of a predetermined size or larger are removed. According to the forest inventory conducted by the U.S. Forest Service, the amount of land classified as "hardwood" in the Tennessee Valley has increased over the past century. However, the amount of quality hardwood has decreased. While widespread uncontrolled burning of Southern forests in the first half of the 20th century may have contributed to this phenomenon, most foresters believe the primary culprit for the reduction in quality is the diameter limit harvesting method.

Until the arrival of hardwood pulpwood markets, the primary harvesting method in the Tennessee Valley was a selective harvest (diameter limit). Typically, a timber purchaser would convince the landowner

Six to ten trees per acre are retained in most seed tree harvests. The remaining overstory is removed once an adequate stand of natural regeneration has been established. The resulting stand often has too many seedlings per acre to maximize economic return on investment. Photo source: MSUCares

Pictured here is an example of the first harvest in a shelterwood system for upland oak. Eventually, all of the remaining overstory will be removed in a manner that will recruit advanced oak seedlings into the canopy. Picture provided by Dr. Callie Schweitzer, Research Forester, Southern Research Station.

to harvest the larger, "older" trees and the smaller, "younger" trees would then be free to grow and take their place. Using this rationale there would be a perpetual forest and income would be realized at regular intervals rather than once every 40 years. While this method sounds logical, it works against the forest's natural plant succession. Forests in North America tend to be even aged (recall the earlier discussion). Most of the trees that are larger are not older, they simply have a better combination of genetic capability and a quality site. Therefore, the potential for the forest to produce quality timber diminishes with time if the trees with the best genetics are removed repeatedly. This type of harvesting is known to foresters as "high-grading" and is not recommended.

FOREST VS. STAND

Forest landowners should understand the difference in the definitions of a forest and a forest stand to properly implement management activities. Merriam Webster defines a forest as "a dense growth of trees and underbrush that covers a large tract."[2] The Alabama Cooperative Extension Service defines a stand as "a group of trees or vegetation with the same structure and similar growing conditions such as age or species composition."[3] A forest is therefore made up of many stands. Landowners who practice even aged management of their stands can obtain an un-even aged forest by distributing the timing and location of their final harvests. Alabama has one of the most diverse forests in the world due to the diversity of geology, soils present, climate, and to the large number of landowners with varying objectives. About 75% of the landowners own 40 acres or less.[4] The difference in timing and types of timber harvests have created a mosaic of even aged stands which result in an uneven aged forest.

SUMMARY

Harvesting can either be applied to an existing stand or used to establish a new one. The best method and timing of harvesting is dependent upon a landowner's objectives, the resources available, and existing timber markets. By understanding the various types of harvesting, obtaining a written forest management plan, and using a qualified consulting forester, landowners are much more likely to reach their objectives.

References

1 Smith, David M. The Practice of Silviculture: 8th Edition. New York: John Wiley & Sons, 1986.

2 https://www.merriam-webster.com/dictionary/forest. Accessed on 1/17/24.

3 https://www.aces.edu/blog/topics/forestry/common-forestry-terms-for-the-forest-landowner/. Accessed on 1/17/24.

4 https://businessalabama.com/who-owns-alabamas-forests/