UT Extension

Renewable Natural Resources Timely Tips

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Thoughts on Ecological Forestry

This type of forestry generally analyzes forest resources from the standpoint of conserving natural biodiversity and ecological productivity. Ecological forestry emphasizes natural patterns and processes — understanding these, working with them and maintaining their integrity, even when it is inconvenient or financially difficult.

Natural disturbance patterns and processes show the way!

A central theme of ecological forestry is that manipulations should work within established natural disturbance patterns that occured prior to extensive human alterations. Developing native species under these circumstances and maintaining a full range of similar conditions under management offers the best assurances against loss of biodiversity.

A disturbance is any event that disrupts the ecosystem, community or population structure. It changes resources, substrate availability or the physical environment. Fires, floods, wind, insect/fungi outbreaks, ice storms and landslides would all be considered disturbances.

To describe a specific disturbance regime we measure three things:

1. Return interval: The average time between occurrences in a given stand. It is also sometimes expressed as a frequency. For instance, if a disturbance occurs once every 100 years, we say that roughly 1 percent of the area will be disturbed in any given year.

2. Severity: The intensity of the disturbance.

3. Spatial pattern: Distribution of the disturbance at various scales from the stand to the landscape.

Theoretically, a large number of disturbances could affect any stand or forest over the course of its life. When we consider the array of possibilities for a disturbance it can be overwhelming. Often, a few types of disturbances dominate the formation of a local forest. In Tennessee, fires, wind and ice storms have dominated the disturbance process of most of the state. Floods have affected forests in West Tennessee and other areas.

Increasingly, a general strategy for forest management is to follow natural disturbance processes. Although landowners will continue to tailor management to their particular objectives, disturbance concepts provide a broad template to manage forests where native species and ecological productivity are important values.

Forests and Climate Change

Regardless of the ultimate cause, it appears that our planet's climate is increasingly variable and seems to be "changing." What's a forest landowner to think?

On April 21, 2004, the US Global Change Research Program (www.usgcrp.gov), updated their national assessment of potential consequences for the U.S. Chapter 17 discusses the nation's forests.

Key findings include:

■ Forest productivity is likely to increase due to the fertilizing effects of atmospheric carbon dioxide. These effects will, however, be tempered by local environmental conditions, especially moisture stress.

■ Economic analyses indicate an overall increase in timber inventory, subject to external conditions such as urban sprawl. Increased timber inventories potentially reduce rates of return for landowners. These changes will vary by region and will also depend on international production.

■ Changes in the severity, frequency and extent of natural disturbances are possible due to future climate changes. Analyses suggest that the seasonal severity of fire hazard is likely to increase over much of the U.S., with larger increases expected in the Southeast. The interactions between climate change and droughts, floods, hurricanes, landslides, ice storms, wind storms, insects, diseases and introduced species are difficult to predict. However, changes in these disturbances and their effects are possible.

■ Analyses indicate changes in the location and area of potential habitats for many tree species and plant communities. Alpine and subalpine habitats, and the variety of species dependent on them, are likely to be greatly reduced. Potential habitats for oak/hickory and oak/pine in the East and ponderosa pine and other arid woodland communities in the West are likely to expand. How well plant and animal species adapt to, or move with changes in their habitat, will depend on their dispersal abilities and the nature of the actual disturbance. Invasive and introduced species that disperse rapidly are likely to find opportunities in newly formed habitats.

■ The effects of climate change on socioeconomic benefits obtained from forests will be influenced by future changes in human demands, as determined by human reactions to climate changes. Outdoor recreation is very likely to be altered by climate change. Warm-water fishing would increase while cold-water fishing would decrease. Summer recreation in the mountains may increase as we look for cooler environments. Skiing opportunities may decrease.

Our forests react to environmental changes — typically in predictable fashion. Astute observations will guide our appropriate response.

Let us know if we can relieve any anxiety.

Larry Tankersley, Extension Specialist
Forestry, Wildlife and Fisheries

Supplemental Planting and the Use of Advance Reproduction in Regenerating Oaks

Oak stands can be regenerated by natural means, but advance planning is usually required. When natural regeneration is anticipated, an evaluation must take place to determine regeneration potential. This evaluation should recognize that the primary sources of regeneration are sprouts and advance regeneration (natural seedlings). Advance regeneration is generally the most dependable source. Size of advance regeneration is critical to success. The most desirable seedlings for regeneration are at least 2 feet tall and preferably 4 feet, or taller, in height. If the evaluation indicates that regeneration potential is adequate, the stand can be harvested using a complete clearcut or using group selection. If regeneration potential is not adequate, steps can be taken to open up the stand and obtain advance regeneration, providing adequate seed trees are present. Injection of a midstory species may be required. The technique is a modified shelterwood method of regeneration.

Where adequate seed trees are not present, and you want to increase the oak component in the next stand, supplemental or enrichment planting can be used. Success of supplemental planting requires that high-quality, large seedlings be used. These seedlings should have a root-collar diameter of at least 3/8 inch, good development of lateral roots and a height of at least 2 feet. Supplemental planting can occur following a complete clearcut or by underplanting before the final harvest. When planting in a clearcut, the planting spots should be chosen so that the seedling will not likely be overtopped by sprout-origin seedlings of other species and will not be too close to existing seedlings of desirable species. Underplanting of oaks can be very successful, but harvesting and/or injection are required to insure enough light for growth of seedlings. Treatment may require only partial cutting of the main canopy, injection of midstory species, or both, depending on the stand and midstory density.

Wayne K. Clatterbuck, Professor
Forestry, Wildlife & Fisheries

Heating with Wood: A Wise Choice

Throughout history, wood has been an important source of fuel. Today, about half the wood harvested globally is used for heating and cooking. In the U.S., wood represents about half of our renewable-fuel usage.

Despite the fact that using wood for fuel is an old concept, heating with wood continues to have a number of advantages:

1. Established technology. Some renewable-energy technologies, such as wind turbines and solar panels, are still being developed and remain relatively expensive. By contrast, efficient, clean-burning stoves for burning wood are readily available, affordable, durable and easy to use. Wood is also very flexible. It can be stored until it is needed and can be burned (depending on the system) as firewood, chips, sawdust or pellets. Wood can be used efficiently in a small household stove or in large, industrial boilers.

2. Low cost. While coal and other fossil fuels may be cost-competitive sources of fuel for large utilities, wood is often the least-expensive option for smaller-scale users. For example, at my house in Knoxville I have a natural gas furnace. My utility charges $1.44 per therm of natural gas. The equivalent cost (per unit of usable energy) of wood is $269 per cord. I can purchase wood for less than $200 per cord, so I am saving a lot of money by heating with wood instead of natural gas! Another example, electric heat at 7.1¢ per kilowatt-hour is the equivalent of firewood at $325/cord.[1]

[1] You can do the same type of calculations using your current fuel cost by using this on-line calculator:http://www.fpl.fs.fed.us/tmu/resources/documents/fuel-value-calculator.xls

3. Environmentally friendly. Wood is a renewable, plentiful and locally available resource. In Tennessee we have more forests now that we did in the past, and tree growth outpaces harvest by about 2:1. Burning dry wood in a properly-operating stove produces very little smoke. Wood is extremely low in mercury, sulfur and heavy metals, so burning wood does not produce the acid-rain and other emissions associated with burning coal. Trees capture carbon dioxide from the air as they grow and make wood. This same carbon dioxide is released when the wood is burned. Because of this cycle, burning wood is considered to be "carbon-neutral" in terms of contributions to the greenhouse effect and global climate change. Finally, any wood species can be used for fuel. Tree form is not important. Trees that do not have value for products such as lumber can be cut and used for fuel. Removal of these trees from a stand can often be beneficial to the long-term health and productivity of the forest.

The biggest disadvantage of burning wood is that it is less convenient. If you have a natural gas furnace, you only need to adjust the thermostat. Wood must be cut, split and stored. The stove must be loaded and the ash must be disposed of.

If you want to use firewood for heating, it is important to have a good-quality stove and chimney system. This 'wood-burning system' also includes dry firewood. Dry firewood delivers more heat, because less heat is used up evaporating water. Dry wood also burns more completely, ensuring a cleaner and safer fire. Incomplete combustion of wet wood produces dirty smoke that can accumulate as creosote in the chimney. If this creosote builds up, it can eventually ignite and cause a chimney fire. Wood that is cut-to-length, split, stacked and exposed to drying breezes in the spring should be dry enough to burn the following fall. If you burn dry wood in a properly installed and well-maintained stove, it is no more dangerous that other heating systems.

Heating with wood is an established technology and can be a safe, money-saving, environmentally friendly way to heat your house. As a bonus, there is a unique feeling of satisfaction and comfort that comes from admiring a wood fire.

Adam Taylor, Extension Forest Products Specialist
Forestry, Wildlife and Fisheries

Introducing Hardwood Corridor Thinning

Throughout Tennessee there is an abundance of family-owned forests that are over-stocked and are experiencing reduced growth. These forests have the potential of producing quality hardwood timber at rates faster than current growth indicates. Often the owners of these forests desire to begin thinning their forests and even seek technical assistance for that purpose. Yet professional foresters often have difficulty with management recommendations due to a lack of product marketability, landowner objectives or financial constraints. In such cases, foresters typically recommend doing nothing and suggest re-evaluating the forest in 10 years. Although this recommendation has merit, many landowners desire revenue-generating, active forest management, and are simply not accepting of the "do nothing and wait 10 years" recommendation. They are seeking a new and innovative method that both improves the forest and provides income. A possible solution is hardwood corridor thinning (HCT).

HCT is a not a complex model to implement. Essentially one-third of the trees are removed by harvesting linear strips, or corridors. Typically the corridors are 20 feet wide, repeated on 60-foot centers. All trees within the 20-foot corridors are harvested, and 40 feet of undisturbed trees on either side of the corridors are left. The sequence is then repeated. Once the thinning is complete, the corridors are obvious when viewed linearly, but are much more discrete when they are viewed from a radial direction.

Modifications in HCT can be made to suit a variety of ownership objectives, and include:

- Along with harvesting all trees within the corridors, additional thinning (or crop tree release) can be conducted in the 40-foot retention areas, thereby more fully releasing future crop trees. This will help avoid the development of lop-sided crowns that potentially form from a one-sided release.
- Rather than aligning the corridors in a systematic, linear fashion, they can be aligned to follow elevation contours creating a more natural (or wave-like) appearance.
- The corridors can periodically be shifted to harvest around especially desirable trees, leaving them for the future.
- "Swells" within the corridors of one-half acre or more can be made to enhance wildlife nesting and other habitat needs.

HCT is an underutilized forest management practice with some uncertainties. Currently, research is lacking, but is developing in this area of hardwood management. Unsolved questions and genuine concerns exist. For instance, the propensity of the crop trees located along the corridor edge to become damaged could be problematic. Damage can result from

epicormic (undesirable) branching, wind throw or the logging operation itself. There is also uncertainty with the composition and quality of the regeneration (new seedlings) that originates within the corridors following the harvest. Another hesitation relates to the appearance and utility of a forest. For many landowners, the corridors will be considered an improvement by providing access for recreation, vistas for wildlife viewing and lanes for fire protection and hunting. Others may dislike the linear appearance.

HCT offers a means of providing a modest income in some forest stands that have been traditionally overlooked or left unmanaged. It offers a "walk lightly" approach with minimal disturbance or damage to the residual trees, enhancing conditions for wildlife and recreation, all while retaining or even enhancing aesthetic values.

David Mercker, Extension Forester
Forestry, Wildlife & Fisheries

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Extension Specialist
Forestry, Wildlife and Fisheries
(865) 974-7977

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From:

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The University of Tennessee
Institute of Agriculture
Department of Forestry, Wildlife and Fisheries
2431 Joe Johnson Drive Rm 274
Knoxville, TN 37996-4563

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