



FORESTRY, WILDLIFE & FISHERIES UPDATE NEWSLETTER

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Hardwood Analysis and Trends (HAT – September 2013)

David Mercker, Extension Specialist, Forestry

After significant increase in lumber value for most hardwood species within the region this spring, **HAT** reports that prices have stabilized. They've done so at a value that is considerably higher than the same period last year. A composite price of #1 common red oak, white oak, and poplar lumber suggests a 24.7 percent increase in value over the past 12 months. That's a remarkable surge and is very encouraging news for Tennessee woodland owners. When coupled with the upswing in residential constructions, and the inevitable use of hardwood furnishings that will complete those constructions, it suggests that prices should remain firm, at least for the short-run. There is some unease, however, that international demand (a sector that helped the US hardwood industry endure the most recent recession), is softening.

On a separate note, one of the biggest changes this year for the wood products industry is a greater awareness of and participation in certification. The F & W Forestry Report indicates

“The big companies are picking certification systems and we are finally beginning to see an impact on markets, both in terms or preference for certified wood, and in the price that we are receiving.”

MeadWestvaco and Weyerhaeuser (both global wood products companies) are now giving certified wood priority over non-certified. These companies focus primarily on softwood species. Hardwood industries have been much slower to adopt, likely due to a weaker demand. However, if some of the major national home construction firms begin incorporating certified wood into their construction projects, it could become a trend-setter that would change the model for hardwoods.

Recently the Tennessee State Legislature gave approval to allow certified wood from the three major forest certification systems in the construction of public buildings. These systems include the American Tree Farm System and the Sustainable Forestry Initiative, which were added to the previously acceptable Forest Stewardship Council. Many feel that it is only a matter of time when recognition (and use) of certified wood in private sector construction projects will increase as well. In order to become positioned to benefit from these slowly emerging markets, forward-thinking landowners might examine the advantages and disadvantages of becoming certified.

The merits of certified forests and wood have been debated for nearly three decades. This will continue. To address the subject, during 2014-15, UT Extension in partnership with the Division of Forestry, the Tennessee Forestry Association, and the Center for Forest and Wood Certification will be hosting workshops, first for foresters then for landowners. The purpose is to provide information on certification and a means for participating. Details on these workshops will follow.

Ref.: Hardwood Market Report; F & W Forestry Report, 2013.

New Boiler Requirement for Lumber Drying Operations

Adam Taylor, Associate Professor, Forest Products

On March 21, 2011, the Environmental Protection Agency (EPA) issued a new rule to reduce emissions of toxic air pollutants from existing and new industrial, commercial, and institutional boilers located at small/area source facilities. This new rule requires entities with certain types of boilers to take the actions outlined below before several deadlines in 2014.

What an “area source” boiler is

An area source facility emits or has the potential to emit less than 10 tons per year (tpy) of a single hazardous air pollutant (HAP) or less than 25 tons per year of any combination of HAPs. An example of a HAP includes mercury produced as a by-product of burning coal, oil or wood in a boiler.

Most lumber drying operations include boilers that burn wood to produce steam, heat, and/or hot water, which is then used to heat and humidify the kilns. The majority of these boilers would fall into the “area source” definition for boilers covered by this EPA rule. Natural gas boilers are exempt from this rule.



What an “area source” boiler operator needs to do

EPA is regulating area source boilers based on three components: the size of the boiler, the type of fuel burned in the boiler and whether the boiler is new or existing. These elements are defined as follows:

Boiler size

- Large area source boilers have a heat capacity equal or greater than 10 MMBtu/hr
- Small area source boilers have a heat capacity less than 10 MMBtu/hr

Type of fuel burned

Most boilers covered by this rule are non-residential coal, oil or biomass (wood-fired) boilers that existed prior June 4, 2010.

New or existing

An existing boiler commenced construction or reconstruction of the boiler on or before June 4, 2010, while a new boiler commenced construction or reconstruction of the boiler after June 4, 2010.

Once the boiler type is identified, the following actions are required:

For Existing Small Boilers (<10mmBTU/hr) using Biomass

- * [Submit an Initial Notification](#) by January 20, 2014 to Tennessee Department of Environment Conservation, Division of Air Pollution Control and Environmental Protection Agency (EPA).
- * Facilities located in Davidson, Knox, Hamilton, and Shelby Counties need to send Initial Notification to above Counties and EPA.
- * Conduct a tune-up prior to March 21, 2014 and submit a [Notification of Compliance Status for tune-up](#) by July 19, 2014 to Division of Air Pollution Control and EPA or above Counties. Please refer to [Small Entity Compliance guide, page 17, and 18](#) for tune-up criteria.
- * Tune-up every other year.
- * Prepare a Compliance Certification Report by March 1, 2015, and subsequent reports by March 1 of the year after a tune-up is completed. Keep tune-up and fuel usage records on file in the office.

Existing large boilers (>=10mmBTU/hr) using biomass:

- * Submit an Initial Notification by January 20, 2014 to Tennessee Department of Environment Conservation, Division of Air Pollution Control and EPA.
- * Facilities located in Davidson, Knox, Hamilton, and Shelby Counties need to send Initial Notification to above Counties and EPA.
- * Conduct a tune-up and energy assessment prior to March 21, 2014. Please reference (website) for tune-up criteria. For energy assessment components, please refer to [Small Entity Compliance Guide for Area Source, Page 18 and 19](#).
- * Submit a Notification of Compliance Status by July 19, 2014 for tune-up and energy assessment to Division of Air Pollution Control and EPA or above Counties.
- * Conduct a tune-up every other year and prepare Compliance Certification Report by March 1, 2015, subsequent reports by March 1 of the year after a tune-up is completed.

New Small Boilers (<10 MMBtu/hr) using Biomass

- * Submit an Initial Notification within 120 days day of start-up to Division of Air Pollution Control and EPA or above Counties
- * Tune ups every other year
- * Prepare Compliance Certification Report by March 1 of the year after a tune-up is completed

New Large Boilers (≥ 10 MMBtu/hr) using Biomass:

- * Submit an Initial Notification within 120 days of start-up to Division of Air Pollution Control and EPA
- * Facilities located in Davidson, Knox, Hamilton, and Shelby Counties need to send Initial Notification to above Counties and EPA
- * Submit Notification of Compliance within 60 days of conducting performance test for particulate matter to Division of Air Pollution Control and EPA or above Counties
- * Demonstrate Compliance with Emission limits upon start-up of the boiler
- * Prepare Compliance Certification Report by March 1 of the year after start-up, subsequent reports by March 1 of the each calendar year

Appreciating Trees

Larry Tankersley, Extension Specialist, Forestry



A tree is a large, long-lived, perennial, compartmented, woody, shedding, walling plant. Some trees get larger and live longer than any other organism on Earth. A tree is a green plant with leaves, a stem, and roots. As trees grow larger, they become mostly stems of wood and bark. As trees grow from three feet to over 65 feet, the stem increases from about 5 to 75 percent of total dry mass, foliage decrease from 60 to 5 percent, branches from 20 to 5 percent, and roots remain at about 20 percent.

Food made in the leaves is distributed roughly equally to above ground and below ground parts when a tree is small, but as a tree becomes larger, 80 percent or more of its food goes to maintain below ground roots. Many tree problems begin in the root zone. At maturity the massive stem supports the crown of branches where leaves make food to sustain life as long as sufficient water and essential elements are provided by the roots below ground. Trees are perennial and must survive from one season to the next. Trees must work hard to sustain life as they

pass from above ground activity in the summer when shoots elongate, to below ground activity in winter when roots elongate. A record of annual stem growth can be seen in tree rings; there are good years (wide rings) and poor years (narrow rings) for growth depending on stand density (in forests), climate, and nutritional factors (in the root zone).

Some trees survive, others do not. Of all the 4-inch diameter saplings in a hardwood stand, only 10 percent on average survive to become mature 16-inch trees. As the younger, smaller trees die, they decay to enrich the soil with organic matter and nutrients for the surviving trees.

Compartmentalization of decay in trees is a powerful system that protects the living parts of a tree, allowing it to survive many wounds and infectious wood pathogens. (see http://www.nrs.fs.fed.us/pubs/gtr/gtr_nrs97.pdf)

(taken from page 22, in Shortle, Walter C.; Dudzik, Kenneth R. 2012.

Wood decay in living and dead trees: A pictorial overview.

Gen. Tech Rep. NRS-97. Newtown Square, PA: U.S.

Department of Agriculture, Forest Service, Northern Research Station. 26 p.)

Managing Young Hardwood Stands for Sawlog Production

Wayne Clatterbuck, Professor, Silviculture and Forest Management

Careful management of young hardwood stands can greatly increase the future value of the stand. Often the fastest and largest trees in the stand are harvested prematurely before they reach financial maturity. The trees that remain are those that are not as valuable with inferior growth rates. Most of the wood value in hardwood stands is with trees of preferred species with better grades and greater diameters. The goal is to produce highly-valued trees that have long, straight stems without branches for the lower 30 feet of their length at maturity and are free of defects.

The process of managing young hardwood stands to maximize growth and value involves three steps: (1) selecting crop trees, (2) releasing the stand, and (3) harvesting sawlogs.

Trees selected as crop trees are those that are grown as an investment for the future. They are species of high value such as oaks, walnut, and cherry that grow on sites where the species is well-adapted. Choose crop trees of the desired species that are healthy --- free from defects and disease; tall and straight; dominant or co-dominant crown class; at least one-third of the total height of the trees is live crown; and with few small diameter or no branches on the lower portion of the stem. Reject trees that have stem defects such as seams, cracks, crooks or multiple stems; insect or disease damage; major forks; and wounds, scars, or poorly healed branch stubs. Usually 40 to 60 well-distributed trees per acre are chosen as crop trees equating to a 20- to 25-foot spacing between crop trees.

Releasing the stand is accomplished by thinnings to give selected crop trees more room to grow. Removing the inferior or undesirable trees gives the remaining trees more water, nutrients, sunlight and space. Thinnings allow larger, more valuable trees to grow to a commercial size in less time. Thinning also promotes the overall health of the stand by removing the defective, poorly-formed, and diseased trees.

Care must be taken not to thin too much. Some non-crop trees that are not interfering with the growth of selected crop trees are left to encourage the growth of tall, straight, unforked crop tree stems and to inhibit the growth of lower branches. If too many trees are removed, new branches may sprout along the stems of the remaining crop trees, reducing log grade and value. Trees removed during thinnings can often be used for firewood, pulpwood, biomass and other products. More trees than just the crop trees remain after the first thinning. These extra trees are removed in subsequent thinnings.

Depending on the quality of the site, the stocking level, and the growth and health of trees, the stand should be thinned every 15 to 20 years until the economic/financial maturity occurs. Thinning advances the continued growth of the more valuable crop trees in the stand. Financial maturity is when the expected value increase of a stand no longer exceeds the rate of return of an alternative investment. The rate of return of trees or stands of trees usually increases with improvement in tree grade, increasing diameter (and volume) growth rates, and greater merchantable heights. Once these rates of growth begin to diminish, especially below a desired rate, the stand is considered financially mature.

Stands should be harvested once they reach financial maturity if the only goals are investment and financial criteria. The length of time and the size of tree at financial maturity depend on the species of trees, site productivity, and the markets available. One aspect often overlooked before the harvest is assessing the regeneration that will compose the "new" hardwood stand. Prior to and during the harvest, steps can be taken to encourage regeneration of desired vegetation and to control unwanted species.

Once stands begin to approach financial maturity or when stands need to be thinned, contact a forestry consultant, the Tennessee Division of Forestry or your local county Extension office for assistance and information.



Light Requirements of Trees

Wayne Clatterbuck, Professor, Silviculture and Forest Management

Most trees have very specific requirements for how much sunlight or degree of shade that they are able to endure. Some trees grow well in full sunlight, while other trees do not perform as well. Some trees are more adaptable than others to varying amounts of sunlight. Recognizing the light requirements of different tree species will assist in the planning and evaluation of how trees will respond to silvicultural practices.

Shade tolerance is a comparative term used to describe a tree species' ability to become established, grow and persist under shade or low light intensity, quality (wavelengths), and duration. Tolerant trees can grow comparatively well when little light is available. Intolerant species cannot grow well in low light levels, but grow very well at light levels approaching full sunlight. Other species are more flexible and are considered more intermediate between full sunlight and more shaded conditions. In forested areas, tolerant trees reproduce and form understories beneath canopies of less tolerant trees or even beneath their own shade. Intolerant trees reproduce successfully only in the open or where large canopy gaps occur.



Knowledge of tolerance is necessary in establishing and managing trees in urban landscapes. Unfortunately, many shade-tolerant trees are planted in full sunlight conditions, increasing stress and affecting some of their physiological processes. These trees often do not adapt readily to increased light levels, usually decline and may eventually die. Dogwoods and redbud are two examples of shade-tolerant trees that are often planted in full sunlight. These trees are naturally found in the partial shade of the forest edge and interior. Shade-tolerant trees grow best in partial shade beneath larger trees or nearby structures or buildings that provide some shade during the day.

No direct measure of shade tolerance is available, since tolerance is an expression of genetic and physiological response to the environment. Shade tolerance of trees with wide, north-to-south geographic ranges, such as sugar maple and ash in the eastern U.S., differs with trees being more shade tolerant at the northern latitudes. Tolerance is not constant for a species under all circumstances. Age affects tolerance, as trees usually become more intolerant with age. Most maples, oaks and eastern white pine are more shade-tolerant when young, but become more intolerant as they mature. Tolerant species are usually more photosynthetically efficient because they are able to utilize light at lower levels than shade-intolerant trees.

The morphology and physiology of leaves and trees that are tolerant or intolerant of shade are quite different. Table 1 provides some of these attributes of trees with different shade tolerances. Table 2 presents the shade tolerance by species for many trees found in Tennessee.

Table 1. Attributes of trees with different shade tolerances.

	Shade-Intolerant	Shade-Tolerant
Leaf Morphology		
Individual Leaf Area	Low	High
Leaf Orientation	Erect	Horizontal
Leaf Thickness	High	Low
Cuticle Thickness	High	Low
Stomatal Size	Small	Large
Stomatal Density	High	Low
Leaf Physiology		
Light Saturation Rate	High	Low
Stomatal Conductivity	High	Low
Water Use Efficiency	High	Low
Crown Morphology		
Branch Orientation	Erect	Horizontal
Plant Morphology		
Allocation to Leaves	Low	High
Allocation to Roots	High	Low
Stem Taper	Low	High
Live Crown Ratio	Low	High

Table 2. Relative tolerance of trees.

Tolerance Level	Species
Tolerant	Maple, Buckeye, Hornbeam, Hackberry, Redbud, Beech, Dogwood, Persimmon, Silverbell, Holly, Magnolia, Blackgum, Sourwood, Hemlock, Basswood
Intermediate	Hickories, Hawthorns, Ash, Oaks, Baldcypress, Elm
Intolerant	Birches, Ginkgo, Honeylocust, Kentucky Coffeetree, Cherry, Black Locust, Walnut, Eastern redcedar, Sweetgum, Yellow-Poplar, Pines, Sycamore, Cottonwood, Sassafras, Willows

Managing Native Grass Forages – Picking a Site for Establishing Native Grasses

Patrick Keyser, Professor and Director, Center for Native Grasslands Management

If you are considering incorporating native warm-season grasses (NWSG) into your forage program, **now** is the time to decide where to make next spring's planting. Although NWSG will grow on almost any site where you can realistically grow and manage forages, establishment is much easier on some sites than others. In addition, by properly matching NWSG species/varieties to available sites you will be able to maximize stand productivity and longevity.



Competition control is easily the biggest challenge we have in establishing native pastures/hayfields and should be your first consideration for site selection. In order of increasing risk of weed problems (and therefore, decreasing ease of establishment), consider fields with the following history: new ground, cotton, soybeans, winter annuals, corn, hay, and pasture. Any field with appreciable amounts of bermudagrass may be an especially tough challenge for successful NWSG establishment.

The second consideration should be site quality. As is the case with all forage grasses, NWSG produce more forage on better sites. On the other hand, poorer sites (those with lower fertility) tend to have less weed pressure and typically allow for greater success in establishing NWSG.

Because of the competitive advantage that NWSG have over other common forage grasses (e.g., orchardgrass, tall fescue, hybrid bermudagrasses) on poorer, thinner soils, you may want to initially select a site where you have struggled to maintain good stands of other grasses in the past. These are often the same sites where you have lost stands following severe droughts. On the poorer sites, avoid planting eastern gamagrass and consider blends that include little bluestem, a species that does particularly well on drought-prone or low productivity soils.

On the other end of the spectrum, you may have struggled to maintain good stands of grass on wet-natured or poorly drained sites. Some NWSG produce very well on such sites, most notably lowland switchgrass (*Alamo* in TN and southward, *Kanlow* in KY and northward) and eastern gamagrass. Upland switchgrasses, big bluestem, indiagrass/little bluestem (in that order) need better drainage and are less suitable for wet sites.

Finally, you should consider management flexibility in determining where to plant NWSG. If your initial planting is fairly small and will provide only a few days of grazing per rotation, you will want easy access to an alternate summer pasture. Also, access to shade and reliable water are more critical for summer pastures and should be considered carefully. Although rotational grazing is not essential for managing NWSG, it can be the preferred approach and some consideration should be given to fencing and flexibility for implementing such a system in the future.

Taking into account potential weed problems, site quality, and management issues all will help ensure successful establishment of native grasses and will allow you to make them work more effectively for you for years to come.

Wildlife Management Calendar for September

Craig Harper, Professor, Wildlife Management

Wildlife Notes

Blackgum and sumac are turning red—fall is coming!
 Chestnut oak acorns and white oak acorns begin to fall
 Male white-tailed deer shed velvet from antlers
 Bobwhites finish nesting
 Juvenile ruffed grouse begin to disperse
 Local mourning doves migrate south later in the month
 Blue-winged teal migrate through TN
 American kestrels are migrating through TN
 Broad-winged hawk migration peaks in TN
 Night migration of passerines (various songbirds) often occurs
 Fall warbler migration peaks
 Hummingbirds begin migrating south
 Young black rat snakes have hatched and are emerging
 Southern leopard frogs may be heard this time of year
 Monarch butterflies migrate south

Habitat Management

Burn and disk old-fields and other early successional habitat

- will reduce woody encroachment by sweetgum, elms, and other undesirable woody saplings in the field
- will stimulate forb growth next spring, which will provide brooding cover for wild turkeys and bobwhites, and will improve forage availability for white-tailed deer
- may reduce grass dominance where nwsgr have become too dense
- don't be afraid to burn; prepare adequate firebreaks by disking around the perimeter of the field and burn against the wind
- Smokey Bear actually likes for you to burn – it provides him with more food!
- refer to [Chapter 6](#) in *Native Warm-Season Grasses: Identification, Establishment, and Management for Wildlife and Forage Production in the Mid-South*, PB 1752 for additional information on managing early successional habitat for wildlife

Plant firebreaks and other disked strips not left for natural vegetation

- annual cool-season grains (especially wheat) along with annual legumes (crimson and arrowleaf clover) are excellent choices
- refer to [A Guide to Successful Wildlife Food Plots](#), PB 1769 for additional planting information
-

DO NOT mow old-fields at this time of year if you are interested in wildlife using them!

- mowing does not reduce encroaching woody vegetation
- stimulates grass and leads to reduced forb cover (which means less food and cover)
- increases thatch at ground level and makes travel through the field much more difficult for wildlife
- manage and maintain old-fields by burning or disking in late March/early April or September/October (if woody encroachment is a problem); **don't mow them!**
- Refer to [Native Warm-Season Grasses: Identification, Establishment, and Management for Wildlife and Forage Production in the Mid-South](#), PB 1752, for additional information on managing early successional habitat

Spot-spray undesirable woody plants in old-fields and other early successional areas

- multiflora rose, privets, sweetgum, green ash, and *Ailanthus* are examples of undesirable woody plants in early successional areas
- Roundup, Garlon 3-A, Arsenal, Cimarron, Escort, and PastureGard should be considered
- refer to [Chapter 6](#) and [Appendix 4](#) in *Native Warm-Season Grasses: Identification, Establishment, and Management for Wildlife and Forage Production in the Mid-South*, PB 1752, for additional information

Prepare fields with tall fescue and orchardgrass to be sprayed this fall

- mow, hay, burn, or graze field now to reduce debris on field and stimulate fresh grass growth
- spray tall fescue and orchardgrass (as well as timothy, bluegrass, and bromegrasses) with a glyphosate herbicide (2 quarts/acre) in early November
- see chapter 5 in [Native Warm-Season Grasses: Identification, Establishment, and Management for Wildlife and Forage Production in the Mid-South](#), PB 1752, for additional information on eradicating perennial cool-season grasses

Prepare new cool-season plots for fall planting

- spray existing sod with glyphosate herbicide (such as Roundup—2 quarts/acre)
- amend soil according to soil test recommendations
- incorporate lime and fertilizer into root zone of plot with a disk or chisel plow

Plant cool-season food plots

- refer to [A Guide to Successful Wildlife Food Plots: Blending Science with Common Sense](#), PB 1769, for additional planting information

Mow and spray perennial forage food plots for weed control if necessary

- refer to [A Guide to Successful Wildlife Food Plots: Blending Science with Common Sense](#), PB 1769, for additional information on herbicide recommendations and managing food plots

Silage-chop or strip-mow dove fields to provide seed and hunting opportunities

- refer to [A Guide to Successful Wildlife Food Plots: Blending Science with Common Sense](#), PB 1769, for additional information on management strategies for dove fields
- be sure to take a kid dove hunting

Top-sow winter wheat on freshly disked seedbed to attract doves and provide forage for deer, wild turkeys, and other wildlife through fall and winter

Flood fields early in the month for migrating blue-winged teal and local wood ducks

Construct/repair dikes and water-control structures for flooding fields/woods in November/December

Sow winter wheat along edges of flooded fields to provide important forage for migrating Canada geese and American wigeon later this winter

Burn upland forested areas where adequate sunlight is sufficient to stimulate understory groundcover

- burning in late growing season helps reduce dominance of woody species in the understory
- encourages more herbaceous response
- burning in closed-canopy woods does little to stimulate understory; 20 – 40% sunlight entering canopy is adequate

Begin timber stand improvement work

- Sept and Oct is a great time to kill unwanted trees; herbicides applied via girdle-and-squirt or hack-and-squirt are readily transported to the root system as trees prepare for winter senescence
- stimulate growth among oaks, beech, blackgum, cherry, persimmon, and other mast producers by killing surrounding competitors
- girdle unwanted trees and spray wound with a 50% mixture of Garlon 3-A and water or a 10% solution of Arsenal AC and water; refer to herbicide labels for efficacy on various tree species

Begin watching and identifying good acorn producers

- one-third of the oak trees produce roughly 75% of all the acorns
- if you are interested in improving acorn availability in your woods, distinguishing good producers from poor producers will help you identify which trees to favor
- once acorns begin to fall, walk through the woods and mark trees with good acorn crops with aluminum tags or tree marking paint near the bottom of the tree
- continue this for at least 3 years and a pattern will begin to develop identifying those trees that do not ever produce many acorns (even in a good acorn year)
- good producers can be released by killing or removing unwanted adjacent competitors, allowing the crowns of favored trees to expand and produce more acorns

Order tree seedlings now if you intend to plant trees this fall/winter

Clean-out bluebird boxes to allow more room for roosting bluebirds when cold weather arrives

- 10 or more bluebirds may roost in a single box on cold nights

Clean-out wood duck boxes and replace old wood shavings with fresh shavings

- screech owls and squirrels may use the boxes through fall and winter
- repair/install predator shields if necessary

Wildlife Damage/Population Management

Conduct survey for white-tailed deer using infrared-triggered cameras

- one camera per 100 acres
- optimally, camera “stations” should be established in April with trace mineral salt; deer become accustomed to visiting the site through the summer
- to conduct survey, set-up cameras, bait with shelled corn and take pictures for 2 weeks
- individual bucks can be identified by antlers and other body characteristics

If bats are in your attic, don't close them up now

- young are still present
- if you close them up, they will die and produce a terrible odor
- maternal colonies will be leaving for hibernation soon

Help the cause – shoot some resident Canada geese during the September goose season!

Young black rat snakes should not be killed

- they are not venomous
- they are beneficial to have around the house and barn as they kill many rodents
- they are visible at this time of year as they have recently hatched (about 12 inches long)

Refer to [*Managing Nuisance Animals and Associated Damage Around the Home*](#), PB 1624, for additional information on wildlife damage management

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