



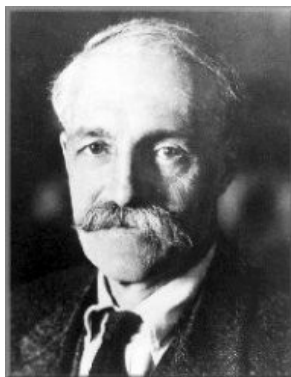
Update Newsletter

Department of Forestry, Wildlife and Fisheries
Dr. Keith Belli, Department Head

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Website: <http://fwf.ag.utk.edu>

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The Last Unfinished Business of Gifford Pinchot

- Gifford Pinchot, Forest Service Chief, 1898-1910

As the first Chief of the US Forest Service, Gifford Pinchot pioneered forest conservation in the U.S. Near the end of his life, Gifford celebrated his accomplishments creating the National Forest System and setting in motion strong State forestry agencies, but referred to private forestry as his "last unfinished business."

"Our responsibility to the Nation is to be more than careful stewards of the land, we must be constant catalysts for positive change."

Gifford Pinchot was one of America's leading advocates of environmental conservation at the turn of the twentieth century. Born into wealth and endowed with imagination and a love of nature, he shared his money, possessions and intellect to further the causes of the common good.

It was at Grey Towers, the family estate, that James Pinchot first encouraged his son to explore the profession of forestry. But such training did not yet exist in the United States, so, after graduating from Yale University in 1889, Gifford went abroad to study at L'Ecole Nationale Forestiere in Nancy, France.

When Pinchot returned home at the end of 1890, the nation was obsessed by a fury of development. The American Colossus was fiercely intent on appropriating and exploiting the "riches of the richest of all continents." With equal fervor Pinchot set to work. In the next two decades he raised forestry and conservation of all our natural

resources from an unknown experiment to a nationwide movement. He became head of the Division of Forestry in 1898 and under President Theodore Roosevelt was named Chief Forester of the redefined U.S. Forest Service. National forest management was guided by Pinchot's principle, "the greatest good of the greatest number in the long run." His magnetic personal leadership inspired and ignited the new organization.

During his government service, the number of national forests increased from 32 in 1898 to 149 in 1910 for a total of 193 million acres. Pinchot and Roosevelt together made conservation public issue and national policy. Roosevelt considered the enactment of a conservation program his greatest contribution to American domestic policy. In speaking of Gifford Pinchot's role:

". . . among the many, many public officials who under my administration rendered literally invaluable service to the people of the United States, Gifford Pinchot on the whole, stood first." ~Theodore Roosevelt

Shortly before his death, he completed a ten-year effort to write an autobiographical account of his work between 1889 and 1910 and his part in the development of forestry and conservation in the United States. *Breaking New Ground*, the title excerpted from a Roosevelt accolade, was published posthumously in 1947. Other writings that Pinchot had authored included *The Fight for Conservation*, a dozen monographs on forestry subjects, a popular book on his journey to the South Seas, and approximately 150 published articles, reports, bulletins, lectures and addresses.

On October 4, 1946, at the age of eighty-one, Gifford Pinchot died in New York City of leukemia.

"Conservation means the wise use of the earth and its resources for the lasting good of men."

"The earth and its resources belong of right to its people."

"World-wide practice of Conservation and the fair and continued access by all nations to the resources they need are the two indispensable foundations of continuous plenty and of permanent peace."

###

Forest Landowner's Association's Extension Forester of the Year

David Mercker, Extension Forester, Forest Management



A University of Tennessee Extension forester is the Forest Landowners Association's Extension Forester of the Year. The organization, which is comprised of forest landowners in 17 southern states, selected UT Extension professor Wayne Clatterbuck for the 2008 honor. The purpose of this award is to recognize an extension forester for exceptional contributions to forest landowner education, issues, and services.

The Forest Landowners Association enjoys a close working relationship, even partnership, with forestry schools and colleges across the country. The FLA magazine, *Forest Landowner*, relies heavily on their work for contributions, and membership relies just as heavily on them for guidance and advice at the local level. The Extension Forester of the Year Award allows the Forest Landowners Association to single out one individual among that group who has made great strides in the advancement of forest landowner education and outreach. Past recipients include Tim Traugott of Mississippi State

University, Debbie Gaddis of Mississippi State University, Bill Hubbard, Southern Regional Extension Forester, and Jonathan Kays of the Maryland Cooperative Extension Service.

Dr. Wayne K. Clatterbuck is a Professor in Forestry, Wildlife & Fisheries at the University of Tennessee in Knoxville. He holds an appointment with the Agricultural Extension Service. His responsibilities are in forest management education and include assistance to the county extension network in forestry, coordinator of the Tennessee Master Logger Program, forest landowner education, urban forestry, and continuing education for forestry professionals. He has been with the university since 1995.

Dr. Clatterbuck attended the University of Kentucky and earned a B.S. in Forestry with a minor in soils in 1978. After a summer internship position at the Oak Ridge National Laboratory, he attended graduate school at Mississippi State University and received a M.S. in Forestry in 1980 and a Ph.D. in Forestry with minors in Soils and Botany in 1985. His research project for his M.S. degree, sponsored by the USDA Forest Service, was the physiology of oak acorn storage and germination for nursery operations. His doctorate degree was in hardwood silviculture investigating the growth and development patterns of cherrybark oak and sweetgum in mixed stands.

Prior to his position at the university, Clatterbuck was (1) a forest consultant for a private foundation in Arkansas conducting research on management of mixed oak-pine stands (1985-1986); (2) a research forester, ecologist & wildlife biologist (interdisciplinary) with the USDA Forest Service in Sewanee, TN as the primary investigator in the development, validation, and extrapolation of a forest community classification model for the evaluation of wildlife habitat and forest management (1986-1988); (3) an instructor (temporary position for a professor on sabbatical) at the University of the South in Sewanee, TN teaching an undergraduate course and laboratory in silviculture (1993); and (4) assistant state forester for operations and planning director for the Tennessee Dept. of Agriculture, Division of Forestry where he supervised nine program and field supervisors who in turn supervise 450 employees, director of Division \$16 million budget, and planning director of Division programming (1988-1995).

Clatterbuck is responsible for the undergraduate silviculture class (FWF 312) each fall and a graduate class on Forest Growth and Development (FOR 560) taught biennially.

The primary research interest of Dr. Clatterbuck is in forest stand dynamics focusing on the ecological changes in species composition, stand structure and development during forest succession and following forest disturbance. His studies center in hardwood silviculture, particularly oak species, from obtaining regeneration to intermediate stand treatments and rehabilitating undesirable cutover stands. He directs several graduate students and presently has projects on oak regeneration alternatives, Best Management Practice (BMP) implementation, southern pine beetle and Firewise education.

Clatterbuck is the author of 20 research publications on hardwood silviculture, many other articles on the forest resources in Tennessee, and many extension articles. He gives numerous presentations on forest management to professionals and landowners annually. Clatterbuck presently serves as the chair of the Scholarship committee and is a member of the Policy committee for the Kentucky-Tennessee Society of the Society of American Foresters, the national professional forestry organization.

Wayne enjoys traveling, hiking, camping, gardening, basketball, and participates in sports activities with his family; wife Sara, son Ross and daughter Corey.

Congratulations, Dr. Clatterbuck on receiving this award. We greatly appreciate all your hard work and the efforts you consistently show forth in reaching out to others. We are proud to have you as a co-worker. Congratulations!!!

###

After the Tornado: Announcing Tax Workshops for Landowners With Damaged Timber

David Mercker, Extension Forester, Forest Management

The University of Tennessee Department of Forestry, Wildlife, and Fisheries will host three workshops addressing the basics of what forest landowners should know about tax treatment of timber casualty loss as a result of the recent tornados. Each workshop will last from 6 – 8:30 p.m. and will include a meal sponsored by the Tennessee Tree Farm Committee. Landowners, foresters, and tax accountants are encouraged to attend. There is no charge to attend, but preregistration is required. To register (and to obtain directions) contact the University of Tennessee County Extension Leader listed below.

4/21/8 – Lewis County

Hohenwald, Commercial Building, Memorial Park
Jason Morris at 931-796-3091

4/22/8 – Macon County

Lafayette, Ray Goad Building, Macon Co. Fairgrounds
Steve Walker at 615-666-3341

5/12/8 – Madison County

Jackson, UT Research and Education Center, 605 Airways Blvd.
Bill Wyatt at 731-668-8543

For more information contact David Mercker at 731-425-4703 or dcmercker@utk.edu

###

Engaging Communities in Urban Tree Risk Assessment

Joshua Idassi, TSU Extension Forestry Specialist

Tennessee State Extension, Tennessee Tech University and Hallers Landscaping prepare to engage arborists and other green industry professionals' in performing tree risk assessments in their communities. Four workshops are to be held throughout Tennessee providing hands-on training enabling green industry professionals to better assess the trees in their communities.

The initial component of this project will include purchasing the IML Resistograph package and training a core group of people who will then act as instructors in four workshops held in four Tennessee locations.

Workshop Locations:

April 18th – Nashville – TSU/AITC Bldg.

May 13th – Cookeville – South Hall/Rm 104

June 18th – Jackson – WTN Exp. Station (Rm B)

Sept. 11th – Knoxville – TUFC/ASLA pre-conference workshop/Hilton

Objectives:

Arborists and other green industry professionals will experience hands-on how to evaluate decayed wood in trees using IML Resistograph technology for essential tree assessment and increase their ability to locate and manage hazard situations in the surrounding environment.

Profile health and quality of Tennessee's Landmark & Historic Trees

Provide advanced training opportunities for Tennessee Master Gardener volunteers and Tennessee Tree Stewards (Citizen Foresters, etc.)

Provide educational internship opportunity for two college students.

Conduct survey to determine perception/perceived value of urban landscape trees.

For registration information contact:

Dr. Joshua Idassi, TSU Extension Forestry Specialist at (615) 963-5616 or jidassi@tnstate.edu Or

Karla Kean, TSU Extension Agent-Montgomery County at 931-648-5725 or kkean@utk.edu

###

Habitat Management

Finish burning woods and old-fields to enhance conditions for wildlife

- secure burning permit and develop burning plan with Tennessee Division of Forestry
- make sure firebreaks are in place
- get help from experienced personnel if you don't have experience burning
- burning fields is **much** more beneficial for wildlife than mowing!
- refer to Chapter 6 in *Native Warm-Season Grasses: Identification, Establishment, and Management for Wildlife and Forage Production in the Mid-South*, PB 1752, http://www.utextension.utk.edu/publications/pbfiles/PB1752_C6.pdf, for additional information on managing early successional habitats

If you won't burn fields, now is the time to mow – just before spring green-up

- for best results for wildlife, disk the area after mowing to facilitate litter decomposition, improve travel for small wildlife and stimulate the seedbank

Spray tall fescue, orchardgrass, and other perennial cool-season grasses

- spray a glyphosate herbicide @ 2 quarts per acre (with surfactant) when grass is 8 – 10 inches tall and actively growing in late March/early April (just prior to warm-season plants germinating or sprouting)
- after grass is killed, burn the field (if needed), then disk to stimulate the seedbank
- when disking in the spring, a preemergence application of imazapic (6 – 10 ounces of Plateau) may be necessary after disking to control johnsongrass, crabgrass, broadleaf signalgrass, and other undesirables germinating in late spring
- eradicating these undesirable grasses will enable the seedbank to germinate and provide better quality forage and cover for wildlife that need early successional habitat

Disk strips around field edges to encourage early successional growth

- disk strips 2 tractor-widths wide (12 – 15 feet)
- can be used as firebreaks

Plant firebreaks and other disked strips not left for natural vegetation

- iron-clay cowpeas, re-seeding soybeans, milo, Egyptian wheat, and various millets provide forage and seed
- for a variety of wildlife species, see *Growing and Managing Successful Food Plots for Wildlife in the Mid-South*, PB 1743, <http://www.utextension.utk.edu/publications/pbfiles/PB1743.pdf>, for seeding rates and additional information

Finish fertilizing trees/shrubs for increased soft mast production

- this is for trees out in the open, not those in woods
- fertilizing oaks in woods is a waste of time and money; to increase mast potential for trees in the woods, timber stand improvement practices are needed

Finish erecting boxes for bluebirds

- bluebird boxes should be no closer than 80 yards apart
- up to 9 or more bluebirds may roost in a single box on cold nights

Build brushpiles along or in old-fields that already provide good cover

- put large stems on bottom, small stems on top
- building brushpiles along a woods edge adjacent to a tall fescue pasture or hayfield may do more damage than good because all rabbits present will then be isolated for predation

Spray perennial forage food plots for weed control if necessary

- see *Growing and Managing Successful Food Plots for Wildlife in the Mid-South*, PB 1743, for recommendations

Plant warm-season food plots

- see *Growing and Managing Successful Food Plots for Wildlife in the Mid-South*, PB 1743, for seeding rates and additional information

Plant native warm-season grasses and associated forbs

- non-native cool-season grasses (such as tall fescue, orchardgrass, and bromegrasses) should have been killed last fall before planting!
- spraying cool-season grasses in spring before planting nwsgr often does not eradicate the csg
- use preemergence herbicides when planting native grasses
- plant before early June
- plant bluestems, indiagrass, switchgrass, and sideoats grama seed **no deeper** than ¼ inch; eastern gamagrass approximately 1 inch
- **be patient!**
- refer to *Native Warm-Season Grasses: Identification, Establishment, and Management for Wildlife and Forage Production in the Mid-South*, PB 1752, http://www.utextension.utk.edu/publications/pbfiles/PB1752_C5.pdf, for additional information

Conduct drumming counts for grouse in mid-April

Collect soil test samples from plots to be planted this fall and lime now as needed

- applications of lime require about 6 months before full effect on pH is realized

Establish salt/mineral licks for white-tailed deer

- best if offered in a metal-lined trough that can be cleaned occasionally with bleach/water solution

Wildlife Damage/Population Management

Leave **young wildlife** alone

- let nature take its course; you'll do more harm than good by trying to save "orphans"
- young birds "fall" out of the nest as they learn to fly
- fawns remain bedded in seclusion throughout the day for the first few weeks of life

Check for openings in the attic as nesting season approaches

- helps keep **bats and squirrels** from getting into places where they are not welcome

Close all entrances to crawl spaces and other areas where **skunks** are not wanted

- most skunks are born in May
- females are choosing sites to give birth now

Set traps correctly to catch **moles!**

- make sure runway (tunnel) is active before setting traps
- excavate 6-inch by 6-inch square exposing runway and determine exact depth of runway
- replace dirt firmly, but not compacted
- set trap at exact depth so mole will be caught

Put up chicken-wire fence 2 feet high around vegetable gardens to protect them from **rabbits**

Put up a 2- or 3-strand electric fence

- one strand 6 inches above ground and the other 6 inches higher, to keep **groundhogs and raccoons** out of vegetable gardens

Erect a single-strand electric fence (2 ½ feet above ground) with aluminum tabs attached every 3 – 5 feet to repel **deer** from vegetable gardens

- smear peanut butter on the aluminum tabs
- deer are attracted to peanut butter; when they touch the aluminum tabs with their mouths, they learn to stay away
- Plant “alternative” forages for wildlife on the outside of fencing around a garden to satiate the appetite of deer, groundhogs, and rabbits, further helping to keep them out of the garden
- refer to *Growing and Managing Successful Food Plots for Wildlife in the Mid-South*, PB 1743, for seeding rates and additional information

Snakes are beginning appear with warmer days

- clean-up around the house (mow, remove piles of wood, brush, and trash) to repel snakes
- there is no reliable “repellent” for snakes; only “snake oil”

Refer to *Managing Nuisance Animals and Associated Damage Around the Home*, PB 1624, <http://www.utextension.utk.edu/publications/pbfiles/pb1624.pdf>, for additional wildlife damage management information

For more information contact: *Craig Harper @ 865-974-7346 or charper@utk.edu.*

###

Fertilize Farm Ponds to Increase Fish Production

reprint – Thomas K. Hill, Professor Emeritus, Fisheries Management

Farm Pond Fertilization is a key factor and one of the best management tools available to increase fish production. Where balanced populations of largemouth bass and bluegill exist, a well-executed fertilization program can result in 175-200 pounds of harvestable fish per acre. Unfertilized ponds rarely produce more than 50 pounds per acre of harvestable sized fish.

It is time to start fertilizing when pond waters stabilize above 60 degrees F in the spring. Apply 100 pounds per surface acre of 8-8-2 or 40 pounds of 20-20-5 every two weeks until a good green plankton bloom develops. Liquid pond fertilizer usually available as 10-34-0 also works well. When a white object can be seen 18 inches beneath the surface, another application of fertilizer should be made. Check with your fertilizer supplier for a time-release pond fertilizer. This formulation packaged as 10-50-0, is designed to make pond fertilization easier on you because it is applied usually only once per season.

Fertilize as often as necessary to maintain the proper color of water. Generally, ponds will need to be fertilized seven to 10 times each year with either granular or liquid formulations. Stop fertilizing in October when the water cools, but renew the practice each spring. Haphazard and intermittent fertilization often results in a stunted fish population.

Where a pond has been properly fertilized for at least five years, phosphate fertilizer alone often provides satisfactory results.

Nitrogen fixing bacteria and decomposition of organic materials on the bottom of such ponds may supply enough nitrogen. Either super-phosphate (20 percent) applied at 40 pounds per acre or triple super-phosphate (46 percent) at 18 pounds per acre will supply the needed phosphate nutrients at costs reductions of 50-60 percent.

###

Enteric Septicemia of Catfish- Typically Peaks April Through May

Thomas K. Hill, Professor Emeritus, Fisheries Management

Enteric septicemia of catfish seems to be their most common disease. The bacteria enter through the nares (nostrils) and enter the brain. They stay there dormant for a period of time, begin to multiply and then spread through the body. Symptoms may look like other bacterial infections. Bleeding under the skin on the belly, popeye condition, depigmented areas which may look like an ich infestation, and lesions that appear first as blisters develop into open ulcers. Typically, some catfish will exhibit the characteristic “hole-in-the-head” symptom that is easily observed.

There are typically two peaks for “ESC” each year, April through May and September through October. These are the time of year when pond water temperatures will be 71-82 degrees F. Be on the alert to any behavioral or appearance changes in your fish!!

Treatment are feeds containing either Terramycin for 10 days or Romet® for five days. Resistance to either of these drugs has not been reported. Some success with control has been attained by withholding feed altogether for a few days before offering the medicated feed.

###

Home-Grown Channel Catfish in Cages

Thomas K. Hill, Professor Emeritus, Fisheries Management

For Tennessee families who have access to a pond or lake, growing channel catfish in suspended cages during the summer months can provide fresh fish and stretch food budgets. Catfish have been grown successfully in cages made of nylon netting, plastic-coated wire and molded plastic mesh. The mesh openings should be at least one-half inch to allow adequate water exchange.

Either a rectangular cage 4 feet x 3 feet x 3 feet deep or a cylindrical one 4 feet high x 4 feet diameter makes a nice family size cage. Cages like these are capable of holding 400 to 500 Channel catfish. When 6-inch fingerlings are stocked in early April and fed a quality 28-32 percent protein catfish cage feed until mid-October, the fish will grow to an average weight of 16 ounces.

Cages may be either floated or fastened to a dock. They should be at least 1 foot off the bottom and located so water can circulate freely to carry metabolic wastes away from the catfish.

The fish will require once a day feeding, and early morning feeding may have some advantages. For instance, the fish will have all day to digest and assimilate the food while dissolved oxygen in the water is highest. They will consume an amount of feed equal to about 3 percent of their body weight daily.

###

Fisheries Questions: Who You Gonna' Call?

1. First contact is with your U.T. County Extension agent.
Find the county agent - go to - <http://www.utextension.utk.edu/offices/default.asp>
You can also research your questions from the following website and then call your agent with a more informed question. www.msstate.edu/dept/dept/srac
2. County agent will contact the Regional Fisheries Agent (if further assistance is needed).
3. If County agent cannot be contacted and you have an emergency you may contact the Regional Fisheries Agent directly.

FISHERIES AGENTS - "FIRST RESPONDERS"

WESTERN DISTRICT **Ronald E. Blair, Extension Agent and County Director**
Henderson County Extension Office
P. O. Box 159
Lexington, TN 38351
Telephone: 731 - 968-5266
E-mail: rblair3@utk.edu

CENTRAL DISTRICT **Creig Kimbro,**
Grundy County Extension Office
P.O.Box 338
Coalmont, TN 37313-0338
Telephone: 931-592-3971
E-mail: ckimbrow@utk.edu

EASTERN DISTRICT **Kelli Amonett, Extension Agent and County Director**
Morgan County Extension Office
P. O. Box 325
Wartburg, TN 37887-0325
Telephone: 423- 346-3000
E-mail: damonet1@utk.edu

###

What is a Healthy Forest?

Larry Tankersley, Extension Forester

This is a fun/difficult question with as many definitions from utilitarian to ecosystem perspectives. Consider this list from *Forest Health and Protection* by Robert Edmonds et al. 2000, McGraw-Hill Series in Forest Resources.

- > A condition where abiotic and biotic influences do not threaten current or future management objectives,
- > A fully functioning community of plants and animals and their physical environment,
- > An ecosystem in balance,
- > A condition of forest ecosystems that sustains their complexity while providing for human needs.
- > A healthy forest is resilient to changes.
- > The ability of forest ecosystems to bounce back after being stressed.
- > The ability of a forest to recover from natural and human stressors.
- > A healthy ecosystem should be free from "distress syndrome," where this syndrome is characterized by reduced primary productivity, loss of nutrient capital, loss of biodiversity, increased fluctuations in key populations, degradation of biotic structure and widespread incidence and severity of insect and disease outbreaks.

You can see the range of definitions for Forest Health, pretty exciting! Pick one and talk among yourselves.

For more information contact Larry Tankersley at 865-973-7346 or ltanker1@utk.edu

###

Larry Tankersley, Extension Forester

You need enough to:

- > surface, discuss, and confirm what you want from your forest land,
- > know the capabilities of your land,
- > encourage you to think long-term when you act,
- > help decide how to accomplish what you want,
- > understand “trade-offs” between conflicting desires,
- > efficiently and effectively schedule what needs to be done,
- > use as a basis for marketing decisions.

Planning is fundamentally three sequentially linked activities. First is *collection and analysis* of information about conditions and opportunities to change or improve the use of your forest. Second is the *decision-making* phase where we decide which alternative for managing our land to use and implement on the ground. The third phase actually becomes the “plan”— *a schedule of what kind, when and where activities will take place on the ground* to create the conditions and outcomes we want.

Forests are unique enterprises. Compared to business, agriculture and human life spans, forests take a long time to grow and develop. We need to make sure that we have(or plant) species that will be desired by future timber markets and/or are useful for wildlife for the decades to come. While changes in a forest may be slow, we do need a plan to monitor our forests should problems or opportunities emerge that need timely attention.

A plan documents your goals and aspirations, current conditions in your forest, including road development, schedules for regular and periodic activities and provides for the general operation of forest business for fun and profit.

There are many specific and practical reasons to plan and their importance varies with the forest owner and the forest’s size, conditions and location. Consider your forest management plans today!

(Adapted from, *Forest Management, 4th edition*, 2001, Lawrence S. Davis et. al., McGraw-Hill series in Forest Resources)

Trees Survive With Defensive Dieback

Larry Tankersley, Extension Specialist, Forest Management

Trees in Tennessee have been stressed by heat and drought for the last couple of years. To sustain some life trees and other woody plants reduce the number of parts that must be maintained i.e. fed and defended. Often this allows the tree to survive albeit with a reduced size.

Across the Tennessee’s landscape, around our houses and in town, we see the trees reacting to the last few years of drought. Meteorologists tell us that we are several inches below averages for our part of the country. The result is reduced photosynthesis by our abundant green landscape. With reduced photosynthesis trees cannot add new growth effectively. Prolonged stress makes it difficult to maintain all of the existing tree. If there is not enough water there is limited food to supply the whole tree. Starch reserves in twigs and branches are used when energy from photosynthesis is reduced. Spent twigs and rootlets die back. This “defensive dieback” extends the life of the tree by allowing the tree to survive on dwindling energy reserves. When conditions return to normal, trees can return to their normal metabolism and resume growing. With time they might ultimately become larger than they were prior to the drought. Defensive dieback is how many trees survive.

When conditions continue and/or worsen stressed trees will continue to use food reserves resulting in more die back.. When up to 60% of the crown has died back often the tree will feather out i.e. buds along large branches and the trunk will produce numerous small twigs along their length. These trees can survive but will be grossly misshapen. Typically the tree dies of starvation.

In a forest, defensive dieback is tree death. As we move from one tree to thousands, water is limited across the landscape. Seemingly random tree death across this landscape is how a forest survives drought. Insects and diseases are opportunistic attacking stressed trees assist/hasten this dieback.

Trees and forests have evolved effective mechanisms to survive changing weather patterns during their lives. Dieback and tree death are normal processes that make trees and forests fascinating to watch and appreciate.

Watering your trees when it is dry continues to be the best thing you can do to prevent stress to your trees. In the forest, anticipating and removing the trees likely to die and or competing with our favorites is recommended.

For more information contact Larry Tankersley at 865-973-7346 or ltanker1@utk.edu

Light Requirements of Trees

Wayne K. Clatterbuck, *Forest Management and Silviculture*

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

For more information contact Wayne Clatterbuck at 865-974-7346 or wclatterbuck@utk.edu

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Forest Stewardship for Youth

Lesson Plan - reprint from Penn State Cooperative Extension (submitted by Mirian Wright, FWF Secretary)

Stewardship means being responsible for something and taking good care of it such as protecting your belongings and using them carefully without harming or wasting them. So whether we use a forest for hiking, hunting, or getting wood, we need to be good forest "stewards" so that the other people can use the forest today, tomorrow, and for many years to come. *"What can you do to keep the forest healthy and useful?"*

Even though you may not own a forest, you can still be a forest steward. You are a forest steward when you choose to use products from renewable resources (e.g., trees). You are a forest steward when you recycle wood and paper products. You are a forest steward when you keep the forest beautiful by not littering. You are a forest steward when you don't hurt plants and trees (without good reason).

Many people think that a forest is just a piece of land covered with trees, but a forest is more than just trees. A forest has many parts, and each part is important! *Soil* is the foundation of life in the forest. It holds *nutrients* and *water*. Add some *sunshine* and you can grow *plants*, like grasses, weeds, bushes and trees! *Wildlife* needs these plants to have places to live and things to eat. Finally *decomposers* break down dead plants and animals in the forest. Over time, decomposed plants and animals become part of the soil, and the circle is complete! The parts of a forest join together to make for a smooth-running system. A forest needs all its parts to work right.

Forests provide us with many things we often don't think of, such as clean air and water, and beautiful places to camp, fish, hunt, hike, or just relax.

Someday, you might have a forest of your own. You will be a forest steward when you plan for and choose to do the things in your forest that keep it healthy and useful for plants, wildlife, and people. Take time to learn about forests and wildlife in your area. Seek others who can help you understand the value of being a forest steward such as county extension agents, forest resource professionals and wildlife biologists.

*Use this text to fuel a discussion on forest stewardship. It was taken directly from **From the Woods: Forest Stewardship** (Penn State Cooperative Extension, Adam K. Downing, Sanford S. Smith, James C. Finley, and Shelby E. Chunko).*

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Durability of Wood Plastic Composites

Adam Taylor, Assistant Professor, Wood Products Specialist

Wood-plastic composites (WPCs) are a combination of wood flour (or other natural materials such as rice husks) and plastic shaped into decking lumber. WPCs are a relatively new product and are often better known by their various brand names – eg. Trex, ChoiceDek, Eon or SmartDeck – or as “composite lumber.” WPCs can be manufactured in a variety of colors, shapes and sizes, and with different surface textures. Lumber made entirely from plastic with no wood flour added – “plastic lumber” – is also available.

WPCs are expensive compared to solid wood options but they do not require painting or other finishes, nor will they warp or rot like wood does. However, WPCs are not maintenance-free and they can be degraded in outdoor environments. The wood in the WPCs can still be attacked by rot and mold fungi, and sunlight can discolor and break down the plastic component.



No material is totally maintenance-free. This railing is made from pure plastic; however mold and lichen can still grow on the surface. Periodic cleaning is required to prevent the growth of microorganisms.

The wood in WPCs is normally used only as a low-cost, light-weight filler. As such, the inherent properties of the wood are not important. However, recent research at the UT Forest Products Center has shown that by using wood species with natural resistance to insects and fungi in WPCs, the durability of the composite can be improved. This result suggests that by taking advantage of the wood’s properties, better WPCs are possible.

WPC is a relatively new product and comes in many formulations; thus its potential durability is not well understood. New WPC products in the future may provide even better performance.

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Hardwood Analysis and Trends (HAT) – March 2008

David Mercker, Extension Forester, Forest Management

HAT tracks #1 common 4/4 lumber. This is “average” quality lumber that measures one inch thick. Further this is lumber, not logs, nor standing trees. The direction of lumber price normally precedes the direction of log and standing tree price. Disappointingly, lumber prices have not improved over the course of the past few months. Already in 2008, the following changes have occurred in the species tracked by HAT: black cherry (- 9%); sugar maple, yellow poplar, black walnut, and hickory (all -3%); red and white oak, ash and soft maple (no change).

Presently there are a number of concerns for the hardwood industry. But these are mainly related to the lack of demand. And demand will again return. Rather than focus on such concerns, with this issue, HAT will highlight some upbeats. Consider the following:

1. Over a 49-year span beginning in 2002, the volume of US hardwood growing stocks have increased 98 percent and this after losses from fire, losses from mortality and urban sprawl, and after supplying wood for the world’s use! **Is there any other natural resource that has enjoyed a net increase of 98 percent in the last 49 years?** Good news is that supply is NOT an issue; we have championed the science of growing trees.
2. Consumption of rail ties is near record level. This provides much needed market for low-quality hardwood trees - trees that otherwise might remain in the woods. Lately military spending has driven the tie market.
3. US forest lands are primarily owned by private families rather than controlled by governments. This is largely unique to the world.
4. The US dollar value is trending downward, and this should spur exports.
5. Emerging trends in biofuels, biomass, carbon sequestration, and ecosystem services could all bring opportunities for landowners and the industry.
6. A well-developed infrastructure, highly educated professional foresters, savvy landowners, and strong conservation ethic will continue to position the US favorably in the world timber market.

Landowners should seek the assistance of professional foresters, have a management plan developed that reflects their ownership objectives, consider forest certification where economical, and participate in county forestry association educational programs to stay in sync with current events. Trees are remarkably renewable, and will continue to provide the products and services needed in the coming centuries.

Summarized with permission of the Hardwood Market Report, Memphis, TN.

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