

# Alabama's **TREASURED** Forests



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**Hardwood Issue**



# STATE FORESTER'S MESSAGE

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by C. W. MOODY

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**T**his issue of *Alabama's TREASURED Forests* highlights hardwood management, an area often overshadowed by softwood, or pine, production. However, the importance of hardwoods to our state is extremely great, not only in terms of the raw materials supplied to the forest industry, but also the many other benefits derived from them. Wildlife, cleaner water, and even the paper on which this magazine is printed are just a few of these benefits.

As managers of our forest resource, both hardwoods and softwood, you need to be aware of several proposed federal tax simplifications which would eliminate capital gains treatment for timber income and require the capitalization of costs associated with timber growing. This causes us great concern because timber and other forest products support Alabama's number one manufacturing industry.

One of the points used to encourage landowners to invest in forestry has been capital gains treatment for timber income. An "implied" contract exists with those who have already made such investments in timber stands which not only accrue to their benefit, but to the benefit of everyone in this state and throughout the nation. I feel strongly that this tax incentive is an investment in our future timber products base, wealth base, employment base, and *not* a subsidy to wealthy people as some would imply.

I alert you to this proposal so that you might consider whether to contact your Congressman and Senators Denton and Heflin to communicate your feelings. If you believe, as I do, that these incentives benefit many people through investments in our wealth base, you *should* contact those noted above and urge them to reject any portions of any tax simplification program which would eliminate treatment of timber income as capital gains and require the capitalization of ordinary expenses relating to growing timber.

Sincerely,

A handwritten signature in cursive script that reads "C. W. Moody". The signature is written in dark ink and is positioned below the typed name "C. W. Moody".



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The Alabama Forestry Commission supports the Alabama Forestry Planning Committee's TREASURE Forest Program. This magazine is intended to further encourage participation in and acceptance of this program by landowners in the state. Any of the agencies listed above may be contacted for further information about the TREASURE Forest program.

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Cover Photo: Alabama's hardwoods transform an average drive into a scenic excursion.

# Alabama's TREASURED Forests

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# Nature Strikes



*Even an artist's brush could never completely capture the splendor on the Ragan Farm*

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by CYNTHIA K. PAGE, Editor

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**T**HIRTY YEAR OLD natural pines stretching toward the sky extend a warm welcome to visitors at the Ragan farm in Houston County. Standing straight and rigid they almost appear to guard the rest of the natural beauty of this wiregrass country which grows some of the finest timber in the state.

These trees aren't being managed for

monetary gain, though. Gene and Marilyn Ragan have a different TREASURE, one that's meant purely for its beauty, recreation, and environmental preservation!

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#### **TREASURE a Matter of Opinion**

TREASURE Forest is not typical of many government programs which often

mandate certain practices to qualify. This program allows the landowner to choose his own objectives. What TREASURE doesn't do is allow other aspects of forest management to be neglected or for practices to be introduced which would have adverse effects on other resource values.

When the Ragans first moved to the 153-acre homesite, about the only view



# A Pretty Pose

surrounding them was pasture with natural scattered trees. A small trailer housed the four member family on weekends while they started to work on the house.

Marilyn reflects, "I'm a city girl, but I always loved the beauty of the country. I decided that since the house wasn't in the woods, I'd just have to bring the woods to the house." She did indeed!

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## The Beauty of It All

Keeping in mind their primary objectives of aesthetics and environmental enhancement, Marilyn gradually transplanted trees from the nearby woods in the yard. Poplar, dogwood, hickory, magnolia, sweetgum, water oak, and several other varieties now beautifully landscape the sloping homesite. Spring and fall colors are spectacular!

Of course, the natural pine stand leading into the property contributes to the beauty all year, but their appearance, too, required some work! Even though the Ragans never plan to cut timber for income, they do cut for the sake of good management. A sprayer which attaches to their tractor is used to spray lindane for insect control, but once diseased or insect infested trees are discovered, they are promptly cut, piled and burned. Additionally, the pines have been thinned to permit maximum growth of the higher quality trees.

A few snags have been left randomly to provide shelter for squirrels, woodpeckers, and other birds. Cattle, too, benefit from grazing the bahai cover under the pines.

Fire has not been a problem in the timber stand. If a fire should start, however, a fire flap is always handy. A winding road and creeks provide a natural fire lane so wildfire damage can be kept at a minimum.

Besides the trees, other plants were carefully selected and placed around the home-site and ponds. Flowers of all sorts—begonias, impatiens, geraniums, amarillas, tulips, along with many ornamentals—add color to the already attractive setting. Marilyn studied plant encyclopedias to dis-

cover what would grow best and any other benefits which the plants could provide, especially to the wildlife.

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## A Wildlife Refuge

"Oh, we could never shoot anything," says Gene. "Every living thing is highly valued here, and we want the birds and animals to have a place where they feel safe. We aren't opposed to the hunting that goes on all around us, but once the animal is on our property, he has a safe refuge."

A hardwood bottom farther beyond the homesite provides mast and shelter for the wild animals. A winding stream sparkles with unusual clarity not only because of the management of the watershed itself, but also because the Ragans have taken steps to ensure soil and water conservation. Pastures with standing water were drained by ditches, gullies were filled, and dams on the pond were seeded. Field borders not only help to prevent runoff, but also provide excellent nesting areas for birds.

As previously stated, many of the trees and plants were chosen for their contribution to wildlife. Mahonian grapes, acorns from oaks, blueberries, scuppernongs, and others are within easy access. Fox squirrels, geese, ducks, dove, quail, rabbits, and birds of all kinds enjoy the Ragan hospitality. "Even snakes, except poisonous ones," says Gene, "are relatively safe here."

Of course, we couldn't talk about the



wildlife without mentioning the babies! One could hardly call an eight to ten pound catfish "baby" but that's how Marilyn refers to them. The Soil Conservation Service assisted the Ragans in building a second pond below one which was already on the property. Stocked with white amur, catfish, bream, and bass, the ponds significantly add to the attractiveness of the surroundings. Canadian geese, mallards, Chinese geese, and ducks float peacefully atop the glassy surfaces. The catfish swim right up to the bank to be fed!

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## A Time to Every Purpose

"Many people tell us, 'If I had this, I'd just relax and enjoy it,' but what they don't understand is that it takes continuous work to keep it attractive," says Marilyn. Gene credits his wife with the determination and hard work required to maintain the grounds. "She's always got something to do outside," he says. Their 23 year old son, Middleton, helps with all the mowing, but Marilyn is the one who does the planning and planting.

Inspired by her mother, father, grandmother, and aunt—all with green thumbs—she works by an annual plan. All trees and shrubs are planted in December and January. With the first signs of spring, bulbs and other bedding plants are put into the ground. Clean-up, pruning, mulching, fertilizing, and weeding demand a lot of energy. In the summer, weeding is still a major issue, along with watering, fertilizing, mowing, and spraying the trees and flowers for insects. Then, of course, there's freezing and canning of fruits and vegetables. Fall sees a continuation of routine practices as well as planting Dutch bulbs.

Is there time to enjoy it? "Sometimes late in the afternoon we sit out on the picnic table under the trees, and relax in the peacefulness and the beauty. We get a lot of pleasure out of our friends and relatives enjoying it, too. But our real pleasure," says Marilyn and Gene, "is that we do it together. This is *our* TREASURE." ♣



# LET'S GET STARTED! Hardwood Regeneration

by TOM CAMBRE, Hardwood Specialist, Alabama Forestry Commission, Dadeville, Alabama

*Paper presented at Wood Energy Conference—A Forest Management Tool for Small Landowners, Rome, Georgia, May 18-20, 1982.*

SEVERAL OPTIONS ARE AVAILABLE to the landowner or manager when regenerating hardwoods. The regeneration method used usually will depend upon the management system used: uneven-aged or even-aged.

## UNEVEN-AGED SYSTEM

Uneven-aged management may be accomplished using the following methods.

### Diameter-Limit Method

This method is, in almost all cases in the South, the least desirable. Trees are selected for cutting by the diameter limit method, for example, "cut everything above a 14-inch stump," or the buyer or logging contractor is allowed to select the trees. When this method of cutting is used, the resulting regeneration is usually composed of slower growing, shade-tolerant species. In addition, the smaller stems (under 14-inch stumps) are looked upon by the landowner as desirable for the new stand. This is not the case, however, even though they may be of a desirable species. Hardwoods naturally occur in even-aged groups where openings in the forest canopy are large enough to permit establishment. Trees left after a diameter limit cut are often the same age as the larger, neighboring stems that were cut. Therefore, these smaller stems have been suppressed and will not respond to release satisfactorily unless they are a shade-tolerant species. In addition, having been suppressed by the previous crop trees, they tend to be more susceptible to insect and disease attack and thereby produce a lower grade of timber. Each successive cut will consist of a lower grade product and lower per acre volume. In many cases, the only reason markets are available for this material is because of improved utilization techniques.

### Single-Tree Selection System

This system is often recommended for landowners who have small tracts because it is believed the income from these smaller

tracts should be spread out over a longer period. There could be some merit in this belief; however, removal of single trees has not proved to be an effective way to regenerate the hardwoods of the South. Openings created in the forest canopy by the removal of single trees are not large enough to allow efficient use of the site. The system fails to provide for quick, orderly removal of overhead competition and allows development of shade-tolerant species, many of which are not desirable.

## EVEN-AGED REGENERATION SYSTEM

Five choices exist for even-aged management of hardwoods.

### Artificial Regeneration

Artificial regeneration is one method in which the landowner or manager must be totally committed. Too many hardwood stands in the South reflect half-hearted attempts at plantation establishment. These stands did not result from the planted seedlings in many cases, but from uncontrolled natural regeneration that took the site. This is especially true of the thousands of acres of yellow-poplar that have been planted across the South in the past.

The first step in plantation establishment should be to determine site suitability for the species to be planted. Two good references are Broadfoot's research paper and the report by Baker and Broadfoot. Today, hardwood plantation establishment cost can average \$300 per acre. A reasonable amount of time and money invested in matching sites with the species to be planted can avoid costly failures.

The second step is site preparation. All salable sawlogs, pulpwood, and other products such as energy wood (if a market exists), must be removed. It is necessary to time the completion of the harvest so that site preparation can be finished during the summer and fall prior to planting. Many hardwood sites in the large flood plains of the South are too wet to prepare during the winter. All standing trees and stumps should be sheared at, or slightly below, the ground line. In addition, the site must be root raked, the

debris piled and burned, and disked with a heavy bush and bog site preparation disk. If this work is completed early during the summer, it is important to disk again to prevent development of a grass sod on the site.

Where old crop fields or pastures are to be planted, sub-soiling is generally necessary to break up the established pan. Pastures should be deeply plowed to break up the sod. In general, the higher the degree of site preparation, the less expensive the planting and cultivation cost will be.

Planting can begin as soon as the seedlings are fully dormant and can be lifted. The seedlings, after lifting from the nursery, should be graded and only those that are 24 inches and taller with a minimum root collar diameter of three-eighths inch planted. Prior to planting it is very important to keep the seedlings in a cool, moist environment and to protect them from freezing. Seedlings should be planted to the original root collar depth. Cottonwood cuttings should be 20 inches long and planted, big end down, with 2 inches left above the soil surface.

Spacing recommendations vary with the species involved and products to be grown. In any case, sufficient space must be provided to allow cross cultivation. Most hardwood plantations are 10 × 10 feet or 12 × 12 feet with combinations of the two.

Cultivation requirements will vary from two to five times per year for a minimum of two years. Cottonwood, sycamore, green ash, and willow, for example, begin height growth almost immediately after planting. Oaks usually begin height growth in the second and sometimes the third year after planting and may require cultivation for three to four years.

Young hardwood plantations must be protected from livestock grazing and overstocked deer herds. Fencing will exclude cattle, but deer can be a problem. One solution is the brush fence. If the site was forested prior to planting, a brush fence can be constructed by bulldozing the last 50 yards or so of logging debris into a giant windrow around the perimeter of the plantation. The windrow should be approximately 10 to 12 feet high and 20 feet wide at the base. The



entrances to the field, for equipment, must be fenced.

Another method of artificial regeneration that should be used more widely is direct seeding of the oaks. The Southern Hardwood Laboratory at Stoneville, Mississippi has worked with direct seeding of cherrybark, Shumard, and Nuttall oaks for several years. Problems with acorn depredation by rodents can be severe when acorns are sown in openings as small as 40 × 90 feet. Few problems were encountered with rodents, except near the edges, when openings as large as 3 acres were sown. Acorns sown as deep as 6 inches can germinate and produce seedlings, but the best seedling establishment resulted from 1 and 2 inch sowing depths. This method will not result in a pure stand of oak but will increase the oak component of the future stand. How much the oak component is increased will depend on how much the landowner or manager is willing to spend on competition control.

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### Natural Regeneration

Natural regeneration of southern hardwood is relatively easy and inexpensive when compared to artificial means. Difficulty and expense become important factors when efforts are made to control the species and timing of regeneration.

Three major sources of regeneration can be used, depending upon the objectives in management and site capability. Natural hardwood regeneration results from seed, advanced regeneration, or from stump and root sprouts.

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### The Silvicultural Clearcut

This is a very efficient method of regenerating hardwood stands. There is a very important difference between a commercial clearcut and a silvicultural one. A silvicultural clearcut could be described as a commercial clearcut followed by site preparation. First, all salable material is removed. Then all culls and unmerchantable material are either felled or injected. No desirable species should be injected. If a bulldozer with shearing blade is used, every effort should be made to keep the blade near the soil surface with as little soil disturbance as possible. All stems two inches and larger should be felled. There is no need to windrow and burn debris. Stump height must be kept low (six inches from soil surface or lower) to improve the quality of sprouts.

Silvicultural clearcuts produce even-aged stands that favor intolerant, fast-growing species. Quality of the site seems to be a very important factor in species composition of the new stand. On good sites in the southern uplands, seedlings of fast-growing species

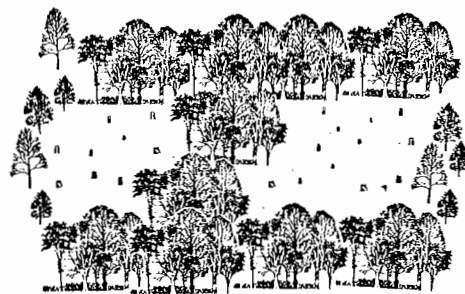
such as yellow-poplar, ash, black locust, black cherry, and birch along with sprouts from the oaks, red maple, and others usually predominate. On the southern lowlands, seedlings and sprouts from sweetgum, ash, sycamore, the oaks, willow, cottonwood, and others predominate. The poorest sites in the uplands are much more easily regenerated to the oaks, but on the better sites oaks are more difficult and expensive to establish.

Silvicultural clearcuts should not be used as a means of regenerating fully stocked and over-mature stands of hardwoods. This practice in this instance may result in a total failure as a means of obtaining desirable natural regeneration. These stands should be given a shelterwood cut 5-10 years prior to the silvicultural clearcut (see shelterwood below).

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### Group Selection

This method is often recommended when impacts on wildlife and other resources should be decreased. The size of the area can vary, but generally should not be smaller than one acre. The average opening created



when using the group selection method is probably between eight and ten acres. Site preparation requirements are the same as for silvicultural clearcuts. The major disadvantage of the group selection method is that many small stands are created that are difficult to map and administer.

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### Shelterwood

This method is most often used in the Northeast when the objective is the more shade-tolerant species such as beech and sugar maple. In the South, the shelterwood method has been recommended as one that "may work" when the objective is to increase the oak component of the future stand. Oaks **must be present** in the understory as advanced regeneration (1 inch diameter at the root collar and 4 ½ feet tall) prior to the final cut. Natural establishment of oak seedlings varies by years from none to thousands per acre, partly from tree to tree and year to year. In some parts of the southern Appalachians, bumper crops have been produced every 4 years by white oak and every 5 years by Northern red oak. Even during good crop



years most acorns are destroyed by animals, birds, and insects.

Once oak seedlings become established, they must have direct overhead sunlight for at least two hours per day to maintain height growth in the understory. However, an oak seedling will die back and resprout several times before the root system dies. Small oak seedlings in the understory have been found to have root systems 20 to 30 years old. Once a satisfactory number of seedlings have been established in the understory, it is necessary to gradually open up the stand canopy to allow enough sunlight into the forest floor to maintain height growth on the oak seedlings, but to keep down competition. Probably a three-step shelterwood cut would be most favorable. The first cut should reduce the overhead stand to 70 to 80 percent stocking, followed 2 years later with another cut to reduce stocking to 40 to 60 percent, and a final cut 5 years after the initial cut. All stems 2 inches and up must be removed during the final cut. If a two-step shelterwood is used, the first cut should reduce stocking to 40 to 60 percent level followed by the final cut no later than 3 years.

Like artificially regenerated stands, natural regenerated stands must be protected from domestic cattle grazing and overpopulated deer herds.

In some upland areas, grapevines may totally dominate a stand of regeneration. Grapevines should be cut at or near the soil surface a minimum of 3 years prior to removing the canopy. The root systems will die from the lack of sunlight before the canopy is opened. Grapevines in the bottoms are not a major problem.

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### Summary

The uneven-aged management system generally employs hardwood regeneration techniques that favor slower growing, shade-tolerant species. The even-aged management system uses regeneration methods that encourage fast-growing intolerant species. The silvicultural clearcut and group selection methods are relatively easy to apply and are reliable. The shelterwood system is usually recommended when the landowner wishes to increase the oak component of the future stand. Hardwood plantations are a reliable method of regenerating hardwoods, but can be the most expensive. ♣



# Changing Philosophies of Hardwood Management—An Update

by R. C. KELLISON, Director, Hardwood Research Cooperative, School of Forest Resources, N. C. State University, Raleigh

*Presented at Third Symposium on Southeastern Hardwoods, Dothan, Alabama, April 16-17, 1985.*

**T**HE INTEREST IN SOUTHERN hardwood plantations was relatively intensive from about 1960 to 1970. However, the high cost of establishment has caused all but three forest-based companies to reduce their planting to less than 1000 acres annually. The opposite has been true in the regeneration and management of natural hardwood stands.

Greater use of hardwoods is being realized in the manufacture of pulp and paper and structural board, and continued use is being made of quality sawtimber for lumber, veneer and plywood. The lower-grade timber is finding ready markets in pallets and railroad cross-ties. The use of hardwoods for fuelwood is not expected to increase significantly until after the year 2000.

The philosophy for managing southern hardwoods has changed significantly since the first symposium in this series of three was held in 1971. By comparison it has changed more significantly during the time from the second symposium in 1977 than it did between 1971 and 1977. The objective of this paper will be to discuss the impact of the changes on the hardwood resource in the South.

southern hardwoods came about 1960. It arose, not because there was a sudden need for the resource but because of the switch from extensive to intensive pine forestry in the South. The old fields of the Soil Bank days were supporting thriving pine plantations, while the companion stands on site-prepared lands were struggling for survival and growth. The apparent solution to the

ment programs with a myriad of species. The irony of the effort was that few organizations were planting hardwoods, and even fewer knew how or where to plant the potential crop. The interest was responsible for a series of events, resulting in the formation of the Hardwood Research Cooperative at N. C. State University, the U. S. Forest Service's Instant Cellulose



## Hardwood Plantations—1960-1985

Excluding the Mississippi Delta where some intensive management of cottonwood (*Populus deltoides*) plantations was practiced during the decade following World War II, management of the southern hardwoods was almost completely ignored until about 1960. This situation prevailed despite a reasonably strong research effort by the U. S. Forest Service with projects based at Stoneville, Mississippi; Charleston, South Carolina; and Asheville, North Carolina; by the Tennessee Valley Authority, Norris, Tennessee; and by several universities such as Louisiana Tech University, Ruston, Louisiana.

The turning point for management of the

dilemma was to intensively site-prepare every acre of land being regenerated. By about 1970, the intensity of pine plantation establishment had abated because of the exorbitant costs and the recognition that site degradation commonly accompanies intensive site preparation. Considerable intensive site preparation continues to this day, but it is more commonly done on a prescription basis so that adverse site impacts are minimized.

A part of the forestry interest of the late 1950's and early 1960's was the initiation of tree improvement programs of the southern pines. That enthusiasm spread to the southern hardwoods so that a number of forestry organizations started tree improve-

ment programs with a myriad of species. The irony of the effort was that few organizations were planting hardwoods, and even fewer knew how or where to plant the potential crop. The interest was responsible for a series of events, resulting in the formation of the Hardwood Research Cooperative at N. C. State University, the U. S. Forest Service's Instant Cellulose

A conclusion from the research was that hardwood plantations could be successfully established and managed but that the effort



would be about twice as costly per unit area as for pine plantations. The lack of quality control in establishing the plantations often resulted in poor survival and growth, which added to the cost. The outcome was that many organizations withdrew from planting hardwoods; today, only Union Camp Corporation, Franklin, Virginia; Westvaco Corporation, Wickliffe, Kentucky; and Crown-Zellerbach Corporation, Bogalusa, Louisiana continue to plant a minimum of 1000 acres annually. Each of these organizations has a pulp mill from which printing and writing papers are manufactured, and a large part of the wood for the furnish will be obtained from the plantations. They justify the investment on the value added to the end product rather than on stumpage and on the availability of the wood in a desired species mix at times when replacement wood from nonindustrial sources is unavailable. An additional justification for hardwood plantations is that a seedling harvest and two coppice harvests can be obtained from the same rootstock (Malac and Heeren, 1979). The yields from the coppice crops relative to a base of 100 for the seedling crop are expected to be 120 and 100, respectively. Beyond the second coppice crop, tree survival is expected to decline enough to justify destruction of that stand and the establishment of a second-generation stand.

About 120,000 acres of hardwood plantations exist in the South and the area is being expanded by approximately 8000 acres annually (TABLE I).

**TABLE I.** Estimated percentage of the 120,000 acres of hardwood plantations in the South, by species.

Species	% of Total
Cottonwood	40
Sycamore	15
Sweetgum	20
Eucalyptus	12
Ash	5
Oak	3
Other	5

### Natural Regeneration—1960-1985

Extensive research conducted on regeneration and management of natural hardwoods by public agencies and private organizations shows that the best way to rehabilitate degraded hardwood stands which predominate throughout the Eastern Deciduous Forest is to exact a biological clearcut (Kellison, et al., 1981; Beck, 1980). That type of clearcut, which is accomplished by harvesting all merchantable timber and

controlling the residuals, differs from a commercial clearcut in which the residuals remain to proliferate following removal of the commercial timber.

I do not want to leave the impression that the only way to regenerate a hardwood stand is by clearcutting. That option may be desired by a forest industry that is interested only in fiber production, but it may be inappropriate for a nonindustrial private owner who prefers some income at 10- to 15-year intervals rather than a large sum at 40-year intervals. There are many harvesting systems to attain that objective—single-tree selection, group selection, patch clearcuts and shelterwood cuts—if a good stand already exists. There are no partial harvesting systems to accomplish the objective if the present stand is of poor quality and inferior stocking. The only logical alternative is to reduce the degraded stand to the ground to allow for desired regeneration and stocking.

Most naturally regenerated stands on industrial forestland will be on sites that cannot be readily converted to pine plantations. Those sites are often characterized by a high water table, fragile soil or steep terrain. Although response to intermediate stand management, especially thinning, is commonly attained (Breneman, 1983), the difficult machine operating conditions which often cause tree and site degradation will frequently preclude partial harvests. Clearcut harvests of about 40 years for fiber and 60 years for sawtimber are anticipated on industrial lands. Variants of these harvest ages will likely predominate on nonindustrial private land. The 80-year rotations espoused for public lands in addition to numerous harvesting constraints will make that timber marginally available, if available at all.

### Hardwood Usage—1980 Onward

In the past five years, greater emphasis has been placed on management of natural hardwoods than at any time in memory. The pleasant surprise has spanned one of the greatest economic downturns since the Great Depression. Why the sudden interest in the resource? The answer is economics. Hardwoods are being used for products for which they had been grudgingly accepted only a few years ago.

Quality hardwoods for *sawtimber* and *veneer* will continue to demand premium prices. In addition to the premium cabinet woods such as black walnut (*Juglans nigra*) and black cherry (*Prunus serotina*), prices have escalated for the oaks (*Quercus spp.*), gums (*Nyssa spp.*), and ash (*Fraxinus spp.*). Stumpage prices of \$240 per thousand board feet (MBF) for No. 1 and No. 2 logs

of southern red oak were offered from North Carolina to Mississippi in early 1984, and the furniture manufacturers predict that the price will continue strong for at least another decade. Oak lumber for furniture manufacture is equally in demand in Europe, Scandinavia and Eastern Asia as it is in the United States.

The manufacture of *pallets* from lumber is one of the strongest growth areas in the United States. In 1982, 5.5 billion board feet of lumber, 75% of which was hardwoods, went into the product (Barringer, 1983). The projection is that the pallet industry will continue to demand lumber in increasing quantities for manufacture of the product because no other natural resource has the resiliency of wood. In the absence of resiliency, cardboard boxes and their content crush from stacking and transport.

The southern pine plywood industry is increasingly encountering a shortage of peeler logs of the desired quality or at an acceptable price. The soft hardwoods, notably sweetgum and yellow-poplar, are being used with increasing frequency as the inner plies of structural *plywood*. As much as 35% of the product consists of the soft hardwoods at some plywood mills in the South.

Southern hardwoods are also being increasingly used for the inner plies and for the faces of furniture-grade plywood and veneer. The premium-grade plywood manufactured by organizations like Columbia-Carolina Corporation, Old Fort, North Carolina, consists of several plies of yellow-poplar sandwiched between face and back veneer of premium-grade hardwoods. Some structural plywood of wholly hardwood composition is also being marketed. Yellow-poplar is commonly used as the face as well as for the inner plies.

The *railroad crosstie* market has historically consumed a large amount of timber but that use has been cyclical in recent years. Approximately one billion board feet of timber was consumed annually by the industry from 1975 to 1980, but the demand declined with the 1981-82 recession and has not regained its former position (Barringer, 1983). The reason for the decline is apparently the negligence by the railroad industry to maintain the tracks. Substitutes for wooden crossties lack the resiliency of wood and suffer from fatigue when other than vertical forces are applied by trains.

*Fuelwood* primarily for residential use was consumed at the rate of 4.8 billion cubic feet in 1900 but then declined to 2.3 billion cubic feet in 1950 and to 0.5 billion cubic feet in 1970. Because of the oil embargo in the mid-1970's, the use of wood, primarily for home heating use, climbed to 3 billion cubic feet by 1980,



# Oak Regeneration by Direct Seeding

by ROBERT L. JOHNSON and ROGER M. KRINARD, Principal Silviculturist and Mensurationist, Southern Hardwoods Laboratory, Stoneville, Mississippi.

**D**IRECT SOWING OF OAK ACORNS has not always met with success. This paper summarizes recent research regarding direct sowing of oaks in research plots and commercial trials. Present findings indicate that seedlings can be established from properly stored acorns sown any month of the year by hand or machine. They should be sown at a two-inch depth, although they can be sown up to six inches deep.

Oaks are an important major component of southern bottomland hardwood forests. Not only does industry depend on a steady supply of high quality oak logs, but the vitality of many different species of wildlife is dependent at least in part on oak mast.

In most sections of the South, the current supply of high quality oak sawtimber is adequate, but meeting future needs may require that we artificially establish oaks, since stands resulting from natural regeneration often have few oak seedlings. Oaks will have to be established artificially in recently abandoned agricultural fields intended to provide timber and prime forest habitat for wildlife.

Planting of one- to three-year-old seedlings with followup weed control is a proven way to establish oaks. It has been successfully done at Stoneville, Mississippi, and elsewhere. But the technique is expensive and time consuming. Planting of large, bare-rooted seedlings up to three years of age without weed control is being studied, as is planting of containerized oak seedlings. Neither method is being used commercially.

Another option for establishing oaks is direct seeding of acorns. This approach is less expensive than planting because it eliminates the costs involved with growing seedlings in a nursery. It is also less time consuming than planting seedlings.

There have been several efforts in the past 25 years to direct-seed oaks in the eastern United States. Only a few have been successful. However, investigators have generally agreed on the following:

1. Acorns must be covered with soil.

2. Fall and spring seeding give about equal results.
3. Animals, particularly squirrels and chipmunks, are the greatest deterrent to direct seeding, as they dig up and destroy a high percentage of the acorns. No suitable repellent is available.

This paper summarizes results of oak seeding research at Stoneville, Mississippi, from the 1960's to present, and from commercial seedings in the 1980's that cover about 500 acres. Research plots have been studied on several different sites, including eight in the Mississippi Delta, two in minor stream bottoms of the coastal plain, and five in the silty uplands. Commercial trials have been in the Mississippi Delta and the silty uplands.

## Animal Damage

Earliest seeding tests at Stoneville, Mississippi, were conducted under a full forest canopy; most were considered unsuccessful due to rodent losses. It was later found that site-prepared forest openings of two acres or more and agricultural fields had much less rodent damage, and seeding was much more successful. Therefore, results and recommendations presented in this paper are applicable only to two-acre or larger forest openings and to old fields relatively free of competing vegetation.

## Species

Research trials included the following oak species: Nuttall (*Quercus nuttallii* Palmer) Shumard (*Q. shumardii* Buckl.), cherrybark (*Q. falcata* var. *pagodifolia* Ell.), and water (*Q. nigra* L.). However, commercial seedings also involved swamp chestnut (*Q. michauxii* Nutt.), chinkapin (*Q. muehlenbergii* Engelm.), overcup (*Q. lyrata* Walt.), willow (*Q. phellos* L.), and bur (*Q. macrocarpa* Michx.) oaks. To date, Nuttall oak appears to be the most adaptable

species and has consistently given the best results.

Acorns of the white oak group (swamp chestnut, chinkapin, overcup, and bur oaks) have had poorer field germination than red oak acorns in two successive spring sowings in a commercial seeding venture. Number of acorns sown per foot of row was unknown, but a machine seeder was used for both groups of acorns in both years. In 1983, eight sites were seeded, 4 each with red oaks and white oaks, and 14 sites were seeded in 1984, 8 to red oaks and 6 to white oaks. Based on six 50-foot row samples per site, average distance between seedlings after one growing season of the 1983 sowing was 10 feet for the white oak group and 4 feet for the red oak group; the 1984 sowing averaged 24 and 7 feet between seedlings for the white and red oak groups, respectively. If 4 seedlings per 50 feet can be considered at least adequate, then 71 and 23 percent of the white oak seedings and 96 and 69 percent of the red oak seedings for the 2 years would be adequately stocked.

## Site Selection

The same guidelines used for site evaluation prior to planting of seedlings should be suitable for use with direct seeding. In most cases, the guides developed by Baker and Broadfoot (1979) will suffice. A key consideration is the timing and duration of flooding on a site. Shumard and cherrybark oak acorns should be sown on well-drained soils that flood for periods of only a week or less during the growing season. As a general rule, neither species should be sown on clay soils subject to growing season flooding. Conversely, Nuttall oak acorns grow well in clay soils and can withstand constant flooding from January through mid-May. Water oak acorns are somewhat less water tolerant.

## Seed Collection and Storage

Seed maturity varies by species and by



year, but generally acorns mature and drop from about the first of October to the first of January. The first acorns to fall are usually defective. With experience, they can be detected by their light weight and pale-colored pericarp. Acorn collection must not be delayed, as most acorns will be devoured within a few days by animals such as deer, turkeys, racoons, and squirrels. A few acorns from each parent tree should be cut in the field to determine that they are not rotten, infested with insects, or underdeveloped.

Acorns should be placed in cold storage immediately; never leave them in a warm, dry environment such as a heated building. They should be stored in 4-mil thick polyethylene bags at about 35°F. Nuttall acorns can also be stored in water at 35°F, but they are the only acorns to which this storage procedure applies. If cooler facilities are not available, acorns can be stored loose or in polyethylene bags buried about 1 foot deep in the ground. After a few days of cold storage, acorns should be put in water and the floaters discarded. Sometimes, with very small acorns, even good seeds will float. Thus, a small sample of floaters should be cut to verify their condition. If facilities are available, an additional check of viability is to place 5 to 10 acorns, with their pericarps removed, in a germinator at about 80°F. Germination should begin in about 6 to 8 days. Every 1 to 2 months a few acorns should be removed from storage and cut or test germinated. It is also worthwhile to run float tests periodically.

Red oak acorns must not drop below a 30 percent moisture content (based on oven-dry weight) during storage. Moisture contents of the stored population can be estimated by checking moisture content of a few sample seeds every 3 or 4 months. If sample seeds average below 35 percent moisture content, the stored population should be submerged in water at room temperature for about 24 to 48 hours. Generally, 40 to 45 percent moisture content is a good storage range for red oak acorns.

According to Bonner (1973), properly stored red oak acorns will remain viable for up to 3 years, although percent germination may decrease. Under any long-term storage method, some acorns will germinate, but they can still be successfully direct sown—even if the radicle is broken in the sowing process (Bonner 1982). There are no reported techniques for successfully storing white oak acorns beyond a few months.

### Time of Seeding

Recent research indicates that, with an occasional exception, acorns can be

successfully sown any time of the year. This finding is particularly important in regenerating sites covered with water or otherwise unworkable during the dormant season. Simply seed after the water recedes, which for some bottomland areas could be June or July.

In a 1983 old-field test of Nuttall oak, seedling percent (the ratio of the number of live seedlings to the number of sown acorns) in mid-October was 67, 78, 78, and 59 for May, June, July, and August sowings, respectively. August differed from June and July, but not May, at the 0.05 level of significance. While initial germination began approximately 45 to 60 days after the May sowing, depending on sowing depths, germination of later sowing dates started within 30 days of sowing regardless of depth (FIGURE 1). Acorns that had been sown on the same old-field site in March had a seedling percent of only 9, probably because of

flooding that occurred after germination began, but before the May planting.

Cherrybark oak and Shumard oak were sown in the silty uplands, following logging and deadening or lopping of remaining stems. Sowing was in 1983, beginning in February and then monthly from April through August. By October the range in cherrybark oak seedling percent was from 12 (for seeds sown in April) to 36 (for seeds sown in July). For Shumard oak, the range was from 16 (for seeds sown in August) to 54 (for seeds sown in May). Over all months, seedling percent averaged 23 for cherrybark and 37 for Shumard.

A commercial seeding done in April 1984 was followed by 2 months of dry weather and little germination. Sprouting of acorns increased in July—after a good rain. Based on total seedlings counted in October, 13 percent of the acorns had germinated by July 2, 28 percent by July

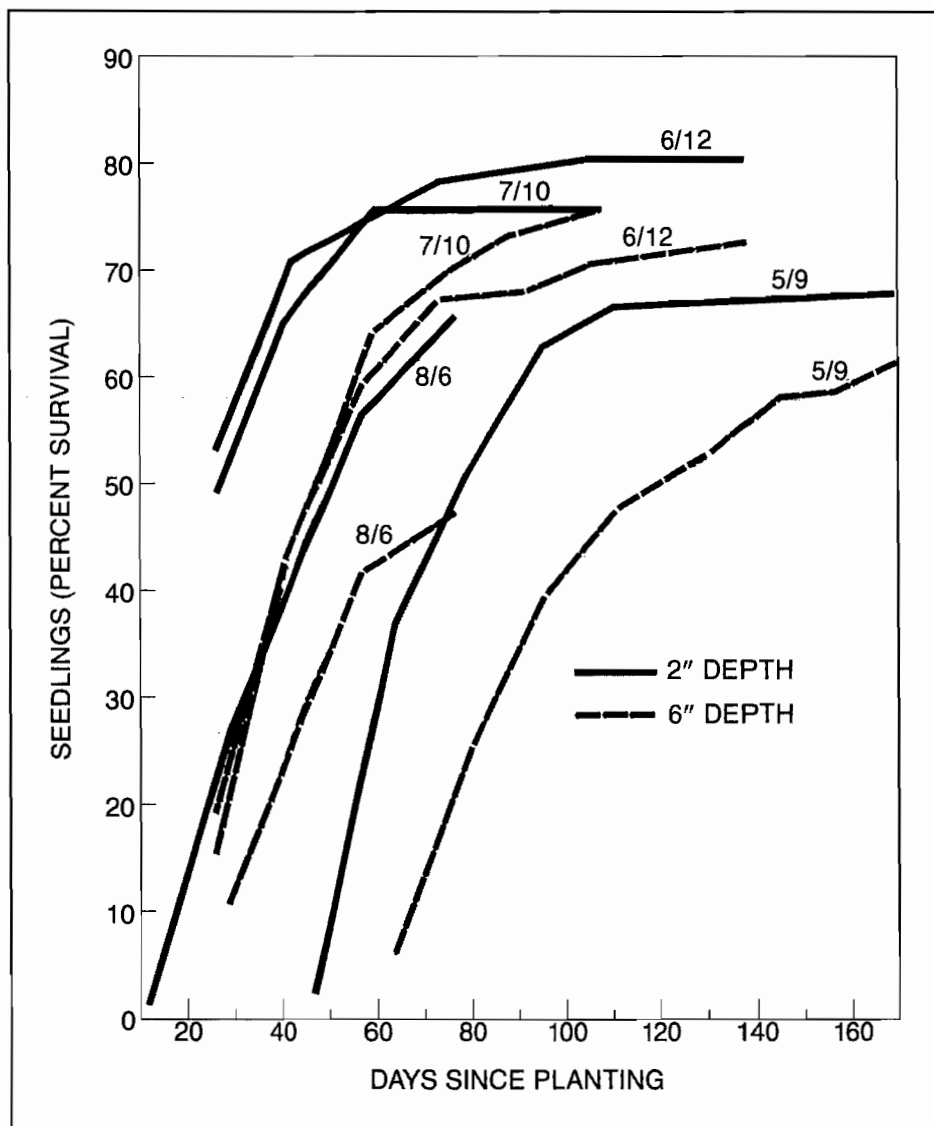


FIGURE 1. Seedlings produced from acorns sown at two different depths on four different dates in 1984 (5/9, 6/12, 7/10, 8/6) by

number of days since sowing. Data through October 18, 1984. Sowing dates noted on plotted curves.





16, 36 percent by July 31, and 70 percent by August 12. Thus, acorns may remain dormant in the soil most of the summer but still germinate late in the growing season. There was a mixture of red oak acorns involved: Shumard, cherrybark, water, willow, and Nuttall. Counts were made on forty-eight, 50-foot row samples.

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### Depth of Seeding

Acorns of any size, from the smallest water oak to the largest Nuttall, can be successfully sown at any depth, down to six inches. However, depth and size may influence percent germination and early seedling size.

On old-field Sharkey clay soil, a test of Nuttall and water oak acorns involving three planting depths—2, 4, and 6 inches—showed a greater seedling percent at 2 inches (54) than at 4 or 6 inches (41 and 40). Testing was at the 0.05 level using Duncan's Multiple Range Test. The seedling percent of Nuttall oak (55) was greater than water oak (35). There was no interaction of depth by species. First-year seedling heights were inversely related to planting depths, but differences were less than 0.1 foot.

In another 1984 trial, Nuttall oak acorns were sown at 2 and 6 inches in January on clay soil where a nearly pure stand of overcup oak had been growing for 50 years. The overcup oak were either cleared by KG blade, injected the summer before sowing, or left untreated. After one growing season, 2-inch survival was greater than 6-inch—52 vs. 32 percent—and survival on the cleared plots (58 percent) was greater than the injected plots (45 percent), which was greater than the untreated plots (22 percent).

A 2- and 6-inch sowing depth trial, where sowing was done in mid-July, 1984, on old-field clay soils with Nuttall oak acorns, was combined with three temperature conditions: acorns removed from a cooler and sown immediately, acorns allowed to warm and dry in the sun for either 1 hour prior to sowing, or acorns allowed to remain in the sun for 3 hours prior to sowing. Temperature conditions and depth did not influence seedling percent after the first or second growing season. Apparently there was delayed germination in some instances because survival values were higher the second year than the first year, with survival at 2 inches increasing from 22 to 37 percent and at 6 inches from 30 to 35 percent.

There are two reasons for sowing deeper than 2 inches. One is to discourage pilfering by rodents, and the other is to have acorns in a less hostile environment than that near the soil surface. Deep sowing may reduce

the loss to rodents, but not enough to justify the extra sowing effort. The environmental factor seems most important in clay soils, where the soil surface may change from fully saturated to extremely dry within a few days.

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## Method of Sowing

Both hand and machine seeding have been successful. Hand seeding can be done with a tool such as one developed at Stoneville, Mississippi, or the acorns may be sown in holes made with a bar or even a stick. The hand tool gives the advantage that depth of seeding can be consistent; also, the person does not have to bend over to put acorns in the holes.

Machine seeding is well suited for open fields. There are at least three different machines in use. One was developed at Stoneville by modifying a soybean planter. It will handle acorns ranging in size from water oak (small) to Nuttall oak (large), and it automatically drops a seed every 30 inches. Machine seeding is an option only when soil moisture conditions are suitable, which may not occur until the growing season.

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## Spacing

Our experience has shown that: (1) 35 percent germination is a reasonable expectation for acorns, (2) 1 out of 10 or 11 sown acorns produced a free-to-grow tree in 10 years on cleared, forested sites of the ash-elm-sugarberry type, and (3) 1 out of 4 sown produced a free-to-grow tree in 10 years on old fields. Thus, sowing about 1,500 acorns per acre would provide for a first-year stocking of 500 seedlings, with 150 to 375 free-to-grow trees in 10 years (depending on site conditions) and good prospects for a future sawlog oak stand. Between-row and within-row spacing to allow for approximately 30 square feet per acorn would depend on site conditions and whether the area is to be hand or machine sown. Thus, spacings could range from about 3 by 10 feet—to allow for future between-row weed control if desired—to 2 by 15 feet or even wider.

Eleven years after machine sowing Nuttall oak acorns at a spacing of 2 by 10 feet, Johnson (1983) obtained about 550 codominant trees averaging 2 inches d.b.h. (diameter breast height). The spacing appears a little close, but it allows for thinning of unneeded trees for firewood. The stand can only have about 200 codominants per acre when trees average 6 inches d.b.h.

In a 16-year-old test of hand-sown Nuttall, there were still over 400 free-to-grow oaks

per acre from about 3,500 acorns sown (four per spot with spots spaced at 5 by 10 feet) (Johnson 1981). Free-to-grow trees had successfully competed with natural sprouts and seedlings of green ash (*Fraxinus pennsylvanica* Marsh.), water hickory (*Carya aquatica* (Michx. f.) Nutt.), and sugarberry (*Celtis laevigata* Willd.).

Uniform spacings are not feasible in cut-over areas, but one technique already used is to have the planting crew line up abreast and sow seeds across the opening, bypassing stumps, tops, and other impediments. The method appears to give a good distribution of seedlings.

Particularly in cut-over areas, but also in old fields, natural regeneration will compete with the direct-seeded oaks. But, based on research efforts to date, oaks will be competitive in the elm-ash-sugarberry forest type. Conversely, on sites where yellow-poplar (*Liriodendron tulipifera* L.) grows well, direct-seeded oaks are soon overtopped, and unless released, few oaks will survive (Johnson 1984).

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## Weed Control

Studies show that intensive control of weeds by disking improves early height and diameter growth of planted oak seedlings. Mowing between planted or seeded rows of oaks reduces overtopping competition from other tree species and provides additional sidelight to developing oaks, but the treatment probably does not stimulate their rate of growth (Kennedy 1981). Even without weed control, direct-seeded oaks will continue to develop provided they have direct overhead sunlight.

When the largest oaks average between 15 and 25 feet tall in a regeneration stand, they may be released by deadening or cutting competitors. Indications are that earlier release is not effective because the oaks may again be overtopped by faster growing species.

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## Survival and Growth

Survival one year after germination is generally very good. Even overtopped trees may survive eight or more years. Some oaks only two feet tall have survived overtopping for fifteen years.

Growth rates vary by species and site, but as a general rule, trees of all oak species grow slowly the first 5 years. About 1 to 2 feet of annual height growth is average for the best trees. From age 5 to 15, trees may add 2 to 3 feet of height annually. Thus trees that have been free-to-grow should be 30 to 40 feet tall after 15 years.

Growth in d.b.h. was also slow for all oaks during early years in these direct

seeding studies. In 15 years, the best trees averaged 3 to 4 inches d.b.h. Based on development of natural oaks, free-to-grow direct-seeded trees should grow much more rapidly in diameter during the next 25 years (Putnam *et al.* 1960).

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## Future of Oak Seeding

At Stoneville, Mississippi, we are continuing to test direct seeding in several locations. Commercial trials are proceeding on at least two National Wildlife Refuges and one National Forest, and a project of several thousand acres has been instituted on a State wildlife refuge in Louisiana. There are also several small privately-owned, old agricultural fields being seeded to oaks.

Direct seeding of oaks shows promise as a relatively inexpensive and flexible method to regenerate a very important species group. Compared to planting, preliminary figures indicate that direct seeding may be much faster and one-third to one-half the cost. It can also be done any time of the year, provided the soil is not covered with more than 2 inches of standing water or is too dry to make a hole for the acorns to be sown in.

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# Mid-South Upland Hardwood Regeneration Problems and Alternatives

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**M**ANY OF THE MID-SOUTH'S most productive upland hardwood sites need regenerating either because they have reached financial maturity or are inadequately stocked. Methods and requisites for regenerating these stands are discussed here.

Whether through neglect, exploitive cutting practices or honest mistakes, a high percentage of the South's best hardwood sites are now poorly stocked with low quality residuals. Too often, owners or buyers of timber made diameter-limit cuts and selective cuts, always selecting the biggest and best trees for removal. Their hope was that perhaps the trees they left would replace the ones they cut—and sadly enough, that is just what happened. These smaller, inferior trees, often the same age as the removed dominants, were not capable of developing into high vigor, high quality trees. The most valuable, commercial species in our southern forests are, at best, intermediate in shade tolerance. Therefore, the fastest growing, most vigorous trees will assume early dominance within the stand. These dominant trees usually have the best form and highest value. Their desirable characteristics made them the target of the repeated, high-grade cutting practice of the past: piecemeal removal as they reached commercial size. This selection against dominant traits quickly makes dominants and co-dominants out of trees that cannot maintain this position on their own merits. The cycle continued with each successive trip through the stand until the owner was left with virtually nothing of value.

This is certainly not a new message; we've all heard it many times before. It serves no good purpose to try to place the blame, if any, for the existing conditions. The real world of market demands and financial necessities often dictates actions that are not optimum in every way. Suffice it to say that many stands no longer fulfill the potential of the site from a timber standpoint—and are not likely to improve much with age. These are the stands, along

with some well managed mature ones, that need regenerating if the owner expects to successfully manage them for their maximum site potential.

Getting regeneration on good hardwood sites is a simple matter. Regenerating the most desirable trees and having them develop into the stand of your dreams is probably going to be a little more difficult, especially in upland areas of the mid-South. For example, regeneration cuts in the Southern Appalachians raise a concern that the oaks, especially northern red oak (*Quercus rubra* L.), will not be as prominent as desired in the new stand. However, there is some consolation that at least yellow-poplar (*Liriodendron tulipifera* L.), and other desirable light-seeded species will prevail. When you cut good bottomland sites you may hope that cherrybark Oak (*Q. falcata* Michx. var. *pagodaefolia* Ell.), and other good oaks will be well represented. At least, you can usually count on ash (*Fraxinus* spp.), sycamore (*Platanus occidentalis* L.), sweetgum (*Liquidambar styraciflua* L.), and other desirable light-seeded species.

When foresters in the mid-South decide to regenerate their upland hardwood stands they also desire the oaks as a major component—but, this time it is more necessity than desire. In much of the mid-South uplands, the least you can expect if you don't get oak can be pretty grim, from a timber standpoint. This is not to say that oak is the only important timber species existent in these stands. The better sites will usually contain desirable trees other than oak, such as walnut, cherry, and perhaps good quality hickory (*Carya* spp.). Unfortunately, these trees may only occur sporadically and cannot really be counted on like the "salvation" species in other areas. In much of the mid-South, especially outside the yellow-poplar range, if you don't get oak you can more likely expect low quality red maple (*Acer rubrum* L.), dogwood (*Cornus florida* L.), sassafras (*Sassafras albidum* [Nutt] Nees) and other

less desirable species. For this reason, most of my emphasis will be on regenerating the upland oak species.

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## Sources of Regeneration

The upland hardwood stands of the mid-South regenerate from several sources when adequate sunlight is available. These sources are discussed on the following pages.

Trees in the new stand may develop from seed after the overhead canopy is removed. The seed of some trees such as yellow-poplar and ash remain viable in the duff layer for several years and will germinate when adequate light reaches the forest floor. Other seed comes from trees within the stand immediately before they are cut, or from seed trees. Also, birds, animals, and wind transport seeds from adjacent stands. Light-seeded species may be blown into the regeneration area from several hundred feet away (McGee et al. 1979). Many of the desirable light-seeded species such as yellow-poplar can germinate from seed after the harvest cut and successfully compete with other plants.

A common problem associated with regenerating upland hardwood stands is that some will not regenerate to the same species. This is especially true with regard to oak stands, as stated earlier. *Stump sprouts* provide one source for perpetuating oak and other species that were present in the stand before the harvest cut. However, undesirable trees also sprout vigorously and can become a competitive problem. Because of their extensive root systems, the vigorous stump sprouts will often dominate other forms of regeneration. Some stands are almost entirely of stump sprout origin as evidenced by many multiple stem trees in the stand.

Where oaks are concerned, the frequency of sprouting varies with species and stump size. Northern red oak, scarlet oak (*Q. coccinea* Muenchh.), and chestnut oak (*Q. prinus* L.) usually sprout more frequently than white oak (*Quercus alba* L.) and black

oak (*Q. velutina* Lam.). Small stumps, less than 12 inches, sprout more frequently than larger ones (Sander 1977). The quality and longevity of stump sprouts have been questioned, but sprouts originating from smaller stumps near or below the ground line are usually good risks (McGee et al 1979). *Root sprouts* are also produced by most hardwood species. Some, such as black locust (*Robinia pseudoacacia* L.) and sassafras may regenerate entirely from root sprouts and, in some instances, are so prolific that thick clumps develop which can interfere with more desirable regeneration. These species do not usually dominate for very long, however, because of their relatively short life and sparse foliage. I have even seen intolerant species such as yellow-poplar eventually gain dominance over these species and, except in perhaps the most extreme conditions, the intermediately tolerant oak should prevail.

Black locust, a legume, may even benefit other, more slowly developing species because of its ability to fix atmospheric nitrogen in the soil. It has even been planted as a nurse crop with yellow-poplar, black cherry (*Prunus serotina* Ehrh.), green ash (*F. pensylvanica* March.), northern red oak, and white oak, (Chapman and Lane 1951). Sprouts of undesirable, tolerant species such as red maple, dogwood, and eastern hophornbean (*Ostrya Virginiana* (mill) K. Koch) may cause real problems and could dominate the site for many years. Desirable sprouts and seedlings may outgrow these undesirables, but in many cases control will be necessary, usually by the use of herbicides.

Stump sprout expectancy can be estimated from the original stand before the harvest and, if care is taken to cut low stumps, should be an important source of valuable stems for the new stands (TABLE 1).

On the better hardwood sites (site 75 and above), oaks may not be present in



**Stump sprouts provide a source of regeneration for hardwoods.**

regenerated stands to the same degree that they were found in the stand that was harvested. They may be replaced by other valuable species such as yellow-poplar, ash and cherry, but in many upland mid-South areas the odds are better that they will be replaced by less desirable species. The key to assuring that the oaks will be well represented in the new stand lies in the adequacy and distribution of *advance oak reproduction*. A small proportion of acorns produced by the oaks in the existing stand will avoid depredation by animals and insects, fall on a favorable seed bed, become covered by a light layer of litter, and will germinate under the forest canopy. Some of these seedlings will quickly die, but if conditions are right others will endure for several years (perhaps as long as 30 or 40 years). The top growth is very slow, usually dying back and resprouting several times. However, the root system continues to

develop and thus desirable advance reproduction is established. It takes several years for this reproduction to develop into the stems necessary to grow rapidly enough to compete with other plants in the new stand. Sander et al (1976) evaluated the adequacy of oak advance reproduction in the North Central States and found that stems at least 4.5 feet tall will compete most successfully in the new stand. The number of these stems needed to ensure an adequately stocked oak stand was set at 433 well-distributed stems of advance reproduction per acre. Where this advance regeneration is inadequate, it can be augmented by low origin stump sprouts, using the stump sprout expectancy chart. This guide assumes a relatively pure oak stand which will allow considerable volumes of timber from intermediate thinnings from well managed stands.

Oliver (1978), working with red oaks in the Northeast growing in association with other species, primarily red maple and black birch (*Betula lenta* L.), found that as few as 60 well-distributed stems of advance reproduction or stump sprouts might be enough to eventually provide sufficient dominant red oaks for adequate density and spacing of oaks at rotation age (45 oaks at rotation age 60 with a 33 percent insurance factor). This assumes a mixed stand where mostly other species would be removed during intermediate cuttings. Oliver did his work in the Northeast, but his red maple and black birch competitors should be compatible to the red maple, sassafras, black locust conditions that often occur in the mid-South. Some control might still be necessary for long lived tolerant species such as dogwood and hickory.

Guidelines were also developed for the Ozark National Forest, which is near the western edge of the oak-hickory range. This forest does not have some of the faster growing mesic species of the Appalachians and some North Central States to compete with the oaks. Taking this into consideration, the forest guides designate that at least 300 well distributed stems of desirable advance reproduction, at least 2 feet tall, must be present before the original stand is harvested. The 300 also includes potential stump sprouts.

While there may be some difference of opinion as to how many stems of what size are required to meet the landowner's regeneration objective, it is agreed that the degree to which oaks will be a dominant component of the new stand is in proportion to the presence of advance regeneration and stump sprout potential in the original stand. New oak seedlings without several years of root development have not been able to compete successfully.

For site index 55 to 60, oak regeneration is not much of a problem, as oaks are well suited

**TABLE 1—Expected percentages of oak stumps that will sprout after cut<sup>1</sup>**

Size class <sup>2</sup>	Black oak	Scarlet oak	Northern red oak	White oak	Chestnut oak
2-5	85	100	100	80	100
6-11	65	85	60	50	90
2-16	20	50	45	15	75
17+	5	20	30	0	50

<sup>1</sup>Sander (1977) from data developed by Roth and Hepting (1943), Wendel (1975, Johnson (1975), and unpublished data at Columbia, Mo.

<sup>2</sup>Diameter breast height class of parent tree (in inches).



to compete on these drought-stressed sites. However, for the best sites—75 plus—especially in the Ozark region, where desirable non-oak species are limited, oaks will still be the species to manage. As mentioned earlier, it is on these best sites that it is most critical to understand what the potential for regeneration will be if the present stand is harvested. Sandor (1977) developed an evaluation procedure for determining the adequacy of oak regeneration.

If evaluation proves that oak or other desirable, intolerant and intermediately tolerant species are adequate for meeting regeneration objectives, then total canopy removal is the most efficient method for regenerating the stand in the South. This must be a silvicultural operation, cutting or deadening all residual trees down to about 2 inches in diameter. This site preparation can be done as either a pre-harvest (Loftis 1978) or post-harvest operation. The smaller, noncommercial trees of undesirable species can be cut or treated with herbicides depending on how competitive these sprouts will be. Red maple is a prolific sprouter and may offer severe competition to more desirable species if it is not controlled. Grapevines (*Vitis spp.*), while they are desirable for some nontimber objectives (wildlife), can be a serious problem for regeneration. Trimble and Tryon (1979) recommended control by severing the vines, just above the ground, at least four years before harvest. The vines will resprout for a couple of years, but will die within 3 years if there are no large holes in the canopy.

Once the commitment is made to regenerate, whether naturally or artificially, the best practices must be followed. Anything less is usually a waste of time, money, and effort. This is fine for those stands where adequate regeneration potential exists at harvest time. However, what are the options on those stands where advance regeneration and sprout potential is not present—those which contain only an understory of junk species just waiting their chance to take over the site? How will the advance reproduction become established? Researchers continue to look for the best answer. Some options to consider until new research findings become available are presented in the following sections.

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### Regeneration Techniques

If there is not enough potential oak regeneration, or if it is not large enough to compete successfully, proper application of the *shelterwood* system should be a viable alternative. Shelterwood has been tried and mostly failed, in the past. All the information needed to assure consistent success is not yet available, but we should be able to improve on past experiences using the information we do have. Here again, only the very best silvicultural application is likely to be

successful. Sandor (1979) recommends that the first cut of a three-cut shelterwood should not reduce overstory stocking below 60 percent, according to Gingrich's (1967) stocking guides. This should provide enough light for germination and survival, if enough acorns are produced and there are enough absent-minded rodents to plant them. Remove trees in the lower crown classes and try to leave a uniform residual canopy, avoiding large holes. One thing I have learned from experience, if there is junk understory present and we open the overstory up a little, we'll get *little more* junk, and if we open the overstory up a lot, we'll get a *lot more* junk. For this reason, the understory will most likely have to be controlled. Probably the most efficient way to control this unwanted understory is by the use of a selective herbicide treatment.

If the second cut is needed it should probably be made when the stand increases back up to the 70-80 percent level. This cut should reduce stocking to about the 50 percent level when seedlings are about 3 feet tall. As long as 25 years might be required to develop adequate regeneration, but perhaps you could have what you need in about 10 to 15 years, with an intensive effort.

*Single tree selection* is not generally recommended for regenerating the southern upland forest. Most of our valuable hardwoods are relatively intolerant of overhead shade and cannot develop properly without orderly and timely removal of overstory trees. Group selection, where groups of trees at least ½ acre in area are removed, can be successful, but the shade from trees on the edge will reduce the growth of trees in small openings. For this reason, openings should be at least 2 acres in size to reduce edge effect and to simplify record keeping and stand mapping.

Another option is to actually *plant oak seedlings* which would develop into advance reproduction. This would be a possibility especially where a seed source for the desired species is not present, or for establishing genetically improved trees. The seedlings would be planted with the shelterwood system and given time to develop into strong advance regeneration before the final harvest cut. Exact methods are not yet known, but this system is being tested by the Forest Service's North Central Forest Experiment Station and others.

The *use of fire* is another option worth consideration. Fire obviously played a part in the establishment of almost-pure oak stands found in areas of the mid-South. C. E. McGee, Southern Forest Experiment Station, is working with fire in upland stands.

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### Summary

Recognizing the problems that can exist with regenerating the Mid-South's upland

hardwood stands emphasizes the need to know what is happening in the stand several years before the final harvest. Adequate long range planning is a prerequisite to assuring adequate natural regeneration.

Generally, one of the main problems with regenerating forest stands is that we are not committed to using the total wood resource available in these stands. Until we become less selective in what is considered useful, or is junk, and until we develop the techniques and the willingness to use that which is now considered useless, regeneration problems will not only continue with hardwoods, but with pines as well. Meanwhile, we must pursue the challenge to do the best we can to grow the trees that are in demand. ♣

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# PESTS

## What to do when pests hit hardwoods, too!

by JIM HYLAND  
Chief, Pest Management

**T**HE HARDWOOD STANDS of Alabama are an important source of timber, wildlife, water and recreational activities. In short, these stands are the backbone of the TREASURE Forest. The hardwood stands are a unique resource with special problems and opportunities for management which have probably received less attention than they deserve. Insects and diseases present a continuing threat to hardwoods. It is far better, in terms of costs and ease of operation, to prevent attack by insects and diseases than to remedy them after they occur. It is, therefore, important to recognize the major hardwood insect and disease pests and to understand how to deal with them.

### INSECTS

Insects contribute to low quality in many hardwood stands in Alabama. Insects destroy seed; kill or suppress seedlings and sprouts; contribute to poor tree form; cause growth loss, dieback, and mortality; and produce defect and degrade. Insects cause indirect losses through disruption of sustained forestry practices, regulation of forest types, and altered wildlife habitat. Two major hardwood insect pests exist in Alabama—defoliators and borers.

#### Defoliators

How much trees are injured by insect defoliation depends on the extent of defoliation, tree species, season, frequency of defoliation, competition within stands,

and tree vigor. One partial defoliation does little harm to trees. Complete defoliation, however, may cause growth loss, crown dieback, and mortality. Deciduous hardwoods (those that shed leaves in winter) resist defoliation injury more than evergreen conifers do and can generally withstand a moderate amount of defoliation before survival is threatened. Slow growing hardwood species are usually less susceptible to injury than are fast growing species. Early season feeders that defoliate trees during spring are most harmful because the tree's food reserves are low immediately after its leaves have developed. Late season defoliators are least harmful because the summer foliage has replenished food reserves. Most hardwoods can withstand one complete defoliation, but heavy defoliation during successive years, especially of early season species, or two or more defoliations the same year can be disastrous. Dominant and codominant trees generally have higher food reserves and are least affected by defoliation.

Additionally, vigorous trees in well-tended stands can tolerate more defoliation than can those that have been weakened or stressed. Defoliation increases susceptibility of weakened trees to insect borers and disease. Surviving trees are often stunted, ill-formed, and unmerchantable.

Defoliation creates openings in the forest floor, and scrub vegetation is released. Defoliation also increases fire hazard and reduces esthetic, recreational, and wildlife values.

#### Major Species—Defoliators

Several defoliators have caused minor

localized problems in forest stands. There are three species that have caused widespread problems.

*Forest tent caterpillar* has annually caused defoliation in the Mobile River Basin. The acreage averages 60,000 per year. Growth and dieback occur, but trees are seldom killed. The hardwood trees eaten are swamp tupelo, gum and oaks. Generally, in Alabama, the problem is confined to the swamps, but occasionally the population is high enough to cause damage to adjacent upland sites.

*Linden looper* defoliated over 100,000 acres in Northeast Alabama in 1979 and 1980. This insect caused the hardwoods to become stressed, thereby, allowing borers and disease to enter and cause mortality. The defoliation spilled over into adjacent urban areas causing great alarm to homeowners. The population has not increased to a damaging stage since the spring of 1980.

*Oak leafroller* defoliated oaks in Northwest Alabama in 1981-82. This repeated defoliation followed by a dry summer stressed the oaks allowing the two-lined chestnut borer to kill large numbers of oaks on the ridges.

#### Prevention—Defoliators

Insect defoliators are generally cyclic in that the population builds up for one or more years, then declines. Outbreaks of defoliators are spectacular, yet natural controls, including parasites, predators, and weather, usually suppress epidemics before serious losses occur. Silvicultural practices designed to promote stand vigor or to reduce the proportion of the favored



host, help limit risks. Sticky bands placed on trunks of individual trees will snare wingless female moths, such as fall and spring cankerworms and linden loopers, before they lay their eggs. Practices such as “pick-up and destroy” and “prune out and destroy” can help reduce hibernating forms, tents, and small colonies. Insecticides are available for most defoliators and may be needed occasionally.

## Borers

Borers are the most costly insect pests of hardwoods, yet least spectacular because both larvae and galleries are largely hidden from view until the tree is cut and processed. Borer damage accumulates slowly during the life of the tree. These loss figures amount to about \$42 per thousand board feet for upland oaks in the Midsouth. At this loss rate, a mill cutting 5 million board feet of oak per year would lose \$210,000 to defects and degrade. Studies of white oak cooperage showed that two percent of the log and bolt volume and seven percent of the stave blanks were rejected because of borer damage. Estimates of the costs of borer impact are high, yet they would run markedly higher if they accounted for logs downgraded from veneer grades to factory grades, and from factory grades to pulpwood, and for borer-caused losses in nurseries, seed orchards, and shade and ornamental trees.

## Major Species—Borers

Oak sawtimber is particularly hard-hit by insect borers. *Red oak borer* and *carpenterworm* attack both red and white oaks. These borers mine the bark, then tunnel into the sapwood and heartwood and leave large worm holes, bark pockets, and associated stain and decay that constitute degrading defects when the timber is harvested. *White oak borer* severely damages white oak cooperage, particularly the smaller logs. *Oak timberworm*, a pest of both red and white oaks, attacks at wounds where sapwood is exposed.

Hickories usually escape serious injury.

During droughts, however, *hickory bark beetle* may cause widespread mortality of weakened trees. *Hickory borer* tunnels into trunks of saplings and poles in scattered localities and causes measurable defect:

*Lilac borer* and *banded ash borer* attack ash trees of any size and cause breakage in young trees, defect in sawtimber, and scars and decline in ornamental trees.

*Two-lined chestnut borer* causes extensive mortality of oaks and other hardwoods weakened from defoliation, drought, or fire.

*Pinhole borers* seriously threaten fresh-cut logs and green lumber by attacking the wood and riddling it with pinholes.

## Prevention—Borers

Controls for reducing borer damage should fit into ordinary, day-to-day silvicultural operations. Timber landowners should be aware of and use such practices that maintain or improve tree vigor. Some of these include thinning, fertilizing, and matching tree species to site. Landowners should favor tree species least damaged by borers, identify and remove brood trees, harvest as soon as trees are physiologically mature, minimize injuries to residual crop trees, and survey timber stands closely during periods of severe stress. In one study, researchers removed brood trees from selected plots and reduced red oak borer populations by 73 percent.

Resistant strains or clones have been found for a few borer species. Natural enemies of borers are effective controls and can be favored by practices that promote stand diversification. Wrapping trunks, mechanical “worming,” and gallery fumigation can be small-scale controls.

Insect borers can generally be controlled with chemical insecticides. Because of high treatment costs, however, actual use of pesticides for borer control is limited largely to protecting nurseries, plantations, seed orchards, shade and ornamental trees, and possibly high-grade lumber and veneer trees. Certainly in high-risk areas, fresh-sawn logs and green lumber must be treated for protection from pinhole borers.

## DISEASES

The first economic impact of tree diseases is a reduction in the quantity and quality of merchantable wood in a stand. The primary aim of disease management is to minimize these losses.

To have successful disease management programs, landowners should know what the costly diseases are and should be able to recognize signs of these diseases in living trees. An infectious tree disease is caused by an invading biotic agent that changes a tree's normal physiology, morphology, and wood density or quality. Most tree diseases are caused by microscopic fungi that cannot be isolated and identified by people untrained in pathology or mycology, but signs of fungal invasions can be seen by most people who observe trees closely. These signs may be root rots, declines, stem cankers, and decays.

## Root Rots

Hardwoods may occasionally be affected by root rots. Leaves gradually yellow over the entire crown before they turn brown. Most leaves remain on the tree. Roots die before the trunk and crown do, and suckering seldom develops on the lower bole and root collar as it does on wilting trees. White or creamy fungal masses may appear in bark cracks or on root collars. Sporophores, mushrooms, or conks may develop on the ground near the base of affected trees or on decaying root collars. Trees of the same species will generally be affected by a specific root-rot fungus in a given area. An infectious disease or root rot is indicated when symptoms develop in one species while other species on the same site remain healthy.

Chemical treatments for indigenous root rots are not economical, so management strategies must be used to minimize disease impact. When many merchantable trees die from root diseases, they should be cut and sold before their wood decays. Regeneration on sites with a high incidence of root rot should favor marketable species that are not susceptible to the indigenous fungus. Most nonindustrial hardwood stands



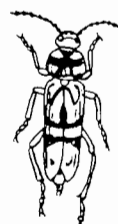
Poplar and willow borer  
Order Coleoptera  
length, 1/3 in.



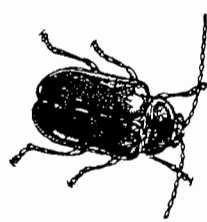
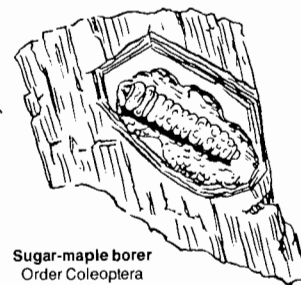
Forest tent caterpillar  
or forest armyworm  
Order Lepidoptera  
wing span, 1 3/4 in.



Chestnut weevil  
Order Coleoptera  
length, 5/16 in.



Sugar-maple borer  
Order Coleoptera  
length, 1 in.



Alder flea beetle  
Order Coleoptera  
length, 1/5 in.

are small and have a mix of species. A landowner should take advantage of this mix by making regenerative selections from nonsusceptible species on the site.

## Declines

Oaks and other upland hardwoods may sometimes decline from unknown causes. Symptoms may include dwarfed leaves, gradual crown thinning, growth reduction, and twig and branch dieback. Trees may decline for several years and then die. Decline caused by an infectious agent may affect only trees of the same or similar species. Some declines may actually be unidentified wilts or root rots. Oak decline and mortality in Alabama has been identified as a disease complex begun by oak leafroller defoliation and climaxed by lethal attacks from two-lined chestnut borers and root rot. Environment also influenced the decline. The often complex biological and physical factors responsible for declines may be difficult to identify, explain, and control. A landowner should seek professional assistance when making management decisions about a stand with declining trees.

## Cankers

Southern hardwoods are sometimes infected by canker fungi that damage a tree's morphology, physiology, and wood quality. Cankers are dead areas on trunks, limbs, and twigs and are often outlined with callus. Initial stages in canker development on thick-barked species are difficult to detect because bark over cankered tissues varies little in color from bark over healthy tissues. Aged cankers are flattened or depressed areas in the wood, and the bark is cracked or sloughed. These depressions are made by growth of healthy wood around cankers. Various fungi cause cankers in oaks and other species. These fungi, which can be identified by their reproductive structures on the host, can weaken stems to allow easy breakage; stain and decay wood; cause top dieback; destroy established apical dominance; and occasionally girdle stems and cause death.

Canker infections are started by fungal spores in bark wounds or on branch stubs. Some cankers are favored by cool spring temperatures and others by the higher summer temperatures. Those favored by high temperatures are usually most destructive during droughts, and those favored by cool temperatures usually become inactive as temperatures warm up in late spring. No chemical treatments for these cankers are economical. Natural stands do not need special attention for canker management alone, but severely cankered trees should be removed during thinnings or other silvicultural operations.

## Decays

Decays and associated defects account for more wood volume loss than all other hardwood diseases combined. Decays reduce wood density and quality. Decaying trees use growing space and time, water, nutrients, and sunlight. On boles, indicators of decay are old butt scars from fires, butt bulges, rotten branch stubs, holes, blind knots, and sporophores or conks.

Many fungi decay wood. Some decay only heartwood, but others decay both sapwood and heartwood. Fungal spores are produced by sporophores on downed and standing trees. These spores are windborne and can start an infection if they land in a vulnerable place on the host.

Trunk rots are started by infections through wounds, fire scars, broken tops and branch stubs. A complex succession of nondecay microorganisms may actually condition the wood for decay before wood-decaying fungi become active. Such a succession has been observed in northern hardwoods. Trunk rots are limited to wood formed before wounding and later infection.

Decays can be minimized by effective management. Landowners should remove trees with canker and trunk rots to provide growing space for sound trees. Many decayed trees can be salvaged. Canker rots develop rapidly and should be dealt with when they are identified. Felling unmerchantable culls will reduce the amount of canker-rot infections by minimizing the

distance spores are spread from sporophores on boles. Stand improvement cuts should remove trees with trunk rots and cankers that will cause culls. Primary stocking left after cuts should contain trees with no rotten stubs over three inches in diameter, no large surface wounds, no holes, and three or fewer blind knots (healed stubs) anywhere on the bole up to eight feet above the merchantable top.

Regeneration of harvested stands should include measures to reduce decay incidence. Most upland hardwood sites are relatively poor, and natural regeneration from stump sprouts may be most important.

Oaks are good stump sprouters on poor sites, and sprouts outgrow most competition. Sprout clumps may develop from one stump and require thinning. Heartwood decay is greater on poor sites than on good ones, and its incidence can be increased if sprouts are not thinned properly. When thinning sprout oak clumps, landowners can reduce decay hazards by using Roth's recommendations: thinning sprouts three inches or larger in d.b.h. (diameter breast height) will not create a decay hazard; thin larger sprouts only when the crotch is a wide "U-shape" and not when it is a "V-shape;" and remove surplus sprouts with a sharp saw and make the cut smooth and slightly sloping. Never leave stubs. Successful management of regeneration will reduce decay hazards.

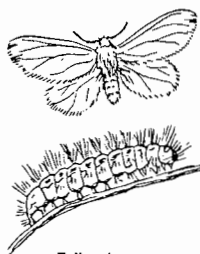
In general, TREASURE Forest owners can continue their hardwood stands by common sense rules of keeping the trees healthy. Landowners striving for TREASURE Forests can improve the health of their stands by removing all trees that breed insects and diseases and by lowering the hazard to pests through sound hardwood management techniques. ♣

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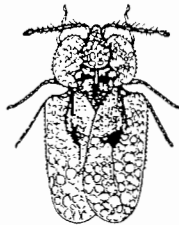
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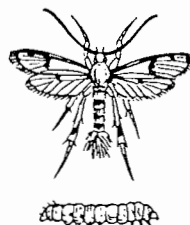
Elm sawfly  
Order Hymenoptera  
length, 1 in.



Fall webworm  
Order Lepidoptera  
wing span, 1 1/4 in.



Sycamore lace bug  
Order Hemiptera  
length, 1/8 in.



Maple callus borer  
Order Lepidoptera  
wing span, 1 in.



Oak timber or ambrosia beetle  
Order Coleoptera  
length, 1/2 in.



Boxelder bug  
Order Hemiptera  
length, 5/8 in.



# ACTIVITIES

## DISTRICT

# 1

March saw an unusual amount of fire activity in our district. The following statistics reflect the totals in our counties: **Calhoun**—77 fires, 2,454 acres; **Cherokee**—155 fires, 12,109 acres; **Etowah**—37 fires, 4,946 acres; **Marshall**—31 fires, 445 acres; **Dekalb**—39 fires, 2,262 acres. Thanks for assistance from **Houston 11** and **13!**

**Marshall County** gave a slide presentation to **Evans Elementary School** on the effects of deforestation and what we can do to promote better forest management.

**DeKalb County** inspected and certified **Crossville VFD**. New officers were elected at the Association meeting.

**Jackson County** conducted their **FFA Forestry Judging Contest** and also conducted the northeast district forestry judging contest.

**Marshall County** completed **FFA Forestry Judging Contest** with **Albertville**, **Douglas**, **Arab**, and **DAR** high schools. **Douglas** was the winner... congratulations **Douglas!**

**Soil Conservation** banquet for outstanding farmer awards were presented a forestry slide presentation. Some of the awards given were to former FIP landowners in **Marshall County**.

A plaque for outstanding contributions to forestry in **Marshall County** was presented to **Ms. Ruby Gilbreath** at her retirement as **Guntersville** librarian.

**Larry Parker**, **Marshall County** Ranger, assisted **Doug Martin** of **Boaz Scout Troop 273** in **Guntersville** on his **Eagle Scout Project**. He is doing his work on wildfires and prescribe burning in **Marshall County**.

**Ed Eldridge** has been working with **Tri-Community Volunteer Fire Department Pleasant Grove**, and **Crow Mountain** in regard to the procurement and transfer of fire trucks.

Approximately 80 acres of control burn was done for **Revere Copper and Brass Company** in **Jackson County**. Also 60 acre control burn was done on the **Skyline Management** area.

The **Alabama Highway Department** property in **Jackson County** was cruised by **Jackson County** forester and a letter submitted to them on results with hopes of procuring part of the property.

A Tree Ordinance was passed by the **Scottsboro City Council** in **Jackson County**.

A forestry demonstration and tour was held on **John Jacobs** property in **Jackson County**.

**Stanley Anderson** met with **Game & Fish** and **Cedar Bluff Police Department** regarding **Daniel Gap Tower** being used for **USMC** training exercise for **SAM Missile**.

## DISTRICT

# 2

The **FFA Forestry Judging Contest** in **Cullman County** and **North Central District** was recently conducted by **Tom Kimbrell** and **Darrell Johns**.

Two hundred students from **Maddox Middle School Seventh Grade** (**Jasper**) were given a program on forestry, soils, wildlife plus a tour of a coal mining operation.

Twenty second and third graders from **St. Paul's School** had a field day on **Forestry and Conservation** at **Camp Meadowbrook**. **Darrell Johns** and **Mike Cornett** conducted the tour.

The **Second Annual North Alabama Forestry Expo '85** will feature **James Martin**, **President** of **Auburn University** as keynote speaker on **July 27, 1985**.

The **FFA Judging Contest** was recently held in **Blount County**. **Blountsville** came in **2nd** in **SCS District** and **Pennington High School** will go to statewide judging contest. **Sharon Clark** has been training the **FFA** members in the county.

**Environmental Education Day** for **Blount County** was held at **Palisades Park**. Students from all county schools participated. **Sharon Clark** spoke on tree identification.

**Donnie Anderson** presented the **Treasure Forest** slide show at the **Soil Stewardship Program**, **May 6**, in **Oneonta**.

**Zed Armstrong** made a general forestry talk on fire prevention at the **Hayden Elementary School**.

**Ranger Rick Hofmeister** must hold the record for the most forestry films shown in a single day. On **April 13** **Rick** presented 15 different films at **Tannehill Historical State Park** during the **Alabama Forest Owners' Association Annual Meeting**.

**District Forester Bart Williams** recently participated in a 5 member review team with **Fire Chief Hugh Mobley** and 3 other **District Foresters**. The review team visited **South** and **North Carolina** for the specific purpose of analyzing their respective forest fire problems and their methods of fire control.

**Phearthur Moore** headed back to **Auburn Forestry School** for another quarter of studies.

**Tom Kimbrell** is serving the **Auburn School of Forestry Alumni Association** as **Secretary-Treasurer** during **1985**. Membership dues are **\$5/year**. Call **Tom** at **798-3227**.

**Johnnie Tidwell** and **Rob Rimer** recently presented a fire prevention program to 180 first graders of the **Montevallo Elementary School**.

**Gary Hamilton** and the other members of the **St. Clair County Forestry Planning Committee** recently held a forestry tour for small landowners. **David Lewis** described the

economic reasons for intermediate thinnings in a 30 year old pine stand. A site that had been chopped and planted was visited also.

**Jim Gober** and **Gary Faulkner** are eagerly awaiting the visit of two forestry officials from **Sweden**. They will give the visitors a tour of facilities for the production wood energy near **Montevallo**.

## DISTRICT

# 3

**Pickens** and **Tuscaloosa** counties had "hand's on" prescribed burning demonstrations for interested landowners. **Pickens County** burned one hundred sixty acres on **January 24th** and **25th** with eleven landowners present. **Tuscaloosa County**, in addition to the demonstration, had an article in **The Tuscaloosa News** on prescribed burning.

**Tuscaloosa** was the site of a meeting on **Forest Herbicides** on **March 12**. The meeting was sponsored by the **Alabama Cooperative Extension Service**, **Alabama Forestry Commission**, **Soil Conservation Service**, and **Resource Management Service, Inc.** Eighty-five private landowners and agency personnel attended the meeting.

**Arbor Week** proved to be a popular week in **District 3** as most counties had presentations of free seedlings to government organizations, schools, or beautification councils. Articles were also used to inform the public of **Arbor Week**.

The **March 5** meeting of the **Livingston Tree Commission** was the day when **Livingston** was presented with a **Tree City USA** award. This brought the total of **Tree City, USA's** to two in **Sumter County**.

A presentation on **Smoke Management** by **Hugh Mobley** was given on **March 8** to **Weyerhaeuser Company** field crews who are responsible for carrying on extensive prescribed burning programs as well as assisting in fire protection on **Weyerhaeuser Company** lands in **West Central Alabama**. Twelve people were present for the slide show and talk.

**District 3**, like most of the state, experienced one of the worst fire seasons in several years this spring. Lack of rainfall coupled with high winds and low relative humidities were responsible for the increased number and sizes of fires in the area. The public responded well to the fire alert placed on the area due to dangerous conditions. A hearty gratitude goes out to the broadcast and print media for their help in keeping the public informed of the fire situation in **West Central Alabama**.

## DISTRICT

# 4

During **April** **Clayton Schwind**, **County Forester**, had two articles published in the **LAFAYETTE SUN**, "Wildfires

Burn Over 550 Acres" as well as "You May Own an Alabama Treasure."

**FFA** groups from **Milltown** and **Five Points** participated in an **FFA Forest Judging Contest** organized by the **County Forester**.

**Chambers County Fire & Rescue Association** held a meeting with the program concerning **District 4 Firemen's** competition, **RCFP Grants**, and the availability of trucks.

In **April**, **Randolph County** received and delivered to **The Randolph Leader** the **Iron Eyes Cody** materials. This is for the **TREASURE Forest Awareness** campaign.

On **April 16** certification for five **Fire Depts.** was received. Photos were taken and will be used in the **Randolph Leader** over a period of several weeks.

**The Randolph Leader** published **Nix's TREETIPS** columns which concerned the fire season statistics, fusiform rust, seedling prices, and needle cast.

**Wedowee Garden Club** held a yearly plant auction. **Steve Nix** acted as the auctioneer of plants to raise club funds.

**Doyle Foster** put out reward posters early in **April** with good results.

**Chambers County Commission**, and the **LaFayette, Lanett**, and **Valley City Councils** proclaimed **Arbor Week** and several tree planting ceremonies were held in the **County**. There was good coverage in all the newspapers.

**W. N. McCollum, FRHII**, is also **W. N. McCollum, Paramedic**. He taught a two-day course in **First Aid** and **First Arrival** to 30 members of **Pine Grove Fire Dept.** In **March** the **Clay County Volunteer Firemen's Association** studied fire prevention and fire training with 40 people present.

**Glenn Berry**, **County Forester**; **Forrest Johnson, FRHII**; and **Darrell Durham, FRII**; were on the run with wildfires through **March** and **April**; from **February** through the summer of **1985**, they will be working in all spare moments to complete the new office.

**Ralph Woolley, Kate Prater**, and **Joel Neighbors** assisted in the **Child Safety Program** (finger-printing) at the **Hanover Vocational Center** on **March 3**. Over 500 children from **Coosa** and **Tallapoosa** counties were there with their parents. **Smokey** attended also and helped with the project.

The **Educational TV** group that plans, writes, and films **FIRST THURSDAY** arrived at **Flagg Mountain** and **Weogufka** the third week in **April** to film **Kate Prater** and other familiar faces from our **AFC "performing arts"** group (**Coosa County**) for the **May 2** segment of that program which aired at **8:30 P.M.**, **May 2**.

**The Roanoke Tree Board** planted trees in the yard of one of the schools as a part of the **ARBOR WEEK** activities;

Steve Nix met with the **Crepe Myrtle Garden Club** and assisted in planting in the **Garden Club Project Park**. He also met with the **Roanoke Beautification Board** at the City Library; the Board made plans to plant 20 holly trees in the **Roanoke** business district.

**Charles Sikes** did a program on Fire Control for the **A&M Fire Dept.** using RCFP materials. He worked with the **Wedowee Fire Dept.** concerning the use of the RCFP radio; Sikes met with the **Planning Committee** of the **District 4 Volunteer Firefighter's Associations** to assist with the plans for the competition held in May in **Randolph County**. Sikes also presented a program on **First Aid and CPR Safety** to the **Randolph County Association of Volunteer Fire Departments**.

**John Tyson** met with the **RC&D Committee** and assisted in making the 1986 Work Plan. He attended the **Talladega Cattlemen's Association** meeting in February.

**Guy Slayden** did a program for 256 Kindergarten youngsters in **Alexander City** in February. This was an **ARBOR WEEK** activity which was requested by **Mrs. James Petrey**.

**Ernie O. Moore**, District Forester, has just returned from a week-long tour of **North and South Carolina Department of Forestry** facilities. He has given a most interesting and informative report of all aspects of the management of wildfires, offices, personnel, financing, equipment and differences in approach to problems/challenges to the **DHQ-4** staff.

The official "fire season" begins October 1 each year and runs through April 30. It began in September of 1984. **Pilot Ray C. Jones** reports that 682 hours were flown on Fire Patrol in this District. **Scott Phillips**, Dispatcher, provided this information—TOTAL (fire season) 1,279 Wildfires for 29,405.3 acres.

DISTRICT

5

On February 11, **Marengo County** landowners **Brooks Bulter** and **Sonny Langley** were presented their **TREASURE** Forest certification by **Senator Frances Strong** and **Representative Harrell Blakeney**.

On February 15, **Linden** received certification as an official **Tree City**, U.S.A. **Mayor Pat Vice** accepted the certificate and flag.

On February 18, **Clanton** received certification as a **Tree City**, U.S.A. On hand for the ceremony were **Billy Joe Driver**, Mayor of Clanton, **State Representative Curtis Smith**, **State Forester C. W. Moody**, **Clanton Tree Commission Chairman Dan Nolen**, and **District Forester H. C. Lucas**.

**Chilton County** landowner **Tobie Mayfield's** property has been certified as a **TREASURE Forest**.

On February 21, **WAKA T.V.** in Selma broadcast a talk show on prescribed burning. Also in **Selma radio talk shows** aired discussing **Arbor Week** and the **Tree City** programs.

On February 11, a slide presentation on **Regenerating Forests** was shown to the **Camden Exchange Club**.

On April 9, the **Wilcox County Extension Service** held a forestry tour on the property of **William Collins**. A demonstration was given on timber volume estimation and timber marking. Use of a spot gun was demonstrated by **AFC** personnel.

On March 4, the first acre ceremony was held for the new **Wilcox County Progressive Soil Survey**. Keynote speaker for the occasion was **Albert McDonald**, **Alabama Commissioner of Agriculture**.

On April 11, **Marengo County** personnel participated in the annual **Forestry judging contest**. **Sweetwater High School** won and will represent **Marengo County** in the **District** finals.

On April 15, the **Marengo County Volunteer Fire Departments** unified to form a **County Fire Department Association**.

On April 24, the **Thomaston Fire Department** received **State Certification**.

During **Arbor Week**, tree plantings were held and free seedlings given away throughout **District Five**.

A total of fifteen programs were presented throughout the **District** this past quarter to groups such as **FFA**, **4H** students, **Garden Clubs**, **Boy Scouts**, and elementary school children on topics as diverse as **Forestry Careers**, **Tree Identification**, **Tree Planting**, **Wildlife**, **Wood Utilization**, and **Trees in a Woman's World**.

DISTRICT

6

**Dale County Forest Planning Committee** sponsored a landowner workshop dealing with **Forest Taxation** in February. **Extension's Forest Economist Bill McKee** conducted the program while a driving rainstorm flooded **Ozark**.

**Ms. Nancy Michel**, a reporter for the **Dothan Progress**, was chosen as a winner of the **W. Kelly Mosley Award** for her outstanding articles concerning forestry in Southeast Alabama and was presented a certificate and painting at the **Houston County Forest Landowner Association** meeting in May by **C. W. Moody**.

With much needed assistance from the county and district personnel in **District Six**, the **RC&D Forestry Committee** published a revised directory of **Forest Vendors** and **Timber Buyers**.

**Urban Forest Coordinator Barry Lawrence** and **Forest Ranger Jerry Dwyer** met with the city of **Geneva's** **Beautification Board** to discuss **TREE City** status.

Two **Arbor Day** Programs were presented by **Tracy Lawrence** during **Arbor Week**. Trees were distributed to **Wicksburg High School** and **Town & Country Garden Club** in **Webb**.

**Dean Gjerstad**, Associate Professor from **Auburn**, presented an informative talk to the **Houston County Forestry Association** on the importance of **vegetation control** in **Southern Pine Plantations**.

**Dr. Joseph Meyers**, with the **Alabama Non-Game Species Program**, presented a program at **Wallace State Community College** on **Bluebird Management** and other non-game species.

**Barry Lawrence**, **Lowell Williams**, **Jerry Smith**, and **Tracy Lawrence** participated in the **75th Boy Scout Jubilee** held in **Dothan**. An educational booth was set up with information on **Careers in Forestry**, **Wildlife**, **TREASURE Forest**, **Campfire Safety**, and **Safety in the Woods**.

**Love Town R.C.F.P.** was certified in **Houston County**.

**Geneva County Forestry Association** met in late February and **RC&D Forester Brian Bradley** presented a slide show and discussion on the conversion of **Marginal Cropland** to **Pine Trees**. **AFC County Supervisor Ronnie Hickman** explained the pending forestry legislation to the 22 people attending, while **SCS District Conservationist James Norris** discussed the **Alabama Conservation Cost-sharing Program**.

**Barbour County Farmers Day Program** was a big event, drawing 300+ landowners to a day of activities including **County Supervisor Don VanHouten's** display of forestry materials and handout information. **Extension Service's Bill McKee** presented a fine talk about forestry as an investment.

The **Coffee County Forestry Advisory Committee** held its quarterly planning meeting to develop an agenda of activities for 1985. Among the items discussed were **outdoor display signs**, **prescribed burning**, **field demonstrations**.

**Forest Industry Assistance** was the highlight of the recent **Wiregrass Resource Conservation and Development Forestry Committee** meeting. **Harold Stepler of Great Southern Paper Company** and **Cal Lavelly of Union Camp Corporation** presented to the 22 people in attendance the programs their companies offered private landowners. Assistant State Conservationist **J. S. Parker** and U.S. Forest Service **RC&D Coordinator Bob Terry** both shared program and funding insights on a **State and Regional level**.

**Pike County TREASURE Forest** landowner and former regional **Helene Mosley Award** winner, **Robert Sellers** was chosen as **AFA's 1985 Tree Farmer of the Year** and was presented a plaque and gifts at the annual meeting of the **Alabama Forestry Association**. **Robert** manages approximately 2300 acres in **Pike County**.

DISTRICT

7

**District 7** sponsored a **Smoke Management School** conducted by **Hugh Mobley** of **State Office** on April 4, 1985.

Several industry people and landowners were represented as well as **District 7** personnel.

**Forester Gib Burke** and **Ranger Robert Knowles** set up and judged the **District FFA Forestry Judging Con-**

test on April 13 in **Atmore, Alabama**.

On April 20 a **Fire Fighters Parade** was held in **Brewton**. The **Forestry Commission** along with numerous **Escambia County RCFP Departments** participated in the parade.

**Escambia County** personnel helped **Brewton** celebrate its 100th Birthday by putting on a demonstration of fire fighting equipment. The theme of the demonstration was "Past and Present" fire fighting techniques.

April 22, the city of **East Brewton** passed a **Tree Ordinance**. This is the first step toward certifying **East Brewton** as a **Tree City USA**.

DISTRICT

8

The **Washington County Forestry Planning Committee** sponsored a landowner tour on February 12. Approximately 60 people visited fertilization test plots in "pitcher plant flats" on **Champion International property**. During lunch, **Dr. Bill McKee**, with the **Cooperative Extension Service** presented a program on forestry investments and taxes. The group then visited the **AFC portable sawmill** which was set up on the **Jordan Estate** property in **Washington County**.

During **Arbor Week** (February 17-23) tree give-aways were held in **Mobile, Clarke** and **Choctaw Counties**. Numerous **Arbor Week** programs were conducted all over the **District**.

Three new **Tree Cities USA** were dedicated during **Arbor Week** this year. The three new ones were **Fairhope, Robertsedale** and **Summerdale** in **Baldwin Co.** This brings **District 8** to a total of seven **Tree Cities**, these being: **Mobile, Foley, Loxley, Silverhill, Fairhope, Robertsedale** and **Summerdale**.

During **March**, **Mobile County Supervisor Patrick Waldrop** held an **FFA Forestry Judging Contest** with two teams from **Citronelle** competing and one team each from **Alba** and **Baker**. **Citronelle** was the winner.

On **March 21**, **Clarke County Supervisor Mike Hinson** held an **FFA Forestry Judging Contest** with two teams from **Grove Hill** and one team each from **Jackson** and **Thomasville** participating. **Grove Hill** was the winner.

On **March 7**, **Lynn Sullivan** from the **Bay Minette District Office** conducted a program and tree planting ceremony with the **Silverhill Tree Board** and the **Silverhill School**.

On **March 14**, **Baldwin County Supervisor John Martin** presented a program on **Forestry Taxation** and **Forest Fire Control** needs at a meeting sponsored by the **Baldwin County Farm Bureau Forestry Committee**. A delicious steak dinner was served. **Mr. C. W. Moody**, **State Forester** was on hand to present **Mr. Lyman Martyn** with his **Treasure Forest Certificate**.

DISTRICT

9

Members of the **Florance Garden Club, City Officials, Alabama Forestry Commission** personnel and



interested citizens gathered at the Forestry Commission office on April 19, for the official opening of the WILD-FLOWER POTPOURRI TRAIL. After the welcome by **Hammie Stamps**, **Louise Bone** spoke to the group on the importance of wildflowers and the educational importance of this project. **Dr. Harry Larsen**, a member of the Mosley Award Selection Committee, made the Mosley Award presentation to **June Thompson**, President of the Florence Garden Club and to **Louise Bone**, District 9 Secretary. **Jim Spain**, Director of the Florence Recreation Department made the official dedication speech. Over 100 species of wildflowers are planted along the trail.

The **Franklin County Forestry Planning Committee** recently presented the TREASURE Forest Award to **Jim Glasgow**. Members of the committee met at the **Glasgow's Gravel Hill** farm where the presentation was made.

The **Billy Haraway** farm in Limestone County was recently certified as a Treasure Forest. Members of the Forestry Planning Committee joined **Mark Sullivan**, Staff Forester; **Howard Swanner**, County Supervisor; and **Greg Wood**, Forest Ranger, in the presentation ceremony.

A teachers workshop for **Agribusiness instructions** will be held at the **Bear Creek Educational Center** in July. Alabama Forestry Commission personnel and industry foresters will assist **Calvin Palmer**, District FFA Coordinator, in presenting the workshop to area teachers. Plans are being developed for FFA students to attend a workshop in the fall of 1985. For

more information on either workshop, contact **Louise Bone**, District 9 Headquarters.

**Boy Scouts of Hamilton** have become actively involved in restoring the bluebird population to this area. They are cooperating with the **State Non-Game Wildlife Program** and will furnish data gathered from monitoring the bluebird houses during the year. **Tony Avery** advises this troop.

**Lawrence County AFC** personnel assisted **Scout Troop 105** in planting a 75th Anniversary Tree. By planting a tree marking the 75th Anniversary of Scouting the troop members earn a Diamond Jubilee Patch.

**Howard Swanner**, County Supervisor in Limestone County, assisted the **Cooperative Extension Service** agents with their Spring club programs. AFC personnel presented fire prevention and general forestry programs to three schools.

**Marion County Personnel** held Arbor Day programs for first grade children. Each child was given seedlings to take home to plant. **Tony Avery**, County Forester, demonstrated proper methods of planting.

**Falkville School** in **Morgan County**, was the site of the FFA speaking contest. **Roger Nichols**, County Forester in Morgan County served as a judge for the 4-H Speaking Contest.

**DISTRICT 10** **Bruce Johnson**, Montgomery County forester, received the coveted Golden Hard Hat award at the annual meeting of the Alabama Forestry Association in

Montgomery May 6-7. This award is given for inspecting and approving 100 or more original Tree Farms, and is the first time such an award has been made in Alabama.

**Ed McCullers**, Titus, is the Elmore County nominee for the Kelly Mosley award for 1984.

The **Lowndes County Forestry Planning Committee** has a meeting set for mid-June at the civic/municipal center in Ft. Deposit. Plans call for forest economist **Dr. Bill McKee** from Auburn to make a presentation.

SPONSORS of the **Lee County** demonstration forest project toured the **Mary Olive Thomas** demo forest in early April to determine new directions for demonstration forestry on the property. With the recent death of Ms. Thomas the forest has become the property of Auburn University.

MONTGOMERY County supervisor **Choppy Johnson** held a tree planting event in the median understorey along Interstate 85 near the Capital in April with members of the **Keep Montgomery Beautiful, Inc.** group. **Choppy** is a long-time executive member of KMB, and was party to planting about 150 redbud and dogwood seedlings.

**SEVEN Alabama Power Co. foresters** from throughout the state toured the Patterson property in Russell County to observe the TREASURE Forest management of **John Rudd** this spring.

**DISTRICT 10 Ranger Cliff Cobb** recently attended and successfully completed the National Rifle Association police firearms instructor school

at the University of Alabama, and will now serve as the District firearms instructor. Also, **Cliff** and Ranger **Tommy Wilson** of Montgomery County will serve as merit badge instructors at Boy Scout Camp Tuckabatchee, and Autauga County, during June and July.

LANDOWNERS from across Elmore County met at the **Soil Conservation Service** office in Wetumpka on the evening of May 9 for a forest insect and disease meeting that had been rescheduled from a month earlier. FID specialist **Jim Hyland** from the AFC State headquarters, and other experts, made presentations. A similar meeting on the subject of managing hardwoods is set for July 11.

A SPECIAL fire prevention day was held at the **Wal-Mart** in Auburn the first week in April at which fire suppression equipment from all departments in the County which participated was displayed. The Commission was well represented, and **Smokey** was there sometimes acting like Forester **Randy Quick**. This is the second year the event has been held at this location, and it is a big success.

MACON COUNTY's crew, **Jessie Fitzpatrick** and **Moses Hall**, has been very active in performing firebreak plowing services. Their quality work and professional manner of serving County residents will pay dividends far into the future.

## CALENDAR\*

**July 1**—Cleburne County, 6:30 p.m. Forestry & Wildlife Association. Call Debra Mathews, 463-2620.

**July 1-12**—Mexico City, Mexico. World Forestry Congress. Forest Farmers Association and Alabama Forestry Association plant tours in conjunction with the Congress. FFA (404) 325-2954; AFA (205) 265-8733.

**July 9-10**—Montgomery County. Forest Herbicide Workshop. An in-depth meeting with many experts. Fee \$90. Call Dr. McKee, 826-5330.

**July 10-11**—Athens, Georgia. Soils & Forest Management Workshop. Call Dr. Hampton, (404) 542-1585.

**July 11**—Elmore County, 7:00 p.m.

24 *Alabama's Treasured Forests*

Hardwood Management is topic at County Forest Landowners Association. Call Lynn Justiss, 567-5486.

**July 15-19**—Lee County. Teachers' Conservation Workshop. Tell a local science teacher about this workshop on everyday practical forestry. Nearly all expenses are paid by Alabama Forestry Foundation. Call Rei Boyce, 265-8733.

**July 17**—Facelift Revisited, Allen Bragg Farm, Madison County, 8 a.m. - 3 p.m. Held in conjunction with Alabama Farm Bureau Commodity Conference and sponsored by Alabama & Madison County Rural Development Councils. Exhibits, Farm Tours, Lunch. Free to interested Farmers.

**July 17-19**—Madison County, Farm Bureau Commodity Conference. Call Steve Guy, 288-3900.

**July 20**—Shelby County, 10:00 a.m. Alabama Forest Owners' Association Growing Pole Timber, speaker Errol Shaw, Koppers Company. Come early for coffee & donuts and a special discussion on Growth Rings &

Growth Rates. Joe Tucker Park, Helena. Call Lee, 663-4138.

**July 27**—Cullman County, 8:00 a.m. North Alabama Forest Expo 1985. Exhibitors call Darrell Johns, 739-3530 Ext. 315.

**July 27**—Society of American Foresters Annual Meeting, Ft. Collins, Colorado.

**September 26-27**—Second Annual Alabama Forest Landowner Forum, Montgomery, Alabama. Sponsored by Alabama Forestry Planning Committee. Call Cynthia Page 261-2525

**September 28**—Alabama Rural Community Fire Protection Annual competition, Prattville, Alabama. For more information contact Ray Tucker, 261-2528.

**November 2**—Southwest Alabama Forestry and Wildlife Festival, Jackson, Alabama. For more information contact the Jackson Chamber of Commerce, 246-3251.

\*Any member agency of the Alabama Forestry Planning Committee can be contacted for more information about listings in this section.

## EDITOR'S UNDERSTORY

By CYNTHIA K. PAGE

Birds' cheerful melodies faded under the loud honking of geese announcing our arrival. Their alarm aroused the other residents to join in their heralding.

Marilyn Ragan busily packed topsoil around a new plant, unaware that we had changed our plans to arrive earlier than she had expected us. How appropriate that we should find her in the yard with dirt on her hands and sacks of potting soil strewn all around indicating that spring planting was underway! She stopped, brushed off her hands and knees, and smiled warmly to greet us.

Marilyn's dark hair frames her gentle face, and the color contrast to her hazel eyes gives them a clarity that almost allows one to see into her soul.

Twenty-nine years ago, she was active as National President of College Club of the American Home Economics Association, the field in which she took her Bachelor's Degree. She was also an excellent diver and swimming instructor. In 1958 she sang with a choir from Georgia at the World's Fair in Brussels.

Along came Gene Ragan, who was just beginning his career in agricultural broadcasting, and she began to sing a different tune. The Ragans have two sons—Russell, a 25 year old television newsman in Selma; and Middleton, 23, who helps with the work on the farm.

Marilyn's enthusiasm and attitude have transformed what was once a pasture into a picturesque homesite. What she does with her plants, an artist does with paint and a brush. At 50, she is in great physical shape! No one would guess that she underwent back surgery two years ago. Even then she worked in the yard while wearing a body cast just to get it ready on time!

She still works out and swims at the Olympia Spa in Dothan when she can break away from the yard. "She really does get

herself overcommitted sometimes," says Gene. "There's something to do here all the time." A member of the Dogwood Garden Club for many years, she won the Horticulture Sweepstakes two years in a row.

Marilyn admits, "I'm a city girl, but I've always had a love for the country." Having lived next to her grandmother, she learned a great deal from both her and her parents. Marilyn's mother won "Yard of the Month" last spring in Blakely, Georgia, for her landscaping talents. Her father often had vegetable gardens and fruit trees and even helped to plant many of the trees at the Ragan farm. An aunt also had an influence on Marilyn. It seems that the whole family had green thumbs!

Sitting in the glassed-in sun porch, we suddenly caught a glimpse of Priss, a fox squirrel, playing in the yard. Marilyn treats all of the animals like pets, even the large catfish who come to her at the pond's edge to be hand fed!

Nature is in its glory at the Ragan farm. Blooming plants and trees paint a scenic view across the sloping lawn. A blue jay splashed in the bird bath and quail scooted

under a shrub as we continued our conversation.

With Gene constantly on the move himself with his broadcasting, advertising, and related activities as well as raising Charolais cattle, Marilyn passes days in the yard or reading the latest business trends. "She's a business-minded person," her husband pointed out, "and she does quite well with her ventures." Stacks of magazines—*Forbes*, *Money*, *Changing Times*, *Personal Finance*, *Wall Street Journal*—all attest to the fact that she does indeed love the business field. And, of course, there's a *Southern Living* magazine nearby. "I catch up on all my reading in the winter," says Marilyn.

Her interest in TREASURE Forest was aroused two years ago. Having already accomplished a great deal of the work, certification came quickly following the receipt of a management plan. "The beautiful part is that we've done this *together*," Marilyn beamed as she cast an affectionate glance at her husband. "And we're still learning! We used to cut all the dead trees, but now they tell me that we should leave a few for the wildlife."

She is, indeed, a special lady. You see, to her "the world of Nature is very beautiful without a sound," for a degenerative hearing disease has slowly robbed her of her sense of sound.

"There's so much to see!" she enthusiastically proclaims. "You can communicate without hearing." William Cullen Bryant once wrote, "To him who in the love of Nature holds communion with her visible forms, she speaks a various language." Perhaps he, too, meant that the language of Nature could be understood without being heard.

Today, as I write, it's beautiful outside. The sun is shining and the temperature is pleasant. I'll bet Marilyn is outside on her hands and knees pulling weeds, creating a lovely flower garden, talking to the geese, or feeding the catfish!





# LANDO

LEGISLATIVE  
ALERT



## NATIONAL



by J. KENNETH MYERS, Legislative Affairs Specialist, U.S.D.A. Forest Service

**T**HE 1985 FARM BILL is a major issue before Congress at the present time. Well over 100 bills have been introduced in the 99th Congress that deal with various aspects of farm legislation. There are nearly a dozen versions of the general Farm Bill itself. The Administration has submitted its own version of farm legislation. A common factor in these bills is a new direction for the Government's role in American Agriculture—reducing dependence on Federal subsidies and placing greater emphasis on the free market system.

Another common element in most of the bills is an emphasis on conservation practices to reduce erosion on highly erodible, marginal croplands. This conservation component appears in the bills in two forms: (1) denying USDA payments to farmers who begin tilling grasslands that have not been in production in previous years (the so-called "Sodbuster" provision) and (2) establishment of a "Conservation Reserve" to retire highly erodible croplands and place them in a permanent vegetative cover.

The latter proposal should be of direct interest to Alabama's forest owners. The bills would direct the Secretary of Agriculture to set up the Conservation Reserve program by entering into contracts with farmers and ranchers to convert erosion-prone cropland now in production into a less intensive use, which would include pasture, permanent grass or legumes, or trees. Contract length would be from 7 to 15 years. Basis for the contract would be a plan developed by the local conservation district. USDA would provide technical assistance in carrying out the plan, share the cost of carrying out conservation measures called for in the plan, and pay an annual land

rental fee for those acres placed in the service. The amount of the fee would be determined by bids received from farmers. The recognition that tree planting, where suitable and appropriate, is an effective means of conserving soil and water would provide an excellent opportunity to restore productivity to some of Alabama's lands. This legislative proposal enjoys broad support among Members of Congress. It has been also supported by national conservation organizations in testimony before House and Senate Committees earlier this spring. It appears that it is a firm part of the Farm Bill.

Congressional committees have begun consideration of this legislation. A House Subcommittee has already approved the conservation reserve measure after adopting several amendments to refine and strengthen its provisions. Amendments include one that would allow the State Forester to work with the local conservation districts in reviewing and approving a landowner's conservation reserve plan where tree planting is indicated.

A bill related to the Farm Bill, but having the single objective of providing farmers relief from indebtedness to the Farmers Home Administration, has been introduced by Congressman Webb Franklin and Senator Thad Cochran, both of Mississippi. This bill called the "Farm Debt Restructure and Conservation Set-Aside Act of 1985," would allow the Department of Agriculture to acquire an easement for up to 50 years in wetlands, upland, or highly erodible land if the land was row-cropped in the preceding three years and secures an FmHA loan which the farmer cannot repay on a timely basis. Payment for the easement by

USDA would be through canceling a portion of the farmer's debt. The bill has not received Committee consideration yet, but is expected to be reviewed as part of the Farm bill.

The Federal budget is the dominant issue occupying much of Congress' time. The need to reduce the Federal deficit while maintaining domestic programs and emphasizing defense programs creates a dilemma that will not have an easy solution nor one that will be obtained quickly. This budget issue may have an effect on Alabama's forest owners. The Administration has proposed in its Fiscal Year 1986 budget request the elimination of financial grants to the States that operate the cooperative forestry technical assistance, resource protection and urban forestry programs. Cost-share payments under the Forestry Incentives Program would also be eliminated under this program, along with the broader cost-share payments under the Agriculture Conservation Program (ACP).

Tax reform is the Congress' agenda for legislative action but has yet to receive attention. Both Congress and the Administration are interested in simplifying the Federal tax code but as yet there has not been much agreement on how to do this. A part of the Administration's proposal has been the removal of certain tax benefits, including those that allow the cost of tree planting to be deducted from a landowner's income and the income received from timber harvest to be treated as a capital gain. The possibility of the removal of these forest landowner tax benefits has initiated action by forest industry and conservation organizations to insure Congress recognizes their importance. No action is expected on tax simplification until later this year. ♦

# WINNERS

## STATE

by FRANK SEGO, Legislative Liaison, Alabama Forestry Commission

**I**T'S HISTORY! The Regular Session of the 1985 Alabama Legislature is over. Some say for the better, others say for worse. Realistically, no one ever gets everything he wants from any session of the legislature, be it California, Missouri, Delaware or Alabama.

This, of course, holds true for measures being sought in the interest of forestry in this state. However, a close analysis quickly reveals that Alabama's forestry program fared well in 1985. Of all legislation proposed, two of the most-sought-after were passed and signed into law by the governor.

House Bill 58, by Representative Bob Harvey of Oneonta, dealt with doubling the present forest products severance tax and the privilege tax on the processor. The measure will provide a \$1.8 million appropriation to the Forestry Commission. This bill ran in tandem with another Harvey measure, HB 602, which provides a matching \$1.8 million appropriation to the AFC from the General Fund for the 1985-86 State Fiscal Year.

### A Teamwork Effort

After a series of "stop and go" encounters with various elements, both bills received their third and final reading in the Senate at 11:58 p.m. on the 29th day of the 30-day session. It was a tremendous victory for the total forestry program in this state. However, it took a relentless effort on the part of Forestry Association leaders, forest landowners and officials of the Forestry Commission to gain passage of these bills. Landowners and industry realized the necessity for such legislation if the Forestry

Commission is to do the job it was mandated to do by an act of the 1969 Legislature.

As *The Birmingham News* pointed out in an editorial for its March 15 editions, "Increasing the Forestry Commission's funds wouldn't just help put out fires, it might be the best way to prevent them and the severe loss to the state's economy of so many timber acres. Those new funds would still not put the Forestry Commission on easy street, but they might increase the one-man fire crews that exist in most counties."

Passage of these bills was hailed as a major accomplishment for Alabama forestry in what proved to be its most successful legislative effort since the inception of the Commission. State Forester C. W. Moody was quick to praise House and Senate members and the Wallace Administration for supporting this legislation.

Another measure that passed the House but fell victim to the midnight hour of the 30th day in the Senate was a proposed amendment to the Constitution, by referendum, for a statewide assessment of 10¢ per acre on Alabama forestlands. This proposal received the endorsement of industry, landowners and county governing bodies which are now making appropriations to the Forestry Commission. It also had the support of the Legislative Forestry Study Committee.

### Marengo Bill Passes

Currently, there are 37 counties with forest acreage assessment in the state. The latest to be adopted was Act No. 85-467, by Representative Harrell Blakeney, of Thomasville, which enables Marengo

County to levy a finance charge of 10¢ per acre on forestlands within that county. Efforts will continue to enlist counties on an individual basis until a statewide referendum can be passed.

### An Increase In The General Fund

The General Fund budget for 1985-86, which eluded the budget isolation process until the 29th day of the session, reflected an increase of \$863,594 over 1984-85 for the Forestry Commission.

State Forester Moody clearly indicated that the increased funding would be used to improve state nurseries and fire control operations.

### When Budgets Were Passed

On the subject of budgets, the writer conducted a little research and came up with the following graphic which shows how many days into each session it took for final action on the General Fund budget:

Year	General Fund Budget
1976	29th
1977	30th
1978	30th
1979	12th
1980	30th
1981	30th
1982	29th
1983	30th
1984	27th
1985	29th



# Protecting Bottomland



## Hardwood Benefits

by MIKE NICOLO, Forest Hydrologist, USDA Forest Service

**B**OTTOMLAND HARDWOOD FORESTS are an extremely valuable resource to landowners in Alabama. These forests occupy floodplains that are adjacent to major rivers and streams throughout the state, but they are especially prevalent on the Coastal Plain.

Water is the driving force of bottomland hardwood communities and flooding is a vital feature in the maintenance of these wetland systems. The forests may vary from areas where the soils remain saturated with water throughout most of the year to sites where soil saturation may last only a week or month during the year. Few trees, other than the bald cypress, will grow in bottomland areas which are under water during all seasons or for extended periods of time. Over 60 tree species can grow, however, in areas subject to occasional overflow and to brief periods of flooding. A few of the better known species which grow in periodically flooded bottomlands are swamp tupelo, water tupelo, bald cypress, red maple, sweetgum, willow, water oak, green ash, river birch, and slash pine.

Although there is disagreement concerning the exact values and functions which bottomland forests and other wetlands possess, some values and functions are generally recognized. Bottomland hardwood forests play a major role in controlling downstream flooding by slowing the movement of water into stream and river channels. The bottomland floodplains serve as natural valley storage basins that reduce downstream flood peaks. The periods of wetness and dryness in bottomland hardwoods foster a rich and complex pattern of habitats for a wide variety of land and water animals. Many birds and mammals are especially dependent on the types of habitat provided, while periodic flooding provides spawning and nursery habitat for fish able to move with the floodwater's edge across the floodplain. Bottomland hardwoods act as natural filters to reduce the impact of non-point source pollution. The forest floor and vegetation absorb and remove sediment, nutrients such as nitrogen, and other substances such as pesticides preventing them from reaching water bodies. Visual and cultural values associated with bottomland

forests are derived from the role they play in providing visual contrast and diversity on the landscape and in providing educational opportunities. Commercial values of bottomland hardwoods include timber production, hunting and commercial and sport fishing.

Bottomland hardwoods are a significant source of wood fiber. Most of the commercially important tree species are relatively shade-intolerant and require full sunlight for satisfactory growth and development. Others are more tolerant of shade and competition. Most foresters consider only one practical means of harvesting and regenerating bottomland hardwoods—clearcutting and natural regeneration.

Whatever system of timber management is utilized in bottomland hardwood forests, the protection of the natural values and functions of these areas should be a primary consideration of the landowner. Protection can best be afforded by requiring certain standards or best management practices to be met during and after timber harvest activities. Some of the more important

standards which can be utilized by the landowner include the following:

1. *Modifications, such as clearcuts, should be well distributed within uncut tracts of land whenever possible.* This will reduce the total impact to the affected bottomland area.
2. *Streamside management zones should be maintained along streams and rivers whenever cutting or site preparation is taking place.* These zones are strips of land which are left essentially undisturbed during the management activities. Although some trees can be selectively removed from the zone, equipment movement and soil disturbance should be kept to a minimum. The primary reasons for leaving streamside zones are to maintain channel stability of affected streams and rivers, to maintain the filtering capacity of the forest floor next to water bodies to catch soil moving from upslope sources, and to maintain temperature stability within affected streams and rivers. There is no simple rule of thumb relating to the necessary width of streamside management zones. Factors such as the erosion potential of the soil, the

slope of adjacent land areas, and the general landform of the surrounding area should be taken into consideration. For large streams and rivers the streamside zone should be a minimum of 50 feet, however.

3. *Logging debris that is placed in stream and river channels as a result of timber harvest should be removed as soon as possible.*
4. *Timber harvests should be restricted to the dry season of the year or to periods when dry site conditions exist.* In Alabama, the dry season is generally the summer and early fall. Restricting logging to periods when dry site conditions exist reduces the soil disturbance and subsequent soil movement which might otherwise occur. Logging under dry conditions will also reduce the amount of soil compaction which would occur during wet-site logging. When harvesting sites which remain wet or saturated throughout the year, specialized equipment designed to reduce soil disturbance and compaction should be used. In these cases, low pound per square inch (PSI) skidders with tracks are more suitable than rubber tired skidders.
5. *Roads should be excluded from*

*bottomland areas whenever possible.* Roads that must enter these areas should do so perpendicular to the stream or river. When crossings are necessary, a suitably designed culvert or bridge will normally be required. If the road is determined not to be needed on a permanent basis, these structures should be removed after the management activities are completed.

6. After management activities are completed, *significant areas of soil disturbance such as skid trails and log landings can be revegetated with grasses or a grass-legume mixture to prevent long term erosion problems.* Compaction problems on these and other areas can be mitigated by subsoiling or plowing the affected sites to a depth of 10 to 12 inches.

The bottomland hardwood forest is a highly diverse and complex area which provides a multitude of commercial and noncommercial benefits. The conservation, along with wise use of these areas, is essential if future generations are to share in the benefits they provide. Steps taken to protect the unique values of these forests during their management is a wise investment in the future. ♣





# OAKS, ACORNS, AND WILDLIFE

by ROBERT WATERS, Wildlife Biologist U.S.D.A. Soil Conservation Service

**M**ORE THAN 20 SPECIES of oaks are native to Alabama. Some are common throughout the states. Others are found in only a few places. Some are valuable for lumber, others are of little or no value for that purpose, but the seed (acorn) of all oaks native to Alabama are valuable to wildlife.

Nutritionally, acorns are a good food concentrate for wildlife. They are high in fat and carbohydrates and they contain protein, vitamins, calcium and phosphorus. At least 96 species of wildlife are known to feed on acorns. Among them are deer, squirrels, quail, turkey, ducks (especially mallards and wood ducks), many non-game birds, racoons, flying squirrels, and rodents such as rats and mice.

The oaks are divided into two broad groups—the white oaks and the red oaks. The latter are sometimes called black oaks. Seed of the white oaks mature in one year; those of the red oaks require two years.

Common white oaks in most of Alabama are the post oak, overcup oak, chestnut oak, swamp chestnut oak, and white oak. Common red oaks in most of the state are water oak, willow oak, laurel oak, black jack oak, northern red oak, scarlet oak, black oak, and southern red oak. The white oaks are more valuable for timber production and their acorns are generally preferred by wildlife. Some believe that wildlife prefer the acorns of white oaks because they contain less tannic acid than do acorns of the red oak group.

The following statements are based on results of research by many people in various parts of the South. They are generally true in Alabama, but there are probably exceptions in the state to each of them.

Oaks that usually grow on bottomland (water, laurel, willow, overcup, swamp chestnut, and white) usually produce more acorns than do oaks that usually grow on upland (post, black jack, southern red,

black, scarlet, and northern red). Oaks that grow on bottomland are more likely to produce a merchantable tree, also a tree that can be sold for lumber at some future time.

Acorn production varies from year to year and from species to species. For example, white oak may produce a bumper crop of acorns one year; and black jack may produce practically none. The next year black jack may have a bumper crop and white oak may produce none. But generally an individual oak, regardless of species, that produces a good crop of acorns one year also produces a good crop every year that's productive for that species. In other words, some individual trees are better producers of acorns than are other trees of that species.

Oaks that grow on bottomland are generally larger than oaks that grow on upland. This helps account for higher acorn yields on bottomland oaks.

Acorns vary a good bit in size—even acorns from trees of the same species. Individual trees of a species may produce small acorns, other trees of that species may produce acorns twice as large. Therefore, a tree that produces only a few larger acorns may bear as many pounds of seed as another tree of that species that yields more, but smaller acorns.

Many factors influence the minimum ages at which acorn production begins. One is competition. Apparently crowded trees start producing at a later age than do trees with plenty of crown space. It usually takes about 25 years for Alabama's native oaks to get into significant acorn production.

Even during years of bumper acorn production for a species, all trees of acorn-bearing size and age do not produce. About 60 percent of the trees in the white oak group are productive in good years. About 90 percent of the red oaks are productive in the better years. The two most dependable acorn producers in Alabama are the water oak and the willow oak—two species that



are found throughout the state. Water oak is the most consistent acorn producer; it rarely fails to produce a crop of acorns.

Best seed production comes from healthy, vigorous trees with larger diameters (at least 12 inches) and well developed crowns.

Acorns are subject to heavy damage by weevils. Such damage is worse during some years than during others. As a rule, about 25 percent of the acorns that reach maturity are unsound because of damage by weevils.

None of Alabama's native oaks produce a crop of acorns every year. Numerous weather factors influence acorn production. Late spring freezes are not uncommon in Alabama. When that happens, white oaks yield few or no acorns and red oaks produce none or few the second fall after the late spring freeze.

Just how important are acorns in the diets of wildlife? Let's look at a few of our common game species:

*Deer*—Acorns usually become available in quantity in September, and they are preferred food of deer in fall, winter, and even into spring when available. A Missouri study showed that in the total volume of food eaten by deer, acorns range from zero percent in June to 62.4 percent in October. The Missouri study lasted 5 years. During the 5 years, the percentages of acorns in the total volume of food eaten by deer in late fall and early winter were 80, 7.3, 32.6, 44.3, and 53.9. These percentages also reflect acorn production during each of the five years because consumption of acorns by deer is in proportion to acorn abundance. Researchers in Alabama and throughout the range of deer have found that acorns, when available, are the principal fall and winter food of this important game animal.

A researcher in Arizona had this to say about acorns and deer, "During a fall of acorns, deer may eat little else; and because they respond so quickly to changes in diet, deer have been recorded which have gone from thin, dry-haired condition to sleekness and good flesh in 15 days when there was a plentiful supply of acorns."

In Alabama, deer consume large quantities of forage and browse from smilax, Japanese honeysuckle and numerous other plants, but eagerly seek and readily consume acorns when they are available. Browsing usually falls off when acorns are available in quantity. This is important in deer management because the amount of browse available on any given area usually determines that area's ability to support deer. If acorns are available in quantity, they supplement the browse and usually produce enough high quality food for good populations of deer.

*Squirrels*—Hunters, foresters, wildlife

## TREASURE SEEKERS • TREASURE FINDERS TREASURE KEEPERS

*This column will be devoted to keeping you updated on current participants in the TREASURE Forest Program. TREASURE Seekers have signed creeds, TREASURE Finders have recently been certified, and TREASURE Keepers have been recertified.*

### TREASURE SEEKERS

There were no creed signers this quarter.

### TREASURE FINDERS

#### CERTIFIED TREASURE FOREST LANDOWNERS

(3/7/85)

FINDERS	OBJECTIVES		ACRES
<b>Calvin Jones (DeKalb)</b>	1-Timber	2-Wildlife	142
<b>Travis Smith (Etowah)</b>	1-Timber	2-Wildlife	260
<b>H. F. White (Etowah)</b>	1-Timber	2-Wildlife	480
<b>Estate Holley (Covington)</b>	1-Timber	2-Recreation	961
<b>George Leon James (Clarke)</b>	1-Timber	2-Wildlife	513
<b>John H. Prine (Mobile)</b>	1-Wildlife	2-Timber	140
<b>William Harraway (Limestone)</b>	1-Wildlife	2-Recreation	95
"Limestone's County's 1st TREASURE Forest"			

### TREASURE KEEPERS

<b>Larry Walters (Marengo)</b> (originally certified September 25, 1978)	1-Timber	2-Wildlife	240
<b>William Alexander (Monroe)</b> (originally certified November 15, 1979)	1-Timber	2-Wildlife	328

biologists, and others interested in squirrels know that acorns are important to both the gray squirrel and the fox squirrel. An adult of either species requires about 1.5 pounds of feed per week. Their main diet consists of nuts and acorns.

Oaks in a timber stand are essential for maintaining a population of squirrels. The best gray squirrel habitat is found along streams. That's also the best place to grow merchantable hardwoods. So, the landowner who desires a crop of squirrels each year should consider leaving hardwoods, especially oaks and hickories, along streams.

It's interesting to note that the mast (seed) crop on oaks and hickories affects the reproduction of squirrels. There is usually poor squirrel reproduction in the year that immediately follows poor mast crops.

*Wild Turkey*—Acorns are preferred food of the wild turkey, also. Much of what we have already said about acorns, deer, and

squirrels is also true about acorns and the wild turkey. This magnificent game bird prefers acorns as food in fall and winter. Therefore, oaks are essential in goal habitat for the wild turkey, especially the oaks that produce smaller acorns.

*Other Game*—Many other species of game feed extensively on acorns. Quail eat them readily. Ducks, especially the mallard and wood duck, seek them out when they are available. Acorns are important for many non-game species, also.

The bottom line is this: If you desire a crop of game animals, leave on each acre of upland at least five mast-bearing oaks. These oaks should be from both the white oak and red oak groups. Then if one species fails to produce mast, others are likely to succeed. From the standpoint of both forestry and wildlife, it's frequently good management to favor hardwoods on bottomland. ♠



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