



3rd Biennial Shortleaf Pine Conference: Speaker Abstracts

Shortleaf Pine Opportunities for Assistance¹

Tim Albritton²

Forest landowners frequently overlook shortleaf pine as a potential option when they are considering artificial and natural regeneration. Landowner education is needed to raise the awareness of the history of shortleaf pine, the opportunities for assistance, and the benefits of managing this species on their property. The NRCS, American Forest Foundation and other partners will complete three landowner marketing campaign beginning in the winter of 2015 and over two years will continue to engage family forest owners in sustainable forest management with an emphasis on riparian forest improvements, prescribed fire and shortleaf pine management. Once engaged, landowners will receive offers for additional information, site visits from professional foresters and wildlife biologists. Landowners accepting one of these offers will receive monthly email communications with educational information and promotions to landowner events and other opportunities like financial assistance. Landowners will receive invitations to at least three technical education programs and three landowner field days. Shortleaf pine provides a viable option for many landowners. It is one of the major timber species in Alabama and throughout the eastern United States. Through landowner education, technical assistance, and financial assistance we can make a positive impact on the restoration of this important species.

¹ Oral paper presented at the 3rd Biennial Shortleaf Pine Conference, Knoxville, TN September 22nd, 2015. Wayne Clatterbuck (Ed.).

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Collaborative Landscape-scale Fire Management in Arkansas, Building Partnerships to Restore Ecosystems¹

McRee Anderson²

Collaborative fire management planning and landscape-scale ecological monitoring depends on land managers across the region finding common ground in their understanding of ecosystem structure and function and in estimates of desired future ecological conditions. Over the last few years, a broad group of organizations have come together and are currently engaged in several large landscape-scale restoration projects to restore oak-hickory and oak-pine ecosystems throughout the Interior Highlands of Arkansas. The goals of these activities are to increase forest health, restore fire dependent woodland ecosystems, fire safety in the wildland/urban interface and protect municipal water sources and water quality. Historically, low intensity surface fires burned these through these systems about every 2-7 years. Plant and animal species once common and broad ranging under the more frequent fire regime are now identified as “Species of Greatest Concern” in the States’ Wildlife Action Plan. Historic records indicate that pre-settlement Ouachita and Ozark woodlands averaged around 38-76 trees per acre. Current densities in much of the region average 300-1000 stems per acre. Restoring this ecosystem takes partnerships grounded in science with a common long-term vision and commitment. There restoration efforts have been cultivated by Arkansas Prescribed Fire Council, Oak Ecosystem Restoration Team and the South-Central Fire Learning Network. These collaborative groups have continued to institutionalize prescribed fire and wildfire training, adaptive management and monitoring, regional fire science, and public education and outreach across the



region. These collaborative efforts continue to attract funding streams from a variety of sources that supports the long-term restoration efforts in the region.

¹ Oral paper presented at the 3rd Biennial Shortleaf Pine Conference, Knoxville, TN September 22nd, 2015. Wayne Clatterbuck (Ed.).

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The Importance of the Shortleaf Pine Initiative: An Agency, Regional and Personal Perspective¹

Ken Arney²

The increased interest of landowners and natural resource managers in restoring shortleaf pine (*Pinus echinata*) throughout its range couldn't have come at a more opportune time. The US Forest Service Forest Inventory & Analysis had been reporting a loss of shortleaf pine and shortleaf pine savannas all across its natural range for many years. Landowners and natural resource professionals concerns over the loss of shortleaf pine was the impetus for the US Forest Service to reach out to our partners to help establish the Shortleaf Pine Initiative. Recent changes in the Farm Bill and competitive grants for Landscape Scale Restoration projects increase the opportunity for this initiative to stem the loss of shortleaf pine habitat and begin to restoring shortleaf pine throughout its range.

¹ Oral paper presented at the 3rd Biennial Shortleaf Pine Conference, Knoxville, TN September 22nd, 2015. Wayne Clatterbuck (Ed.).

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What Is your Shortleaf Pine Story? ¹

David Arnold²

What is your shortleaf pine story? If you are at this conference you have one. As natural resource professionals we all have a common foundational love for forests. That love might have been instilled by our parents, grandparents, exciting adventures in the woods, or just curiosity. Somewhere along our forest odyssey we came across shortleaf pine. When did your path cross with *pinus echinata*? What excites you about continuing the journey?

¹ Oral paper presented at the 3rd Biennial Shortleaf Pine Conference, Knoxville, TN September 22nd, 2015. Wayne Clatterbuck (Ed.).

² David Arnold, Assistant State Forester, Tennessee Division of Forestry

Shortleaf Seedling Production and Quality Seedlings¹

R. Wayne Bell²

International Forest Company (IFCO), in operation since 1983, is the largest producer of containerized seedlings and shortleaf pine in the U.S. IFCO maintains membership at seven research cooperatives to remain current with the latest forest technology for landowners. Seedling supply is critical to the success of the Shortleaf Pine Initiative. Over the last five years, shortleaf seedling production ranged from 2 to 4 million seedlings in the southeast, with IFCO producing approximately half of this quantity. Future seedling



production and supply will not be problematic with sufficient advanced planning. Quality seedlings are essential for the successful restoration of shortleaf pine. One important attribute of high quality seedlings is root quantity, an attribute that improves seedling survival after planting. Containerized seedlings have greater than four times the number of roots and double the root weight compared to bareroot seedlings. Containerized seedling cost, however, is approximately double that of bareroot seedlings. The key to successful artificial regeneration of shortleaf pine is to: order seedlings early, procure the correct seed source, plant seedlings deep, and conduct site preparation activities early.

Additional Key Words: Containerized seedlings

¹ Oral paper presented at the 3rd Biennial Shortleaf Pine Conference, Knoxville, TN September 22nd, 2015. Wayne Clatterbuck (Ed.).

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Shortleaf Pine Restoration: Science and Management in the Western Range¹

Martin L. Blaney², Tom Foti and Bryan Rugar³

With twenty years of pine-bluestem and pine-oak restoration efforts in the western range and the formation of the Interior Highlands Shortleaf Pine Restoration Initiative (IHSPi), ample research, monitoring and management experience allows us to provide lessons learned that may assist other managers. This presentation will highlight a sample of landscape-level projects that demonstrate the effectiveness of partnerships towards our restoration goals. The diversity of practitioners and management methods used among the conservation partners has encouraged collaborative discussions concerning management recipes, what has worked and what hasn't. One of the primary goals of the IHSPi was to define the variations among shortleaf communities in the western range, which we combined into three distinct communities for which to describe restored conditions. With managers in mind, the Desired Future Conditions (DFC) subcommittee has attempted to define and characterize structural and compositional variables that describe DFC for ecological restoration projects. I will describe the process undertaken in the development of the DFCs and present a table which translates canopy openness to silvicultural metrics that marking crews and managers are familiar with for shortleaf pine stands. As the IHSPi was working towards its goals, and the range-wide Shortleaf Pine Initiative continued to gain support among the states, we recognized that, although managing pine stands on public lands is beneficial, improved management of shortleaf pine, including restoration, is critical on private lands as well. I will conclude by addressing the steps Arkansas and Missouri have taken to provide management incentives to private landowners with shortleaf forests.

¹ Oral paper presented at the 3rd Biennial Shortleaf Pine Conference, Knoxville, TN September 22nd, 2015. Wayne Clatterbuck (Ed.).

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Shortleaf pine—one species, or nine? Feeble thoughts from an armchair silviculturist¹

James M. Guldin and James F. Rosson, Jr.²

Shortleaf pine is widely distributed across 22 states east of the 100th meridian, but the condition of shortleaf pine in each of those states varies from being a primary dominant species across a significant part of its range to a forgotten and hard-to-find remnant scattered in relict and often poor and xeric sites. The stories of the demise of shortleaf include past high-grading, selective marking against the species in favor of other southern pines, loss of fire and resulting encroachment of hardwoods, and the elimination of native pure or mixed stands by loblolly pine plantations. From the perspective of an armchair silviculturist, the fate of shortleaf pine and the opportunities for restoration vary widely across seven subjectively identified and varyingly broad ecoregions. Subjectively ranked from best to worst for condition and opportunity for restoration, these include Ouachita shortleaf, Ozark shortleaf, Gulf Coastal Plain shortleaf varyingly mixed with loblolly pine, Atlantic Piedmont shortleaf, southern Appalachian shortleaf, Cumberland Plateau shortleaf, and Northern Appalachian/Blue Ridge shortleaf. Secrets to restoration and recovery of shortleaf pine will include figuring out where it remains and why, where it ought to be found, ability to use prescribed fire, rehabilitation of stands with a minor and varying component of shortleaf pine, presence of viable local timber markets for pines and hardwoods, availability of planting stock from local seed sources, and innovative efforts to rehabilitate stands with a minor mixed shortleaf component. Challenges will surely include land ownership, site quality and growth rates, and what appears to be a universal professional disdain for shortleaf pine in the eyes of field foresters.

¹ Oral paper presented at the 3rd Biennial Shortleaf Pine Conference, Knoxville, TN September 22nd, 2015. Wayne Clatterbuck (Ed.).

² Jim Guldin, Supervisory Research Ecologist & Project Leader, USDA Forest Service-Southern Research Station; James F. Rosson, Jr., FIA Analyst, USDA Forest Service-Southern Research Station

Shortleaf Pine Restoration on Alabama Wildlife Management Areas¹

Daniel A. “Drew” Nix, R.F.²

The Wildlife and Freshwater Fisheries (WFF) Division purchased approximately 2,000 hectares of industrial paper company lands in Jackson County at Skyline Wildlife Management Area during the 1980’s. Some of these lands were forested in young loblolly pine plantations. First thinning of these plantations was initiated during the mid 1990’s. Six months after thinning, these stands were devastated by an ice storm. After salvaging these timber stands, the WFF Division began experimenting with shortleaf pine restoration to mitigate against future ice storms in North Alabama. In 2001 the Alabama Forever Wild Land Trust purchased more than 12,000 hectares of industrial pine forestland as additions to the Freedom Hills and Lauderdale Wildlife Management Areas. These additions were subject to a timber reservation of up to 20 years. WFF applied for a State Wildlife Grant to begin shortleaf pine-bluestem restoration on these lands as they came out from timber reserve. Upland sites chosen for restoration were treated with chemical and sometimes mechanical site prep. Sites were then site prep burned and reforested with bareroot shortleaf seedlings. First year survival with bareroot stock was less than 10%. Reforestation shifted the following year to container stock and survival increased to 90% or better. Wildfire and prescribed fire have occurred in many reforested shortleaf stands with various results depending on season and intensity of fire. Most all shortleaf top killed by fire, have sprouted creating a mosaic of tree heights lending to the perception of a naturally regenerated stand. A diverse understory of numerous native legumes and grasses has resulted and increases the wildlife value of these stands. Plans are to continue with shortleaf restoration on these WMA’s and manage as an uneven aged forest with diverse understory.



¹Oral paper presented at the 3rd Biennial Shortleaf Pine Conference, Knoxville, TN September 22nd, 2015. Wayne Clatterbuck (Ed.).

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History and Composition of the Interior Highlands Shortleaf Pine Restoration Initiative¹

J. Fitzgerald²

The Interior Highlands region of Arkansas, Missouri and Oklahoma once supported vast expanses of shortleaf pine-bluestem woodlands as well as mixed stands of pine-oak and oak-pine, with the variation dependent upon geologic and topography patterns. Landscape-scale restoration of pine-bluestem woodlands began in the early 1990s when the Ouachita National Forest began to implement thinning and prescribed fire to restore habitat for the federally endangered Red-cockaded Woodpecker. While there was ongoing, but mostly ad hoc, communication among scientists and practitioners across the region after the ecological benefits of shortleaf pine restoration became apparent, it wasn't until January 2011 that a regional partnership, the Interior Highlands Shortleaf Pine Restoration Initiative, emerged with a goal of sharing knowledge about management techniques and quantifying the desired structural attributes of shortleaf pine-bluestem and pine-oak ecosystems across the Ozark, Boston and Ouachita Mountains. I will report on the history and current composition of the partnership, describing what I think makes it work, and highlighting those aspects that could help others who might want to form a similar collaborative.

¹Oral paper presented at the 3rd Biennial Shortleaf Pine Conference, Knoxville, TN September 22nd, 2015. Wayne Clatterbuck (Ed.).

²Jane Fitzgerald, Central Hardwoods Joint Venture Coordinator, American Bird Conservancy & Interior Highlands Shortleaf Pine Initiative

Dendrochronology and Forest History¹

H.D. Grissino-Mayer²

Dendrochronology is the science that uses tree rings dated to their exact year of formation to analyze temporal and spatial patterns of processes in the physical and cultural sciences. Trees are ideal for learning about the past environment because they are stationary, ubiquitous across many types of landscapes, and able to record environmental processes in the growth record. Tree rings are formed in temperate and subarctic species in regions that facilitate formation of one ring per year based on the intra-annual seasonality of climate. This is crucial in dendrochronology because it provides annual resolution whereby we are able to date events to one year only (and sometimes to the season) with no plus or minus errors. This precision is achieved using the statistical technique of crossdating, a set of procedures that ensures the correct calendar year has been assigned to each ring formed. In my talk, I will examine the applications of tree-ring dating mainly to better understand the wide diversity of disturbance processes that affect trees and forests. Key among these disturbances is wildfire. Tree-ring dating can precisely date when past fires occurred and forest ecologists can use this information to learn about the past frequency of fire, its seasonality, and especially its spatial dynamics. Dendrochronology has also been widely applied to learn more about the past dynamics of insect populations by focusing on those trees species that are affected (via defoliation or mortality) by insects and those not affected (control species). Other applications include using tree-ring information to learn the effects of various silvicultural treatments on tree and forest growth, as well as to better understand the effects of human-caused air and water pollution.

Additional Key Words: Tree rings, wildfires, insect dynamics, silviculture.



¹ Oral paper presented at the 3rd Biennial Shortleaf Pine Conference, Knoxville, TN September 24th, 2015. Wayne Clatterbuck (Ed.).

² Henri D. Grissino-Mayer, Professor, Department of Geography, University of Tennessee, Knoxville, TN, 37996-0925.

Prescribed Fire and Bat Conservation ¹

J.M. O’Keefe and S.C. Loeb²

With bat populations declining due to white-nose syndrome and other factors, it is critical to strike a balance between the use of prescribed fire for managing natural areas and the need to protect bats and their critical habitats. Indiana bats (*Myotis sodalis*) and northern long-eared bats (*M. septentrionalis*) are two federally protected forest-dwelling bats that occur in forests where shortleaf pine (*Pinus echinata*) and other fire-adapted tree species are important components. Both bats roost under sloughing bark of dead limbs or trees, and both are adapted for foraging for insects under the canopy or along forest edges. With sufficient frequency and intensity, prescribed fire has the potential to benefit these bats by restoring pines and oaks, and by reducing understory clutter. However, concerns about the potential indirect and direct effects of prescribed fire on bats during critical life stages (e.g., the summer maternity season) can prevent or delay the effective use of fire as a restoration tool. Additional information is needed to understand how prescribed fire affects habitat for these forest-dwelling bats in fall, winter, and spring. Our goal is to help resource managers to develop plans that balance the needs of sensitive bat species with the needs of the fire-adapted ecosystems where these bats occur.

¹ Oral paper presented at the 3rd Biennial Shortleaf Pine Conference, Knoxville, TN September 22nd, 2015. Wayne Clatterbuck (Ed.).

² Joy M. O’Keefe, Assistant Professor, Center for Bat Research, Outreach, and Conservation, Indiana State University, Terre Haute, IN 47809. Susan C. Loeb, Research Ecologist, USDA Forest Service, Southern Research Station, Clemson, SC 29634.

Were We Are Now - Successes and Challenges for Shortleaf Restoration in North Carolina¹

Bill Pickens²

Efforts to restore shortleaf pine in North Carolina began in 2005 when the North Carolina Forest Service and North Carolina State University Forestry Extension, in response to concerns about declining acres of shortleaf pine forests, organized our first shortleaf workshop. Since that initial workshop we have sponsored three more workshops focused exclusively on shortleaf management, including the First Regional Shortleaf Conference in Raleigh in 2010. In addition numerous presentations, field days, and other outreach efforts have been given to private forest landowners and public land managers through workshops or meetings sponsored by a diverse group of organizations such as the Society of American Foresters, Association of Consulting Foresters, state and federal agencies, Tree Farmers, and local forest landowners associations. Because of these outreach efforts we have seen an increase in the interest in shortleaf restoration and management by public and private landowners. And with that interest have come some modest but significant restoration successes. Many challenges and issues remain for a shortleaf initiative in North Carolina. One of those challenges was noted as “shortleaf is an upland species without the production capacity of loblolly nor the ecological capacity of longleaf. It seems unremarkable and is therefore expendable”. An important goal for our restoration effort is to identify what makes shortleaf remarkable, educate land managers about its values, and communicate to forest landowners why those attributes make



shortleaf a good option. This presentation will review what we have accomplished and summarize challenges and issues we face as we strive towards restoring and maintaining shortleaf in North Carolina.

¹ Oral paper presented at the 3rd Biennial Shortleaf Pine Conference, Knoxville, TN September 22nd, 2015. Wayne Clatterbuck (Ed.).

² Bill Pickens, Conifer Silviculturist, NC Forest Service, Clayton, NC 27520

Cumberland Plateau Stewardship Fund: Resources for Restoring and Managing Shortleaf Pine in the Cumberland Plateau¹

J. Scott²

The National Fish and Wildlife Foundation will provide an overview of the Cumberland Plateau Stewardship Fund, a public-private partnership that supports the restoration of native forests to conditions that will improve associated wildlife species and the health of freshwater systems, while advancing strategies to support working forests. The Fund is supported with Federal funding from the USDA's Natural Resources Conservation Service, and private funding from International Paper's Forestland Stewards Initiative, Alcoa Foundation and Altria Group. The Fund has a particular interest in accelerating shortleaf pine ecosystem restoration (including shortleaf pine and shortleaf-oak forests) with a 5-year goal of establishing 3,500 acres of shortleaf pine and improving an additional 50,000 acres of existing shortleaf pine habitat through the use of prescribed fire and other management tools.

The presentation will discuss the upcoming request for proposals for the 2016 grant cycle, focusing on opportunities to support shortleaf pine restoration, enhancement and management within the Cumberland Plateau region of Alabama, Georgia, Kentucky and Tennessee. The presentation will provide a high level summary of the program objectives and accomplishments to date, eligible activities, funding priorities for 2016 and key considerations for potential applicants.

Additional Key Words: shortleaf pine, restoration, enhancement, prescribed fire

¹ Oral paper presented at the 3rd Biennial Shortleaf Pine Conference, Knoxville, TN September 22nd, 2015. Wayne Clatterbuck (Ed.).

² Jon Scott, Manager, Southern Regional Office, National Fish and Wildlife Foundation, Washington, DC, 20005.

Underplanted Shortleaf Pine Seedling Survival and Growth in the North Carolina Piedmont¹

David K. Schnake², Scott D. Roberts³, Ian A. Munn³, and John D. Kushla³

A study was established in North Carolina to evaluate the viability of underplanting shortleaf pine (*Pinus echinata* Mill.) seedlings beneath a residual hardwood overstory as a method of reestablishing the shortleaf pine component to Central Appalachian Piedmont sites. Twenty-eight treatment plots were harvested to retain one of four residual overstory basal areas (RBA): 0, 15, 30, or 45 square meters per acre. Three shortleaf pine stock types were established within the RBA treatment plots; bareroot stock (BR), and containerized stock with small plugs (SP), and large plugs (LP). Overstory basal area affected survival only in the RBA0 plots which had the poorest survival for all three stock types over the first growing season.



Seedling growth declined with increasing overstory basal area for all three stock types over the second growing season. Significant differences in percent survival were also noticed between the three stock types. The LP seedlings had the highest survival and the BR the lowest. Containerized seedlings achieved superior height and groundline diameter growth across all treatments but the differences were greatest between the LP and BR seedlings. Comparatively low survival in the RBA0 plots and the inverse relationship between overstory basal area and growth are attributed to gradients in overstory and understory competition levels and site harshness across the four RBA levels. The superior growth and survival of containerized seedlings is attributed to more intact root systems with higher root mass although we cannot rule out seed source differences. The results of this study suggest that underplanting may be a suitable regeneration option for the initial establishment of shortleaf pine on marginal Central Appalachian Piedmont sites. Further improvements in seedling survival and growth may be realized by planting containerized seedlings.

¹ Oral paper presented at the 3rd Biennial Shortleaf Pine Conference, Knoxville, TN September 22nd, 2015. Wayne Clatterbuck (Ed.).

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Shortleaf Pine Genetic Resources – Supporting Restoration in the Southern Region¹

R. Taylor², B.S. Crane³, B. Rowland², M. McGregor², B.J. Ray², C. Leggins⁴

The USDA Forest Service National Forest System (NFS) in the Southern Region actively supports shortleaf pine reforestation and restoration. The NFS Genetic Resources Management Program (GRMP) manages 525 acres of shortleaf pine seed orchards, which is approximately 95% of all known orchard resources in existence in the south (Shortleaf Pine Resources Survey 2015). The GRMP also maintains a seed bank and manages 155 shortleaf progeny tests, which will provide scion material for orchard expansion, backup seed production areas and opportunities for climate change research. The GRMP is working with partners to help build shortleaf pine orchard resources, providing genetically diverse seed to support restoration.

¹ Oral paper presented at the 3rd Biennial Shortleaf Pine Conference, Knoxville, TN September 22nd, 2015. Wayne Clatterbuck (Ed.).

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⁴ C. Leggins, North Carolina Forest Service, Seed Orchard Manager

Fire Exclusion is Causing an Increase in Hybrids Between Shortleaf and Loblolly Pine¹

R.E. Will, J.F. Stewart, K.M. Robertson, J. Bradley, B.S. Crane, J. Guldin, and C.D. Nelson²

Hybridization between shortleaf and loblolly pine has dramatically increased since the 1950's and may threaten the genetic integrity of the more fire-, cold-, and drought-adapted shortleaf pine. Shortleaf pine seedlings have a basal crook that facilitates resprouting after topkill from fire. Hybrids lack this feature. A retrospective study of regeneration under frequently burned and nonburned mixed loblolly pine-shortleaf pine stands found that prescribed fire favored shortleaf pine and eliminated loblolly pine and hybrid pine seedlings. Fire exclusion resulted in a mix of loblolly, shortleaf, and hybrid seedlings. In another study we



burned one- and two-year-old planted loblolly, shortleaf, and F1 shortleaf x loblolly pine hybrid seedlings. Burning killed loblolly and hybrid pine seedlings while the majority of shortleaf pine resprouted after topkill. Therefore, prescribed fire is necessary to prevent establishment of loblolly pine and shortleaf x loblolly pine hybrids during shortleaf pine restoration efforts.

Additional Key Words: Prescribed Fire, Topkill, Resprout, Basal Crook.

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