



# **12th Biennial Longleaf Conference**

**LONGLEAF REFLECTIONS**  
LONGLEAF REFLECTIONS

**Looking Back Taking Stock Making Progress**

Alexandria, Louisiana October 23-26, 2018



Longleaf Professionals and Landowners,

Welcome to the 12<sup>th</sup> Biennial Longleaf Conference and welcome to Alexandria!

This Conference is happening because of the work you do and the support you have provided. There would be no Conference without the sponsors and partners or without the private landowners, land managers, wildlife biologists, foresters, conservation groups, consultants, university researchers, agency and outreach personnel and staff who share a passion for the restoration of the longleaf pine ecosystem. By all of us working together, we will restore this ecosystem and host a successful conference.

I am particularly excited about the Welcome Reception and the silent auction that will go on throughout the Conference. Longleaf Alliance staff, sponsors and members have located and donated numerous unique longleaf items from across the range that I am sure you will be excited about. We will be joined this year by Laurelin Sitterly, an artist from Rhode Island, that will be painting a unique piece inspired by the longleaf ecosystem throughout the week of the Conference and then auctioned off at the Thursday night party. Please take a moment to talk with her about her art and love of longleaf.

Lisa Lewis and Jim Caldwell from the Kisatchie National Forest will give our keynote address on Wednesday with a decidedly Louisiana flavor and then we break up to hear 48 experts discussing different aspects of longleaf management and restoration. There really is too much to see, hear and learn about, so pick carefully.

On the field trip Thursday, we will visit the Kisatchie National Forest and David Daigle's ranch. On the Kisatchie we will see what they are doing to manage and restore their longleaf; while at David's ranch, we will learn about growing longleaf and raising cattle together.

The Conference concludes on Friday with a plenary session with Paul Trianosky and Latimore Smith.

Please visit with our exhibitors and sponsors to learn their connection to longleaf forests and take home a one-of-a-kind gift!

This is your conference. You are all making longleaf conservation happen on the ground, every day. Thank you for coming, and I hope you enjoy yourself, meet new friends with shared interests and learn something new.

Robert Abernethy  
President, Longleaf Alliance

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# 2018 Longleaf Conference Sponsors



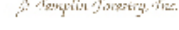
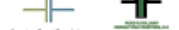
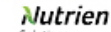
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## 2018 Longleaf Conference Exhibitors

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ArborGen, LLC	SFI, Inc
Advantage Forestry Container Pines	Louisiana Forestry Association
Whitfield Farms	Berger
The F.A. Bartlett Tree Expert Co.	USDA-NRCS
IFCO	PRT
US Forest Service, Kisatchie	DOGGETT John Deere
Roundstone Native Seed	GA DNR
Bodenhamer	Laurelin Rian Art
Proptek, LLC	Bruce Lyndon Cunningham
Dauntless Air	Pine Garden Baskets
The Conservation Fund	USDA Southern Research Station
Align Mineral Management	Yale School of Forestry
Drax Biomass, Inc.	AG-Renewal, Inc.
Forestate Growers	Truax

## 2018 Longleaf Conference Agenda

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### **Monday, October 22**

1:00pm – 5:00pm	Longleaf Partnership Council Meeting – Baton Rouge Room
8:00pm – 10:00pm	Hospitality Suite Open – Spire Room

### **Tuesday, October 23**

8:00am – 11:30am	USFS Forest Supervisor Meeting – New Orleans Room
8:00am – 5:00pm	Longleaf Partnership Council Meeting – Baton Rouge Room
Noon – 4:00pm	LLA Board Meeting (Invitation only) – OK Allen Room
4:00pm – 8:00pm	Early Registration Open – Atrium
4:00pm – 6:00pm	Exhibitor & Poster Set-up & Silent Auction Donations Accepted – Atrium
4:00pm – 8:00pm	The Longleaf Alliance Store Opens – Atrium
6:00pm – 8:00pm	Welcome Reception
7:00pm – 9:00pm	Palustris Society Social (off-site, by invitation)
8:00pm – 10:00pm	Hospitality Suite Open – Spire Room

### **Wednesday, October 24**

7:30am – 7:00pm	Registration – Atrium
7:30am – 8:30am	Continental Breakfast – Atrium
7:30am – 6:00pm	Poster Set-up – Atrium
7:30am – 8:00pm	The Longleaf Alliance Store Open – Atrium

### **Opening Plenary Session**

### **Lake Charles/Lafayette Ballroom**

8:30am – 8:35am	Color Guard; Pledge of Allegiance; Moment of Silence
8:35am – 9:00am	Welcome and Opening Comments: Jacques M. Roy, Mayor of Alexandria Robert Abernethy, The Longleaf Alliance
9:00am – 9:45am	Key Note Address: <i>Kisatchie Reflections – How We Got Here and Where We are Going</i> Lisa Lewis & Jim Caldwell, Kisatchie National Forest
9:45am - 10:00am	State of the Alliance – Robert Abernethy, The Longleaf Alliance
10:00am – 10:30am	BREAK

## **CONCURRENT SESSION A**

10:30am – 12:00pm

### **1-A: RESTORATION THROUGH PARTNERSHIPS – US Forest Service Restoration Through Partnerships – Baton Rouge A**

Session Description: In the Fall of 2017, the US Forest Service issued the Million-Acre Challenge to put an additional one million acres of National Forest System lands on the path towards restoration in support of America's Longleaf Restoration Initiative. Each National Forest has been tasked with developing a Forest Longleaf Restoration Strategy. This session will speak to the origins of the Million-Acre Challenge and the collaborative efforts needed for success, highlight case studies of successful collaborative projects between the US Forest Service and Local Implementation Teams, and a panel discussion will dive into the challenges and progress in rolling out this key initiative and allow session participants to weigh in.

Moderator: Kyle Jones, US Forest Service

10:30 – 11:00 *US Forest Service Million-Acre Challenge* - Ken Arney & Jeff Matthews

11:00 – 11:30 *USFS and LIT collaborative success stories* - Ivan Green, Troy Ettel, Tim Mersmann & Vernon Compton

11:30 – 12:00 *Leading by example through the Million-Acre Challenge: A panel discussion* - Carl Petrick, Michael Spisak, Jason Nolde, Troy Ettel & Robert Abernethy

### **2-A: THE GROUNDCOVER – Lessons from the Field – Monroe Room**

Session Description: Methods used by restoration professionals to restore groundcover in longleaf ecosystems is as variable as the people working in the woods. This session will focus on different ways of achieving your groundcover objectives.

Moderator: Tamara Campbell, US Fish & Wildlife Service

10:30 – 11:00 *Restoring native groundcover in sandhill communities in North Florida: Associated cost, equipment, and method* – Charles Oliver

11:00 – 11:30 *Using pineywoods cattle and prescribed fire to accelerate understory restoration* – Dr. Micheal Davis

11:30 – 12:00 *Propagation of native forbs for reintroduction on longleaf restoration sites in the western Fall Line Sandhills and Pine Mountain of Georgia* – Dr. Joyce Klaus

### **3-A: THE TREE – Conversion to Longleaf Pine – Alexandria Room**

Session Description: As more landowners are working to restore forested habitats, the question of how to successfully convert these systems to longleaf becomes more important. This session will examine conversion techniques that are used across the longleaf range.

Moderator: Ryan Mitchell, The Longleaf Alliance

10:30 – 11:00 *Underplanting longleaf - keys for success* – Nathan Klaus

11:00 – 11:30 *Thinning, site preparation and underplanting options for converting pine plantations to longleaf pine* – Devon Oesterling

11:30 – 12:00 *Longleaf pine uneven-age management demonstration area* – Glenn Hughes

### **4-A: THE ECOSYSTEM – Wildlife Habitat Management – New Orleans Room**

Session Description: Longleaf forests and associated open pine systems provide habitat for numerous wildlife species well-suited for the structure of these forests. Many of these species have declining populations or are at risk or are simply of interest as game or non-game species. In this session, you'll learn how forests with varying parameters can provide suitable habitat while offering flexibility for managers and maintaining conservation values. Also, hear experts talk more about the relationship between habitat use and survival by wildlife species and prescribed fire with a focus on by wild turkeys and bobwhite quail.

Moderator: Joe Cockrell, US Fish & Wildlife Service

10:30 – 11:00 *Using wildlife habitat models to evaluate management endpoints for open pine woodland and savanna.* – Kevin McIntyre

11:00 – 11:30 *Reproductive ecology of female wild turkeys in a fire-managed longleaf pine forest* – Nathan Yeldell

11:30 – 12:00 *Effects of fire management and weather impacts on northern bobwhite brood ecology in open pine systems* – Dr. Theron Terhune

### **Recognition and Awards Luncheon**

12:00 - 12:15

### **Lake Charles/Lafayette Ballroom**

Lunch Served



12:15 - 12:50

Lunch Speaker:

*Increasing Prescribed Fire Capacity Through Partnerships and Community Engagement*

James Sowell, US Forest Service National Forest and Grasslands in Texas, Angelina / Sabine National Forests

12:50 – 1:30

Longleaf Award Presentations — Robert Abernethy

1:30pm - 2:00pm

BREAK

### **CONCURRENT SESSION B**

2:00pm - 3:30pm

#### **1-B: RESTORATION THROUGH PARTNERSHIPS - Moving the Needle for America's Longleaf Restoration Initiative – Baton Rouge A**

Session Description: The America's Longleaf Restoration Initiative is just beyond the mid-point working toward the goals outlined in the Range-Wide Conservation Plan for Longleaf Pine. The Longleaf Partnership Council and its partners have been working over the last few years to better understand the trends in gains as well as losses of longleaf range-wide and implement potential "game changers." This session explores: where do we stand today as an Initiative, where are we on the path to reaching the 8-million-acre goal by 2025, ideas for expanding the scale and scope of restoration across public and private forestlands, and new projects we hope will move the needle.

Moderator: Stephanie Hertz, Texas A&M University

2:00 – 2:30     *State of the America's Longleaf Restoration Initiative* – Andrew Schock

2:30 – 3:00     *America's Longleaf Restoration Initiative— Opportunities for accelerating the pace of restoration* – Gary Burger

3:00 – 3:30     *A Southeast Database for Longleaf Pine: Expanding the Florida Model* - Amy Knight and Brian Camposano

#### **2-B: THE GROUNDCOVER – Research – Monroe Room**

Session Description: We all have much to learn from the ongoing applied research that is happening in longleaf forests. This session will specifically look at some of the latest work to come out on various aspects of longleaf groundcover restoration.

Moderator: Carol Denhof, The Longleaf Alliance

2:00 – 2:30     *Plant community assembly in high diversity southeastern pine savannas* – Kyle Harms

- 2:30 – 3:00     *Large-scale evidence of the value of seed additions for longleaf pine savanna groundcover restoration*  
– Angela Larsen
- 3:00 – 3:30     *Which seed sources for longleaf pine restoration? Common garden and genetics studies to inform seed zone development* – Dr. Joan Walker, Lisa Giencke & Dr. Danny Gustafson

### **3-B: THE TREE – Timber Production – Alexandria Room**

Session Description: Most landowners and managers include timber production as one of their important objectives. Periodic income from timber is essential for private owners to economically justify longer rotation length, and that helps to realize many other objectives. This session will focus on considerations for longleaf managers who want to optimize timber production, with implications across the range. Comparative economic performance of longleaf vs. slash and loblolly will be examined across the southern US on a range of site indices, with and without additional income from non-timber products. A survey of the historic, current and future markets for longleaf timber, as well as emerging new markets for longleaf offers reasons to believe better days are ahead for longleaf premium products. For land managers with stands nearing mid-rotation, important decisions will soon need to be made, based on stand assessments and available markets, and recommendations will be provided to better guide your management actions.

Moderator: Richard Broadwell, Private Landowner

- 2:00 – 2:30     *An argument for longleaf pine - Comparing economics of yellow pines across the Southern United States* – Karuna Paudel
- 2:30 – 3:00     *Longleaf, a valued past and exciting future* – Charles “Buck” Vandersteen
- 3:00 – 3:30     *Playing the dealt hand: Reassessing timber management options at mid rotation* – John Willis

### **4-B: THE ECOSYSTEM - Fire – New Orleans Room**

Session Description: Ecological fire management for longleaf restoration and maintenance continues to expand in different places, on different scales and in different ways. Therefore, more data is needed and what exists needs to be put toward planning fire management actions. The talks in the fire session cover several ecosystems, all fire dependent. They include reporting on ecological fire management on a large scale using current science and technology for management decisions, a 10-year study of the

interplay of fire and geology that can inform restoration efforts and a presentation on the land steward's role in using creativity in his or her use of fire for longleaf restoration when data or historical evidence is lacking.

Moderator: Erik Brown, The Nature Conservancy

2:00 – 2:30 *Fire and Tree-ring Research in Old-growth Pine Savannas of Florida* – Jean Huffman

2:30 – 3:00 *Groundcover diversity in West Gulf CP longleaf pine woodlands: Fire and Geology* – Susan Carr, David Moore, JoAnne Bruser

3:00 – 3:30 *Making sense of it all: Ecosystem condition class tools to facilitate assessment, planning and monitoring of the longleaf and shortleaf pine woodlands of the Talladega Division, Alabama* – Jonathan Stober

3:30pm – 4:00pm

BREAK

### **CONCURRENT SESSION C**

4:00pm - 5:30pm

#### **1-C: RESTORATION THROUGH PARTNERSHIPS - Opportunities for Accelerating Restoration through Partnerships – Baton Rouge A**

Session Description: Partnerships and collaboration across boundaries are key to the success of the America's Longleaf Restoration Initiative. Local Implementation Teams (LITs) across the range are working at the local scale to achieve the goals established in the Range-wide Conservation Plan. This session will highlight case studies of LITs at various stages of development and organization while introducing attendees to the strategic planning process, the results and progress from several LITs, and the benefits of collaboration.

Moderator: Kent Evans, Texas Longleaf Partnership

4:00 – 4:30 *Conservation planning and mapping- Tools for building partnerships and road maps for landscape-scale restoration* – Rob Sutter

4:30 – 5:00 *The Ocala LIT: Growing longleaf on the ground and through partnerships in North-Central Florida* - Ivor Kincaide & Cheryl Millett

5:00 – 5:30 *Developing an Apalachicola Regional Stewardship Alliance Longleaf Conservation Plan* – Brian Pelc

## **2-C: THE GROUNDCOVER – Metrics & Policy – Monroe Room**

Session Description: With all the factors that go into managing for longleaf ecosystem restoration, it can be difficult to accurately gauge level of success. It is important to design assessments that will best characterize and shape policy to positively impact groundcover restoration. New methodologies will be discussed that are making efforts to more accurately assess forest conditions in order to influence larger policy issues.

Moderator: Alison McGee, The Nature Conservancy

- 4:00 – 4:30     *Measuring success in longleaf system restoration: Refining our approach to gauging status and progress in groundcover restoration* - Latimore Smith
- 4:30 – 5:00     *Threading the (pine) needle: Developing groundcover metrics that are easy and rapid to collect and accurately measure the ecological integrity of longleaf and other open pine ecosystems in the southeastern US* - Rickie White
- 5:00 – 5:30     *Assessing Longleaf Condition Class in North Carolina: Comparing methodologies* – Jeff Marcus

## **3-C: THE TREE – Silvicultural Research – Alexandria Room**

Session Description: Focusing on The Tree, this session will bring together experts in longleaf silvicultural research to present new results. Keeping with the conference theme *Looking Back, Taking Stock, Making Progress*, Jim Guldin will look at existing research and applying it to contemporary restoration efforts; Susana Sung will present a paper on how nursery production treatment can enhance height growth; Mary Anne Sayer focuses on fire and how to take advantage of the natural fire tolerance to sustain production of longleaf pine.

Moderator: Bill Pickens, North Carolina Forest Service

- 4:00 – 4:30     *Longleaf pine silviculture research from the USDA Forest Service—20<sup>th</sup> century findings translated for application in the 21<sup>st</sup> century* – James Guldin
- 4:30 – 5:00     *The devil is in the details—Sustaining the growth of young longleaf pine despite crown scorch* – Mary Anne Sayer
- 5:00 – 5:30     *Nursery production treatments enhance height growth of outplanted longleaf pine seedlings* – Susana Sung

#### **4-C: THE ECOSYSTEM – Managing for Species of Concern – New Orleans Room**

Session Description: The longleaf ecosystem is rich in species diversity, both plants and animals. Learn more about that diversity in this session, including the use of a habitat quantification tool that accounts for the functional value of longleaf habitat for a suite of species. Learn also from land managers about restoration and management techniques that assist with recovery of several longleaf ecosystem species of concern, ranging from the red-cockaded woodpecker, gopher tortoise, flatwoods salamander, gopher frog, northern bobwhite quail, and carnivorous plants and other fragile natural community types.

Moderator: Julie Moore, Board Member, The Longleaf Alliance

4:00 – 4:30 *Managing for flatwoods salamanders – challenges, successes, and techniques for the future* – Jana Mott

4:30 – 5:00 *Integrating private landowners into rare species recovery through habitat management, translocation, and head-starting in South Carolina* – Lisa Lord

5:00 – 5:30 *Function-based quantification of longleaf habitat for priority species using an ecological integrity approach* – Paxton Ramsdell

6:00pm – 8:00pm

Poster Reception – Atrium

7:30pm

Silent Auction Ends – Atrium

8:00pm – 10:00pm

Hospitality Suite Open – Spire Room

#### **Thursday, October 25**

7:00am

Registration Desk Open – Atrium

6:30am – 7:00am

Coffee and Bagged Breakfast Available – Atrium

7:00am – 4:30pm

Field Tour

6:00pm – 9:00pm

Party & Live Art Auction – Hotel Bentley

#### **Friday, October 26**

7:30am – 12:00pm

Registration Desk Open – Atrium

7:30am – 12:30pm

The Longleaf Alliance Store Open – Atrium

**Breakfast Closing  
Plenary Session**

7:45am – 8:15am

8:30am – 9:20am

**Lake Charles/Lafayette Ballroom**

Breakfast Served

**FEATURED SPEAKERS**

*Longleaf Conservation, and Riding the Momentum for  
Sustainability in the Forest Marketplace*

Paul Trianosky, Sustainable Forestry Initiative

*Making Progress –Prospects, Challenges and Opportunities for  
Longleaf Ahead*

Latimore Smith, Southern Wild

9:20am – 9:30am

Conference Wrap-up - Robert Abernethy, The Longleaf Alliance

9:30am – 10:00am

BREAK

**CONCURRENT SESSION D**

**10:00am – 11:30am**

**1-D: RESTORATION THROUGH PARTNERSHIPS - Addressing  
Today's Challenges for a Sustainable Future – Baton Rouge A**

Session Description: Ensuring the future of the longleaf ecosystem for the long run requires foresight and addressing the next generation's challenges today. This session will highlight a few of those efforts including a fire mentoring program working to train tomorrow's fire managers, efforts to educate and train private landowners in prescribed fire through "learn and burn" workshops, and coordination efforts of the Southeast Prescribed Fire and Air Quality Workgroup working to foster collaborative efforts to support and increase the appropriate use of prescribed fire as a natural resource management tool to enhance forest health and public health and safety.

Moderator: Randy Tate, The Longleaf Alliance

10:00 – 10:30 *Southeast Prescribed Fire and Air Quality  
Workgroup: Addressing tomorrow's challenges  
Today* – Mark Melvin

10:30 – 11:00 *"Learn & Burn" Workshops: Opportunities to  
provide prescribed burning experience and  
mentorship* – Jennifer Fawcett

11:00 – 11:30 *Longleaf Pine Fire Mentoring Program* - Troy Ettel  
& Toby Bokum-Fauth

**2-D: THE GROUNDCOVER – Strategy Roundtable Discussion –  
Monroe Room**

Session Description: This session will provide the opportunity for those involved in groundcover restoration to gather and discuss

strategies for prioritizing groundcover efforts and leverage partnerships to move projects forward. Specific topics for discussion include increasing plant materials, resource sharing, metrics, and shaping policy.

Moderator: Victor Vankus, US Forest Service, National Seed Lab

10:00 – 10:30 Increasing Restoration Resources

10:30 – 11:00 Measuring Success

11:00 – 11:30 Shaping Policy

### **3-D: THE TREE – Longleaf Management Panel – Alexandria Room**

Session Description: This panel will discuss important topics that land managers should consider for successful longleaf forest management. Specific subjects will include tools that industrial private landowners can use when deciding to convert to longleaf, herbicides used in site prep when ecosystem restoration is the goal, and early entry prescribed fire in young longleaf stands.

Moderator: Ryan Mitchell, The Longleaf Alliance

10:00 – 11:30 Kent Evans, Jennifer Smith, Nathan Klaus

### **4-D: THE ECOSYSTEM – Realizing the Value of Ecosystem Services Provided by the Longleaf Ecosystem – New Orleans Room**

Session Description: If you live in a simple world where the only measure of a forest investment is tons of fiber per acre, then longleaf costs more, takes longer, and requires more attention in management. But for an increasing number of forest investors, well managed forests yield a variety of valuable products and services, and markets are developing where society also values well managed forests. Come hear from experts that are realizing the value of a diverse mix of products such as carbon, wetlands mitigation and endangered species and how the value of longleaf forests is now beginning to be recognized by market forces.

Moderator: Steve Jack, Joseph W. Jones Ecological Research Center

10:00 – 10:30 *Conserving forests to benefit drinking water and forest landowners* – Lisa Lord

10:30 – 11:00 *Financial incentives for landowners who establish long-term gopher tortoise recipient sites* – Eric Seckinger

11:00 – 11:30 *Conservation capitalism and ecological credits* – Lamar Comalander

**11:30am**

**Conference Concludes. Have a safe trip home!**

## Conference Field Trip Descriptions

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Just outside of greater Alexandria lies Louisiana's only National Forest. The Kisatchie National Forest is home to some of the best remaining longleaf in the western range of the species. The tour will spend time at the Vernon Unit, known for its sweeping views of the rolling hills landscape. After years of stewardship, the Vernon is quietly becoming a longleaf showpiece equaling anything else found across the range. Frequent use of fire has shaped the forest here, earning the area its nickname of the "Burnin' Vernon." Frequent fire has promoted a rich understory of native warm season grasses, dominated by bluestem varieties, forbs, and fall-flowering species. Fire-dependent longleaf specialists such as red-cockaded woodpecker, bobwhite quail, and the Louisiana pine snake find a home on the Vernon unit, and with any luck will be visible (or audible) during the tour. This great diversity of species coexists where active and compatible timber management is also being practiced. The tour of the Vernon Unit will highlight a Quail Focal Area, imbedded wetlands, RCW areas, and their adaptable fire management program, along with the partnerships that have made these common objectives possible.

The tour will also showcase an award-winning private landowner property in Beauregard Parish. Daigle Farms, the 2017 Lower Mississippi Valley Joint Venture Private Landowner Conservation Champion, and a Louisiana Department of Wildlife and Fisheries Natural Heritage Site, was once a clear cut. Having come full circle through decades of sound stewardship, the property now represents a functioning longleaf pine savanna alongside the utilization of resources in a manner that is compatible with habitat restoration goals. Using controlled herbivory and prescribed fire, just as historical records confirm it was maintained pre-settlement, the property supports abundant wildlife habitat, wood products, and native understory forage for quality Braford and Brahman Cattle. Nesting and foraging habitat for the endangered red-cockaded woodpecker is maintained alongside the endangered American chaffseed plant. Open pinewood savanna provides habitat for bobwhite quail, wild turkey, and other grassland nesting birds. These subjects, and more, make this property one that can't be missed in central Louisiana.

**THANKS TO OUR GREAT FIELD TOUR PARTNERS!**





## 2018 Regional Longleaf Award Recipients

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Congratulations to the 2018 Regional Longleaf Award Recipients! These individuals and organizations make daily contributions and show unwavering dedication to furthering the cause of longleaf restoration across the southeastern United States.

### Individual Awards & Award Recipients

**The Bill Boyer Natural Resource Professional of the Year Award:** recognizes a natural resource professional who has made outstanding contributions within the field of longleaf ecosystem conservation

*Nathan Klaus, Georgia Department of Natural Resources*

**The Palustris Corporate Achievement Award:** recognizes a corporation with long-standing commitment toward conservation of the longleaf ecosystem

*Roundstone Native Seed Company*

**The Gjerstad/Johnson Landowner of the Year Award:** recognizes a private landowner for ensuring the future of the longleaf ecosystem on private land

*David Daigle of Ragley, Louisiana*

**The Burner Bob Award:** recognizes an individual or organization for outstanding efforts in championing prescribed fire to ensure the future of the longleaf ecosystem on private land

*Jesse Wimberley, North Carolina Sandhills Prescribed Burn Association*

**True Longleaf Champion Awards:** recognize a lifetime of dedication to the conservation and restoration of the South's iconic forest

*Vivian Beech of Grand Bay, Alabama*

*Luther Jones, Natural Resources Conservation Service (retired)*

*Clay Ware, US Fish and Wildlife Service (retired)*

## Conservation Partner Awards & Award Recipients

**Natural Resource Conservation Service Team Achievement Award:** recognizes an NRCS team that has gone above-and-beyond the call of duty in delivering longleaf restoration for private landowners

*NRCS Chesterfield County South Carolina Field Office*

**Department of Defense Team Achievement Award:** recognizes a DOD team that has excelled in managing and restoring the longleaf ecosystem on Military Installations

*Georgia Sentinel Landscape Team*

**US Fish and Wildlife Service Team Achievement Award:** recognizes a USFWS team for their exemplary management and restoration of the longleaf ecosystem for wildlife

*North Carolina Partners for Fish and Wildlife Program*

**USDA Forest Service Team Achievement Award:** recognizes a USDA FS team that has significantly improved and expanded the management and restoration of the Longleaf ecosystem on and around the National Forest System

*US Forest Service Million-Acre Challenge Team*

**Non-Profit Conservation Partner Award:** recognizes a non-profit organization that has significantly improved, protected and conserved the longleaf ecosystem

*The Nature Conservancy*

## 2018 Instagram Photo Award Recipients

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Grand Prize – Angie Carl



1<sup>st</sup> Place – Alan Teed



2<sup>nd</sup> Place – Zac Cordova



3<sup>rd</sup> Place – Forestate LLC



## Presenter Bios

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### POSTER PRESENTERS

**Austin R. Arabie.** Austin is a native of Southwest Louisiana, and he and his wife, Debbie, have lived in Beauregard Parish for over 20 years. He is a graduate of McNeese State University, with a MS in Environmental Science. Austin has been in the environmental field for 30 years, having been employed by industry, regulatory agencies, and engineering firms. He is currently the President of Arabie Environmental Solutions, Inc., an environmental consulting and engineering firm that provides a broad range of environmental services for business, industry, and government. Austin generally fills his spare time outdoors working on family-owned timberland in Beauregard Parish or on his personal property in Cameron Parish. His projects on these properties include management of pine plantations; restoration and maintenance of a native longleaf pine stand; protection of pitcher plant bogs; wildlife habitat improvement targeting deer, quail, turkey, and waterfowl habitats; and coastal prairie restoration.

**Alynne Askins.** For the past 12 years, Lyne has served as the Refuge Manager for the Carolina Sandhills National Wildlife Refuge, a 45,000-acre landscape dominated by the longleaf pine ecosystem. In prior positions, Lyne served as a refuge manager at the Savannah Coastal Refuges Complex, GA; Bon Secour National Wildlife Refuge, AL; and Lower Suwannee and Cedar Keys National Wildlife refuges, FL. Prior to joining the US Fish and Wildlife Service, Lyne was a biologist with the SC Department of Natural Resources. Her professional interests are longleaf pine restoration and management, prescribed fire advocacy, and natural resources leadership development. She currently serves on the SC Prescribed Fire Council, is the immediate Past-President of the SC Chapter of The Wildlife Society, and previously chaired the Sandhills Longleaf Pine Conservation Partnership, the Local Implementation Team for the Rangewide Conservation Plan for Longleaf Pine. Lyne is originally from Charleston, S.C. and received a BA from Furman University and a MS in Forest Resources from Clemson University. Go Tigers!

**Charles Babb.** After 36 years with the USDA-NRCS (32 years in Chesterfield, SC), Charles Babb retired in 2016 to accept the position of Coordinator for the SC Sandhills Longleaf Pine Conservation Partnership (SLPCP). Charles works closely with the Chesterfield Soil and Water Conservation District and all the SLPCP partners to coordinate private landowner assistance to establish and manage longleaf pines within the LIT boundaries of Chesterfield and Darlington Counties. He oversees the administration and management of a number of SLPCP grants, and assist landowners with USDA/NRCS Environmental Quality Incentives Program (EQIP) contracts for longleaf practices.

Babb has a passion for helping landowners make wise land-use decisions. Being from the upstate of SC, his love for the longleaf pine habitat was learned over years of experience both on the job and in the woods hunting turkey and quail. Babb is a Certified Prescribed Fire Manager who enjoys the art of applying prescribed fire to longleaf fire lands. He especially enjoys working with landowners to teach future burners the necessary skills to apply fire to their own lands.

**Don Bragg.** Originally from northern Wisconsin, Dr. Don C. Bragg received BS (1992) and MS (1995) degrees in forestry from Michigan Technological University in Houghton, Michigan and earned a PhD in forest ecology from Utah State University in 1999. After a brief stint as a post-doc at the University of Michigan, in early 2000 Dr. Bragg became a Research Forester with the USDA Forest Service's Southern Research Station in Monticello, Arkansas. Since June 2017, he has been the Project Leader for the Southern Research Station's longleaf pine (SRS-4158) and southern pine ecology and management (SRS-4159) research work units. Author of more than 110 scientific and technical publications, his research interests include southern pine silviculture, forest dynamics modeling, applied historical ecology, restoration of old-growth ecosystems, disturbance ecology, riparian large woody debris recruitment simulation, the history of forestry, and birdseye sugar maple. Dr. Bragg was also the Editor-in-Chief of the Journal of Forestry between 2013 and 2017.

**Barbara Crane.** Barbara has been a forester in the south for 37 years. Since 2003, she has been the Regional Geneticist for the USDA Forest Service Southern Region, National Forest System. In this position, she provides oversight management of the regional pine and hardwood seed orchards and the seed bank. She also manages multiple projects related to tree conservation, e.g. species such as Table Mountain pine, Atlantic white cedar, Balsam and Fraser firs, Carolina and Eastern Hemlocks, Red spruce, American chestnut. She supports silviculture programs related to reforestation and restoration, with a priority emphasis on longleaf and shortleaf pine restoration.

Prior to the Forest Service Barbara spent 20+ years working in Forest Management and Research in both forest private industry and academia.

Her education includes a BS in Forest Management (Univ. Tenn.), a MS in Forest Genetics (Clemson Univ.) and a MS in Tree Physiology (Univ. Florida). She is a certified Forester and a member of the Society of American Foresters (SAF).

**Tamara Campbell.** Tamara serves as the Endangered Species Act Section 7 and Conservation Planning Assistance Projects Biologist for the US Fish and Wildlife Service in Mississippi. Additionally, she has been coordinating longleaf pine and prescribed fire activities in MS for nearly eight years.

**LuAnn Craighton.** LuAnn works for the Georgia Chapter of The Nature Conservancy and serves as the Outreach Director and Local Implementation Team Coordinator for the Chattahoochee Fall Line Conservation Partnership (CFLCP). The CFLCP is a collaborative effort working in west Georgia and east Alabama on the conservation, restoration and management of the longleaf pine ecosystem. LuAnn is a biologist and has worked in land management, environmental education, land conservation and sustainable development for over 25 years. She graduated from Miami University in Oxford, Ohio, with a degree in Botany. She has served on the Chattahoochee Valley Land Trust Board, Georgia Forestry Foundation Board, Institute for Georgia Environmental Leadership (IGEL) Board and the Harris County Zoning Adjustment Board. LuAnn enjoys living on a farm in rural Pine Mountain Valley, GA.

**Jennifer Fawcett.** Jennifer is an Extension Associate in the Department of Forestry and Environmental Resources, Extension Forestry at North Carolina State University (NCSU). She serves as Coordinator of the Southeast Regional Partnership for Planning and Sustainability (SERPPAS) Prescribed Fire Work Group and assists in implementing prescribed fire-related education and outreach programs across the Southern region. She received her BS in Animal Science from the University of Delaware, MS in Forest Resources from Clemson University, and is working towards her EdD in Agricultural and Extension Education at NCSU. She currently serves as an Advisory Board member for the Southern Fire Exchange and is a lifetime member of the North Carolina Prescribed Fire Council.

**Jennie Haskell.** Jennie has been a forester with USDA Forest Service since 2000. She joined the natural resources planning team at Savannah River in 2003. As a silviculturist for the USDA Forest Service-Savannah River, she actively manages for RCW habitat improvement within the longleaf pine ecosystem. She is a partner with the Local Implementation Team the SOLO-Ace Longleaf Partnership. The USDA Forest Service-Savannah River actively manages approximately 200,000 acres for the Department of Energy at the Savannah River Site near New Ellenton, SC. Approximately a third of the landscape is managed for longleaf pine ecosystem.

**Laurel Kays.** Laurel is an Extension Assistant specializing in prescribed fire projects at NC State University. Laurel previously worked as the Forestry Project Manager for the Southwestern North Carolina Resource Conservation and Development Association, a non-profit based in Waynesville, NC. With this organization, Laurel worked on grant-based projects with organizational partners and landowners to reduce wildfire risk. She has also worked in forestry and conservation outreach for organizations including the National Park Service, as well as in Washington, DC, on technology policy issues. Laurel holds an MS in Forestry from NC State University and a BA in Government & Politics and American Cultural Studies from University of Maryland, College Park.

**William McFarland.** William received his Bachelor's Degree from the University of Southern Mississippi in 2016 and is currently pursuing his Master's Degree in Environmental Biology at the University of Southern Mississippi, where he is studying under Dr. Micheal Davis. His research interests are focused on the composition and diversity of plant communities in the East Gulf Coastal Plain, particularly in longleaf pine communities. He also has a strong interest in plant systematics and botany. He plans to graduate with his Master's Degree and pursue a Doctoral Degree from an as-of-yet undetermined university, eventually hoping to teach and conduct research in plant ecology and/or plant systematics at a university.

**Emma Kaitlin H. McWilson.** Emma is a Senior at the University of South Alabama studying Environmental Sciences. She has created and is conducting an on-going floristic survey of Mobile, Alabama's Longleaf Pine Treasure Forest as part of a Directed Studies program in association with the University of South Alabama and the Mobile Botanical Gardens. Her interests include wetland ecology, conservation biology, and restoration.

**Cheryl Millett.** Cheryl is Tiger Creek Preserve Manager with the Florida Chapter of The Nature Conservancy at Tiger Creek Preserve. She has led landscape-scale partnership programs there focused on land and invasive species management since 2005. Currently, she leads the Ocala Longleaf Local Implementation Team and the Heartland Cooperative Invasive Species Management Area.

**Lytton Musselman.** Lytton is the Mary Payne Hogan Professor of Botany and former department chair of the Department of Biological Sciences at Old Dominion University. In 1984 he established the Blackwater Ecological Preserve after the gift of 319 acres from the Union Camp Corporation. He is the manager of the Preserve. His research interests are in the history of longleaf, and the naval stores industry in Virginia. Author of several books on plants of the Bible and Qur'an he is currently working on a book on the plants of the Adirondacks and a volume on edible plants of Virginia and neighboring states.

**Mary Frances Nieminen.** Mary is a research associate in the Silviculture & Forest Restoration Lab at the Jones Ecological Research Center at Ichauway in Newton, GA. Her current focus is on growth and spatial influences of regeneration within upland pine stands in southwest Georgia. She obtained her BS in Environmental Science from Florida State University and a MS in Forestry from Mississippi State University.

**Joe Reinman.** Joe is a Wildlife Biologist at St. Marks National Wildlife Refuge where he has worked with imperiled species and longleaf pine systems for nearly 40 years. He earned a Bachelor of Science in Wildlife Ecology from the University of Florida.

**Alan Shadow.** Alan is a native of Louisiana and graduated from Louisiana State University-Shreveport with a BS in biochemistry in 1995. He began work with the LSU AgCenter Red River

Research Station in Bossier City, Louisiana shortly after graduation, focusing on row crop variety trials and evaluations. He later moved to the main campus in Baton Rouge to work with the Agronomy Department in developing native plants to fight coastal erosion and obtained an MS in Agronomy from LSU in 2005. After obtaining the MS, he was hired as a career intern through the USDA NRCS Plant Materials Program and worked at the Manhattan Plant Materials Center in Manhattan, Kansas for two years before moving to the East Texas Plant Materials Center in 2007 where he became manager in 2011.

**Nicole Strauss.** Nicole studies at the College of Charleston in South Carolina, working as an undergrad researcher in Dr. Daniel McGlinn's lab. She is interested in ecology and behavior of reptiles and amphibians, particularly the effect of disturbance on community structure.

**Curtis VanderSchaaf.** Dr. VanderSchaaf received his degrees at Stephen F. Austin State University, University of Idaho, and Virginia Tech University. He has worked in the forestry profession at the University of Arkansas at Monticello, Auburn University, Texas A&M Forest Service, and the Minnesota Division of Forestry. He currently is an Assistant Professor at Louisiana Tech University.

**Evan Wheeler.** Evan is an Auburn University School of Forestry and Wildlife Sciences Master of Science in Wildlife Sciences student. He is working on a field research project to examine how longleaf pine (*Pinus palustris*) planting density influences the relationship between timber objectives and wildlife habitat management goals. He grew up in coastal Alabama and is an avid outdoorsman, especially dedicated to saltwater fishing and wingshooting. After graduation, he intends to pursue a career in longleaf restoration and land management throughout the Lower Coastal Plain of the southeastern United States.

## **SPEAKERS**

**Robert Abernethy.** Robert was selected as President of The Longleaf Alliance in September 2012. Prior to that time, Robert was the Assistant Vice President for Agency Programs with the National Wild Turkey Federation for 17 years. In that role, Robert maintained partnerships with all state and federal wildlife and land management agencies and oversaw all longleaf restoration work the NWTF was involved in on state, federal, and private lands. Robert also coordinated the NWTF's effort to assist the state wildlife agencies in the restoration of the wild turkey. Robert has a BS from NC State in Wildlife Biology and a MS from LSU in Marine Science. He has worked all over the US and Canada on projects as varied as waterfowl management and research, wetlands research and restoration, wild turkey restoration, hunter recruitment, and habitat restoration of Louisiana marshes, bottomland hardwood forests, Carolina bays, oak savannahs and longleaf pine forests. His passions are his family, turkey hunting and habitat restoration (especially longleaf) on the family farm in Southeastern North Carolina.



**Gary Burger.** Gary currently serves as the Statewide Forester for the SC Department of Natural resources where he administers their timber sale program and coordinates management and restoration activities with Regional Staff on over 280,000 acres of SCDNR-owned lands. Prior to joining SCDNR, Gary worked with the National Wild Turkey Federation as a Registered Forester for five years, with a primary focus on longleaf pine restoration across the southeast. There, he managed a number of wildlife habitat improvement grants, cooperative agreements, and stewardship projects from a variety of sources such as the National Fish and Wildlife Foundation, the Natural Resources Conservation Service, the US Fish and Wildlife Service, and the US Forest Service. Gary's longleaf experience and prescribed fire expertise were developed over 12 years as the first trained forester of the Hitchcock Woods in Aiken, SC. While there he developed their first Forest Management Plan and reintroduced selective timbering and prescribed burning to the 2,000-acre urban recreational forest. The Hitchcock Woods now serves as a successful model for the use of prescribed fire in the wildland-urban interface. Gary has a BS ('93) and an MS ('96) in Forest Resources Management from Clemson University. He recently served as the Chairman for the South Carolina Prescribed Fire Council, on the Governing Board of the Coalition of Prescribed Fire Councils, and as the Incoming Chairman of the Longleaf Partnership Council.

**Jim Caldwell.** Jim is the Staff Officer for Public Affairs, Recreation, Heritage and Administration for the Kisatchie National Forest. Jim has been with the Forest Service for 47 years and has always worked in longleaf pine country. Jim holds a Forestry and Wildlife degree from Mississippi State University. Among other duties he has been a certified silviculturalist with the Forest Service. He enjoys speaking with groups and leading forest tours, often times in the longleaf pine forest. Jim enjoys hunting, fishing and photography and one of his favorite activities is photographing longleaf pine. In 2015 Jim led an effort to place the Eastern Wild Turkey, longleaf pine and bluestem grass on the new Louisiana State Quarter for the America the Beautiful US Mint State Quarter series.

**Brian Camposano.** Brian has served as the State Forest Ecologist for the Florida Forest Service in Tallahassee since 2014. He began his career with the Florida Forest Service in 2007, working as a biologist at Goethe State Forest before moving onto the District Biologist role in the Jacksonville District in 2010. He graduated from the University of Florida with a BS in Wildlife Ecology and Conservation (2005) and a MS in Interdisciplinary Ecology (2011). He has worked on the Longleaf Pine Ecosystem Geodatabase in cooperation with FNAI since accepting his position as the State Forest Ecologist, including securing the funding for the second major assessment in Florida.

**Susan Carr.** Susan is a plant ecologist, who in later life directs her professional attention toward Florida land conservation. As a Program Manager with the North Florida Land Trust, Susan

focuses on land protection of the Ocala to Osceola Conservation Corridor in NE Florida. Susan also serves as President of the Florida Native Plant Society, a nonprofit dedicated to the preservation, conservation and restoration of Florida's native plants and native plant communities.

Susan earned a BS in Botany from the University of Florida in 1988, and later returned to her alma mater to complete her PhD in Wildlife Ecology and Conservation in 2007. Her graduate research focused on floristic diversity of fire-maintained pinelands across Florida. This research lead to several publications and continues to inform the ongoing development of the US National Vegetation Classification.

**C. Lamar Comalander.** Lamar has more than forty (40+) years' experience in forest management and assisting private landowners in land management. Areas of expertise include land and timber analysis with specialized expertise in quail management, endangered species management and associated longleaf ecosystems.

Lamar is a past board member of The Forestry Association of South Carolina and a board member of Congaree Land Trust. Lamar is a member of Society of American Foresters, The Longleaf Alliance, and Carolina Quail Association; he currently serves as President Emeritus of Milliken Forestry Company and is a Registered Forester in SC and NC. Lamar is certified in red-cockaded Woodpecker management holding both Federal and State Endangered Species Permits and coordinates research, grant proposals, habitat management, mitigation, and technical analysis on over two hundred twenty-one (221) RCW clusters; these RCW clusters represent seventy-two percent (72%) of all RCW enrolled in Safe Harbor in South Carolina.

**Vernon Compton.** Vernon works for The Longleaf Alliance as Director of the Gulf Coastal Plain Ecosystem Partnership. The Gulf Coastal Plain Ecosystem Partnership is a voluntary public/private landowner partnership formed in 1996 that now sustains over 1.3 million acres of diverse habitat in northwest Florida and south Alabama. The fifteen partners are the Department of Defense (Naval Air Station Pensacola and Whiting Field and Eglin Air Force Base), the Florida Department of Environmental Protection, the Florida Forest Service, the Florida Fish & Wildlife Conservation Commission, Gulf Power, The Longleaf Alliance, the National Park Service, the Northwest Florida Water Management District, National Forests in Alabama, The Nature Conservancy, Nokuse Plantation, Westervelt Ecological Services, Resource Management Service, Escambia County, FL, and the National Wild Turkey Federation. The partnership allows the partners to combine their expertise and resources to more effectively manage their individual properties and to meet the challenges of restoring and sustaining the larger longleaf ecosystem. Vernon has a Bachelor of Science in Forest Management from LSU and prior to joining The Longleaf Alliance in 2010 worked for the Florida Chapter of The Nature Conservancy and the Florida Forest Service at Blackwater River State Forest.

**Dr. Micheal Davis.** Dr. Davis is Director of Lake Thoreau Environmental Center at the University of Southern Mississippi and a member of the Collaborative Forest Landscape Program team at Desoto National Forest. Current research in his lab includes utilization of Pineywoods cattle in longleaf pine restoration, effects of prescribed fire on forest soil respiration, gallberry reduction BMPs, pitcher plant bog restoration, and effects of forest management on pollinator diversity. Dr. Davis also serves as a consultant for oil and gas exploration companies and his duties range from monitoring threatened and endangered species to NRDA activities. Dr. Davis received his BS and PhD in Botany from Auburn University and has been with the University of Southern Mississippi since 2001.

**Troy Ettel.** Troy is the program officer for the Turner Foundation where he manages the foundation's grantmaking programs related to wildlife, biodiversity, and land conservation. He served as the Director of the Longleaf Pine Program with The Nature Conservancy from October 2011 – August 2018, coordinating the Conservancy's role across nine states in restoring one of the most iconic and diverse ecosystems on planet Earth. He served on the 33-member Regional Longleaf Partnership Council, whose purpose is to promote effective communication and collaboration among the large number of partners working to conserve longleaf pine ecosystems across the South, for seven years including a 3-year-term on the Leadership Team from 2015 - 2017.

**Kent Evans.** Kent was raised in Texas, mostly on small ranches near McKinney, Weatherford and Stephenville. He earned BS and MS degrees from Texas A&M University in Wildlife and Range Science. He served 34 years with the US Forest Service managing federal lands in New Mexico, Texas, Alabama, Georgia, and Tennessee. He is experienced with public/private partnerships including administration of the 1996 Olympic Whitewater Canoe/Kayak venue on the Cherokee National Forest, restoration of the Conasauga River Ecosystem, and restoration of the longleaf pine / fire ecosystem. He has served as a District Ranger in Alabama and as the Timber/Fire Staff Officer for the National Forests and Grasslands in Texas. Kent is under contract to Texas A&M Forest Service as Coordinator, Texas Longleaf Implementation Team. Kent and his wife, Debra, are new owners of cutover lands in east Texas where they are re-establishing longleaf pine. In their spare time, the Evans' try to keep up with their three kids and five grandkids in California, Washington, and Texas.

**Lisa Giencke.** Lisa is a Senior Research Associate in plant ecology at the Joseph W. Jones Ecological Research Center at Ichauway in Newton, Georgia. She has a BA in Biology from the University of North Carolina – Chapel Hill and an MS in Environmental and Forest Biology from the SUNY College of Environmental Science and Forestry. Her research interests focus on plant diversity in the longleaf pine ecosystem, including patterns of diversity, fire effects, endangered species management, and restoration.

**Ivan Green.** Ivan currently serves as District Ranger of the Osceola National Forest and has been with the USFS-Forest Service for 26 years. He has also served at the USDA-Forest Service, National Forest in Alabama; Apalachicola National Forest, Florida; Wakulla Ranger District, Florida; Tuskegee Ranger District, Alabama and the Savannah River Site. He has worked in the capacity of Staff/Liaison Officer, District Ranger, Forest Ecologist, Civil Rights Officer, and Deputy Forest Manager. Ivan holds a Bachelor of Science in Forestry with a concentration in Forest Ecology and a minor in business from Louisiana Tech and Grambling State Universities.

**Dr. Jim Guldin.** Dr. Guldin is the Station Silviculturist for the Southern Research Station of the USDA Forest Service, and is stationed in Hot Springs, Arkansas. He is one of three Station scientists who serve on the SRS Research Advisory Board, which supervises the scientific research program for all of the Station's research work units across the South. He's been with SRS for 25 years; prior to his appointment to the Board in 2017, Guldin served as Project Leader for two of the Station's silviculture and wildlife research units for nearly two decades. He started his career in the South on the faculty at the School of Forest Resources at the University of Arkansas-Monticello from 1982-1991. Jim describes himself as an "alleged" expert in the theory and application of uneven-aged silvicultural systems in southern yellow pines and in Ozark oak-hickory forests, on the restoration of even-aged shortleaf pine-bluestem woodlands in the Ouachita Mountains of Arkansas and Oklahoma, and restoration and management of longleaf pine forests and woodlands in the lower Gulf Coastal Plain.

**Danny Gustafson.** Danny is a plant molecular ecologist interested in mechanism structuring plant populations and communities. Much of his research has focused on issues of seed source selection and ecotypic variation as it relates to restoring North American Grasslands (Oak/Hickory savannas, tallgrass prairie, serpentine grassland, maritime and salt marsh communities, and longleaf pine savannas).

**Kyle Harms.** Kyle's research focus has long been high-diversity plant community ecology. He carried out his PhD research during the 1990s in Panama and has since collaborated with tropical biologists in several other forests. Although he got his start in tropical forest ecology, ever since moving to Louisiana in 2002 he has also worked in sub-tropical longleaf pine savannas. He is currently a Professor at Louisiana State University, with ongoing research projects in longleaf ecosystems of Louisiana and Florida.

**Jef Hodges.** Jef received a Bachelor of Science from the University of Missouri in Fisheries and Wildlife. Before becoming Grassland Coordinator for the National Bobwhite Conservation Initiative, his work experiences include the University of Missouri, Missouri Department of Conservation, a native vegetation seed production company, the now defunct Quail Unlimited as a regional director and biologist, and was self-employed as a conservation contractor

specializing in native vegetation establishment and management and prescribed fire services. He is a Certified Wildlife Biologist and a USDA Registered Technical Service Provider. He is a second-generation owner of a family farm which he manages for biodiversity with an emphasis on bobwhite density.

**Glenn Hughes.** Glenn is Extension Forestry Professor for the Mississippi State University Extension Service. He provides forestry-related programs to landowners, professionals, and others interested in advancing forest management and stewardship in a 21-county area in southeast Mississippi.

Glenn has written and spoken on many forestry topics including longleaf pine management, the Tree Farm System, forest certification, prescribed fire, landowner education, forest history, emerging markets, and general forest management.

Glenn is a Forestry graduate from Mississippi State University and has graduate degrees from the University of Wyoming and Texas A&M University. He lives in Ocean Springs, Mississippi.

**Dr. Joyce Klaus.** Dr. Klaus earned a BA degree in Biology and Environmental Studies at the College of Charleston, and a PhD in Conservation Biology at the University of Central Florida under the direction of Dr. Reed Noss. During her long graduate tenure, she was an EPA STAR Fellow and prescribed fire technician with US Fish and Wildlife Service. Her research encompasses many aspects of habitat restoration within the longleaf pine ecosystem, with special focus on ephemeral wetlands. In the past she worked on a scuba diving charter boat, conducted contract survey work for USDA Forest Service, and was crew leader for the GA DNR Nongame Conservation Section gopher tortoise survey crew. She is currently an Assistant Professor in the Department of Biology and Physical Sciences at Gordon State College teaching ecology, plant biology and infinite sections of freshman biology for both science majors and non-majors. She is Queen of the Campus Greenhouse where she bids her student-minions to do native plant propagation labor.

**Nathan Klaus.** Nathan grew up in the Loess Hills near Council Bluffs Iowa, among some of the best remaining examples of tallgrass prairie and oak savanna in the world. An early connection with this ecosystem has continued to shape him for decades, giving him a strong conviction about saving rare communities, and particular interest in the importance of natural disturbance and restoration of grassland and woodland habitats. He received a BS from the University of Iowa where he studied the effects of isolation and patch size on reproduction of prairie plants. After working for the Iowa chapter of The Nature Conservancy for a time he moved to east Tennessee where he graduated from the University of Tennessee, Knoxville with a Master's in Forestry, Wildlife and Fisheries. His master's thesis examined the long-term effects of logging and natural disturbances on breeding bird communities in the Southern Appalachians. He has worked for the Georgia Department of Natural Resources Nongame Conservation Section for 18

years as a senior wildlife biologist, where he has authored numerous publications on songbirds and restoration ecology. He works to manage nongame landbirds statewide, as well as restoration of longleaf pine, oak woodlands and prairies on state land and private lands.

**Amy Knight.** Amy is the GIS Program Specialist at Florida Natural Areas Inventory. One of her primary roles is conducting GIS analyses to inform a variety of state and regional conservation planning efforts, including development of decision support tools for Florida's environmental land acquisition program. She has been the FNAI lead on the Florida Longleaf Pine Ecosystem Geodatabase, a joint project with Florida Forest Service to map the distribution and condition of longleaf in Florida. Amy has a Master's degree in Zoology from the University of Florida.

**Angela Larsen.** Angela is a postdoctoral researcher under the advisement of Dr. John Orrock at the University of Wisconsin-Madison. She received a BS degree in Biology from UW-Stevens Point, an MS degree from Grand Valley State University, and a PhD from the University of North Carolina-Greensboro. She has experience working in oak savannas in the Midwest and loblolly pine plantations in the southeast, but only recently started studying longleaf pine restoration as part of her current postdoc. She is happy to be part of this conference to continue learning about the unique system.

**Lisa Lewis.** Lisa serves as the Forest Supervisor for the Kisatchie National Forest and is responsible for overseeing the management of over 604,000 acres of national forest lands across the state of Louisiana. The Forest is headquartered in Pineville and has five Ranger Districts within the state.

Lisa has worked for the Forest Service for over 28 years and has held a variety of positions. Before being named Forest Supervisor, Lisa was the District Ranger on the Calcasieu Ranger District where she oversaw the management of over 187,000 acres of national forest lands in Vernon and Rapides parishes.

She holds a Bachelor's degree in Forestry and a Masters in Forest Ecology, both from Louisiana Tech University. Lisa is married to Trey, and they have two beautiful daughters Erin, age 18, who attends Centenary College in Shreveport and Casey, age 16, who is a junior at Leesville High School.

**Lisa Lord.** Lisa is the South Carolina Field Project Coordinator and Savannah River Watershed Project Director for The Longleaf Alliance. Lisa is a Certified Wildlife Biologist and has worked on numerous natural resource management, longleaf restoration, and land conservation projects and initiatives in SC over the last fifteen years, including working closely with private landowners to manage their land. Lisa earned a BS in Wildlife Science, a MEd in Biology Education from Auburn University, and is now also pursuing a MS in Wildlife and Fisheries Biology from Clemson University. She joined The Longleaf Alliance staff last October after

working for several non-profit conservation organizations and as a natural resource and conservation consultant for land trusts and private landowners throughout the state. Lisa works throughout the SC longleaf range, but most frequently in the ten counties along the Savannah River in SC meeting with landowners to discuss longleaf ecosystem management, red-cockaded woodpecker and gopher tortoise management.

She is also concentrating on a new innovative project in partnership with the South Carolina and Georgia Forestry Commissions and the Savannah Clean Water Fund along with the forestry, conservation, and drinking water sectors and priority landowners on the GA and SC sides of the Lower Savannah River. The goal is to improve forestry and land management practices to improve and protect water quality and facilitate permanent land protection in the watershed through conservation easements.

**Jeff Marcus.** Jeff has worked for The Nature Conservancy for four years as North Carolina Longleaf Restoration Director and was a Wildlife Diversity biologist with the North Carolina Wildlife Resources Commission for 12 years before that.

**Jeff Matthews.** Jeff currently serves as Region 8 Regional Silviculturist and has been in this position since January 2016. Jeff has co-led the Longleaf Pine Restoration efforts with Kyle Jones for the last two years. Prior to this position, he has been a Timber Program Manager in Utah, and District Silviculturist in Virginia and Alabama. Jeff spent three years working with mountain longleaf in Northeast Alabama. Jeff completed his Master's Degree in Silviculture at Virginia Tech in 2004. He lives outside of Atlanta, with his wife and four young children and enjoys hiking, gardening, and camping with the kids.

**Dan McGlenn.** Dan is an Assistant Professor at the College of Charleston. His research focuses on understanding the drivers of biodiversity across local to global scales. A native of North Carolina, Dan has worked primarily in tallgrass prairie plant communities but has recently returned to his roots to work on longleaf pine ecosystems which he finds particularly challenging and awe-inspiring.

**Kevin McIntyre.** A native Georgian, Kevin's professional interests center on the application of science to conservation and management of natural resources, with a focus on restoration and management of longleaf pine and other ecosystems of the coastal plain. He has a MS in wildlife ecology and conservation from the University of Florida. His professional experience includes 16 years in natural area management as well as land protection efforts with conservation organizations on the GA and SC coasts. Since coming to the Jones Center in 2001, his professional focus has included promoting the application of science to management and restoration of longleaf pine and social and economic aspects of natural resource management.

When not working, he enjoys all manner of outdoor pursuits, music, his dogs, and spending time with his wife at home in Decatur County, GA.

**Mark Melvin.** Mark is employed at the Joseph W. Jones Ecological Research Center at Ichauway, located in Newton, Georgia. Mark has 25+ years of private land management experience in the South which includes over 250,000 acres of prescribed fire experience. At Ichauway, he works with conservation management and education staff to promote the appropriate use of prescribed fire. Some of his outreach efforts include prescribed fire short courses that provide “hands-on” experience, participation with numerous university courses for undergraduate and graduate students, private landowner outreach, and partnering with many natural resource management agencies.

**Jana Mott.** Jana is the Apalachicola Restoration Specialist for The Nature Conservancy’s North Florida Program. Within this position, Jana leads the effort to restore isolated wetlands on the Apalachicola National Forest and provides support to the Forest biologists. She also serves as a coordinator for partnerships between TNC and the National Forests in Florida under the federal Stewardship Authority, which serves as a mechanism to fund restoration activity on National Forest lands. Jana holds a BS in Environmental Science and Policy from Drake University and has worked for The Nature Conservancy for 15 years in Iowa, Arkansas, and Florida.

**Jason Nolde.** Jason has over 20 years of experience in natural resource management and is currently a Forest Biologist on the Kisatchie National Forest. He has worked in Louisiana, Arkansas, Mississippi and Texas. Over his career he has worked in fire, timber, recreation, wildlife and fisheries.

**Devon Oesterling.** Devon is the Conservation Forester for The Nature Conservancy’s North Florida Program. TNC partners with the Apalachicola and Osceola National Forests and Devon administers timber sale contracts that fund service projects on these forests such as longleaf pine reforestation, site preparation, prescribed fire, and groundcover restoration. Devon graduated from the University of Florida’s School of Forest Resources and Conservation with a Bachelor of Science in Forest Resources and Conservation. He worked for the Florida Forest Service and Southern Forestry Consultants prior to joining TNC in 2017.

**Charles Oliver.** Chaz is the Conservation Specialist for The Nature Conservancy’s North Florida Program. Chaz’s role in TNC NFL is to manage the fire and restoration crew and seasonal SCA Fire Intern Crew and implement all stewardship activities associated with TNC NFL preserves. Chaz earned a bachelor’s degree from The University of Georgia’s Warnell School of Forestry and Natural Resources in Wildlife and Fisheries Biology. He has been working with TNC NFL, based out of Bristol Florida, for five years.



**Karuna Paudel.** Karuna is a PhD Candidate studying and working with the restoration economics of longleaf pine in the Southeastern United States. She left Nepal in 2014 to pursue higher studies and works under the supervision of Dr. Puneet Dwivedi at the University of Georgia. Stemming from a diverse background of environmental science to geography to finally forestry, she considers herself a resource economist. Her interest lies in conservation, ecosystem services valuation, testing governance theories and restoration economics. Silviculture and the system of forest management in the South drew her attention, and longleaf pine given its ecological and cultural importance became her field of study. After her PhD, she will continue her research on restoring species of ecological and economical significance nationally and internationally.

**Brian Pelc.** Brian is Restoration Project Manager for The Nature Conservancy's North Florida Program. Within this role, Brian is also the coordinator for the Apalachicola Regional Stewardship Alliance (ARSA) Local Implementation Team (LIT) for America's Longleaf Restoration Initiative. Partnerships and the direct conservation and restoration work that result from them are the foundation for much of the work in the North Florida Program. Brian holds a Master's Degree in Applied Plant Ecology from the University of Minnesota and has worked for The Conservancy's North Florida Program, based in Bristol, for nine years.

**Carl Petrick.** Carl is the Forest Supervisor for National Forests in Alabama and is currently serving on a detail as the Forest Supervisor for the National Forests in Mississippi. After receiving a BS in Wildlife Management from Auburn University in 1984, Carl began his federal career as a Wildlife Biologist and Enforcement Officer at Tyndall Air Force Base. He then worked at Eglin Air Force Base as the Chief of Fish and Wildlife Management where he helped initiate an ecosystem management approach there and throughout the DOD. After 18 years as a natural resources manager for the DOD, Carl joined the US Forest Service in 2003 as the Natural Resources Staff Officer for the National Forests in Florida. While in Florida, Carl led the development of the first Collaborative Forest Landscape Restoration project east of the Mississippi River, "Accelerating Longleaf Pine Restoration in Northeast Florida." In 2014, Carl accepted the Forest Supervisor position for the National Forests in Alabama. Carl has spent his entire career working within and restoring longleaf pine ecosystems. He was also a member of the Red-cockaded woodpecker (RCW) Recovery Team and has lead efforts which have grown many RCW populations in Florida and Alabama. Carl has always enjoyed hunting and fishing, along with physical fitness and college football. Carl is married to Kim and has three sons: Kyle, 28; Erik, 23; and Alex, 21.

**Paxton Ramsdell.** Paxton is working with stakeholders to develop habitat markets in the southeast region of the US. One of the nation's most biologically diverse regions, the southeast presents a unique opportunity for EDF to create economic opportunities for landowners who

manage habitat for endangered species. Paxton has spent his career working with individuals and businesses on issues related to sustainability and land and species conservation. He began his career at the Brandywine Conservancy in Chadds Ford, Pennsylvania before spending five years at The Nature Conservancy working with multinational businesses. During graduate school, Paxton co-taught an online course for working forestland owners through Virginia's Cooperative Extension, interviewed ranchers in central Texas about land management practices, and evaluated landowner participation in a ground-nesting bird conservation program. After graduate school, Paxton worked for the Virginia Cooperative Extension to boost landowner awareness of, support for, and adoption of agroforestry practices in the Chesapeake Bay watershed.

**Mary Anne Sayer.** Mary Anne is a Plant Physiologist with the US Forest Service in Pineville, Louisiana, where she is a member of the Southern Research Station's research work unit, "Longleaf Pine Restoration and Management." She conducts research on sustainable southern pine management with an emphasis on how to increase the survival and growth of young longleaf pine.

**Andrew Schock.** Andrew has been with The Conservation Fund since September 2003 and is currently the Georgia State Director. He is part of the team working to secure a 205,000-acre conservation easement that promotes longleaf pine restoration in southern Alabama and the panhandle of Florida. At the Fund, he has worked to protect thousands of acres of vital habitat, including parks and greenspace throughout the Metro Atlanta area, Georgia, and Alabama. Recently, Andrew was involved in the 19,577-acre acquisition of the Sansavilla tract that connects past conservation efforts on the Altamaha River in Georgia. In Alabama and Georgia, he is playing a role in moving the Pinhoti Trail, a National Recreation Trail, from the roadways into the forests. Andrew has past affiliations with the National Wildlife Federation as the Southeastern Center Director managing the field office in Atlanta; The Nature Conservancy, where he completed real estate transactions to protect biodiversity, assisted with the establishment of the botanical inventory at Ft. Stewart, Georgia and established the Integrated Management Plan at Ft. Benning, Georgia; The North Carolina Wildlife Resource Commission as a District Wildlife Biologist; and The Department of Defense as a Biological Technician working on endangered species management at Fort Bragg, North Carolina. Andrew has an MBA from Kennesaw State University, Georgia and a BS in Zoology (Wildlife Science) from North Carolina State University, Raleigh.

**Latimore Smith.** Latimore was born and raised in the historic longleaf piney woods of southeast Louisiana, where he currently resides in northwest St. Tammany Parish with his wife, Nelwyn McInnis. He has been an avid student of Louisiana's native flora and natural habitats for more than 30 years. In 1974, he received his BS in Biology from Southeastern Louisiana

University, and in 1983, he received an MS in Wildlife Science from LSU. During the time he was studying for his masters at LSU, he realized his primary natural resource interests were native plants and their habitats, and the composition and functional dynamics of upland ecosystems. He subsequently pursued post-Masters studies in native flora and plant community ecology at LSU. Latimore's main area of expertise is Louisiana's upland habitats and flora, with a particular passion for the history, ecology and restoration management of longleaf pine systems in Louisiana and the southeast US. In recent years, he has overseen TNC-Louisiana's restoration management program on a variety of lands and ecological systems across the state. He has worked extensively throughout his career with industry, state and federal agencies, academia and numerous private organizations, and landowners across Louisiana and the South in the conservation and restoration of native habitats.

**Jennifer Smith.** Jennifer is District Manager, Resource Management Service in Livingston, Texas. She graduated with a BS in Forestry from Stephen F. Austin State University and has worked in the forest industry for over 18 years in various roles such as research, GIS and technology, operations analysis, and forest management. She worked for Temple-Inland, Campbell Global and recently began working for Resource Management Service. Responsibilities include coordination of forest management activities in the district, Texas recreational lease administration, property tax reporting, and cost-share program coordination. She is married to Aaron, and they are busy raising three boys who all participate in multiple sports. When not at a ballgame, most time is spent outdoors; bicycling is quickly becoming a favorite hobby.

**Jamie Sowell.** Jamie is the Fire Management Officer for the Angelina / Sabine National Forest. He began his career on the Angelina National Forest in 1991 as a Youth Conservation Corps (YCC) crew member working in various resource management areas such as timber, wildlife and recreation. That summer launched a career that for 27 years has been filled with experience and opportunities in multiple resource areas managing fire adapted ecosystems. With a passion for fire management, with a focus in prescribed fire and fuels mitigation, Jamie has held positions of firefighter, senior firefighter, heavy equipment operator fire, assist fire management officer, and fire management officer.

Jamie lives in Norwood, Texas with his wife and 10-year-old son. His interests are anything outdoors – hunting, fishing, and the shooting sports. He gives back to his community by serving as president of the school district's Board of Trustees and is involved in many community organizations. He is very passionate about educating youth, young adults and engaging communities concerning our natural resources, and feels it is critical to educate our future leaders on the important role fire plays in keeping communities safe and our forest and wildlife healthy.

**Jonathan Stober.** A biologist with the Shoal Creek District for the last eight years, Jonathan is interested in restoration of fire to landscapes, agency management of fire, and accounting the ecological condition of landscapes under management.

**Dr. Shi-Jean Susana Sung.** Dr. Sung is a Research Plant Physiologist with the Southern Research Station of the US Department of Agriculture Forest Service. She has been studying issues associated with the restoration and regeneration of longleaf pine since 2005. Before that, Dr. Sung was involved in the artificial oak regeneration research in several southern states for over ten years. Her research interests include longleaf pine seedling quality and sapling physiology, root system architecture, and mechanical stability.

**Rob Sutter.** Rob is a conservation ecologist and principal of the firm Enduring Conservation Outcomes (ECO). Previous to ECO, Rob was the regional ecologist for the Southeast Region (US) of The Nature Conservancy (TNC). His focus in both positions has been conservation planning, strategic planning, monitoring and adaptive management, and designing long-term monitoring and research studies. With TNC, Rob worked on longleaf pine projects in the Green Swamp (NC), Fort Bragg (NC), Fort Gordon (GA), Eglin Air Force Base (FL) and numerous other TNC projects. He was one of the co-authors of America's Longleaf's Range-Wide Conservation Plan for Longleaf Pine. With ECO, Rob has led conservation planning for four LITs and facilitated last year's LIT Summit. Other current projects include leading a Collaborative Integrated Watershed Plan for the Virgin River (NV), developing measures and a monitoring plan for TNC's Colorado River Program, and work with the Shortleaf Pine Initiative. Past projects included a coastal resilience project with NFWF and NOAA, Science Advisor to the Clark County (NV) Multiple Species Habitat Conservation Plan, work on the Missouri River Ecosystem Restoration Plan, and several strategic plans for ecosystem initiatives and land trusts. Rob lives in Savannah, GA with his wife and longleaf expert Alison McGee and his stepdaughter.

**Dr. Theron Terhune.** Dr. Terhune is the Game Bird Program Director at Tall Timbers Research Station and Land Conservancy. He received a BS and MS degree from Auburn University in Wildlife Science and a PhD in Forestry and Natural Resources at the University of Georgia. His research interests range from demographic and genetic assessment to translocation of northern bobwhite quail and focuses on evaluating the efficacy of pragmatic habitat management practices to promote conservation and restoration of functional ecosystems. His novel translocation research paved the way for the first translocation protocols in the State of Georgia and now several other states. He recently developed a modified suture technique to attached miniature radio-tags to 11+ day old bobwhite chicks. Theron has extensive experience working with GIS and is a certified GISp (GIS Professional); and, for fun, he teaches GIS and Python programming. He is nationally known for his work on the revision of the National Bobwhite Conservation Initiative (NBCI), a national strategic plan to recover Northern

Bobwhites, functional grassland ecosystems and grassland obligate birds. He also worked closely with the Cornell Bird Lab and the University of Tennessee to analyze and write the Golden-winged warbler Conservation Action Plan. Theron has also developed multiple mobile apps to aid managers, landowners, and biologists in collecting data: BirdsUp (a quail hunting app), Quail Trax (population monitoring app), and InvasiveTracker (an app to track the management and control of invasive species).

**Paul Trianosky.** As Chief Conservation Officer, Paul provides leadership for SFI's conservation programs, principal liaison with conservation organizations, and guidance toward the development of standards and programs that ensure the attainment of conservation objectives. He works to maintain partnerships, grow the network of conservation organizations involved in the SFI Program, and to ensure relevance of SFI's work in promoting sustainable supply chains and responsible sourcing. Paul oversees SFI's Conservation Impact initiative and its Conservation and Community Partnerships Grant Program. He monitors conservation research developments and advancements in sustainable forestry to identify opportunities to further the SFI Program and activities of SFI Program Participants. Paul brings nearly 30 years of experience in forestry, non-profit management, forest certification, collaborative partnerships, and landscape-scale conservation. Before joining SFI, Paul was Director of Southern Forest Conservation for the American Forest Foundation. Prior to AFF, Paul held numerous positions with The Nature Conservancy for almost 20 years, including roles in executive management, and nearly 10 years directing forest conservation strategies in the southeastern United States. Paul has a BS in Forest Resource Management from Virginia Tech, and a Master of Environmental Management from Duke University.

**C.A. "Buck" Vandersteen.** Buck is the Executive Director of the Louisiana Forestry Association, a private trade association representing landowners, loggers, and forest industry. His responsibilities include: public relations, governmental affairs, membership development and education, and promoting the practice of sustainable forestry in Louisiana.

Vandersteen received a Bachelor of Science degree in Forestry from the University of Massachusetts and a Master's in Business Administration from Louisiana Tech University. He is also a graduate of the Institute of Organizational Management in non-profit management through the US Chamber of Commerce and a graduate of the LSU Agricultural Center's Agricultural Leadership Program. He is a professional Forester and Tree Farmer.

Vandersteen is involved in the forest products industry in various capacities, including growing, harvesting, and using forest resources. He has served with the Peace Corps in Liberia, West Africa, as an advisor to that government in forestry-related matters. Vandersteen received the Distinguished Service to Forestry Award in 1996 from the Louisiana Society of American Foresters and became a Fellow in the Society of American Foresters in 2004. In 2005, he was

awarded an Honorary State FFA Degree in the Louisiana FFA Association and Honorary Membership in the LSU Forestry, Wildlife, and Fisheries Alumni Association. In 2008 he was awarded Member of the Year by the Louisiana Society of Association Executives. In 2013 he received the Presidential Award for Leadership by the Louisiana Society of American Foresters. He was inducted into the Louisiana Agricultural Hall of Distinction in 2017.

**Dr. Joan Walker.** Dr. Walker is a Research Plant Ecologist for the USDA Forest Service Southern Research Station with more than 30 years of experience conducting research to inform longleaf pine ecosystem restoration and management. She has studied problems ranging from understanding factors influencing herbaceous communities and the role of fire in seed production, to developing silvicultural practices for restoration.

**George Weick.** George has a BS in Forestry from the State University of New York College of Environmental Science and Forestry at Syracuse, New York, graduating in 1975. He began his forestry career as a timberlands apprentice for Weyerhaeuser Company in November 1976 and worked in De Queen, Arkansas and later Winthrop, Arkansas, until December 1978.

**Rickie White.** Rickie is the Research & Development Manager and a Senior Ecologist for Southeast North America at NatureServe. His past work has involved inventory and monitoring, vegetation classification and mapping, rapid assessment metrics development, conservation planning, and conservation tools development. He is based in NatureServe's Southeast office in Durham, NC.

**Dr. John Willis.** Dr. Willis is an Assistant Professor of Silviculture and Forest Ecology in the Department of Forestry at Mississippi State University. John has been a resident of Starkville, Mississippi since graduating from Michigan State University in 2014 with a PhD in Forestry. Since arriving in Starkville, he has initiated a variety of research projects focused on identifying facilitative mechanisms for longleaf regeneration in the Sandhills of North Carolina. In addition, John has also recently established a series of experiments testing silvicultural techniques for restoring shortleaf pine to mixed-upland hardwoods stands in north Mississippi. Dr. Willis received his BS in Forest Fire Science from Colorado State University, and his MS in Forest Science also from CSU.

**Nathan Yeldell.** Nathan was born and raised in Monroe, Louisiana. He was exposed to the outdoors at a young age by his father, who worked as a hunter educator and biologist for the LA Dept. of Wildlife and Fisheries. Based on his enjoyment of outdoor activities and curiosity of the natural world, he followed suit and pursued a degree in natural resources management at LSU. After earning his bachelor's degree and working on a few wildlife research projects, he decided to return to school and earn his master's degree in wildlife science. His graduate studies at the University of Georgia focused on the ecology of wild turkeys and the effects of

prescribed fire on their reproductive cycle. He has since returned to his home state to work as a biologist for LDWF. In his position he helps landowners develop habitat management plans, provides support for species program management projects, assists with managing Louisiana's public wildlife management areas, and interacts with the public at outreach events. When not working he enjoys traveling with his girlfriend, hunting various game species, and honing his archery skills.

## Concurrent Session Abstracts

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### CONCURRENT SESSION A

#### **1-A – RESTORATION THROUGH PARTNERSHIPS: US Forest Service Restoration Through Partnerships**

##### ***US Forest Service Million-Acre Challenge*** [VIEW RECORDING](#)

Jeff Matthews, Region 8 Regional Silviculturist, US Forest Service & Ken Arney, Deputy Regional Forester for State & Private Forestry, US Forest Service

In the Fall of 2017, the US Forest Service issued the Million-Acre Challenge to put an additional one million acres of National Forest System lands on the path towards restoration in support of the America's Longleaf Restoration Initiative. Each National Forest has been tasked with developing a Forest Longleaf Restoration Strategy. This presentation will speak to the origins of the Million Acre Challenge and the collaborative efforts needed for success.

##### ***USFS and LIT collaborative success stories*** [VIEW RECORDING](#)

Ivan Green, District Ranger, Osceola National Forest; Troy Ettel, Program Officer, The Turner Foundation; Tim Mersmann, District Ranger, Conecuh National Forest; Vernon Compton, GCPEP Director, The Longleaf Alliance

To meet the Million-Acre Challenge, working with partners to reach each National Forest's longleaf restoration goals will play a critical role. Engaging key stakeholders such as Local Implementation Teams and sharing resources is accelerating the pace of restoration and multiplying accomplishments. This presentation will highlight case studies of successful collaborative projects between the US Forest Service and Local Implementation Teams.

##### ***Leading by example through the Million-Acre Challenge: A panel discussion*** [VIEW RECORDING](#)

Carl Petrick, Forest Supervisor, National Forests in Alabama; Michael Spisak, District Ranger, Uwharrie Ranger District, National Forests in North Carolina; Jason Nolde, Forest Biologist, Kisatchie National Forest; Troy Ettel, Program Officer, The Turner Foundation; Robert Abernethy, President, The Longleaf Alliance

The US Forest Service has played a key leadership role under the Americas Longleaf Restoration Initiative over the past year. The ambitious Million-Acre Challenge targets an all-hands approach to longleaf restoration that necessitates communication of priorities and opportunities for collaboration within and outside the Forest Service. This panel discussion will dive into the challenges and progress in rolling out this key initiative and allow session participants to weigh in.



## 2-A – THE GROUNDCOVER: Lessons from the Field

### ***Restoring native groundcover in sandhill communities in North Florida: Associated cost, equipment, and method*** *Recording not available.*

Charles Oliver, Conservation Specialist, The Nature Conservancy

Native warm season grasses are one of the main components of the longleaf ecosystem, but very few acres of intact groundcover remain throughout its range. Grasses contribute fine fuels to fires that help restore and replenish the ecosystems. They also provide structure and forage to many other occupants in the longleaf ecosystem. All warm season grasses benefit from fire's restorative nature but, species like wiregrass, *Aristida stricta*, and piney woods drop seed, *Sporobolus junceus*, require growing season fires in April, May, and June, to increase seed production and viability. Restoring native groundcover in any landscape is most beneficial when humans have altered or disturbed the original composition of the system such that remnant groundcover and/or seedbank are compromised (i.e., pine plantations, deforestation (clear-cuts), agricultural fields (row crops and livestock), and urban development). The Nature Conservancy's North Florida Program, TNC NFL, has worked with native warm-season grass restoration, particularly wiregrass, for the past 25 years in the sandhills around The Apalachicola Bluffs and Ravines Preserve in Bristol, FL. Their objective has been to restore native warm-season grasses in the upland sandhill communities to mimic pre-Colombian systems, which in return would help mimic fire's natural role in the ecosystem. Throughout the years, several different methods of groundcover restoration were implemented, each with an associated cost and scale of success. After several years of tedious restoration attempts, TNC NFL discovered a highly effective method that has refined the collection and planting of a suite of priority warm season species, while minimizing the time and cost of restoration/acre. Once the best management practice of sandhill groundcover restoration was discovered and implemented, TNC NFL shared it with the world. This presentation will focus on past and present restoration methods and associated cost, equipment, and timeline of execution. It will discuss TNC NFL's overall restoration on both TNC and partnering agency lands.

### ***Using pineywoods cattle and prescribed fire to accelerate understory restoration*** *Recording not available.*

Micheal Davis, Director of Lake Thoreau Environmental Center, University of Southern Mississippi

There has been a great resurgence of longleaf pine restoration efforts over the past few decades. Restoration techniques generally include combinations of silvicultural and management techniques, and several methods result in the restoration of healthy productive stands. Restoration of diverse herbaceous understories, however, does not always meet with the same success, particularly with control of clonal woody species such as gallberry. Although pine release treatments and prescribed fire can often successfully control many woody species

such as sweetgum and yaupon, other species can be more recalcitrant (e.g., gallberry, persimmon). We hypothesized that a combination of prescribed fire and browsing by large megafauna would offer the fastest pathway to create diverse understories. This study followed the introduction of a heritage cattle breed, Pinewoods cattle, into prescribed fire treatment plots in a ~100-year-old longleaf pine forest and monitored the effects on herbaceous diversity and woody species density. Pinewoods cattle are unique in that they are a land race breed that has adapted to survive specifically in longleaf pine forests along the Gulf Coast. Thus, these cattle will consume many plant species that continental cattle breeds will not eat. Our results showed that the combination of Pinewoods cattle and prescribed fire greatly reduced the overall density of woody species and accelerated growth of native herbaceous species. Pinewoods cattle also reduced woody vegetation in unburned forest plots suggesting they may also be a useful tool for reducing fuel loads.

***Propagation of native forbs for reintroduction on longleaf restoration sites in the western Fall Line Sandhills and Pine Mountain of Georgia*** *Recording not available.*

Dr. Joyce Klaus, Assistant Professor, Gordon State College

The western Fall Line Sandhills and Pine Mountain regions of Georgia contain longleaf pine habitats unique in the state and are home to many rare and endemic species. Although progress has been made in restoring longleaf pine trees and understory grasses in the area, many forbs are slow to re-establish; some may never re-establish without direct human assistance. Working as a team that includes Georgia Plant Conservation Alliance (GPCA), Mimsie Lanier Center for Native Plant Studies, GA DNR Nongame Conservation Section (NCS), The Environmental Resource Network, and Gordon State College (GSC), our goal is to re-establish, augment and conserve populations of rare and endemic longleaf-associated forb species. We collected seeds and propagules of native forbs with focus on legumes and GPCA-listed high priority species. Independent research students at GSC, working under the guidance of Dr. Joyce Klaus, performed scarification and germination tests for species with no known propagation methods, or determined most efficient means of scarification. Students also experimented with vegetative propagation for some species. For species with known propagation methods, classes of freshman biology students germinated seeds and grew plants as part of a class research project and determined what soil characteristics were best for propagating various species. Dr. Klaus and her students, along with GA DNR NCS staff outplanted the plants in restoration areas and will monitor outplantings to determine survival and measure spread. GSC students and faculty are developing a native plant/pollinator garden on campus to educate the public and encourage stewardship of native longleaf-endemic plants. Heather Alley of the Lanier Center and Dr. Klaus hope to publish new propagation information in a sequel to Heather's "Guide to Propagation and Characteristics of Favorite Georgia Natives:

Part 1.” The manual will be free to interested growers through Georgia Native Plant Initiative at the State Botanical Garden of Georgia.

### **3-A – THE TREE: Conversion to Longleaf Pine**

#### ***Underplanting longleaf — Keys for success* [VIEW RECORDING](#)**

Nathan Klaus, Georgia Department of Natural Resources Nongame Conservation Section

Underplanting, the act of planting seedlings under an existing stand to affect future stand composition, has long promised the opportunity to restore longleaf pine and other species to a stand without resorting to clearcutting. Understanding of the factors that determine the long-term success and failure of underplanting longleaf pine are important before embarking upon this controversial restoration method. In 2005 we conducted an underplanting of containerized longleaf pine into a variably thinned loblolly stand as part of a restoration project on Sprewell Bluff Wildlife Management Area in Upson County, Georgia . We measured seedling survival over the ensuing 12 years and related it to habitat variables such as residual pine basal area, residual hardwood basal area, and woody and herbaceous competition. Nearly a decade after underplanting we thinned the stand a second time. We measured seedling/sapling survival before and after the thin and related survival to harvest intensity, seedling height, and other factors. We present both studies as an affirmation that under some conditions underplanting can be an effective method to add longleaf pine to a stand while maintaining the aesthetic and wildlife values associated with a mature forest.

#### ***Thinning, site preparation, and underplanting options for converting pine plantations to longleaf* [VIEW RECORDING](#)**

Devon Oesterling, Conservation Forester, The Nature Conservancy *Presented by Brian Pelc*

Converting fire-suppressed pine plantations to longleaf pine (*Pinus palustris*) while maintaining a prescribed fire regime is challenging through clearcutting. Underplanting longleaf following thinning and site preparation is a viable alternative. Needlecast maintained by the residual canopy allows for prescribed burning to successfully continue and is particularly useful in stands with predominantly woody fuels. Two different thinning methods were applied to slash pine (*Pinus elliottii*) plantations in mesic and wet flatwoods on The Nature Conservancy’s Flint Rock Preserve in Wakulla and Jefferson Counties, Florida. Combinations of mechanical, chemical and prescribed fire treatments were applied prior to hand planting. In one method, heavy thinning from below removed small diameter and crown classes, retaining dominant, healthy trees. The other, developed at Tyndall Airforce Base, row-thinned by harvesting four rows, retaining two, harvesting one, retaining two throughout, “4-2-1-2.” The four removed rows were site prepped and planted, leaving the single rows untreated for future access. Permanent photopoints and survivorship plots were established to further explore and document this methodology. Most treatments resulted in successful stand establishment and the ability to carry fire. Hot burns in

stands with poor site index, small crown ratio and heavy woody fuel loads resulted in excessive mortality, preventing future fires from being carried. Results included a reduction of hardwood competition, promotion of vertical seedling growth, and a more herbaceous understory. Both treatments have tradeoffs between needlecast volume and uniformity, site preparation operability, aesthetics, residual harvest options, and harvest volume. The minimum threshold of residual pines per acre to carry fire is dependent on average crown ratio and pre-treatment grass coverage. Perceived reduction in growth rate of longleaf due to shading may be offset by earlier vertical growth resulting from burning through the grass stage. These questions should be further explored with future treatments.

### ***Conversion through clearcut with retention of longleaf*** [VIEW RECORDING](#)

Glenn Hughes, Extension Forestry Professor, Mississippi State University Extension Service  
Landowners are increasingly interested in alternatives to traditional pine plantation management. This is particularly true in longleaf pine where non-economic objectives often carry the greatest value to the landowner. However, there are few places where landowners can see “on the ground” application of uneven-age management in longleaf pine, specifically with a private land focus. This presentation describes a 150-acre longleaf pine demonstration area in Mississippi that was established in 2015. Roughly half of the area was a slash/longleaf pine stand where the slash pine was removed in 2015. The other half was a 25-year-old loblolly pine stand that was clearcut and planted with longleaf. This presentation provides pre- and post-harvest data, options for the landowner to consider, and possible next steps that are being considered for this tract. Application of uneven-age management should be considered as a process, not a transaction.

## **4-A – THE ECOSYSTEM: Wildlife Habitat Management**

### ***Using wildlife habitat models to evaluate management endpoints for open pine woodland and savanna.*** [VIEW RECORDING](#)

Kevin McIntyre, Education and Outreach Coordinator, Jones Ecological Research Center at Ichauway

Woodlands and savannas with a canopy stratum dominated by pine were once common across the landscape of the southern US and provided habitat for a unique suite of wildlife species adapted to this vegetative structure. Today, open pine systems are rare and under-represented on the landscape; less than 4 percent of the historic longleaf pine acreage and about 8 percent of the historic shortleaf pine acreage remains. As a consequence, many of the wildlife species associated with open pine are of conservation concern and are federally listed as endangered or threatened, with additional species considered “at-risk” and currently under review for listing. Over the last few years, several efforts have worked to refine suggested parameters for several elements of vegetative structure in open pine, including basal area, canopy cover,

midstory shrub cover, and herbaceous understory cover. These parameters were summarized in the Gulf Coastal Plain and Ozarks Landscape Conservation Cooperative Integrated Science Agenda. This research project compared these parameters to empirical data collected from a 29,000-acre second-growth longleaf pine forest in Southwest Georgia. Vegetation data from permanent monitoring plots were analyzed along with faunal presence/absence data for 17 species collected from a variety of research projects conducted over the last 20 years. This analysis suggests that parameters for stocking, canopy cover, and herbaceous cover could be broadened, and forests with these characteristics would still provide suitable habitat for open pine wildlife species of interest. Broader ranges of structural parameters for suitable habitat for species of conservation interest can offer greater flexibility for managers while still maintaining conservation values.

***Reproductive ecology of female wild turkeys in a fire-managed longleaf pine forest*** [VIEW RECORDING](#)

Nathan Yeldell, Biologist, Louisiana Department of Wildlife and Fisheries

Pine (*Pinus* spp.)-dominated forests are commonly managed with prescribed fire in the southeastern United States to reduce fuel loads, maintain diverse plant communities, and increase habitat quality for wildlife. Prescribed fire alters understory vegetation, which is a key component of nesting habitat for ground-nesting birds. We assessed the influences of vegetation, prescribed fire, and landscape features (e.g., roads, edge) on nest site selection and nest survival of eastern wild turkeys (*Meleagris gallopavo silvestris*) in a pine-dominated ecosystem in west-central Louisiana. We radio-marked 55 female wild turkeys and evaluated vegetation and landscape characteristics associated with 69 nests during the 2014 and 2015 reproductive periods. We used conditional logistic regressions with matched-pairs case-control sampling and information-theoretic approaches to determine if vegetation characteristics within 15m of a nest site, distances to surrounding vegetation communities and edges, and prescribed fire history of patches where a nest was located influenced nest site selection. We calculated hazard ratios for covariates in our top performing models to determine if any of these characteristics affected nest site survival. Turkeys in our study had a longer reproductive season and higher nesting and renesting rates relative to other populations in the southeastern United States. At the local scale, turkeys nested in areas with higher percent ground cover vegetation. At the landscape scale, turkeys nested closer to roads and farther from edges of 2 plant communities. Turkeys selected to nest in forest stands burned two years prior. Nest survival was not affected by percent ground cover, distance to roads, or distance to edge but was negatively associated with time-since-fire; turkey nests in stands burned 3 years prior had lower survival than nests in stands burned the current year. We suggest that burning on a 3-year fire return interval is compatible with management for wild turkeys in southeastern pine-dominated forests.

***Effects of fire management and weather impacts on northern bobwhite brood ecology in open pine systems*** [VIEW RECORDING](#)

Dr. Theron Terhune, Game Bird Program Director, Tall Timbers Research Station and Land Conservancy

Northern Bobwhite chicks require invertebrates for growth and feather development. Early vegetation response following fire often provides invertebrates for chicks but may not provide other resources such as roosting and loafing cover that is typically provided by later successional stages. Thus, adequate management for bobwhites should provide multiple seral stages in close proximity, but the effects of landscape interspersation remain untested for bobwhite broods. Fire effects on landscape complementation, continuity and food availability can impact growth and survival of bobwhite chicks. In addition, weather may inhibit thermoregulation of bobwhites and reduce chick growth, resulting in lower survival to fall recruitment. We found growth of chicks to be negatively related to home range size which was negatively correlated to the amount of area burned. We also found survival of chicks to be positively related to the amount of burned area (i.e., foraging area) within brood home ranges. Rainfall (number of precipitation events and amount of precipitation) negatively impacted chick survival. To maximize growth and survival of bobwhite chicks, increase access to foraging areas while decreasing the size of brood home ranges. Access to foraging areas can be created through frequent prescribed fire at small spatial scales. However, too much fire or too frequent fire may reduce vegetation structure sought out by bobwhite broods during rain events.

**1-B – RESTORATION THROUGH PARTNERSHIPS: Moving the Needle for America's Longleaf Restoration Initiative**

***State of the America's Longleaf Restoration Initiative*** [VIEW RECORDING](#)

Andrew Schock, Georgia State Director, The Conservation Fund

The Range-Wide Conservation Plan for Longleaf Pine was released nine years ago, and with great anticipation and expectation, the Longleaf Partnership Council was first convened in 2011. This puts the America's Longleaf Restoration Initiative roughly beyond the mid-point working toward the goals outlined in the Conservation Plan including 8 Million acres of longleaf by 2025. Over the last few years, we've learned more about the trends in gains as well as losses of longleaf range-wide. Facing these headwinds, the Council decided to recommit to the 2025 goal by identifying "game changers" for moving the needle. With positive examples like the US Forest Service's recent Million-Acre Challenge and Local Implementation Teams achieving record accomplishments through the Longleaf Stewardship Fund, the state America's Longleaf is strong. This presentation explores the questions: where do we stand today as an Initiative, where are we on the path to reaching the 8-million-acre goal by 2025, and what do we hope to achieve moving forward?

***America's Longleaf Restoration Initiative— Opportunities for accelerating the pace of restoration*** [VIEW RECORDING](#)

Gary Burger, Statewide Forester, South Carolina Department of Natural Resources

Just over halfway through the America's Longleaf Restoration Initiative (Range-wide Conservation Plan for Longleaf Pine released in 2009), Forest Survey data show that recovery of longleaf pine-dominated ecosystems lags behind the rate needed to attain the 8-million-acre goal by 2025. Over the last few years, the Longleaf Partnership Council began concerted efforts to identify opportunities to expand the scale and scope of the restoration effort. Key elements of those plans were to expand restoration of longleaf pine on public lands; to bring new landowners—especially, large corporate landowners--into the picture on private lands; to expand the urgency and importance of the message for longleaf pine restoration; to increase support for the application of prescribed fire on both public and especially on private lands; and to increase support for land protection associated with strategically significant tracts. Market-driven limitations on seedling availability, identification of stands with a minor component of longleaf pine, and more fully engaging all potential partners towards the 8-million-acre goal will be key in the next few years. This presentation will discuss new projects that we hope will move the needle towards accelerating the pace of longleaf restoration.

***A Southeast database for longleaf pine: Expanding the Florida Model*** [VIEW RECORDING](#)

Amy Knight, GIS Program Specialist, Florida Natural Areas Inventory & Brian Camposano, State Forest Ecologist, Florida Forest Service.

A new project is underway to develop a spatial database of longleaf pine occurrence and condition that can be used to track longleaf pine status over time and throughout its range. This effort will build on the Florida Longleaf Pine Geodatabase, which integrates multiple ground-truthed data sources into a polygon-based map for longleaf pine on private and public lands. The southeast project involves design of a flexible geodatabase that can accommodate data from multiple sources, including those mined from partner agencies and organizations, as well as new data collected as part of this project. The project also includes design and implementation of a rapid assessment protocol, including a mobile app, with ecological condition metrics for canopy, midstory, and ground layers, consistent with metrics proposed by the Longleaf Partnership Council and the Southern Open Pine Ecosystems project. Field survey locations will be guided by a GIS analysis and prioritization of potential longleaf sites within focal areas. The project is being conducted by the Florida Natural Areas Inventory and other partners with funding from the US Endowment for Forestry and Communities, and guidance from a mapping subteam of the Longleaf Partnership Council. The first version of the southeast database and interactive web map are planned for completion by



December 2019. Our presentation will provide a project overview and an update on progress to-date.

## **2-B – THE GROUNDCOVER: Groundcover Research**

### ***Plant community assembly in high diversity southeastern pine savannas* [VIEW RECORDING](#)**

Kyle Harms, Louisiana State University

Well managed pine savannas of the southeastern US harbor some of the highest diversity groundcover on Earth. We are interested in the ecological and evolutionary processes that gave rise to and maintain high diversity in these ecosystems. Fire is the key disturbance in these ecosystems. Fire keeps woody shrubs and hardwood trees at bay. Even so, the roles fire plays beyond maintaining bunchgrass dominated groundcover are not fully understood. For example, does fire heterogeneity promote coexistence, or otherwise shape groundcover assembly? Regional influences undoubtedly also shape local groundcover communities, yet we do not fully understand the relative contributions that regional and local processes make. For example, do larger regional species pools support higher local species richness in pine savannas? Finally, the relatively few physically dominant foundational bunchgrass species are iconic elements of these ecosystems, but how do they influence the diverse components of the groundcover community? We examined these questions through observations and experiments (fuel manipulation, seed addition, bunchgrass removal, etc.) in Louisiana and Florida. Groundcover biomass (fuel) is heterogeneous and contributes toward small-scale fire heterogeneity, which in turn contributes toward small-scale plant heterogeneity. Seed addition boosts species richness and suggests a role for the regional species pool. Bunchgrass tussocks are overdispersed, and subordinate species are released from competition in their absence. Our observations and experiments motivate a working model for locally high diversity pine savanna groundcover. Key elements of the model include limited seed dispersal from a large regional species pool, frequent fire whose influence is mediated by groundcover fuels, nonrandom spatial patterning of dominant bunchgrasses, and the asymmetric influence of bunchgrasses on subordinate species.

### ***Large-scale evidence of the value of seed additions for longleaf pine savanna groundcover restoration* [VIEW RECORDING](#)**

Angela Larsen, Postdoctoral Researcher, University of Wisconsin – Madison

Longleaf pine savanna ecosystems declined during European settlement as agriculture and fire suppression increased. Following agricultural abandonment, plant species richness and community composition differ from levels in remnant habitats for centuries. Understanding the mechanisms maintaining this persistent legacy is critical for longleaf pine savanna restoration. Our objective was to determine if the importance of dispersal limitation in community assembly varies across communities that differ in their past land use and current restoration



management. We conducted identical seed-addition experiments at 108 longleaf pine savanna sites that varied in past land-use history (historical agricultural use or no agricultural use) and fire history across three locations in the southeastern United States. At each site, we performed seed additions of 21 indicator species that typically characterize non-degraded habitats; these species are often absent from habitats with historical agricultural use. We found that the efficacy of seed addition depends upon current management (e.g., prescribed burn frequency) and past land-use. Three years following seed addition, seed addition increased the richness of indicator species by nearly 0.6, on average, for sites with high fire frequency. Overall, seed addition increased establishment of *Gaylussacia dumosa* and *Tephrosia virginiana*. Furthermore, when current management included high fire frequency, sites with no agricultural history had higher establishment of *G. dumosa* and *T. virginiana*, but lower establishment of *Solidago odora* and *Aristida purpurescens* compared to sites with an agricultural history. Our results suggest that past agricultural effects are maintained over the long term as several native groundcover species have not re-established, even 50 years following agricultural abandonment. Furthermore, our results illustrate the importance of current management of prescribed burns and factors that facilitate seed dispersal (e.g., habitat corridors). Overall, for longleaf pine savanna restoration, we recommend a combination of frequent prescribed burns and seed additions, particularly in areas with an agricultural history.

***Which seed sources for longleaf pine restoration? Common garden and genetics studies to inform seed zone development*** [VIEW RECORDING](#)

Joan L. Walker\*, USFS Southern Research Station; Lisa M. Giencke\*, Joseph W. Jones Ecological Research Center; Danny J. Gustafson\*, Department of Biology, The Citadel; R. Carol Denhof, The Longleaf Alliance; Katherine Kirkman, Joseph W. Jones Ecological Research Center; Anthony J. Savereno, Clemson University Cooperative Extension; Shawna L. Reid, USFS Southern Research Station; George Hernandez, USFS Southern Region; O. Stribling Stuber, Joseph W. Jones Ecological Research Center; Steven T. Brantley, Joseph W. Jones Ecological Research Center

Restoration of the herbaceous understory community of the longleaf pine ecosystem is limited by the availability of appropriate seeds. Furthermore, successful establishment and persistence of restoration plantings may depend on plant material provenance. We report results from three studies that provide data relevant to developing “seed zones” for much of the longleaf pine range, which may provide general guidance for seed sourcing. The objectives were to quantify intraspecific variation in selected common ground cover species, to evaluate alternatives for seed zone design, and to examine genetic composition within the resulting zones. Focal species included five bunchgrasses (wiregrass, little bluestem, pineywoods dropseed and two Indiangrasses), three legumes (goats’ rue and two lespedezas), and anise-scented goldenrod. Seeds were collected from 10-14 populations of each species, grown into

plugs in greenhouse conditions, and outplanted into experimental garden sites. The northern study included collections from the Carolinas and southeast Georgia and planted into three garden locations; the southern study included collections and four garden sites spanning an east-west transect from Mississippi through eastern Georgia, including peninsular Florida. Data on growth, reproduction, and mortality were collected for at least two growing seasons. Multivariate approaches were used to describe geographic patterns of the plant performance traits within and across species. Leaf samples were collected from two species in the southern study, and microsatellite and inter-simple sequence repeats were used to determine the genetic structure and diversity of these plants. The combined results of these studies suggest that 4-6 zones could represent much of the within-species variation; however, results were specific to individual species or traits, and more research over longer periods is needed to increase the confidence in the seed zone recommendations.

### **3-B – THE TREE: Timber Production**

#### ***An argument for longleaf pine — Comparing economics of yellow pines across the Southern US*** **VIEW RECORDING**

Karuna Paudel\*, Stephen Kinane, Dr. David Dickens and Dr. Puneet Dwivedi; all from University of Georgia Warnell School of Forestry and Natural Resources.

Almost 82% of the total planted forestland (15 million hectares) in the US South is loblolly or slash pine. However, during the early 1900s, nearly 30 million hectares were growing longleaf pine relative to the current range of only 1.6 million. An understanding of geographical variability in the economics of yellow pines can help us in better targeting financial resources for increasing the total acreage under longleaf pine – a criticality from the perspective of ecosystem restoration. We first simulated 45 scenarios of growth and yield for planted loblolly, slash, and longleaf pine across the Piedmont, the Upper Coastal Plains and the Lower Coastal Plains using SiMS (Simulator for Managed Stands). Then, we estimated the land expectation value of each scenario for two cases of income: income from selling forest products only and income from selling forest products, carbon sequestered on the stand, and water yield. Our results show better economic returns for longleaf pine in all three sub-regions when incomes from forest products and other environmental amenities are considered. Similar results were observed for the Piedmont and Upper Coastal Plains when only income from forest products is considered. Landowners could harvest longleaf as early as 22 years due to historically low sawtimber prices, higher pulpwood, and pine straw prices. Additionally, most longleaf stands are currently on old agricultural fields which helps in faster growth and therefore, earlier rotations. We suggest that restoration efforts should target forest landowners in the Piedmont first and include incentives for ecosystem services.

***Longleaf — A valued past, an exciting future*** [VIEW RECORDING](#)

Buck Vandersteen, Executive Director, Louisiana Forestry Association

Longleaf pine played a large role in the development of the forest industry in Louisiana. The large, fire-resistant tall timbers attracted countless mills and lumbermen to utilize the resource. Some remnants of the past are captured in places like the Southern Forest Heritage Museum in Long Leaf, Louisiana.

Now longleaf pine is on its way back through conservation efforts and landowner education. The timber qualities and ecosystem benefits of longleaf bring exciting opportunities for the future, and across the South, new markets are developing that can improve opportunities for premium wood for the future.

***Playing the dealt hand: Reassessing timber management options at mid rotation*** [VIEW RECORDING](#)

John Willis, Assistant Professor of Silviculture and Forest Ecology, Department of Forestry, Mississippi State University

Optimizing timber production is a common land management objective among private landowners. To this end, information is often sought on the latest advancements in seedling genetics, spacing considerations, and competition control in order to maximize the production potential of pine plantations. Making sound timber management decisions, however, does not stop at the early stages of plantation establishment. Instead, equally important decisions occur in the middle and latter stages of the rotation, when managing stand density becomes a consideration. Although it may be tempting to adhere to the original management plan, maintaining a flexible outlook is important, as unexpected negative impacts resulting from factors relating to stand development, forest health, or changes in market conditions may alter the optimal management strategy. Landowners should critically evaluate stand potential prior to making density management decisions. Unfortunately, density management decisions are rarely simple and can often overwhelm even the most experienced landowners. Consequently, our team of forest scientists at Mississippi State University has developed a decision-making framework to help landowners evaluate stand potential based on biological and economic factors. This presentation will help private landowners learn to evaluate these factors and devise the optimal mid-rotation management strategy for timber production.

**4-B – THE ECOSYSTEM: Fire**

***Painting a landscape through a land steward's eye*** [Canceled - See replacement abstract on page 62.](#)

Charles Oliver, The Nature Conservancy

Fire is a natural disturbance that has occurred on almost every landscape in the world for millennia. Since European settlement natural systems have been significantly altered and fragmented. The longleaf pine, *Pinus palustris*, ecosystem once stretched along the entire

coastal plain from eastern Texas into southern Virginia and South along the peninsula of Florida, covering over 90 million acres, and was burned every 2-3 years. With natural fire disturbance neutralized by suppression and longleaf largely replaced by other pine species, it is our responsibility to restore and maintain these systems through adaptive management formulated from sound science. However, where data and historical evidence are lacking, restoration efforts must rely on creativity. In addition to being keepers of a bygone era and makers of functional habitat, land stewards should also be the artists of the forest. Wielding a drip torch as a paint brush on a canvas of sandhill or mesic flatwoods, sensitive to the uniqueness of each. Practiced land stewards can develop an artistic eye after years of experience, essential to a process that both restores and “re-ignites” the diverse mosaic of landscapes within longleaf pine’s range. This presentation will look at a land stewards’ role in artistically applying fire to our fragmented and degraded landscapes within the longleaf ecosystem. Understanding when and how to apply fire to the landscape so that the result is an ecosystem masterpiece.

***Groundcover diversity in West Gulf Coastal Plain longleaf pine woodlands: Fire and Geology***

Dr. Susan Carr\*, North Florida Land Trust; David Moore, Forest Botanist/Ecologist, Kisatchie National Forest; JoAnne Bruser, Ecologist [VIEW RECORDING](#)

Longleaf pine woodlands and mixed pine-hardwood forests historically occupied the uplands of the West Gulf Coastal Plain in Central and Northwest Louisiana and East Texas (WGCP; Braun 1950, Delcourt et al. 1981, Christensen 1988, Martin et al. 1993). Today, the largest remaining longleaf pine woodlands are on National Forests in the WGCP and are under various fire management regimes. We present a quantitative description of longleaf pine woodland vegetation on the Kisatchie National Forest in Central Louisiana. We describe floristic composition over a range of sample scales (1 to 250 m<sup>2</sup>) from a sample of 143 plots across soils of Miocene and Pleistocene origin, with comparisons between vegetation of different surface geology. At the onset of our study, study sites had been infrequently burned in the dormant season. We resampled sites over a 10-year period following the re-introduction of growing season fire, and present observations of concurrent compositional changes.

In general, species richness of longleaf pine woodlands is higher in the younger sandy loams of Pleistocene origin compared to heavier clays of Miocene sites (30% difference at the largest sample scales). These differences were evident before and persisted throughout re-introduction of growing season fire. In addition, these patterns are apparent across most plant life form groups (i.e., forbs, grasses, etc.) and across sample scales. Longleaf pine woodlands of Pleistocene sites have higher numbers of non-grass indicator species, whereas Miocene sites support higher bunch grass densities.

Fire dramatically affected species diversity of our WGCP longleaf pine woodlands, with upwards of a 50% increase in mean species richness (per 250 m<sup>2</sup> area) in all sites. The largest compositional changes followed the first growing season burn, with attenuated increases after the second burn. Interestingly, composition dispersion (a measure of community variation) decreased following growing season fire, even as species numbers increased. In general, compositional similarity between sites of similar geology increased following the re-introduction of growing season fire while distinct differences between Pleistocene vs. Miocene communities persisted. Our study results may inform restoration efforts as a quantitative description of reference site conditions and fire response of WGCP longleaf pine woodlands.

***Making sense of it all: Ecosystem condition class tools to facilitate assessment, planning, and monitoring of the longleaf and shortleaf pine woodlands of the Talladega Division, Alabama***

Jonathan Stober, Biologist, Shoal Creek District [VIEW RECORDING](#)

Natural resource managers are tasked with limited resources to assess land base ecological condition, plan actions, and track management implemented to maximize conservation impact. For the montane longleaf and shortleaf pine woodlands of the Talladega Division, we developed tools in an ArcGIS workspace that rank the landscapes ecological condition from restored condition to heavily degraded. Utilizing Lidar (digital elevation model and landform position), historic community type, Fire Frequency Tool 2.0, and an estimation of basal area of pine and hardwood (lidar and imagery), we were able to rank the ecosystem condition class for each stand. We were also able to derive the operational envelope per forest plan guidelines for timber operations and derive the extent and frequency of the prescribed fire program. The ecological condition class categorizes stands from a ranking of 1 where desired future condition is achieved to 5 where fire and species composition is absent, using fire frequency tool inputs and basal area estimates. From these datasets and through an ArcGIS interface we are able to run the ecological condition class tool, adjusting parameters for fire frequency and basal area to help rank the ecological condition of stands across the 235,000-acre Talladega Division land base. We will discuss outputs of the fire frequency tool that facilitate fire management planning and evaluation and outputs of the ecological condition class tool. During this presentation, we will offer observations on data acquisition challenges and data gaps, accuracy assessments of ecological condition rankings, and the ability of these GIS tools to guide further management decisions and current management capacity within the present resource base.

## **1-C – RESTORATION THROUGH PARTNERSHIPS: Opportunities for Accelerating Restoration through Partnerships**

### ***Conservation planning and collaboration* [VIEW RECORDING](#)**

Rob Sutter, Principal & Conservation Ecologist, Enduring Conservation Outcomes

Strategic planning and collaboration accelerate the success of any restoration project by helping identify and implement effective actions to respond to current and changing situations. In this presentation, I introduce a strategic planning process called the Open Standards, a structured, scientifically sound, and transparent planning process that guides project teams in the identification and implementation of effective conservation strategies. The process, through its software, Miradi, incorporates tools that prioritize threats and strategies; models the institutional, political, economic, social and ecological drivers of threats; and tests the logic of strategies. The process uses an adaptive management approach to planning. Examples from several longleaf Local Implementation Team planning efforts will be presented including the Apalachicola Regional Stewardship Alliance, Talladega Mountain Longleaf Conservation Partnership, and the SoLo-ACE Longleaf Partnership.

Collaboration is the merging of perspectives and expertise of multiple stakeholders through an open and interactive process to accomplish shared goals and identify better strategies that a single stakeholder cannot solve alone – a perfect description of the context for longleaf restoration and America’s Longleaf Restoration Initiative. Collaboration will result in a greater likelihood of success and more enduring outcomes. The process develops relationships among participants, building respect and trust, and through working together, better communication and understanding. This presentation will present the benefits and challenges of collaboration.

### ***The Ocala LIT: Growing longleaf on the ground and through partnerships in North-Central Florida* [VIEW RECORDING](#)**

Ivor Kincaide, Director of Land Stewardship, Alachua Conservation Trust & Cheryl Millett, Tiger Creek Preserve Manager, The Nature Conservancy

The Ocala Local Implementation Team kicked off work in fall 2013, beginning with a core of three pillars: on-the-ground work largely on public lands through the Northeast Florida Ecosystem Restoration Team, on-the-ground work on private lands through an incentive program with the Florida Forest Service, and coordination and prioritization work with partners through the Ocala LIT coordinator with The Nature Conservancy. The Ocala LIT has grown since then in the projects we have accomplished and is also in the midst of transitioning to local leadership with the Alachua Conservation Trust. We worked together on a conservation plan to guide our work into the future and continue to refine our priority mapping with the assistance of Florida Natural Areas Inventory’s Longleaf Pine Ecosystem Geodatabase. We share information regularly through an email list and in-person, and have partnered with The

Longleaf Alliance, Florida Land Stewardship Program, and the Florida Forest Service to bring in training workshops. We collaborated with Florida's three other LITs and the Yale School of Forestry to get the latest insight into private landowner outreach. We have new prospects for private lands work, including new landowner training opportunities created by a Prescribed Burn Association Coordinator with Alachua Conservation Trust, and funds from new sources to increase fire and other longleaf management on the ground on private and public lands. How do we ensure our work on the ground adds up to significant achievement to contribute to the America's Longleaf Restoration Initiative's goal of reaching 8 million acres of longleaf habitat and increasing the quality of longleaf habitat? Find out.

***Developing an Apalachicola Regional Stewardship Alliance Longleaf Conservation Plan*** [VIEW RECORDING](#)

Brian Pelc, Restoration Project Manager, The Nature Conservancy

"Local Implementation Teams (LITs)" are partnerships across the longleaf pine range working on the local scale to achieve the goals established in America's Longleaf Restoration Initiative; most broadly to plant new longleaf and manage/improve existing forests up to the 8-million-acre mark by 2025. Within this goal and within the unique opportunities and challenges that local landscapes present, there are myriad strategies to accomplish more and better longleaf habitat. Certainly, themes such as more prescribed fire, more invasive species control and more private landowner outreach will be common across the range of LITs, but the process and priorities are generally decided by local experts, such as a steering committee. Regional organizers (i.e., The Longleaf Partnership Council) and funders (i.e., The National Fish and Wildlife Foundation) have asked LITs to develop spatial priorities, acreage goals, and strategic plans to accomplish those goals as a way to groundtruth and monitor acreage progress. The Apalachicola Regional Stewardship Alliance (ARSA) is the LIT for the eastern portion of Florida's Panhandle and southern Georgia. The ARSA steering committee, made up of representatives from 10 signatory, land-managing entities of federal, state and NGO variety, established an objective of being one of the first LITs to complete a longleaf pine strategic plan, which was accomplished in the summer of 2017. This presentation will describe the process, challenges, and final outcome framed as an exportable product that could be recreated in other LITs or similar conservation partnerships. Beyond meeting the requests of regional coordinators and funders, the plan will help determine 1) where to spend limited resources to achieve maximum habitat benefit, 2) priority of threats to accomplishing key conservation outcomes, and 3) bottlenecks in capacity that could be reduced by agency leadership.



## 2-C – THE GROUND COVER: Metrics & Policy

### ***Measuring success in longleaf system restoration: Refining our approach to gauging status and progress in groundcover restoration*** **VIEW RECORDING**

Latimore Smith, Owner, Southern Wild

One of the most challenging aspects of measuring our progress in longleaf pine system restoration is assessing the ecological status of ground cover and adequately measuring progress in its restoration. We all know the ground cover is the foundation of much of the biodiversity in longleaf systems, and that its quality varies from site to site based on management and stand history. As we evolve in measuring restoration success in different places, it is crucial that those leading the effort to promote and gauge longleaf restoration employ subtype specific ground cover metrics that accurately assess its quality. All current ground cover assessment protocols developed by major players in longleaf restoration have significant shortcomings in gauging ground cover status. These protocols have been oversimplified, it appears, to allow use by resource professionals that lack the expertise to identify most ground cover species, and thus they do a very poor job of assessing composition and prevalence of species, which are core attributes that must be assessed to satisfactorily measure ground cover status. This is a real stumbling block for truly understanding the ecological condition of the many subtypes of longleaf across its range as we are working to restore them and track progress. We must do better. One potential component of a protocol to better assess ground cover condition, that admittedly will require more field time by skilled personnel, is evaluating the presence and prevalence of ground cover “functional groups.” Functional groups are assemblages of species that share certain attributes important for longleaf system integrity and could include, for example, warm-season grasses important for fire, habitat structure, and wildlife food, across-season flowering forbs for pollinators and nectivores, legumes, and rare/unique species. There is a critical need for a working group of ground cover experts and others to solve this major challenge.

### ***Threading the (pine) needle: Developing groundcover metrics that are easy and rapid to collect and accurately measure the ecological integrity of longleaf and other open pine ecosystems in the SE US*** **VIEW RECORDING**

Rickie White, Research & Development Manager & Senior Ecologist for SE North America, NatureServe

With partners, our team developed and is now improving groundcover metrics for longleaf/open pine. To ensure that the metrics are functional and adopted widely, we feel they need to be easy to use and they should accurately measure the ecological integrity and wildlife value of a given area (<http://www.natureserve.org/conservation-tools/projects/developing-rapid-assessment-metrics-measuring-open-pine-ecosystem-heal-0>). Fulfilling this goal is a



challenging endeavor since key indicators of longleaf pine ecosystem health are tied to groundcover herbaceous plant composition, which is difficult to measure rapidly without an experienced botanist. Our version 1.0 metrics were completed in 2016 with the US FWS. Revisions are in progress and include 4-5 groundcover metrics that we hope “thread the (pine) needle” by being easy to collect while also representing ecological integrity and wildlife value. In our presentation, we will outline these metrics, discuss challenges in creating accessible, accurate, and meaningful metrics, review initial results of field tests of these metrics, and ask for input on improving the metrics in future versions.

***Assessing longleaf condition class in North Carolina: Comparing methodologies*** [VIEW RECORDING](#)

Jeff Marcus, North Carolina Longleaf Restoration Director, The Nature Conservancy

The America’s Longleaf Restoration Initiative (ALRI) set a goal of 3.4 million acres of longleaf pine habitat in maintenance condition by 2025. Towards this goal, The Nature Conservancy (TNC) tested three methodologies to assess longleaf condition class on conservation lands in North Carolina. In summer 2015, we conducted field surveys on 13,901 acres. Observers estimated basal area of longleaf and other pines, as well as shrub, grass, and herbaceous cover. In 2016-17, we used National Agricultural Imagery Program (NAIP) imagery and Forest Inventory and Analysis (FIA) plot data to estimate tree density and tree, shrub, grass, and bare ground cover across the entire longleaf range in North Carolina. This method took ~6 months and required advanced computing capacity. In 2018, we asked land managers with 14+ years of experience to provide their expert opinion on the condition class of ~9,600 acres of TNC lands, requiring ~3 hours to complete. The field-based method provided data on each of the ALRI metrics, while the model-based approach yielded a precise grid over a large geographic extent, but did not provide data on all metrics. The expert opinion took the least time and yielded unique insights that other techniques did not. However, this technique was susceptible to subjectivity and limited to properties the land managers were familiar with. Our results demonstrate trade-offs between the number and precision of metrics measured and the scale at which data can be collected. We suggest remote-sensing techniques may be the most practical way to collect data at the scale of a Local Implementation Team or larger, but field-based surveys or expert opinion may be more useful for obtaining some ALRI metrics. We suggest possible changes to ALRI maintenance class metrics and highlight inherent challenges in assessing multiple natural communities in a dynamic system with a single, pragmatic survey.

### 3-C – THE TREE: Silvicultural Research

#### ***Longleaf pine silviculture research from the USDA Forest Service—20<sup>th</sup> century findings translated for application in the 21<sup>st</sup> century*** [VIEW RECORDING](#)

Dr. James Guldin, Silviculturist, USDA Forest Service Southern Research Station

The last half of the 20th century was a heyday of silvicultural research in southern pines, including longleaf pine, in the Southern and Southeastern Forest Experiment Stations of the USDA Forest Service. Research findings specific to longleaf pine included exposition of the shelterwood method, an enhanced understanding of seed and cone development, the basics of genetics and tree improvement coupled with the establishment of 1st-generation improved seed orchards, and the entire degree of science associated with nursery protocols, and planting seedlings—including techniques for site preparation and release from competing vegetation. Iconic experimental research locations for much of that work included the Escambia and the Palustris Experimental Forests. Despite that developing knowledge, the status of longleaf pine declined throughout the 20th century for a number of reasons, highlighted by changing professional attitudes regarding fire in the woods, and the rapid early growth of other species preferred by industry landowners, and culminating in a decline in the value of high-quality pine sawtimber. That decline led to the establishment of America's Longleaf Restoration Initiative, with an aggressive goal of 8 million acres of longleaf pine restored through 2025. Several elements of that USFS research from the 20th century will be fruitful in application to this restoration effort, especially the understanding of the development of longleaf pine stands under conditions that are less than fully stocked. Silvicultural metrics applicable for contemporary restoration efforts will be reviewed, especially options that speak to management and rehabilitation of understocked longleaf pine stands.

#### ***The devil is in the details—Sustaining the growth of young longleaf pine despite crown scorch***

Mary Anne Sayer, Plant Physiologist, USDA Forest Service Southern Research Station [VIEW RECORDING](#)

Low intensity, uniform fire every two to five years is vital to longleaf pine ecosystem function. Forest managers across the Southeast also utilize this tool to reduce understory fuel and favor wildlife habitat. A wide range of stemwood growth responses to fire has been observed, and a loss of stemwood growth by prescribed fire is undesirable to most private landowners. Research on the Kisatchie National Forest was conducted to determine how forest managers can take advantage of Pinus' natural fire tolerance mechanisms to sustain the production of longleaf pine. One means of avoiding a loss of stemwood growth by fire in young pines is timely reestablishment of scorched foliage. Two studies conducted on the Kisatchie National Forest in central Louisiana showed that the foliage biomass of severely scorched longleaf pine saplings was reestablished by one growing season after spring or fall fire. Mechanisms of foliage recovery differed by season of fire. During the three months after prescribed fire in

May, photosynthesis in residual, unscorched foliage and mobilization of stored starch fed new foliage growth. Foliage regrowth was also supplied with current photosynthate during the eleven-month period after prescribed fire in October. However, starch dynamics indicated that this source of carbohydrate did not contribute to foliage recovery after fire in October. A positive relationship between post-fire foliage regrowth and lateral branch number was also seen. These observations provide insight about the season of prescribed fire in seedling and sapling stands of longleaf pine when survival and juvenile growth are among the landowner objectives.

[VIEW RECORDING](#)

#### ***Nursery production treatments enhance height growth of outplanted longleaf pine seedlings***

Dr. Susana Sung, Research Plant Physiologist, USDA Forest Service Southern Research Station

Longleaf pine (*Pinus palustris*, LLP) seedlings can remain in the grass stage (stem < 12 cm) for several years. This study tested the effects of nursery production treatments on reducing time in the grass stage for LLP. Seedlings were grown in Moscow, Idaho in a 4 container cavity volume (60, 95, 125, and 336 ml) x 2 copper root modifying treatment (no-Cu and Cu) x 3 N rate (0.5 (LN), 2 (MN), and 4 (HN) mg N seedling<sup>-1</sup> week<sup>-1</sup> for 19 weeks) x 3 replicate randomized complete block design. Phase I of the study showed that at the end of the 29-week nursery culture, LLP grew larger as cavity volume increased and as N rate increased (New Forests 44:881). Phase II of the study was established on the Kisatchie National Forest in central Louisiana. Fifteen LLP seedlings from each of the 24 nursery production treatments were outplanted to a randomly assigned row at a 2-m by 2-m spacing within each of the three blocks. Sixteen, 28 and 42% of LLP seedlings grown in the largest cavities at LN, MN, and HN, respectively, emerged from the grass stage in the first year. Copper treatment did not affect seedling emergence from the grass stage. By the end of the second season, more than 90% of seedlings emerged from the grass stage except for seedling cultured in the smallest cavities at LN (64%) and MN (84%). After six growing seasons, LLP height and diameter generally increased with increasing cavity volume and N rate. Seedlings were randomly selected for root excavation in season two and six. In general, Cu root modifying treatment was not effective for seedlings cultured in 125 or 336 ml cavities at HN. The extent of lateral root deformity in these seedlings was as severe as those from the no-Cu cavities.

#### **4-C – THE ECOSYSTEM: Managing for Species of Concern**

##### ***Managing for flatwoods salamanders – Challenges, successes, and techniques for the future***

Jana Mott, Apalachicola Restoration Specialist, The Nature Conservancy [VIEW RECORDING](#)

Flatwoods salamanders (*Ambystoma cingulatum* and *Ambystoma bishopi*) once extended from South Carolina through southern Alabama, their preferred habitat ranging from mesic longleaf flatwoods to wet prairies. Originally listed in 2000, these species have been declining at an alarming rate, possibly over 80% since 1999 (Semlitch et al., 2017). The Apalachicola National

Forest contains one of the last remaining metapopulations of *A. cingulatum*, and habitat restoration is critical. Since 2011, ANF, TNC, and the Florida Fish and Wildlife Conservation Commission have been partners in restoring habitat for this species, with a focus on the seasonally dry isolated wetlands used for breeding and larval development. These wetlands are a niche habitat within longleaf systems often overlooked when managing at a landscape scale. Decades of dormant season fire and/or burning under wet conditions have caused encroachment of hardwood shrubs, disappearance of emergent and submergent herbaceous groundcover, and the accumulation of organic material. Our restoration work has focused on clearing with hand tools, chainsaws, and herbicide; and re-introducing fire. Challenges have included determining the right mechanical or hand treatment options for habitat sensitivity and condition, seasonal restrictions and undetermined means to return fire to this habitat. Successes include increased herbaceous vegetation in many cleared sites and three consecutive years of prescribed fire operations targeting flatwoods salamander habitat. Looking to the future, we are shifting focus to the removal of organic matter from these wetland basins using a variety of methods from hand raking to mechanical excavation. While habitat restoration alone can't recover this species, without critical efforts like this these rare animals would have little hope.

***Restoring the red-cockaded woodpecker on public and private land through habitat improvements and translocation in South Carolina***     **VIEW RECORDING**

Lisa Lord, SC Field Project Coordinator and Savannah River Watershed Project Director for The Longleaf Alliance

Longleaf ecosystem restoration and increasing Red-cockaded woodpecker (RCW) (*Picoides borealis*) populations, through conservation and recovery, is a priority in South Carolina. Beginning in 2015, The Longleaf Alliance and Partners began working on public and private lands to enhance RCW habitat, and in 2017, began translocating RCWs to private lands enrolled in the Safe Harbor Program (SHP). Translocation addresses certain challenges within small populations and creates opportunities for long-term conservation on those properties. The recipient populations also contribute to range-wide recovery and increase forest biodiversity because of the RCW's role as a keystone species. This project fostered new partnerships and contributed to many federal and state conservation plans goals. The Francis Marion National Forest (FMNF) has the 5th largest RCW population and provided the donor RCWs for this project. In 2017, 30 RCWs were translocated from the FMNF to five private properties enrolled in the South Carolina Department of Natural Resources SHP. The translocations were important for augmenting the populations and contributing to the stability of existing RCW populations. The quantity of fledglings used for translocation was small in comparison to annual reproduction. These properties also met criteria established by the RCW

translocation team, and landowners were required to establish, improve or maintain longleaf pine and be dedicated to long-term conservation. Additional translocations are being planned for 2018 and 2019. This project is exciting because it quickly produced measurable outcomes towards RCW population expansion and improvement and management of longleaf pine habitat. To illustrate, 12 clusters were installed in August 2015 at Aiken Gopher Tortoise Heritage Preserve, and by May 2016, two banded RCWs originating from 10+ miles away occupied the clusters. Additionally, RCWs were translocated in 2016 and 2017 to Hitchcock Woods. In 2015, no birds occupied the property, and as of March 2017, 13 RCWs were observed roosting.

***Function-based quantification of longleaf habitat for priority species using an ecological integrity approach***    **VIEW RECORDING**

Paxton Ramsdell, Southeast Habitat Program Manager, Environmental Defense Fund

Decades of restoration, supported by tens of millions of dollars in funding, are expanding the acreage of longleaf across the Southeast. To quantify the functional uplift created by longleaf management, conservation, and programs, Environmental Defense Fund, NatureServe, and Florida Natural Areas Inventory (“Partners”) have developed a habitat quantification tool (HQT) that accounts for the functional value of longleaf habitat for a suite of species including the Red-cockaded Woodpecker and the Gopher Tortoise as well as overall ecological integrity. Recognizing the significant range of the longleaf pine ecosystem and its endemic biodiversity, NatureServe first incorporated literature reviews and stakeholder input to identify seven “Southern Open Pine Groupings” including Dry and Mesic Longleaf Pine Woodlands, and Upper Coastal Plain Pine Flatwoods. These groupings provided the basis for developing the forest condition metrics published in the “Rapid Assessment Metrics to Enhance Wildlife Habitat and Biodiversity within Southern Open Pine Ecosystems.” Partners next developed GIS-based and on-the-ground rapid assessment metrics. The HQT accounts for impacts from adjacent land uses such as urban development or agriculture and includes specific vegetation measures that require a site visit. The HQT uses these metrics to quantify the functional value score (quality) of a stand, which is then multiplied by acreage (quantity) to provide a functional acre score. Partners have spent the past year building and field testing the HQT, and we will share an overview of this open-source tool. The HQT quantifies habitat value for a suite of representative species. Recognizing many policies require a species-specific approach, we are collaborating with Florida Fish and Wildlife Conservation Commission to customize the HQT to account for the “Essential Behaviors” of the imperiled Florida Pine Snake. During this session, we will review the process of developing and using both the longleaf HQT and the species-specific HQT.

## **1-D – RESTORATION THROUGH PARTNERSHIPS: Addressing Today's Challenges for a Sustainable Future**

### ***Southeast Prescribed Fire and Air Quality Workgroup: Addressing tomorrow's challenges today*** [\*\*VIEW RECORDING\*\*](#)

Mark Melvin, Prescribed Fire Management Specialist, Joseph W. Jones Ecological Research Center at Ichauway

Many surveys have identified challenges that fire managers and landowners face related to prescribed fire use in the United States. Although informative, these surveys do not address the challenges state agencies navigate in managing fire programs. In particular, it is often overlooked that the states are actually responsible for administering prescribed fire use. States operate independently to develop policy and regulations that work for their own interests; as a result, prescribed fire programs differ greatly by state and region. In 2013, state forestry and environmental protection agencies from eight southern states, as well as the US Environmental Protection Agency, convened a first of its kind forum to discuss issues and concerns related to prescribed fire, smoke management, and air quality. The result was the identification of prescribed fire coordination needs, at a multi-state scale, that benefit both the southeast region and individual states. The outgrowth of the inaugural meeting has been the development of the “Southeast Prescribed Fire and Air Quality Workgroup.” The workgroup’s primary goal is to foster collaborative efforts to support and increase the appropriate use of prescribed fire as a natural resource management tool to enhance forest health and public health and safety.

### ***“Learn & Burn” Workshops: Opportunities to provide prescribed burning experience and mentorship*** [\*\*VIEW RECORDING\*\*](#)

Jennifer Fawcett, Extension Associate, Department of Forestry and Environmental Resources, Extension Forestry at North Carolina State University

“Learn & Burn” workshops can come in many forms, but always have the same intent: to provide participants with new knowledge and hands-on prescribed burning experience. In partnership with Longleaf Implementation Teams, Prescribed Fire Councils, local agencies, organizations, and other key stakeholders, the Southeast Regional Partnership for Planning & Sustainability (SERPPAS) has helped to host 13 of these “Learn & Burn” workshops for more than 350 private landowners and forestry consultants across seven states since 2014.

Partnerships are key to the success of these events since each group can assist with different aspects of the event, from funding to providing the land to burn, sending out invites, or presenting information. Evaluation surveys were conducted at the completion of each workshop, as well as up to four years after the workshops in order to determine program success and the degree to which prescribed burning was subsequently adopted. In addition, surveys and interviews with workshop partners and other past workshop organizers from

around the country were conducted to gather lessons learned, suggestions for future workshops, and to develop a set of best practices. This presentation will share successes and lessons learned from past workshops, as well as tips for putting on a “Learn & Burn” workshop in the future.

**Longleaf Pine Fire Mentoring Program** [VIEW RECORDING](#)

Troy Ettel, Program Officer, Turner Foundation & Toby Bokum-Fauth, Student Conservation Association

The Fire Mentoring Program integrates two high priorities for the future of conservation. The program was developed to help increase capacity for land management, especially application of prescribed burning while developing land managers of the future that better represent the human diversity of our longleaf pine landscapes. The program recruits young people from underserved, under-engaged populations, trains them for fire and land management crews then embeds them alongside teams of wildfire and natural resource professionals. It equips key partners such as the US Forest Service and US Fish and Wildlife Service with capacity to expand restoration activities while providing program participants the training and experience necessary to become certified wildland fire fighters for public service. Initiated in 2014, The Nature Conservancy, the Student Conservation Association, the US Forest Service, and Job Corps are actively collaborating to provide the initial exposure and training that will initiate and provide access to the skill development and experience needed by young people to be competitive for federal or other employment in natural resources. In the four years since the program was launched in 2014, over 80 young people have been trained as wildland firefighters with over 40 serving alongside professional fire crews in Texas, Louisiana, Alabama, Georgia, Florida, South Carolina, and Mississippi. These crews have helped apply prescribed fire and related land management on more than 150,000 acres. Program graduates have proceeded to work for TNC and public and private conservation/land management agencies, and other national forests. However entry-level opportunities that will serve as pathways to careers in natural resource management remain a priority next step to complement the program.

**4-D – THE ECOSYSTEM: Ecosystem Services**

***Comparison, contrast and co-connection of ecosystem services between longleaf pine and tall grass prairie.*** [Canceled](#)

Jef Hodges, Grassland Coordinator, National Bobwhite Conservation Initiative

Acres of longleaf pine, like native grasslands, have declined significantly from historic times. Initiatives to decelerate or reverse these declines are underway but face challenges against economic pressures created by alternative options. Often decisions for retaining or establishing longleaf pine are based solely on formal market values with little or no consideration for non-market value. To retain or establish new acres of longleaf, values need to be assigned to non-



market functions. Payment for Ecosystem Services (PES) has been established in some situations to help address non-market “commodities.” I examine the literature and compare, contrast and identify co-connections of new research between longleaf pine and tall grass prairie ecosystems.

***Conservation capitalism and ecological credits*** [VIEW RECORDING](#)

C. Lamar Comalander, President Emeritus, Milliken Forestry Company, Inc.

This presentation explores the concept of realizing monetary returns utilizing ecological credits. Conserving forest ecosystems for profit, at a scale larger than the “trees” themselves, is not a commonly recognized or utilized practice by private forest landowners. Today’s paradigm is that a tree only produces value when harvested. However, by using the stored carbon and water within trees, in addition to the forest’s biodiversity, the tree has value while standing, not just when it is harvested.

We will explain how carbon, wetland, streamside and water markets and nutrient banks have the potential to generate income for private forest landowners.

Additionally, given current market conditions, we will explore the question of whether private forests are worth more standing than harvested.

In summary, currently, the “natural,” non-timber capital associated with forests is not being measured, evaluated or recognized by most landowners. Because of society’s and private forest landowners’ interest in conserving forest land and the potential for additional income from those lands, it is appropriate that we realize a tree is more than a timber product; it is 25% carbon, 38-50 % water, an oxygen producer, and a valuable contributor to biodiversity.

***Conserving forests to benefit drinking water and forest landowners*** [VIEW RECORDING](#)

Lisa Lord, The Longleaf Alliance

***Financial incentives for landowners who establish long-term gopher tortoise recipient sites***

Eric Seckinger, Florida Fish and Wildlife Conservation Commission [VIEW RECORDING](#)

**4-B – THE ECOSYSTEM: Fire**

***Fire and Tree-ring Research in Old-growth Pine Savannas of Florida*** [VIEW RECORDING](#)

Jean Huffman, Louisiana State University and Tall Timbers Research Station, Southeastern Coastal Plain Tree Ring Lab

Old longleaf and slash pines provide irreplaceable records of a great variety of natural and human history within their growth-rings. Jean will present some results of fire history reconstructions from Central Florida, a North Florida barrier island, and a Florida panhandle pine flatwoods and discuss how they relate to current fire management. She will also discuss some ongoing tree-ring work, and the future of fire history tree-ring studies she has been working on in Florida and Southern Georgia.



## Poster Session Abstracts

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### ***Longleaf Legacy Project***

Austin Arabie, Arabie Environmental Solutions

The longleaf pine (*Pinus palustris*) forests of the Southeastern US were once the most extensive forest ecosystem in North America. With almost 90 million acres dominated by a single species, longleaf were considered inexhaustible. But extensive harvest for its superior lumber decimated the longleaf forests. Currently less than 4 million acres of longleaf pine habitat remain, making it one of the most endangered ecosystems in North America. Sam Houston Jones State Park (SHJ SP), near Lake Charles, Louisiana includes areas of degraded longleaf forests. The Coastal Plan Conservancy (CPC), a non-profit land trust, initiated a project to restore these areas.

Project objectives were (1) Ecological restoration of longleaf pine wetland ecosystems, (2) Provide a highly visible example of the longleaf pine wetland ecosystem that was a major part of the local landscape, and (3) Educate the public about this unique and biologically rich ecosystem. The project was initiated in 2015. In 2016, the CPC obtained a Cooperative Agreement with the Louisiana Office of State Parks, a Corps of Engineers Wetland Permit, and financial support from SASOL. In 2017, the project was named the “Longleaf Legacy Project” and restoration was initiated. Major accomplishments in 2017 include: (1) Mulching of 50 acres (13 in Feb., additional 37 in Dec.) of a thick, undesirable understory in the center of SHJ SP, (2) Selective herbicide application to regrowth of the undesirable shrubs, (3) Installation of interpretive sign to describe the project to park visitors, and (4) Developed and implemented a communication plan to increase public awareness. In 2018 we prescribed burned the 13 acres originally mulched, removing a thin layer of the accumulated duff. This project is on-going. Future plans are to mulch and selective herbicide additional areas, introduce a schedule of prescribed burns, and partner with McNeese State University to monitor results.

### ***National Bobwhite Conservation Initiative mid-project activities and results at the Carolina Sandhills NWR Quail Focal Area***

Allyne Askins & Nancy E. Jordan, USFWS, Carolina Sandhills National Wildlife Refuge

The South Carolina Department of Natural Resources (SCDNR) as part of the National Bobwhite Conservation Initiative designated a portion of the Carolina Sandhills National Wildlife Refuge (CSNWR) as one of four Quail Focal Areas (QFA) in South Carolina in 2015. The refuge, which contains 46,000 acres of the longleaf pine (LLP) ecosystem, is located in the Sandhills Region of South Carolina in Chesterfield County. Northern Bobwhite Quail (NOBO) are native to the LLP ecosystem; the open canopy, grassy groundcover, and pocosin drains provide good habitat for

NOBO. CSNWR manages for NOBO by using a variety of techniques including prescribed burning, timber thinning, patch cuts, food plot and native warm season grass (NWSG) establishment, disking, mowing, invasive species control, and establishing/maintaining thickets. Through NOBO Whistling Cock Surveys, refuge biologists have noted a decline in this species on the refuge, as has been noted throughout its range.

By naming NOBO a focal species on the Refuge and identifying a QFA, biologists intend to focus management actions within the QFA over the next five years (2015-2020) to see if concentrated management can be effective in increasing NOBO quail abundance. The QFA contains 2487 acres, including 1983 acres of natural pine, 113 acres of planted pine, 147 acres of fields, and 244 acres of wetlands. CSNWR has also designated a reference area of equal size and composition, where routine management will occur. This poster describes these areas, management activities during 2016 through 2018, plans for 2019 and 2020, and monitoring techniques throughout the refuge to measure NOBO response.

This project is a partnership between the US Fish and Wildlife Service and the SCDNR.

***Generational Education - The Sandhills Longleaf Pine Conservation Partnership (SLPCP) innovative solution to reaching the next generation.***

Charles Babb, Sandhills Longleaf Pine Conservation Partnership

The SLPCP is located in South Carolina's Chesterfield and Darlington Counties has been widely successful reaching private landowners within their 466,000-acre focus area. As a result of their education programs and close working relationship with the USDA-NRCS, The SLPCP has reintroduced longleaf more than 16,000 acres encompassing more than 350 contracts.

However, the majority of the impact being made is with landowners over the age of 60 who admit to planting their longleaf for their children or even grandchildren. There is a disconnect between the generation that has the foresight to plant longleaf and the future generation(s) that will inherit them. The trees that we are planting now are the ones that we will never see a Red Cockaded woodpecker flitting around. If the longleaf that we are planting will just be another version of a short-rotation loblolly, then we have not been successful in restoring this ecosystem. Our future landowners are more plugged-in than unplugged. Our schools are threatening to implode under ever tightening budgets with little economic room for outdoor learning. Parents may not have the ability, knowledge, or energy to take day trips to the woods. And yet, our longleaf ecosystem will ultimately depend on exactly that generation to sustain them. The SLPCP has partnered with local landowners William and Kasey Lenz to host a multi-generational education program to bridge the gap between young and old in a fun and exciting field setting geared for any age.

### ***The SC Sandhills Longleaf Pine Conservation Partnership (SLPCP) Ground Truthing Project***

Charles Babb, Sandhills Longleaf Pine Conservation Partnership

The SLPCP is a LIT consisting of 365,000 acres of privately-owned lands in Chesterfield and Darlington Counties, SC surrounding 101,000 acres of public lands. Technical and financial assistance for longleaf establishment and management practices is focused towards private landowners, with priority given to those adjacent to public lands already managed in longleaf. Since 2010, over 17,000 acres have been converted to longleaf, adding to the estimated 45,000 acres of existing private, longleaf dominated forest. In 2017, the SLPCP joined forces with Horry-Georgetown Technical College to use forestry interns to initiate a comprehensive field evaluation of privately-owned forest stands within the focal area. Interns spend their days on the road collecting data on stand characteristics such as species, age class, understory type, and evidence of current management. The resultant database is coupled with landowner information from the county GIS tax information and is already being used to expand outreach efforts to individuals owning key properties in the effort to build contiguous blocks of longleaf habitat. Additionally, the Partnership plans to use the data to identify existing owners of longleaf stands in need of improved management, or those with unproductive forest types which might benefit from a discussion on stand conversion. Eventually, this data could be used in creative ways, including being able to combine multiple small tracts needing management services (prescribed fire, thinning, herbicide application) into blocks large enough to be economically feasible for both landowners and consultants. Student interns have collected data on approximately half of the focal area to date. The SLPCP expects to complete entire data collection by 2020.

### ***Fire on the Forty Program models effective partnership for managing wildlife habitat***

Tamara Campbell, US Fish and Wildlife Service & John Gruchy, Mississippi Department of Wildlife, Fisheries, and Parks

Plant and animal communities in MS are adapted to and dependent upon frequent fire. Since the early 1900s, however, fire frequency across these landscapes has been reduced due to public apathy, liability concerns, and costs. To address some of these concerns, wildlife biologists from state, federal, and NGO organizations in Mississippi collaboratively worked with the US Fish and Wildlife Service's Partners for Fish and Wildlife Program and developed the Fire on the Forty Program (2011-present) to provide cost-share assistance for landowners who voluntarily manage their properties' habitat. Focal counties were identified based on priority habitats, management need, and fire deliverability. An outreach campaign was conducted to inform and recruit landowners willing to implement prescribed fire on their property, in addition to providing 50% of the costs associated with the burn. Projects were ranked competitively based on potential habitat benefits. Since inception, we received 1,036

applications totaling over 111,000 acres for prescribed fire. Of those applications, 853 properties were funded totaling 80,667 acres. Greater than 60% of the funded contracts have completed their burn, and many have maintained the practice on their property. Landowner response to this program demonstrates the value of cost-share incentives to encourage habitat management and reaffirms that prescribed fire can be strategically applied to effectively deliver management practices in areas of conservation need.

### ***Longleaf conservation progress on the Chattahoochee Fall Line***

LuAnn Craighton, Chattahoochee Fall Line Conservation Partnership

The Chattahoochee Fall Line Conservation Partnership (CFLCP) is the Local Implementation Team (LIT) working in west Georgia and east Alabama to conserve the longleaf pine ecosystem. The CFLCP has made significant progress in land protection, land stewardship, landowner outreach and forging cooperative relationships in the region to achieve conservation outcomes. The CFLCP is working to encourage the protection, restoration and management of 40,000 acres around Fort Benning by the year 2020. Creating this "conservation corridor" will provide a buffer of natural lands between active military training and daily life outside the Installation while protecting the unique natural heritage of the region. Recent projects designed to support our conservation objectives include: prioritization mapping within our Significant Geographic Area, collaborating with partners to launch a prescribed fire cooperative and training program, organizing a landowner association, and implementing targeted marketing to reach unengaged private landowners. By working together, partners in the CFLCP are achieving conservation success along the Fall Line!

### ***DNA Fingerprinting of Longleaf Pine Seed Orchards and Seed Bank for Genetic Integrity***

Barbara Crane, US Forest Service

The USDA Forest Service in the Southern Region actively supports longleaf pine ecosystem restoration. We manage about 540 acres of longleaf pine seed orchards in Louisiana, Mississippi and South Carolina, which provide suitable seed sources to support restoration. Concerns arose in 2015 about the potential increase of hybridization between longleaf and loblolly pines, because of the unusual morphology of one of the seedling crops at a nursery. Sonderegger hybrids were suspected. To verify the purity of our longleaf resources (seed orchard and seed bank), we DNA fingerprinted all longleaf pine families in the seed orchards. The seed bank drew samples from across multiple years to be tested as well.

National Forest System, the National Genetics Lab (NFGEL) and the Southern Institute of Forest Genetics (SIFG SRS) collaborated on this project. SIFG developed three DNA markers that were used to specifically identify longleaf X loblolly hybrids. NFS seed orchard managers collected needle tissue from 250 families and sent them to NFGEL. Ashe seed bank submitted longleaf seed for testing, samples ranging from 1981 – 2017 collection years. NFGEL performed the lab

testing and analysis. Results showed that no longleaf pine families in any of the orchards were hybrids. Seed samples showed that 2 seed per 100 showed a hybrid fingerprint.

### ***Community disassembly of pine savannas after fire suppression***

Milton Diaz, University of Florida

Many ecosystems around the world are undergoing dramatic and often non-random changes in species composition due to anthropogenic disturbances and stresses (e.g., fire suppression), a process termed “community disassembly.” Community disassembly changes native species composition, and often this process depends on species traits and the type of disturbance. When prolonged or severe, altered disturbance regimes can accelerate species loss and recruitment, often resulting in biotic homogenization across sites. Understanding the effects of altered disturbance regimes on plant community dynamics can provide insights into how these communities might be most effectively restored. Among the altered disturbance regimes that lead to community disassembly is fire suppression. Species losses from fire suppression are particularly severe in savannas where frequent fires are required to prevent colonization of fire-intolerant species and to maintain understory plant diversity. Community disassembly in pine savannas is expected to be influenced by complex interactions between fire suppression and overstory composition. Canopy closure and canopy species composition can result in distinct ground-layer species assemblages. For instance, on a relatively moist site, a fire-suppressed pine savanna might transition into a mixed hardwood forest. On drier sites with nearby seed sources, the disassembly of longleaf pine savannas could lead to a sand pine invaded ecosystem. Hypothesis: I expect that ground-layer species functional composition in sand pine invaded habitats and old-growth savannas to be more similar than those of hardwood mixed forests. I will sample fire suppressed pine savannas and reference sites to compare 10 functional attributes of ground-layer species in these habitats—Specific leaf area, leaf dry matter content, plant height, growth form, light compensation point, plant flammability, nonstructural carbohydrates, and seed mass. Also, I will explore levels of taxonomic similarity between habitats based on ordination analysis and identify what species with which functional traits were lost after fire suppression.

### ***Prescribed Fire Councils***

Jennifer Fawcett, North Carolina State University Extension

As of 2017, 33 Prescribed Fire Councils existed in 29 states across the country, including all nine of the longleaf states. Councils serve as mechanisms to assist fire practitioners, policymakers, regulators, and citizens with issues surrounding prescribed fire use. Often, Councils provide practitioners with educational and experiential opportunities, members with opportunities to come together to discuss fire science and land management activities, and citizens with a better understanding of fire. To learn about the current structure, funding, membership status,

priorities, and needs within each Council, an online survey was conducted in fall of 2017. All 33 Councils participated in the survey for a 100% response rate. Findings showed that while some Councils have no formal membership process, others have membership ranging from less than 50 to more than 200 people. Priorities for the coming year ranged from hosting meetings to membership growth and development of new legislation. Needs included items such as lessons learned and successful strategies from other Councils, recruitment of younger members, legal guidance, and funding assistance. Results show that there is a range of experience and needs across the Councils, from those just starting out and looking for assistance to those who have been established for decades and can provide models for success. This poster is meant to highlight the similarities and differences between the Councils, and to create better opportunities for success of the Southern Councils located in the nine longleaf states by looking back at what has worked and what areas need improvement, taking stock of their current situation, and identifying needs for moving forward.

***Plant community recovery following fire reintroduction: impacts of spatial scale, forest structure, and site type***

Lisa Giencke, Joseph W. Jones Ecological Research Center

In the longleaf pine-wiregrass ecosystem of the southeastern Coastal Plain, fire plays a critical role in maintaining an open canopy, a sparse midstory, and a diverse ground cover. In the absence of fire, a hardwood midstory develops, duff accumulates, and ground cover species richness declines precipitously. The trajectory and time frame for restoring fire-excluded stands, including recovery of the plant community, by reintroducing fire is largely uncertain. Our research objectives were to investigate how fire reintroduction affects species richness at various spatial scales and whether certain guilds of species were associated with fire reintroduction. Our study plots were split between xeric and wet-mesic sites. As part of a larger experimental design, half the plots received nitrogen addition annually from 2001 through 2011. Each plot was 20 × 20 m and contained subplots ranging from 0.1 m<sup>2</sup> to 100 m<sup>2</sup>. All plots were burned in 2001 and subsequently excluded from fire. Fire was reintroduced to half the study plots in 2015. We documented species richness in 2015 and 2017. Fire reintroduction led to an increase in species richness at various spatial scales, especially at the wet-mesic site. Conversely, plots with a history of nitrogen addition continued to decline in richness at several spatial scales, which differed by site. Forbs and grasses were associated with fire reintroduction, while legumes were associated with fire reintroduction only in plots without nitrogen addition. Woody species were associated with nitrogen addition regardless of fire treatment. Thus, plant community recovery following fire reintroduction varies depending on spatial scale, structural legacies (i.e., history of nitrogen addition), and site type. Although fire reintroduction is a critical step in the restoration process, it may not be sufficient for short-term recovery.

Continued monitoring is necessary to understand long-term effects of fire reintroduction on ecosystem structure and community composition.

***Greenhouse propagation of the endangered hemiparasite *Schwalbea americana* (American Chaffseed): experimentation and botanical studies.***

Dr. Danny Gustafson, The Citadel

American Chaffseed (*Schwalbea americana* L. [Schrophulariaceae]) is a federally endangered, hemiparasitic species that primarily occurs in fire-maintained pinelands in the Atlantic and Gulf coastal plains of the United States. Efforts to propagate *S. americana* for reintroduction into the wild have been met with mixed results. Discrepancies in our understanding of host requirements, soil ecology, and growing conditions need to be resolved in order to develop a successful ex situ propagation program. We conducted a series of greenhouse experiments to address the impact growth media, soil microbes, mycorrhizal associations and autoparasitism may have on successful propagation of seedlings. We also tested the effectiveness of storing bare-root plants at 4°C (39 °F) relative to plants overwintering outside or maintained in the greenhouse. We confirmed that cold moist stratification is necessary to achieve high germination rates needed for ex situ propagation. Soil microbes and growth media affected *S. americana* survivorship. We successfully grew plants in the absence of host plants by supplementing nursery media with organic hydrolized fish fertilizer. We did not observe *S. americana* forming mycorrhizal associations or parasitizing its own roots (no autoparasitism). Finally, we demonstrated that 1-year-old bare-root plants stored for three months at 4°C exhibited survival rates that rivaled plants that overwinter outdoors or in the greenhouse. These greenhouse propagated plants can then be used for reintroduction within *S. americana* historic range.

***Ten Million Seedlings: The USDA Forest Service-Savannah River's successful machine planted bare-root longleaf pine efforts at the Savannah River Site***

Jennie Haskell, Savannah River Site

The USDA Forest Service-Savannah River (USFS-SR) has managed the natural resources for the Department of Energy (DOE) at the 200,000 ac Savannah River Site (SRS) since its creation in 1951. The active timber program requires an active silviculture program. Since 1984, the USFS-SR has been planting longleaf pine. While many people reforest with containerized longleaf pine, USFS-SR has been perfecting techniques for establishing bare-root longleaf pine. The high success rate has resulted in planting less trees per acre. USFS-SR collects cones from phenotypically superior parent trees in established seed production area on the SRS. The cones are processed and the seed grown in a state nursery. The bare-root seedlings then return to the SRS for planting. Machine planting longleaf pine, similar to loblolly pine, has been effective and efficient. The planting machines follow the natural contour of the land to minimize the loss of

soil and seedlings due to erosion. Planting machines are required to make a clean trench, a minimum of ten inches deep and pack the soil firmly around each planted seedling leaving a minimal berm. Closing the trench at the bottom, eliminating air pockets, as well as the top so seedlings can withstand being pulled from the ground by the terminal group of needles. Longleaf seedlings are planted so that the terminal bud is at the soil surface. USFS-SR strives to perform adequate herbicide applications and site prep burns in order to insure three to four years of hardwood completion control. This eliminates any need for seedling release which can damage planted seedlings. Although dependent on the species present, a common herbicide mixture includes imazapyr, and triclopyr ester. Machine planting is successful even where mechanical site preparation and burning has not occurred. The v-blade on the dozer removes logging slash, without gouging and scraping away the topsoil.

### ***“Learn and Burn” Workshops: Best practices and lessons learned***

Laurel Kays, North Carolina State University

Increasing the number of individuals capable of conducting prescribed burns is a key piece of achieving many land-management goals in the Southeast, including those of America’s Longleaf Restoration Initiative. Yet for many, particularly private landowners, gaining the experience needed to safely and effectively conduct burns is difficult to impossible. While educational events such as Certified Burn Manager courses are held in many states and are generally open to all audiences, they often do not include an opportunity to gain hands-on burning experience. “Learn and Burn” workshops have been successful in providing this experience, and offer one possibility to work towards bridging this gap. These workshops can vary greatly depending on their audience, location, and other factors, but generally include both a classroom session and a live burn field portion, often conducted by participants under the mentorship of trained agency personnel.

Since 2014, NC State University has worked with state and regional partners to hold these workshops in seven longleaf states. In the spring of 2018, NC State conducted a survey of past workshop attendees to gauge their knowledge gained and actions taken since the workshop. Results show that the majority of attendees were private landowners, with a substantial portion indicating that they took some sort of action related to prescribed burning after the workshop, such as increasing the frequency with which fire is applied on their lands. A separate, informal questionnaire was sent to personnel involved in organizing past “Learn and Burn” workshops to understand their experience in doing so, particularly challenges they faced such as planning for inclement weather. This poster will depict results from both the attendee survey and organizer questionnaire in order to help others develop successful “Learn and Burn” workshops across the longleaf range in the future.



***Restoring the herbaceous layer in a longleaf pine (*Pinus palustris*) woodland after invasion by cogongrass (*Imperata cylindrica*) using herbicides***

William McFarland, The University of Southern Mississippi

One of the most serious threats to the integrity of the rich, diverse herbaceous layer in longleaf pine (*Pinus palustris*) woodlands is the invasion of Cogon grass (*Imperata cylindrica*). This C4 photosynthetic grass was introduced into the United States near Mobile Bay, Alabama in the early 1900s, and since then, it has spread almost throughout the Southern United States as a noxious weed. Its ability to thrive in longleaf pine communities has made it the target of eradication efforts, but unfortunately, few have met with lasting success. Herbicide use (especially the use of glyphosate and imazapyr) is one of the few methods that can achieve some control of cogon grass. The long-term effects of these herbicides on the surrounding native vegetation are largely unknown, and in this study, the effects of herbicide use (for the control of cogon grass) on the herbaceous layer in a longleaf pine is explored. To conduct this study, thirty plots were set up within a frequently burned (<2 years) longleaf pine woodland. Fifteen of these plots were areas previously invaded by cogon grass which were treated with herbicides. Each of these treated plots was paired with a reference plot. Each plot contained four randomly placed 2 m X 2 m quadrats, and percent coverage was determined for each plant species within these quadrats. Diversity analyses were conducted on the resulting data, and an ANOSIM was conducted and paired with an NMDS ordination analysis. Analyses suggest that both treated and untreated plots were similar in diversity. However, an ANOSIM and the corresponding NMDS suggest that the groups are significantly different from each other, suggesting that the use of these herbicides may result in a different, equally diverse plant community than was present beforehand.

***A Floristic Survey of Mobile, Alabama's Longleaf Pine Treasure Forest***

Emma Kaitlin H. McWilson, University of South Alabama

There is a lack of research on longleaf pine ecology, and Mobile has been especially neglected. A floristic survey of the vascular plants in the Longleaf Treasure Forest was conducted. Like many longleaf stands in the US, the Treasure Forest was left unmaintained with burning suppressed until 2005 due to a lack of volunteers and misinterpretations of ecology. In the 35-acre preserve, 18 coordinates were randomly generated and served as central points for each 1 square meter quadrant. Over 10 weeks each plot was observed weekly, with a percentage of each species of vascular plant estimated by eye in order to note percentage of aerial groundcover. The survey shows a sample of the biodiversity of the vascular plant community of the forest, and the progression of seasonal growth. Each quadrant is compared by elevation, burn frequency, total herbaceous density, species density, and biodiversity. Over 45 species of

vascular plants were observed within the quadrants, at least 91% of which are native and characteristic of the longleaf forest.

***How The Nature Conservancy's Conservation Center for Innovation can help with longleaf pine habitat outreach, education and research***

Cheryl Millett, The Nature Conservancy

The Nature Conservancy has long been a leader in America's Longleaf Restoration Initiative planning and implementation, particularly through leading Local Implementation Teams (LITs) on the ground. Two of four LITs in Florida are currently led by Florida Chapter staff. Three of the four flagship preserves of the Florida Chapter include longleaf habitat and share the tangible conservation results of restoration and management experience with partners: Apalachicola Bluffs and Ravines, Disney Wilderness, and Tiger Creek Preserves. We are working to build upon this productive base of long-term experience and existing partnerships in order to greatly expand and focus education/training, outreach, and research to grow knowledge and understanding of our natural resources that will connect nature and people. The Center will utilize the Florida Chapter's network of diverse flagship preserves, their facilities, Chapter staff and partners to achieve this endeavor, including the three preserves that support longleaf habitat. Each of these 'preserve campuses' have a variety of facility infrastructure to build upon, diverse array of habitats, land use history, and management strategies. The preserve campuses will serve as hubs where we can partner with education programs, schools, universities, colleges, agencies, and communities to provide a hands-on environment to learn about and address critical conservation questions. Students, agency staff, interns and scientists from around Florida, the US, and other countries will have the opportunity to work with and be mentored by TNC staff, with the opportunity to stay on-site at a campus for extended periods of time. This is the essence of experiential learning: going beyond the classroom, where on-the-ground teaching/learning (wildlife ecology, fire management, terrestrial and marine habitat restoration, exotic/invasive ecology, and research monitoring for example) can occur and allow students to engage in kinesthetic learning. The Center will also serve as a facilitator/partner for state and regional conferences and meetings to help disseminate information on techniques, best practices, and new research in applied conservation. This expanded focus on youth engagement, public outreach, applied stewardship and learning and demonstration, and conservation education and training will all be essential to inform and influence the next generation of conservationists, environmental leaders, citizens and communities, and support and influence research on questions that can benefit both nature and human needs. We are currently working on strategic planning and a capital campaign to grow the Center's preserve campuses and will be more accessible for implementing America's Longleaf Restoration Initiative's outreach, education, training and research aims.

### ***The Blackwater Ecological Preserve***

Lytton Musselman, Old Dominion University

The Blackwater Ecological Preserve (BEP) encompasses the northernmost extant assemblages of Longleaf Pine-savanna and Longleaf Pine-Turkey Oak communities. This is the only Condition Class 1 site in the entire historical range of longleaf in Virginia and North Carolina north of the Pamlico River. Since the acquisition of the property in 1984, regular prescribed fires have greatly increased the population size and quality of the pyrophytic communities. We are examining the role of fire in the establishment of seedlings as well as collaborative research with Texas researchers studying ground cover beyond the northern and western limits of wiregrass. In addition to naturally reproducing longleaf pines, the area supports numerous state-rare plants. Many of these were first reported through the extensive field work beginning in 1936 by the eminent Harvard botanist, Merritt Lyndon Fernald, in what is now BEP giving us a historical baseline for monitoring. Additionally, the Preserve harbors archaeological relics from the naval stores industry, some from the Colonial era. These are the only remaining tar kilns and turpentine stumps preserved in Virginia, and of great historical import in the development of shipbuilding and naval activity in Hampton Roads.

### ***Spatial influences on longleaf pine regeneration***

Mary Frances Nieminen, Joseph W. Jones Ecological Research Center

Growth and orientation of longleaf pine saplings and their recruitment to canopy positions is not completely understood and only modestly studied in naturally regenerated longleaf pine forests. Silvicultural activities within these forests are also likely to affect overall density and spatial relationships of current and future natural regeneration. Our objective is to assess the spatial relationships of advance regeneration and to determine if the spatial processes influencing midstory individuals vary between silvicultural treatments. The study sites are located within second growth upland longleaf pine stands on Ichauway, a 29,000-acre ecological reserve in southwestern Georgia. A long-term silvicultural experiment was implemented on our study areas in late 2009 to assess several aspects of longleaf pine stands following harvest activities including growth of residual trees, pine and hardwood recruitment, ground cover composition changes, and skid trail recovery. Harvest treatments, each 10 ac in size, included the standard single-tree selection, group selection, and group selection with reserves, a variant of group selection where some canopy trees were retained in group openings. For this study, we mapped existing midstory trees in 10 ac plots within the existing standard single-tree selection and group selection with reserves treatments. Both treatments were within old-field ground cover associated with previously disturbed areas. We will estimate effects of midstory and overstory neighbors on general density, orientation, and diameter and height composition within groups of regeneration.

### ***A Conservation Strategy for the recovery of imperiled frosted flatwoods salamander on St. Marks National Wildlife Refuge***

Joe Reinman, USFWS, St. Marks National Wildlife Refuge

Flatwoods salamanders (*Ambystoma cingulatum* and *A. bishopi*) are specialists of the longleaf pine-wiregrass (*Pinus palustris*-*Aristida* spp.) ecosystem of the Southeastern Coastal Plain. In recent years, however, these species have declined by nearly 90% in concert with loss, degradation, and fragmentation of their natural habitat. In 2015, we initiated a long-term management plan to aid recovery of the Frosted Flatwoods Salamander (*A. cingulatum*) at St. Marks National Wildlife Refuge, one of the last “strongholds” for this species. Our strategy consists of four key efforts: the use of prescribed fire to restore and maintain both upland and wetland habitat; head-starting of aquatic larvae to enhance recruitment of juveniles into natural populations; capture-mark-recapture (CMR) of terrestrial adults and juveniles at three breeding sites to evaluate population demography and assess the efficacy of our head-start program; and annual surveys of historically-occupied wetlands to monitor the status of this species. From 2016 to 2018, we reared more than 1000 larvae in aquatic mesocosms, resulting in a release of more than 700 juveniles at their natal sites. In our CMR study, a total of 450 adult and juvenile salamanders have been captured and marked, with 62 individuals recaptured in subsequent years. Twenty to 55 historically-occupied wetlands have been surveyed for larval occupancy annually since 2014. Results suggest occupancy currently appears to be stable. The monitoring and management efforts will help ensure the continued success of the Frosted Flatwoods Salamander population and will play a vital role in the recovery of this species throughout its historic range.

### ***Longleaf Understory Native Plant Development at the East Texas Plant Materials Center***

Alan Shadow, USDA East Texas Plant Materials Center

The mission of the United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS) Plant Materials Program is to evaluate, select and release native plants to solve conservation problems. The USDA NRCS East Texas Plant Materials Center (ETPMC) in Nacogdoches, Texas plays an active role in native plant development for eastern Texas and western Louisiana, also known as the Western Coastal Plain, Major Land Resource Area, 133B. This region encompasses the western most expansion of the historic longleaf pine range. Native plants released by the ETPMC for application in longleaf pine understory restoration plantings include Harrison Germplasm Florida paspalum (*Paspalum floridanum*), Cajun Sunrise Germplasm ashy sunflower (*Helianthus mollis*), ‘Nacogdoches’ eastern gamagrass (*Tripsacum dactyloides*), and most recently Coastal Plains Germplasm little bluestem (*Schizachyrium scoparium*). The ETPMC is also collaborating with the United States Forest Service and East Texas Natives to increase native plant development in the region. The ETPMC

is currently evaluating and selecting pinehill bluestem (*Schizachyrium scoparium* var. *divergens*), pineywoods dropseed (*Sporobolus junceus*), and swamp sunflower (*Helianthus angustifolius*) ecotypes for longleaf pine ecosystem restoration efforts.

### ***Prescribed Burning Support Network***

Johnny Stowe\*, South Carolina Department of Natural Resources & Charles Babb, Sandhills Longleaf Pine Conservation Partnership

The Sandhills Longleaf Pine Conservation Partnership (SLPCP) is working to increase prescribed burning on privately owned longleaf pinelands in northeastern South Carolina. The approach works by developing a support network connecting private landowners not only to each other, but also to governmental and non-governmental people and resources.

This network includes both formal Longleaf Alliance education events, hands-on community “Learn and Burn” events, “Longleaf and Lunch” gatherings, and SC Certified Prescribed Fire Manager training. Partnership members have been able to conduct unique one-on-one, on-the-ground assistance to landowners as they conduct their first prescribed burns. Additionally, members are working to develop working relationships and trainings targeting local volunteer fire departments, and have built an easily-transportable prescribe burning rental trailer specifically for use by private landowners.

All these efforts are pulling together to restore fire - and fire culture - to some of the most special longleaf pine firelands across the species range.

### ***Importance of fire and water chemistry in explaining twenty years of change in the herpetofauna communities of the Francis Marion National Forest***

Nicole Strauss, College of Charleston

Fire plays a vital role in management of longleaf pine ecosystems. Current management practices target the restoration of longleaf plant communities which require frequent prescribed fire; however, the effect of disturbance on animal communities is not as well understood and these communities may be detrimentally impacted by high fire frequency. The purpose of this observational study was to compare the importance of burn regime and water chemistry in helping to explain change in the herpetofauna community in the Francis Marion National Forest over the past 20 years. Specifically, we resurveyed 15 ponds and recorded species presence using minnow traps and calling censuses. We also recorded leaf litter mass, pond water chemistry and the frequency and time since last prescribed fire. The burn history of the ponds ranged less than one year to over 20 years without fire. We are still processing the data from our 2018 survey, but the historical survey suggests that time since fire had a significant negative effect on amphibian abundance and diversity. Water chemistry, however, was more important than time since fire and largely appeared to reflect habitat differences between ponds with more hard wood forest rather than pine forest. We will compare our

modern community data to the historic dataset using multivariate ordinations and linear regressions. Specifically, we will examine to what degree changes in the fire regime versus changes in the water chemistry influence shifts in the herpetofauna community structure and diversity. Our results will have important implications for our understanding of how disturbance interacts with inherent environmental heterogeneity to structure species that are sensitive to fire.

***Nursery production treatments enhance height growth of outplanted longleaf pine seedlings***

Dr. Shi-Jean Susana Sung, USDA Forest Service Southern Research Station

Longleaf pine (*Pinus palustris*, LLP) seedlings can remain in the grass stage (stem < 12 cm) for several years. This study tested the effects of nursery production treatments on reducing time in the grass stage for LLP. Seedlings were grown in Moscow, Idaho in a 4-container cavity volume (60, 95, 125, and 336 ml) x 2 copper root modifying treatment (no-Cu and Cu) x 3 N rate (0.5 (LN), 2 (MN), and 4 (HN) mg N seedling<sup>-1</sup> week<sup>-1</sup> for 20 weeks) x 3 replicate randomized complete block design. Phase I of the study showed that at the end of the 29-week nursery culture, LLP grew larger as cavity volume increased and as N rate increased (New Forests 44:881). Phase II of the study was established on the Kisatchie National Forest in central Louisiana. Fifteen LLP seedlings from each of the 24 nursery production treatments were outplanted to a randomly assigned row at a 2-m by 2-m spacing within each of the three blocks. Sixteen, 28 and 42% of LLP seedlings grown in the largest cavities at LN, MN, and HN, respectively, emerged from the grass stage in the first year. Copper treatment did not affect seedling emergence from the grass stage. By the end of the second season, more than 90% of seedlings emerged from the grass stage except for seedling cultured in the smallest cavities at LN (64%) and MN (84%). After 6 growing seasons, LLP height and diameter generally increased with increasing cavity volume and N rate. Seedlings were randomly selected for root excavation in season two and six. In general, Cu root modifying treatment was not effective for seedlings cultured in 125- or 336-ml cavities at HN. The extent of lateral root deformity in these seedlings was as severe as those from the no-Cu cavities.

***Economic impacts of projecting horizontal angles to the wrong height when conducting point sampling in longleaf plantations***

Curtis VanderSchaaf, Louisiana Tech University

Horizontal point-sampling selects samples trees by projecting horizontal angles. In many inventories angles are to be projected to diameter breast height (dbh), or the diameter at 4.5 ft, but due to user error, angles are often projected to heights other than dbh. Thus, errors are made as to which trees should be sampled, probabilities of sampling individual trees are incorrect, and the basal area estimate does not truly correspond to dbh. The objective of this paper is to determine the potential economic impacts of projecting angles at heights other than

dbh when dbh is the desired height. Projections for two number of surviving trees per acre at age 15 (400 and 700 trees per acre) and two ages (20 and 30) were used to establish virtual plantations and sampling was conducted using 10 and 20 BAF prisms by projecting horizontal angles to four heights, 4.5 ft, 5.0 ft, 5.5 ft, and 6.0 ft. A taper equation was used to estimate changes in diameter along the stem. For the stand conditions examined in this study, incorrectly projecting angles to heights other than dbh reduced timber appraisals by as much as \$220 per acre. Across many acres and stands, this type of nonsampling error can result in serious errors in valuing stumpage.

***LONGeastOLD. A diameter-distribution growth and yield model and decision support system for unthinned longleaf pine plantations established on old-fields in the southeastern US***

Curtis VanderSchaaf, Louisiana Tech University

A diameter-distribution growth and yield model system was incorporated into a Timber Decision Support System (TDSS) simulator written in Visual Basic. Data used in developing equations were obtained from long-term measurements of plantations located in southwest Georgia. Equations included in this TDSS were those presented for old-fields. Individual total tree heights were predicted using an equation developed using data from plots located throughout Florida and Georgia. A companion TDSS entitled LONGeastCUT also will be created that uses equations developed for cutover sites. This simulator allows a user to determine how the stand-level variables of planting density and site quality will impact long-term yields and economic returns. Users can input revenues by one-inch diameter classes for three product classes (pulpwood, chip-n-saw, and sawtimber) and can input costs of site preparation and first-year herbaceous weed control to determine how these factors will impact the optimal rotation age. This TDSS also allows user to see how pine straw management can impact predicted financial returns. Further economic sensitivity analyses can be conducted since users can change the interest rate and can vary annual revenues (e.g. hunting lease rates) and costs (e.g. management costs and property taxes). An equation is included that estimates biomass of herbage (grasses, grass-like, and forbs) as a function of overstory stand density. Herbage predictions can help managers determine the potential impacts of management alternatives on wildlife habitat and perhaps be helpful in determining fuel loading.

***Mixed-effects height-diameter model for longleaf pine plantations in northern Florida and Georgia***

Curtis VanderSchaaf, Louisiana Tech University

A mixed-effects height-diameter model is presented for longleaf pine (*Pinus palustris* P. Mill.) plantations in Georgia and northern Florida. After obtaining height-diameter measurements from a plot/stand of interest, this mixed-effects model can be calibrated to produce localized individual tree height estimates. Based on model calibration of independent data from South

Carolina, the use of three or four longleaf pine trees from a plot to calibrate the model provides a reasonable compromise between predictive ability and field sampling times. If calibrated at the stand-level, three trees could be used but larger sample sizes of 10 or 15 would be appropriate. To calibrate these models for specific plots/stands, an Excel spreadsheet is available on request.

***Practical implications of ignoring slope when conducting timber appraisals in longleaf pine plantations***

Curtis VanderSchaaf, Louisiana Tech University

Horizontal point sampling is commonly applied during forest inventories. A problem widely known is the error associated with probabilities of selection when projecting horizontal angles along the slope of a site. This study quantified the potential impacts on timber appraisals when failing to account for slope. When percent slope exceeds 15%, the impacts can become meaningful and hence foresters should make sure to address this issue when conducting appraisals.

***Effects of longleaf pine (*Pinus palustris*) planting density on timber stand structure and habitat quality for focal wildlife species***

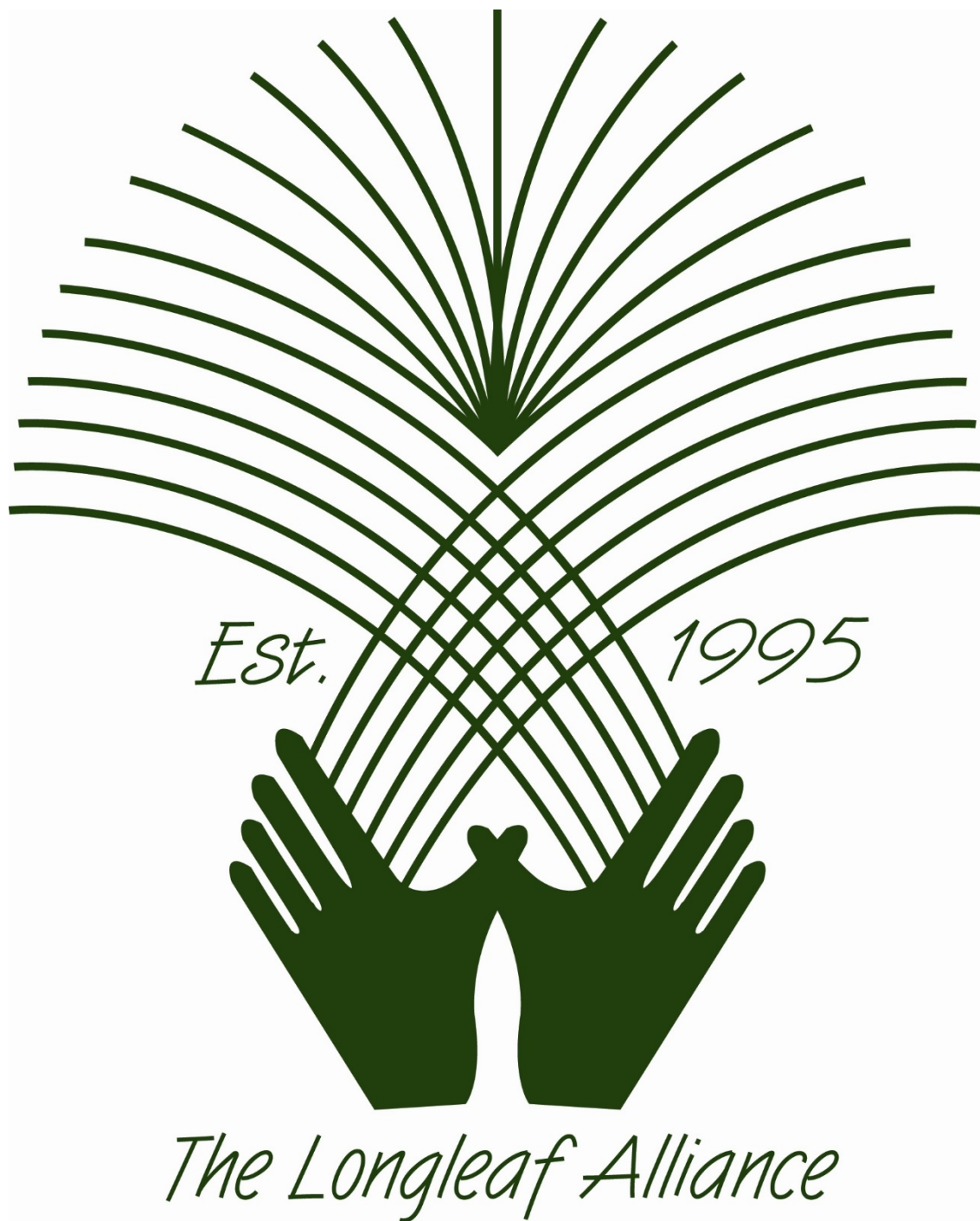
Evan Wheeler, Auburn University

Longleaf pine (*Pinus palustris*) forests contain some of the greatest plant species richness in North America, provide habitat for a wide variety of wildlife, and produce high-quality timber products. Though longleaf forests have been reduced to three percent of their historical extent, there is increasing interest in restoration, mostly via government subsidized programs. The primary objective of these programs is often to enhance or restore habitat for wildlife dependent on herbaceous understory plant communities. In general, there is an inverse relationship between tree planting density and coverage of herbaceous vegetation; therefore, longleaf restoration programs restrict planting densities to a predetermined range. However, the relationship between these restrictions and longleaf management objectives has not been thoroughly evaluated and warrants further inquiry. Therefore, we propose a study to quantify the relationship between longleaf planting density and percent cover of herbaceous vegetation, an indicator of habitat quality for focal wildlife species in longleaf forests. We will also assess the effects of planting density on longleaf pine growth rates and yields, which are important timber objectives. To accomplish these objectives, we will identify a number of longleaf stands throughout Alabama planted to varying densities. Within each stand, we will assess vegetative community structure and species composition and conduct a five percent timber cruise. We will also examine how other factors (e.g., stand age, fire history, site preparation treatments, and previous land use) interact with planting density to affect stand structure and associated wildlife habitat quality. Results will be valuable for both government agencies and private



landowners by providing supporting information for planting density and management recommendations based on the relative importance of timber production and wildlife habitat quality in management objectives.

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