SOUTHEASTERN PRAIRIE SYMPOSIUM

14–17 May 2012 • Mississippi State University

Program

Remnants, Conservation, & Working Lands

Hosted by:

MISSISSIPPI STATE UNIVERSITY

Wildlife Mississippi

SOUTHEASTERN PRAIRIE SYMPOSIUM

Sponsors

MISSISSIPPI WILDLIFE, FISHERIES, & PARKS 80 YEARS

MISSISSIPPI STATE UNIVERSITY

Dept. of Wildlife, Fisheries, and Aquaculture

Dept. of Biochemistry, Molecular Biology, Entomology, and Plant Pathology

Mississippi State University™ College of Forest Resources
Forest and Wildlife Research Center

Wildlife Mississippi

U.S. FISH & WILDLIFE SERVICE
DEPARTMENT OF THE INTERIOR

MISSISSIPPI MAFES AGRICULTURAL & FORESTRY EXPERIMENT STATION

ROUNDSTONE Native Seed LLC

THE WILDLIFE SOCIETY

Mississippi Chapter

Southeastern Section

LAZY MAGNOLIA MISSISSIPPI'S BREWERY

PRAIRIE WILDLIFE
UPHOLDING OUR SPORTING TRADITIONS EVERY DAY

Southeastern Prairies: Remnants, Conservation & Working Lands

Bost Auditorium, Mississippi State University, MS – 14 - 17 May 2012
www.cfr.msstate.edu/wildlife/prairie/

Monday, 14 May 2012

6:00 pm	Shuttles leave hotels for Welcome Dinner at Dorman Lake (last return shuttle at 9:00 pm)
6:30 pm	Registration & Welcome Dinner at Dorman Lake

Tuesday, 15 May 2012

7:00 am	Shuttles leave hotels for Bost Auditorium
7:30 - 8:00 am	Breakfast (Bost South Auditorium)
7:30 - 10:30 am	Registration (Bost Foyer)

Plenary Sessions (Bost Theater)

8:00 am	**Welcome.** Chad M. Dacus, Assistant Wildlife Bureau Director, Mississippi Department of Wildlife, Fisheries & Parks
8:15 am	**Introductory Address**. Dr. Gregory Bohach, Vice President, Division of Agriculture, Forestry & Veterinary Medicine, Mississippi State University
8:30 am	"**Origin and Maintenance of Southern Grasslands**". Dr. Reed Noss, Provost's Distinguished Research Professor, University of Central Florida and President, Florida Institute for Conservation Science
9:00 am	"**Conservation and Restoration of Southeastern Grassland Systems,"** Dr. L. Wes Burger, Jr., Associate Director, Mississippi Agriculture & Forestry Experiment Station and Forest & Wildlife Research Center, Mississippi State University
9:30 am	"**Prairie Restoration and Working Grasslands in the Southeast,**" Dr. Patrick Keyser, Coordinator, Center for Native Grasslands Management, University of Tennessee
10:00 - 10:30 am	Poster Session & Break (Bost South Auditorium)

Morning Concurrent Sessions

Natural History *(Bost Theater)*
Moderator*: Evan Peacock*

10:30 am **Prairies of the Southeastern United States: Historical Extent and Ecology**. John Barone and Karen E. Stephenson

10:50 am **Historical Ecology of the Mississippi-Alabama Black Prairie**. George E. Phillips

11:10 am **Freshwater Mussel Faunas of the Mississippi Black Prairie Prior to Modern Impacts**. Evan Peacock

11:30 am **Assessing Cultural Bias in Wood Charcoal From Lyon's Bluff: A Prehistoric Site in the Mississippi Black Prairie**. Jennifer Seltzer and Evan Peacock

11:50 am **Presenting an Alternative Natural Distribution for Osage Orange,** *Maclura pomifera***, Based on Charcoal Identification from Lyon's Bluff, Oktibbeha County, Mississippi**. Jennifer Seltzer

Disturbance Ecology *(Bost North Auditorium)*
Moderator*: Sam Riffell*

10:30 am **Tree Encroachment in Southeastern Prairies and Grasslands: Consequences and Prospect for Reversal**. J. Morgan Varner

10:50 am **Effects of landscape history and disturbance on forb communities in semi-natural grasslands**. J. G. Dollar, S. K. Riffell, T. J. Schauwecker and L. W. Burger, Jr.

11:10 am **Vegetation Response to Season of Prescribed Fire**. Elizabeth Doxon, Pat Keyser, Craig Harper and Seth Barrioz

11:30 am **Relative Importance of Plant Communities and Nutrient Concentrations in Regulating of Prairie Herbivore Communities**. Chelse Prather and Steve Pennings

11:50 am Discussion

12:10 - 1:30 pm Lunch on your own

Afternoon Concurrent Sessions

Case Studies I *(Bost Theater)*
Moderator*: Chris Doffitt*

1:30 pm	**The Duralde Cajun Prairie Restoration Project, Evangeline Parish, Louisiana**. Charles Allen, Malcolm Vidrine, Marc Pastorek, Peter Loos and Gail Barton
1:50 pm	**The Cajun Prairie Gardens: A Model Landscape for Rural Homes**. Malcolm Vidrine, Charles Allen, Marc Pastorek, Peter Loos, Gail Barton, Jameel Al-Dujaili and Domingo Jariel
2:10 pm	**Comparison of Cajun Prairie and Anacoco Inland Prairie**. Charles Allen, Malcolm Vidrine, Marc Pastorek, Peter Loos and Gail Barton
2:30 pm	**The Cajun Prairie Restoration Project in Eunice, Louisiana: An Update on the Progress of the Project**. Malcolm Vidrine, Charles Allen, Marc Pastorek, Peter Loos, Gail Barton and Bruno Borsari

Working Lands I: Wildlife *(Bost North Auditorium)*
Moderator*: Adrian Monroe*

1:30 pm	**Converting Bermudagrass to Native Warm-Season Grass Pasture: Effects on Dickcissel Nest Success**. Adrian P. Monroe, Samuel K. Riffell, James A. Martin, L. Wes Burger, Jr. and Holly T. Boland
1:50 pm	**Wintering Sparrow Space Use within the Black Belt Prairie.** Tara J. Conkling, Adrian P. Monroe, James A. Martin, Samuel K. Riffell, Jerrold L. Belant, Holly T. Boland, Travis L. DeVault and L. Wes Burger, Jr.
2:10 pm	**Restoring Mammal Communities using Grassland Conservation**. Kristin M. Biondi, Jerrold L. Belant, James A. Martin, Travis L. Devault and Guiming Wang
2:30 pm	**Pollinating Insect Communities in Semi-natural Grasslands Managed for Conservation and Production**. Lindsay Latino, James A. Martin, Joshua W. Campbell, Samuel K. Riffell, Jerrold L. Belant and L. Wes Burger, Jr.

2:50 - 3:10 am Break (Bost South Auditorium)

Afternoon Concurrent Sessions continued

Case Studies II *Hill (Bost Theater)*
Moderator*: JoVonn Hill*

3:10 pm	**The Coosa Valley Prairies/Flatwoods Complex (Floyd Co., Ga.): Discovery, Conservation & Management to Date**. Malcolm Hodges
3:30 pm	**The History and Current Status of Georgia Eocene Chalk Prairies in Oaky Woods Wildlife Management Area, Houston County, Georgia**. S. Leel Echols, Thomas E. Govus, Thomas S. Patrick and Bobby T. Bond
3:50 pm	**Re-open for Business: Prairie, Glade, Woodland, and Other Open Habitat Restoration Projects on State Natural Areas in Arkansas**. C. Theo Witsell, William C. Holimon, Jennifer Akin, Bryan Rupar and Thomas L. Foti
4:10 pm	**Conservation and Restoration of High Quality Understory in Longleaf Ecosystems**. Carol Denhof
4:30 pm	**Native Grassland Restoration in the Black Belt Region of Mississippi and Alabama: Current Efforts and Barriers to Implementation**. Daniel S. Coggin and John Gruchy

Working Lands II: Grazing *(Bost North Auditorium)*
Moderator*: Brian Rude*

3:10 pm	**Mississippi Mixed Native Warm-season Grass Stand Structure and Botanical Composition Impacted by Mowing.** Brian S. Baldwin and Vitalis A. Temu
3:30 pm	**Nutritional profile of native warm season grass grown as a mono- or multi-species pasture.** B.S. Oloyede, B.J. Rude, S. Riffell, J. Martin, H.T. Boland and B.S. Baldwin
3:50 pm	**Evaluation of Wildrye (*Elymus* spp.) as a Potential Forage and Conservation Planting for the Southeastern USA.** Brian S. Baldwin and J. Brett Rushing
4:10 pm	**Performance of stocker steers grazing native warm-season grasses during the summer in Tennessee.** W.M. Backus, J.C. Waller, P.D. Keyser, G.E. Bates, C.A. Harper and R.J. Carlisle
4:30 pm	**Web-based Economic Decision Tool for Summer Forage Production.** Pat Keyser, Elizabeth Doxon, John Waller and Gary Bates

6:00 pm Shuttles leave hotels for Dinner at Dorman Lake
(last return shuttle at 9:00 pm)

6:30 pm Dinner at Dorman Lake

Wednesday, 16 May 2012

7:00 am	Shuttles leave hotels for Bost Auditorium
7:30 - 8:00 am	Breakfast (Bost South Auditorium)
8:00 - 3:00 pm	Field Trip I- Guided Tour of Pulliam Prairie Site Buses leave from Bost at 8:00 am (lunch included)
8:00 - 3:00 pm	Field Trip II - Prairie Conservation in Working Landscapes Buses leave from Bost at 8:00 am (lunch included)
8:00 - 9:30 am	Workshop I - Prairie Green Roof Workshop Tim Schauwecker, Department of Landscape Architecture Buses leave from Bost for MSU Museum at 8:00 am
9:45 - 11:45 am	Workshop II - Southeastern Grassland Insects & Collection Methods Richard Brown & Jennifer Seltzer, MSU Entomological Museum (lunch on own - Buses return to hotels at 11:45)
6:00 pm	Shuttles leave hotels for Banquet at Bost Auditorium (last return shuttle at 9:00 pm)
6:30 pm	Symposium Banquet (Bost South Auditorium) Philip Juras, “Envisioning Southern Grasslands with William Bartram”

Thursday, 17 May 2012

7:30 - 8:00 am Breakfast (Bost South Auditorium)

Morning Concurrent Sessions

Varietal Develop. & Evaluation *(Bost Theater)*
Moderator*: Brian Baldwin*

8:00 am **Rivercane** (*Arundinaria gigantea*) **Response to Cultural Management Practices Among Native and Exotic Competition**. David Russell and Brian Baldwin

8:20 am **Native Cane** (*Arundinaria*) **Propagation and Site Establishment**. Jeremy A. Hamlington, Mark D. Smith, Brian S. Baldwin and Christopher J. Anderson

8:40 am **Breeding for Precocious Germination for Seven Native Grass Species**. Brian S. Baldwin and J. Brett Rushing

9:00 am **Meadowmakers Prairie Seed Project, Pearl River County, Mississippi**. Marc Pastorek, Charles Allen, Malcolm Vidrine, Peter Loos and Gail Barton

9:20 am **Ecotype Versus Variety for Restoration: What's in a Word?** Brian S. Baldwin

Conserv. & Restoration I *(Bost North Auditorium)*
Moderator*: Wes Schilling*

8:00 am **Groundcover Response to Canopy Disturbances and Spring/Fall Burns During Oak Woodland and Savanna Restoration**. Andy Vander Yacht, Seth Barrioz, Pat Keyser, Craig Harper and Dave Buckley

8:20 am **Groundcover Assessment of CRP Continuous Practice 36 in Georgia**. James Tomberlin, Reggie Thackston and Nick Brown

8:40 am **Evolution of Wildlife Management in the South – The Re-recognition of the Importance of Private Lands**. Robert D. Gasaway, Ronnie Haynes, William Collier and Matthew Landes

9:00 am **Funding Opportunities for Native Prairie Restoration through the Partners for Fish and Wildlife Program**. Ronnie J. Haynes

9:20 am **Effect of feeding native warm season grasses during the stocker phase on beef carcass characteristics and meat quality.** V. Kurve, P. Joseph, J.B. Williams, H. Boland, S.K. Riffell, and M.W. Schilling

9:40 - 10:00 am Poster Session & Break (Bost South Auditorium)

Morning Concurrent Sessions continued

Classification & Assessment *(Bost Theater)*
Moderator*: Tim Schauwecker*

10:00 am	**The Use of General Land Office (GLO) Records to Locate Prairie Patches**. Toby Gray and Timothy Schauwecker
10:20 am	**A Revised Classification of Tennessee's Grasslands**. Dwayne Estes
10:40 am	**Division of Lowland and Upland Vegetation within the Central Black Belt of Mississippi**. J.J.N. Campbell and W.R. Seymour, Jr.
11:00 am	**Floristic Inventory of Tallgrass Prairie Remnants in the Grand Prairie Region of the Mississippi Alluvial Plain: A Baseline for Restoration Efforts**. C. Theo Witsell, Thomas L. Foti and Brent T. Baker
11:20 am	**Plant Species Distribution Modeling in the Blackland Prairie region of Mississippi**. Gary Ervin and Steven Hughes
11:40 am	**Ecological Assessment and Terrestrial Vertebrate Surveys for Black Belt Prairies in Alabama**. Alfred Schotz and Michael Barbour

Conserv. & Restoration II *(Bost North Auditorium)*
Moderator*: G. Lackey*

10:00 am	**Butterfly Pea, Slender Indian Grass and Large Flower Partridge Pea in Native Herbaceous Restoration Projects of the Southeastern, US**. Mark J. Hainds
10:20 am	**Discovering Applications for Prairie Systems: An Ecological Approach to Designing for Urban Biodiversity**. G. Lackey and T. Schauwecker
10:40 am	**Roadside Right of Way Plantings Appropriate for the Black Belt Prairie**. Edward D. Entsminger, John W. Guyton and Jeanne C. Jones
11:00 am	**Habitat Associations of Ants (Hymenoptera: Formicidae) and Grasshoppers (Orthoptera: Acrididae) in the Heterogeneous Cedar Glade Landscape of the Central Basin of Tennessee**. JoVonn G. Hill
11:20 am	**Learning about Prairie Restoration Ecology: A Comparison between Biology Majors and Non-majors Students**. Bruno Borsari and Malcolm Vidrine
11:40 am	Discussion

12 Noon - whenever Publication Meeting for interested presenters and potential authors

Poster Session (presenters with posters during morning breaks)

Bost South Auditorium (during morning breaks & throughout symposium)

Performance of Beef Steers Grazing Native Warm Season Grasses in Northeast Mississippi. Holly T. Boland, James A. Martin, Samuel K. Riffell, L. Wes Burger, Jr., and B.R. Rude

Restoration and Winter Avian Use of Isolated Prairies in Eastern Texas. D. Craig Rudolph, Rusty Plair, Dan Jones, J. Howard Williamson, Clifford E. Shackelford, Richard R. Schaefer, and Joshua B. Pierce

The Gelechioidea (Lepidoptera) of the Black Belt in Mississippi with a Comparison of Species in Prairie and Forest. Richard L. Brown and Sangmi Lee

Delivering Grassland Bird Conservation throughout the Eastern and Central United States. Katie Koch, Soch Lor Eric Lonsdorf, Evan Grant, Marissa Ahlering, Laurel Barnhill, Tom Dailey, Ryan Drum, Melinda Knutson, Connie Mueller, David Pavlacky, Christine Ribic, Catherine Rideout, David Sample, Donna C. Brewer, and Mike Runge

Evaluation of Restoration Techniques in Black Belt Prairies of Mississippi. JoVonn G. Hill, John Barone, and Lisa McInnis

Metacommunity Structure of Blackland Prairie Communities in Mississippi and Alabama. John A. Barone and JoVonn G. Hill.

Response of Southeastern Overwintering Bird Communities to Targeted CP33 Upland Habitat Buffers. Kristine O. Evans, L. Wes Burger, Jr., Mark D. Smith, and Sam Riffell

Antiquity of the Mississippi-Alabama Black Prairie: Paleofaunistics of a Late Pleistocene Vertebrate Fossil Assemblage from the Central Gulf Coastal Plain. George E. Phillips and John M. Kaye (deceased)—*Poster originally presented at the Society of Vertebrate Paleontology 62nd Annual Meeting in Norman, Oklahoma, 2002*.

Resource partitioning among Late Pleistocene ungulates in the Black Prairie of Mississippi and Alabama. George E. Phillips and Robert S. Feranec—*Poster originally presented at the Society of Vertebrate Paleontology 68th Annual Meeting in Cleveland, Ohio, 2008.*

Identifying Barriers and Possible Scenarios for Implementing Native Grass Forages on Private Lands in North Mississippi. John Gruchy, Richard Hamrick, Daniel Coggin, Scott Edwards, and George Rowland

Directions to Dorman Lake

From Hwy 82 (Starkville)

From Hwy. 82 (bypass, west of Stark Road), take Hwy 25 South for 8.1 miles. You will pass the sign for the Mississippi Horse Park and the turn to Old Highway 25.

At 8.1 miles, turn left at the top of the hill onto Dorman Lake Road (gravel). Unfortunately, there is no road sign, so check your odometer when turning onto Hwy. 25.

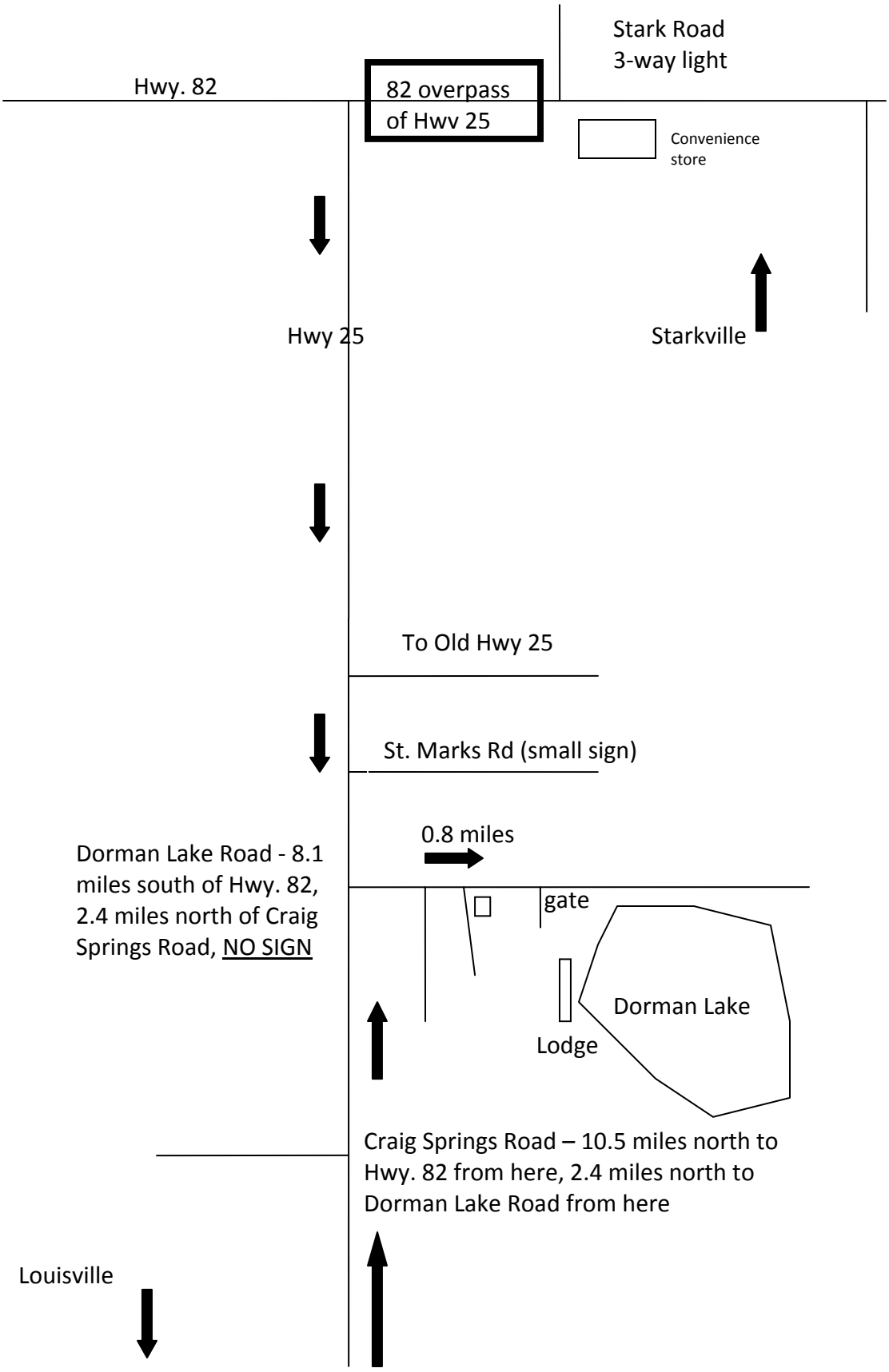
After turning onto Dorman Lake Road, proceed 0.8 miles until you see Dorman Lake and the drive to the lodge on your right.

From Louisville (coming north on Hwy 25)

As you approach Starkville, look for Craig Springs Road on your left. Craig Springs Road is 10.5 miles from Hwy. 82 and 2.4 miles from Dorman Lake Road. There is a road sign for Craig Springs Road.

Pass Craig Springs Road and proceed 2.4 miles to Dorman Lake Road (gravel). Unfortunately, there is no road sign, so check your odometer when turning onto Hwy. 25.

After turning onto Dorman Lake Road, proceed 0.8 miles until you see Dorman Lake and the drive to the lodge on your right.


Stark Road
3-way light
Hwy. 82
82 overpass
of Hwv 25
Convenience
store
Hwy 25
Starkville
To Old Hwy 25
St. Marks Rd (small sign)
0.8 miles
Dorman Lake Road - 8.1
miles south of Hwy. 82,
2.4 miles north of Craig
Springs Road, NO SIGN
gate
Dorman Lake
Lodge
Craig Springs Road – 10.5 miles north to
Hwy. 82 from here, 2.4 miles north to
Dorman Lake Road from here
Louisville

Directions to Prairie Wildlife / Bryan Lodge

Address: Prairie Wildlife, 6111 Old Vinton Road, West Point, Mississippi 39773

- Take US Highway 45 Alternate (MS Hwy. 25) to West Point
- Travel east on MS Hwy 50
- Turn north (***left***) onto Barton Ferry Road
- Travel around the sharp curve (stay on Barton Ferry, now heading east)
- Travel on past Prairie Livestock
- Turn north (***left***) on to Douglas Lake Road
- Travel to the end of Douglas Lake Road
- Turn west (***left***) on to Vinton Road
- Travel about a half mile on Vinton Road (heading west)
- The Bryan Lodge sign and entrance will be on the left
- Turn ***left*** at the lodge entrance sign and follow the road to Bryan Lodge.
-

Driving Directions to Pulliam Prairie Remnant Site

Address: Near intersection of CR-402 and CR-406 at Buena Vista, MS

- Take US Highway 45 Alternate (MS Hwy. 25) to West Point, MS
- Continue North on US-45A approximately 16 miles
- Take Highway 8 exit ramp and travel west (***left***) on MS-Hwy 8
- Continue west on MS-Hwy 8 approximately 7 miles
- Turn north (***right***) onto MS-47 / County Road 402
- Continue north on CR 402 approximately 3 miles
- Travel past community of Buena Vista, MS at intersection of CR 402 / CR 406
- Continue north approximately 0.5 miles
- Turn right off of CR 402 into entrance to Pulliam prairie remnant site (bus should stop here to turn around)
- Off-road travel to the prairie remnant site will be arranged

SYMPOSIUM ABSTRACTS

PLENARY ADDRESSES

Noss, Reed F.; *Origin and Maintenance of Southern Grasslands*
University of Central Florida, Department of Biology, Orlando, FL 32816-2368
Corresponding author contact: Reed.Noss@ucf.edu

Grasslands of the southeastern United States ('the South') occur outside of the North American Grassland Biome, in a region where the potential natural vegetation is classically considered hardwood forest (e.g., Küchler's "southern mixed forest," "oak-hickory-pine forest," "oak-hickory forest," and "Blackbelt," [*Liquidambar-Quercus-Juniperus*]). Whereas the Grassland Biome averages well under 40 inches of rain annually, the South gets 48 to 80 inches. Yet, especially if we consider savannas and woodlands as grasslands, the Coastal Plain was dominated by grassland at the time of European settlement and, according to vertebrate fossils, for most of history since the Miocene, ca. 20 Ma. Other physiographic regions of the South also had abundant grassland. The presence of numerous endemics and monotypic genera associated with grasslands in the South attest to the antiquity of these ecosystems. What explains the presence of grassland in a region that, climatically, 'should be' forest? I offer a general model for the existence of grassland in the South, which includes the legacy of past climate and megaherbivores, plus contemporary factors, especially fire, substrate and landform, hydroperiod, and windstorms and other disturbances. For fire-dependent southern grasslands, the alternative stable state model for tropical savannas is applicable. Other southern grasslands are maintained today by edaphic factors, hydrology, or a combination of factors, though historic periods of dry climate were probably crucial to their origin.

Burger, L. Wes, Jr. *Conservation and Restoration of Southeastern Grassland Systems*
Associate Director, Mississippi Agriculture & Forestry Experiment Station and Forest & Wildlife Research Center, Mississippi State, MS, 39762
*Corresponding author contact: 662-325-7988, wburger@cfr.msstate.edu

Grasslands of one form or another once covered much of the southeastern landscape, but today are among the most critically endangered ecosystems in the nation, having been lost to cultivation, introduction of exotics, and interruption of natural disturbance regimes. Southeastern prairies are diverse in their characteristics and include classic tallgrass prairies of the Black Belt region, upland oak savannas of the upper coastal plain, pine flatwoods of the central upper coastal plain, coastal prairies, and long leaf pine savanna. These southern grasslands were created by complex interactions of historic parent material, edaphic conditions, climate, rainfall, topographic position, and disturbance regimes that included herbivory, wind, and fire, both natural and anthropogenic. The diversity of grasslands has been conceptualized as a prairie continuum or 3-dimensional space where plant community composition varies along axes of soil moisture, herbivory, and fire frequency/intensity. Southeastern grasslands and their associated fauna are, without exception, disturbance-dependent communities. Interruption of natural disturbance regimes will result in transitions to alternate ecological states, across thresholds not easily reversed on a practical timescale without significant inputs. Conservation and restoration of southern grasslands on a landscape scale will require a multi-pronged approach that includes identification and protection of extant prairie remnants; recognition and restoration of degraded, exotic-suppressed, and latent prairie communities obscured by transitions to alternate ecological states; and recreation of semi-natural grasslands through replanting of appropriate NWSG and forb mixtures. In managed working landscapes, dominated by private ownership, conservation of faunal populations will depend on mosaics of remnant prairie, restored

prairies, semi-natural grasslands, and working lands managed for forage, pasture, and biofeedstocks. Landscape-scale conservation will more likely succeed if delivered in a strategic-habitat framework involving: biologically-based planning, targeted conservation delivery, and monitoring/evaluation in an adaptive management feedback cycle. Targeted conservation programs will be most successful if they incentivize protection, restoration, recreation, and management of grasslands in focal priority areas such that percentage of landscape in grassland, patch size, and connectivity are optimized.

Keyser, P. *Prairie Restoration and Working Grasslands in the Southeast*
Center for Native Grasslands Management, University of Tennessee
Corresponding author contact: pkeyser@utk.edu

Even where restoration of degraded Southeastern prairies leads to historic community composition and structure, the process will not be complete until appropriate disturbance regimes are restored. Available evidence makes it clear that this cannot be achieved by fire alone; herbivory was an integral part of these intrinsically disturbance-dependent systems. Short of bison reintroduction, use of domestic livestock and prescribed fire (i.e., pyric herbivory) may come as close to achieving historic disturbance regimes as any tool otherwise available, or likely to become available. Thus, all prairie restoration can be viewed along a continuum with respect to the relative importance of grazing. At one end of this spectrum are sites that have been only marginally degraded, that still hold high conservation and scientific value, and that should be managed carefully (limited use of grazing). On the opposite end of the continuum are sites that have been heavily degraded, upon which management or restoration activities pose little risk to relict resources, and livestock production could be substantial. Despite a greater emphasis on cattle than what may be considered ideal from a natural heritage standpoint, this approach still can lead to tremendous gains with respect to most ecosystem services (e.g., soil health, carbon sequestration, wildlife habitat, and improved disturbance regimes). Although this approach may not lead to idealized restoration, net benefits are likely to be quite substantial given the potential scale involved. Indeed, private landowners, by far the largest category of ownership for degraded grasslands in the region, are likely to be motivated by market-based incentives associated with working land options. Recent research in the Southeast has demonstrated that native grasses can be very productive forages. In the context of more frequent and intense droughts and increasing input costs (e.g., diesel, fertilizer, and agrochemicals), native grasses are becoming a very compelling option even for landowners not primarily motivated by conservation goals. Furthermore, reintroduction of native grass forages can increase awareness of and appreciation for native prairies. Such an interest could lead producers to become engaged in more complete and complex native-based forage systems and management approaches that could ultimately shorten the working grasslands-prairie restoration continuum. If that were to occur, the contribution of the working grasslands approach to prairie restoration could be quite substantial in the long run. Regardless, a variety of approaches, including development of native grass-based working pastures, should be pursued to achieve the larger goal of restoring native grasslands in the Southeast.

BANQUET PLENARY

Juras, Philip; *Envisioning Southern Grasslands with William Bartram*
Corresponding author contact: 233 Dubose Avenue, Athens, Georgia, 30601, philip@philipjuras.com

In 1775, naturalist William Bartram described the prairies he crossed in today's Montgomery County, Alabama, as "magnificent and pleasing". Though hard to imagine in today's landscape, this was one of many grassland environments Bartram described during his four-year journey through the South, which he later documented in the Travels. Inspired by Bartram's descriptions, landscape painter Philip Juras will offer a vision of the pre-settlement landscape, including the Black Belt prairie, as Bartram would have experienced it. He will describe how he combines direct field observation with historical, scientific, and natural history research to depict, and in some cases reimagine, landscapes as they appeared before European settlement. His paintings recreate these landscapes for contemporary viewers in much the same way that nineteenth-century American landscape painters like Albert Bierstadt and Thomas Moran introduced the western frontier to the imagination of eastern audiences.

CONTRIBUTED PAPERS & POSTERS

Allen, Charles*#[1], Malcolm Vidrine[2], Marc Pastorek[3], Peter Loos[4], and Gail Barton[5]; *Comparison of Cajun Prairie and Anacoco Inland Prairie*

[1] Colo. State Univ., Fort Polk Station; 1647 23rd St., Fort Polk, La 71459
[2] Div. of Sciences, LSU at Eunice, Eunice, La 70535
[3] Meadowmakers, Covington, LA 70435
[4] Ecovirons, Chireno, Tx 75937
[5] Flowerpress, Meridian, Ms 39304
*Corresponding author contact: 337-531-7535, native@camtel.net

Cajun Prairie is located in southwest Louisiana and was a large fairly continuous prairie while Anacoco Prairie is located in west central Louisiana in small disjunct patches. A calcareous forest surrounds most calcareous prairie patches while the Cajun Prairie grades into coastal marsh to the south, bottomland hardwood forests to the east, and pine savannah forest to the north and west. The soils in the Cajun Prairie are moderately acid silt loams underlain by a densely packed, hard clay pan located 20 to 40 cm below the surface. The soils of the Anacoco Prairie are usually moderately alkaline clays. The Cajun Prairie flora includes 512 species while the species count from the Anacoco Prairie is 177. A total of 128 species, 72.32% of the 177 Anacoco Prairie species were in common with Cajun Prairie. Purple coneflower (*Echinacea purpurea*), purple prairie clover (*Dalea purpurea*), Indian hemp (*Apocynum cannabinum*), Missouri coneflower (Rudbeckia missouriensis), prairie coneflower (Ratibia pinnata) and prairie acacia (*Acacia angustifolia*) are some species found in the Anacoco Prairie but not the Cajun Prairie. Hairy sunflower (*Helianthus mollis*) is a common Cajun Prairie species that is absent from the Anacoco Prairie. Other Cajun Prairie species that are not found in the Anacoco Prairie include *Rudbeckia grandiflora*, *R. texana*, *Pycnanthemum albescens*, *P. muticum* and *P. tenuifolia*.

Allen, Charles*#[1], Malcolm Vidrine [2], Marc Pastorek[3], Peter Loos[4], and Gail Barton[5]; *The Duralde Cajun Prairie Restoration Project, Evangeline Parish, Louisiana*

[1] Colo. State Univ., Fort Polk Station; 1647 23rd St., Fort Polk, La 71459
[2] Div. of Sciences, LSU at Eunice, Eunice, La 70535
[3] Meadowmakers, Covington, LA 70435
[4] Ecovirons, Chireno, Tx 75937
[5] Flowerpress, Meridian, Ms 39304
*Corresponding author contact: 337-531-7535, native@camtel.net

Cajun Prairie once covered 2.5 million acres in southwest Louisiana but has been reduced by agricultural practices (tilling) to less than 100 acres in small, disjunct remnant strips along railroad rights of way. The Duralde Project was started in 1994 on abandoned agricultural land that was densely covered with a stand of Tallow Trees (*Sapium sebiferum*). The U.S. Fish and Wildlife Service obtained the land and initiated a Cajun Prairie Restoration Project on the 334 acre tract. About 90 acres was seeded in 1995 with commercial seeds of five grass species and about 200 acres of the refuge was planted with seeds harvested from a native prairie in Texas in 1998. Since 1995, small areas on the refuge have been seeded with Cajun Prairie species annually and other small areas planted with plugs of Cajun Prairie species. The site is burned and spot herbiciding is used to control the Tallow Trees. More than 250 species of Cajun Prairie plants are now restored onto this site

Backus,W.M[1]*#, J.C. Waller[2], P.D. Keyser[2], G.E. Bates[2], C.A. Harper[2], R.J. Carlisle[1]; *Performance of stocker steers grazing native warm-season grasses during the summer in Tennessee*

[1] The Research and Education Center at Ames Plantation, Grand Junction, TN
[2] The University of Tennessee, Knoxville, TN
*Corresponding author contact: wbackus1@utk.edu

Early season (ES) and full season (FS) grazing strategies were used to evaluate performance of stocker steers grazing native warm-season grasses (NWSG) in 2010 and 2011. Steers grazed ES for 30-d starting in early May and FS May 4 to August 30 at Ames Plantation Research and Education Center (REC) near Grand Junction, Highland Rim REC near Springfield and the REC at Greeneville, near Greeneville, in which Angus and Angus cross steers (269 ± 12kg) were used in completely randomized design with three forage treatments: 1) switchgrass (*Panicum virgatum*); 2) a combination of big bluestem (*Andropogon gerardii* Vitman) and indiangrass (*Sorghastrum nutans*); and 3) eastern gamagrass (*Tripsacum dactyloides*). Stands of switchgrass (SG), big bluestem and indiangrass (BB/IG) and eastern gamagrass (EG) were 3 yr old (28%) or 4 yr old. Before and after grazing NWSG pastures all steers were fed a high fiber filler diet for 4 d with individual BW taken in the early AM each d and the average BW for the last 2 d was used for initial and final BW for the grazing period. Four steers (testers) were allotted to 1.2-ha paddocks with three replications per treatment. Additional steers were used in a put-and-take manner to keep forage in a vegetative state. Steers had free choice access to pasture, water, mineral, and shade. Steers grazing FS were weighed on 28-d intervals to monitor performance. Data were analyzed using the MIXED procedure of SAS. Least square means for ADG of ES steers grazing BB/IG and SG differed from EG ($P < 0.05$) with ADG of 1.10, 1.00 and 0.77 kg/d for BB/IG, SG and EG, respectively. Least square means for ADG of FS steers grazing BB/IG, SG and EG differed ($P < 0.05$) with ADG of 0.86, 0.65 and 0.40 kg/d for BB/IG, SG and EG, respectively.

Baldwin, B.S.; *Ecotype Versus Variety for Restoration: What's in a Word?*

Department of Plant and Soil Sciences, Mississippi State University, 32 Creelman St., 117 Dorman Hall, Mississippi State, MS 39762
*Corresponding author contact: bbaldwin@pss.msstate.edu

The desire to exploit native grasses and forbs for dual purpose grazing and restoration has gained momentum across the U.S. Early, large-scale restoration projects used available seed of desired species regardless of origin. Because of the size of the projects, economic feasibility dictated the use of significant quantities of improved varieties. The feeling that a species is a species regardless of origin prevailed. In several cases these varieties originated from locations vastly removed from the site being restored. Whether from different latitudes or longitudes, these "introduced" varieties were not ideally adapted to the restoration site. Differences were visually obvious. Such practices gave rise to a push-back movement supporting use of seed from only locally growing populations, sometimes requiring origin within 12-25 miles (19-40 km) of the restoration site. Supporters claim that the genetic integrity of these local populations made them superior to highly "improved" varieties from other locations. Recent genetic research on several native grass species would seem to indicate neither position is entirely correct. Small populations often have genetic diversity to avoid inbreeding, and "improved" varieties have not lost the genetic diversity necessary to adapt to the new location. If this is true, what factors should decide use of material for restoration sites? Economics usually determines this choice. Soil stabilization (quick establishment) is also a primary consideration. Genetic make-up is usually a tertiary or quaternary consideration. A reasonable compromise for the restoration of non-critical sites is the use of materials that are grossly adapted to the location (based on latitude, rainfall, soil type and geography). Improved material should arise from a broad genetic base, improved sufficiently to add in establishment. Locally adapted material should be included in the planting if economically possible.

Baldwin, B.S* and J.B. Rushing#; *Breeding for Precocious Germination for Seven Native Grass Species*

Department of Plant and Soil Sciences, Mississippi State University, 32 Creelman St., 117 Dorman Hall, Mississippi State, MS 39762
*Corresponding author contact: bbaldwin@pss.msstate.edu

Native grasses are notorious for possessing seed dormancy issues that contribute to extremely poor field establishment. Phenotypic recurrent selection (PRS) was used to enhance germination of six native species from populations adapted to the Southeastern United States. The six species selected were switchgrass (*Panicum virgatum*; upland and lowland accessions), big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), indiangrass (*Sorghastrum nutans*), purple top (*Tridens flavus*) and beaked panicum (*Panicum anceps*). Mother plants (collected from the Jamie L. Whitten NRCS Plant Materials Center, Coffeeville, MS) were used to establish the Cycle 0 breeding block. Seed from this block were germinated and screened for reduced dormancy. Seedlings that were selected for rapid, prestratified germination were planted in isolated crossing blocks. This process was repeated for all species until they have reached Cycle 7 (eight total years of selection). While making progress in some species, others seem recalcitrant. However, substantial improvements in prestratified germination have been observed for some species. Lowland switchgrass began in 2002 with a mean germination of 0.02% to a mean germination of 94.00% in 2009. Upland switchgrass, which entered the breeding program in 2005 with a mean germination of 0.07%, has jumped to 32.00%. Indiangrass has improved from 0.20% in 2002, to 25.67% in 2011. Big bluestem began with 2.30% germination, and has improved to 29.67% in 2011. Little bluestem, which also entered the

breeding program late, started with a mean germination in 2005 with 0.80%, and has increased to 16.67%. Purple top and beaked panicum have experienced many delays in selection, particularly poor seedling development, extremely poor germination and cultural practices (i.e. timing of seed harvest, seedling production and germination requirements). Through the use of PRS, progress can be made on these native grasses allowing for easier establishment without compromising genetic diversity.

Baldwin, B.S* and J.B. Rushing#; *Evaluation of Wildrye (*Elymus *spp.) as a Potential Forage and Conservation Planting for the Southeastern USA*

Department of Plant and Soil Sciences, Mississippi State University, 32 Creelman St., 117 Dorman Hall, Mississippi State, MS 39762
*Corresponding author contact: bbaldwin@pss.msstate.edu

Introduced species account for a majority of forage grasses grown for livestock in the southeastern U.S. Cool-season non-native species include: tall fescue (*Festuca arundinacea*), annual and perennial ryegrass (*Lolium spp.*), bluegrass (*Poa spp*.) and orchardgrass (*Dactylis glomerata*). Wildrye (*Elymus* spp.) is a native cool-season perennial grass with forage potential. It may also be planted in prairie restoration and conservation projects. Literature usually cites only two species, *E. virginicus* and *E. canadensis*, however there are six main species that are commonly found in the southeastern U.S.: *E. canadensis, E. virginicus, E. hystrix, E. riparius, E. villosus* and *E. glabriflorus*. Information regarding agronomic principles of these species (i.e. germination characteristics, planting depth, weed control, etc.) as well as forage yield and quality is lacking. The goals of this project are to define optimum germination requirements, planting depth, forage yield and quality. Southeastern wildrye (*E. glabriflorus*) was the species used for germination experiments. The optimum temperature for germination was 20^{o}C (five accessions; four temperature treatments). There were no significant differences for light treatments (constant dark and light, short day, long day). Removal of physical structures surrounding embryo does not enhance germination (glumeless, beardless, combination of both). Optimal planting depth ranges from 0.6-1.2 cm (five depth treatments). In terms of forage yield and quality, an eighteen entry cool-season variety trial was established in the fall of 2010 including tall fescue, wheatgrass (*Agropyron* spp.) timothy (*Phleum pratense*), orchardgrass and seven accessions of wildrye. Cumulative yield (three spring harvests) resulted in 'Jesup MaxQ' tall fescue as the entry with the greatest yield (11.2 Mg/ha) followed by 'Profit' orchardgrass (10.7 Mg/ha), 'Kentucky 31' tall fescue (10.0 Mg/ha) and Virginia wildrye (9.7 Mg/ha). Forage quality analysis is pending.

Baldwin, B.S*# and V.A. Temu; *Mississippi Mixed Native Warm-season Grass Stand Structure and Botanical Composition Impacted by Mowing*

Department of Plant and Soil Sciences, Mississippi State University, 32 Creelman St., 117 Dorman Hall, Mississippi State, MS 39762
*Corresponding author contact: bbaldwin@pss.msstate.edu

In the southeastern U.S., promotion of native warm-season grasses (NWSG) as forage species is accompanied with a paucity of information regarding appropriate management strategies. Mowing mixed NWSG stands impacts sward structure and species diversity thus influencing forage production and wildlife habitat. A harvesting trial was conducted at B. Bryan Farms, Clay County, MS to evaluate effects of five harvest intervals (30-, 40-, 60-, 90 or 120-d) and harvest duration in mixed NWSG stands [indiangrass (IG, *Sorghastrum nutans*), big bluestem (BB, *Andropogon gerardii*) and little bluestem (LB, *Schizachyrium scoparium*)]. Visual estimates of ground cover by vegetation and plant litter, and measurements of sward height and canopy closure, were recorded at each harvest.

After each harvest, frequency of occurrence of plant species, litter and bare ground were assessed. Treatments did not affect grass or forb cover, but harvest duration increased total grass cover and reduced occurrence of forb species. All harvest intervals reduced litter cover by about 42%, but increased bare ground by 28%. Year effect (rainfall and temperature) and accidental spring-burn increased mean grass cover in May 2010 to 78% (30-d), which only differed from the 120-d (71%) and control (57%). After the fire, cover by forbs and litter declined by 50 and 60%, respectively. Season sward height was shortest for the 30-d treatment. Retired plots were taller than first and second year plots, and all treatments were shorter than unharvested control. Canopy closure was greatest for the 60-d harvested plots compared to all other treatments. Neither treatment nor harvest duration affected post-season sward height or canopy closure. Treatments did not affect occurrence of herbaceous or tall forbs, grasses, shrub-like or plant litter, but increased bare ground. Harvest duration increased herbaceous forbs, LB and *Andropogon virginicus* seedlings, decreased IG, but not BB or other perennials. Occurrence of tall forbs and litter increased in the retired plots. Harvesting improved diversity of forbs by reducing competition from tall grasses. Occurrence of the dominant forb (*Solidago canadensis*) was controlled during harvest years.

Barone, John A. *#[1] and JoVonn G. Hill[2]. *Metacommunity Structure of Blackland Prairie Communities in Mississippi and Alabama*. [POSTER]

[1]Department of Biology, Columbus State University, Columbus GA
[2] Mississippi Entomological Museum, Department of Molecular Biology, Biochemistry, Entomology, and Plant Pathology, Mississippi State University.

We examined the metacommunity structure of herbaceous plants, grasshoppers and ants on 21 remnant blackland prairies located in the Black Belt and Jackson prairie regions in Mississippi and Alabama. We first ordinated the site by species matrix and then evaluated three aspects of the distributions of species across the communities: 1) coherence, which measures the number of site absences within the range of a species; 2) turnover, which evaluates how much species composition changes across sites; and 3) boundary clumping, which examines whether species appear or disappear in groups across sites. The ordination axes were compared to location and environmental variables to determine what factors influenced species distributions. We tested two hypotheses. First, specialist species, because of their habitat requirements, would be more likely to have distinctive, Clementsian communities than generalist species. Second, ant and grasshopper communities would be less dispersal-limited than plants, so the composition of their communities would be more likely to respond to environmental variables than distance. Both generalist and specialist plants exhibited a Clementsian metacommunity pattern, with significant coherence, turnover and boundary clumping for both ordination axes. For both ants and grasshoppers, generalist species had a Clementsian metacommunity pattern, whereas the specialist species had a random metacommunity pattern. We found modest support for our hypotheses. At least when a sufficient number of species were present, the communities were largely Clementsian in distribution, regardless of specialization. Distance, in terms of latitude and longitude, was an important factor in organizing the plant communities, presumably the most dispersal limited of the groups, but not for either ants or grasshoppers.

Barone, John A.*#[1] and Karen E. Stephenson[2]
Prairies of the Southeastern United States: Historical Extent and Ecology

[1] Department of Biology, Columbus State University, Columbus, Georgia 31907
[2] Environmental Sciences Program, Columbus State University, Columbus, Georgia 31907
*Corresponding author contact: 706-569-2832, barone_john@columbusstate.edu

Though dominated by forest, the historic landscape of the southeastern United States included a variety of open habitats, such as glades, barrens and prairies. To better understand the factors that led to the presence and maintenance of prairies in this region, this study asked two main questions: 1) How much prairie was present in the Southeast in the early 19th century? 2) On what types of soils and substrates were the prairies located? To address these questions, historical survey maps were used to document the extent and location of prairies in the states of Alabama, Mississippi, Arkansas, Louisiana, Georgia, and Florida. For all six states, we examined each township map (or equivalent) for prairies. Each map with prairie was scanned into ArcGIS, georeferenced, and the areas of prairie were outlined. The final map of prairies was then compared with contemporary soil maps. The historical survey maps show that in the early 19th century Alabama had 73,000 ha of prairie, Mississippi had 91,000 ha, Arkansas had 285,000 ha, Louisiana had 868,000 ha of prairie and Florida had 791,000 ha. Georgia had negligible prairie areas. The soils of these regions differed. For example, in the coastal prairies of Louisiana, about 60% of the historic prairies sat on clayey and loamy alluvial deposits and an additional 26.4% were on thick loess deposits. The prairies of the Grand Prairie region of Arkansas also largely sat on alluvial deposits. In contrast, about 97% of the prairies of the Black Belt region were on chalk outcrops and their derived soils. These soil differences, along with climatic variations, suggest that the prairies of the Southeast have distinctive origins and histories.

Biondi, Kristin M.*# [1], Jerrold L. Belant[1], James A. Martin[1], Travis L. DEvault[2], and Guiming Wang[1];
Restoring Mammal Communities using Grassland Conservation

[1] Department of Wildlife, Fisheries & Aquaculture, Mississippi State University, Mississippi State, MS, USA
[2] USDA, APHIS, Wildlife Services, National Wildlife Research Center, Ohio Field Station, 6100 Columbus Avenue, Sandusky, Ohio 44870, USA
*Corresponding author contact: 484-678-9916, kbiondi@cfr.msstate.edu

Loss of grasslands worldwide has threatened mammal populations which require grasslands for foraging and cover. Grasslands have previously been converted to agricultural systems, but are recently being restored by a myriad of conservation programs. We examined mammal response to the establishment of semi-natural grasslands for biofuel production in an agriculture-dominated landscape. We randomly assigned 8 replicates of a native warm season grass (NWSG) mixture and a switchgrass monoculture to 5-8.4 ha plots near West Point, MS, USA. We used small mammal trapping, camera trapping, track surveys, pellet surveys and observational surveys to estimate relative use by small mammals, carnivores and white-tailed deer (*Odocoileus virginianus*). Preliminary small mammal trapping data suggests two species occur in each treatment, *Peromyscus* sp. and cottonrat (*Sigmodon hispidus*). In Spring 2011 capture rates were low (≤ 1individual/100 trap nights) in both treatments, while December 2011–January 2012 capture rates increased to 42 and 38 captures/100 trap nights in switchgrass and NWSG, respectively. From cameras, we detected slightly greater species richness (4 species/plot/month) and individual visits (16 visits/plot/month) in NWSG than in switchgrass (3 species/plot/month and 9 visits/plot/month, respectively). Deer entered native grass plots twice as frequently (4 tracks/plot/month) as switchgrass plots (2 tracks/plot/month). Semi-natural grasslands

planted for biofuels seem to be suitable habitat for small mammals; however, these data represent pre-harvest conditions. Future research will elucidate post-harvest mammal use and further our understanding of mammal conservation in southeastern grasslands under production. *Student Presentation*.

Boland, Holly T.*#[1], James A. Martin[2], Samuel K. Riffell[2], L. Wes Burger, Jr.[2], and Brian R. Rude;
Performance of Beef Steers Grazing Native Warm Season Grasses in Northeast Mississippi [POSTER]

[1] Prairie Research Unit, PO Box 60, Prairie, MS 39756
[2] Department of Wildlife, Fisheries & Aquaculture, Box 9690, Mississippi State, MS 39762
[3] Department of Animal and Dairy Sciences, Mississippi State, MS 39762
*Corresponding author contact: 662-369-4426, holly.boland@msstate.edu

Use of native warm-season grasses (NWSG) in forage systems for beef cattle may maintain, or improve, animal performance while providing vital ecosystem services. The drought tolerance, low fertilizer needs, high production, and nutritive value of NWSG suggest they could provide a valuable forage base for cattle producers in the Mid-south region. Also, NWSG provide superior wildlife habitat compared to non-native forages species such as Bermudagrass (*Cynodon dactylon*). Prior to extensive producer adoption, management regimes that use NWSG must be validated. Three forage treatments were evaluated: Indiangrass (*Sorghastrum nutans*) monocultures (IND); mixed pastures of Big Bluestem (*Andropogon gerardii*), Little Bluestem (*Schizachyrium scoparium*), and Indiangrass (MIX); and Bermudagrass (BG) which is the typical summer forage of the region. Nine pastures were used (3 per treatment) ranging in size from 7 to 11 ha. Pastures were stocked at 2.7 steers per ha in May, 2011. Cattle were weighed every 28 days and remained on pasture for 110 days. Selected cattle wore activity monitors (IceTag, v 2.004) to measure grazing behavior. Data were analyzed using PROC MIXED of SAS (SAS Inst., Cary, NC) and a significance level of $\alpha \leq 0.05$ was used, with trends defined at $0.10 > \alpha > 0.05$. Average daily gain (ADG) of steers did not differ between treatments during periods 1-28, 56-84, or 84-110. However, during the peak of the season (days 28-56), ADG was greater ($P < 0.02$) in IND (1.1 kg) and MIX (0.9 kg) than BG (0.64 kg). Overall season ADG tended ($P \leq 0.10$) to be greater for IND (0.6 kg) and MIX (0.6 kg) than BG (0.4 kg). Percent of the day that animals spent grazing did not differ within period or overall during the season (IND 45%, MIX 45%, BG 46%). NWSG show promise for use in beef grazing systems in Mississippi.

Borsari, Bruno[1]#* and Malcolm Vidrine[2]; *Learning about Prairie Restoration Ecology: A Comparison between Biology Majors and Non-majors Students*

[1] Department of Biology, Winona State University, Winona, MN 55987
[2] Department of Sciences and Mathematics, Louisiana State University Eunice, P. O. Box 1129, Eunice, LA 70535, and The Cajun Prairie Gardens, 1932 Fournerat Road, Eunice, LA 70535
*Corresponding author contact: 507-454-5041, bborsari@winona.edu

An emerging interest in prairie restoration and reconstruction is offering educational opportunities to develop new teaching methods to impart knowledge in basic prairie ecology. For the present study, students majoring in biology (n=140) and non-majors (n=316) in large introductory biology courses were considered. All students were exposed to prairie restoration ecology principles by either using a prairie case study during one semester or by using the typical lecture format for two different classes (general ecology for majors and intro to biology for non-majors), in alternating semesters. A classroom response system (CPS[RF]) was employed in both contexts to engage students in the learning process and to assess learning. We measured students' learning by presenting a set of questions on the

day of the case study or lecture (pre-test), and again at the onset of the following class (post-test). Test results were obtained from 140 students over the course of two semesters, 70 students in the case condition and 70 in the lecture condition. The same treatment was employed with the non-majors with 158 students being taught the case and 158 being exposed to a lecture. Independent samples t-tests revealed that students in the case study had significantly higher learning gains compared to students who were taught the lecture. A two-factor ANOVA substantiated these results however the data did not produce a significant interaction indicating that students' learning did not depend on the teaching method being employed. This study demonstrates the potential of case study teaching and the capability of achieving learning from all students, when prairie restoration concepts are imparted through case-study teaching.

Brown, Richard L.*[1] and Sangmi Lee[2]; *The Gelechioidea (Lepidoptera) of the Black Belt in Mississippi with a Comparison of Species in Prairie and Forest* [POSTER]

[1] Mississippi Entomological Museum, Box 9775, Mississippi State University, Mississippi State, MS 39762
[2] Frank Hasbrouck Entomology Collection, Box 874501, Arizona State University, Tempe, AZ 85287
*Corresponding author contact: RBrown@entomology.msstate.edu

Surveys of moths in 10 prairie and two forest sites in the Black Belt of Mississippi that began in 1991 have resulted in the collection of 144 species of Gelechioidea representing seven families of Lepidoptera. This survey resulted in discovery of a new species of Elachistidae, *Elachista ciligera*, and a new genus and new species of Autostichidae, *Spinitibia hodgesi*. Nine species of gelechioids were collected that have disjunct distributions from grasslands on the Gulf Coast and in the Great Plains. A comparison of the species in the forest and prairie indicated that 14 of 39 species were dominant in the prairie, with the remainder being found in both prairie and forest or only in forest.

Campbell, J.J.N.[1]*# and W.R. Seymour, Jr.[2]; *Division of Lowland and Upland Vegetation within the Central Black Belt of Mississippi*

[1] Bluegrass Woodland Restoration Center, 3525 Willowood Road, Lexington, KY 40517
[2] Roundstone Native Seed, 9764 Raider Hollow Road, Upton, KY 42784-9216
*Corresponding author contact: 859-229-7711, julian.campbell@insightbb.com

Patterns of native vegetation are summarized for the central Black Belt in Mississippi, excluding larger river valleys and other peripheral transitions. This paper is based on inventory of three 200-300 acre sites, plus general reconnaissance and review. At least 539 species and varieties of vascular plant were found at the two lowland sites, combined. At the upland site (Pulliam Prairie), 448 taxa were found, and at least 90 more occur elsewhere in prairies across the whole Black Belt. All three sites combined have at least 777 taxa, with 203 in both lowland and upland. Aliens comprise only 8-10% of the flora. In lowland woods, oaks, hickories, sweetgum, green ash and red maple are most common. Willow oak is the most abundant large tree, with a variety of associates from dry to wet sites. Ponds and sloughs support local populations of overcup oak, pumpkin ash and cypress, plus buttonbush in more open areas. Riparian zones have distinctive composition, especially on mesic levees with swamp chestnut oak, black walnut and sugar maple. Old fields, roadsides and other open areas adjacent to lowland woods, including shallow ponds managed for water-fowl, contain diverse mixtures of graminoids and herbaceous plants. There are virtually no direct transitions from such open areas to remnants of upland prairies because corresponding soils on the landscape today are largely converted to row crops. However, patches of gama grass and associates (including an undescribed species of

Amsonia) appear to be remnants of the lower grassland types that existed before modern agricultural conversion, when activities of herbivores (including beavers) and people (including fire) probably opened up lowland woods in places. Plans for conservation in the region should address this full diversity of native species and habitats, now sadly fragmented.

Coggin, Daniel S.[1]*. and John Gruchy[2]; *Native Grassland Restoration in the Black Belt Region of Mississippi and Alabama: Current Efforts and Barriers to Implementation*

[1] Wildlife Mississippi
[2] Mississippi Department of Wildlife, Fisheries and Parks
*Corresponding author contact: 662-871-7101, dcoggin@wildlifemiss.org

The Black Belt Region of Mississippi and Alabama once included more than 350,000 acres of native grasslands. Many of the native grasslands in the region have been converted to production agriculture, pine plantations or significantly degraded by the presence of non-native grasses and invasive native woody plants. Remnant grassland sites are scattered across the region, most of which are no greater than 10 – 20 acres in size. Over the past several decades, grasslands in the Black Belt region have gained minor interest from the scientific community; however, no formal effort had been made at restoration. In 2004, Wildlife Mississippi, in cooperation with state and federal partners, began the Blackland Prairie Restoration Initiative which sought to restore, enhance and protect native prairie habitat within Blackland Prairie Region of Mississippi and Alabama. Recently, the initiative was granted a conservation practice under the Conservation Reserve Program. To date, approximately 10,000 acres have been restored and or enhanced under the initiative with several more projects underway. Restoration efforts are constantly evolving based on information gained in the field and through research projects. Barriers to native grassland restoration in the Black Belt include difficulty eliminating non-native grasses and woody plants during establishment, associated costs, and difficulty working with constraints in existing programs.

Conkling, Tara J.[1]*#, Adrian P. Monroe[1], James A. Martin[1], Samuel K. Riffell[1], Jerrold L. Belant[1], Holly T. Boland[2], Travis L. DeVault[3], and L. Wes Burger, Jr.[1]; *Wintering Sparrow Space Use Within the Black Belt Prairie*

[1] Department of Wildlife, Fisheries, & Aquaculture, Mississippi State University, Mississippi State, MS 39762
[2] Department of Animal & Dairy Sciences, Mississippi State University, Mississippi State, MS 39762
[3] United States Department of Agriculture, Animal & Plant Health Inspection Service, Wildlife Services, National Wildlife Research Center, Columbus, OH 44870
*Corresponding author contact: 620-200-0625, tconkling@cfr.msstate.edu

Grassland bird populations are one of the most imperiled guilds in North America. Suitable habitat during winter may be severely limited, especially within the agriculture-dominated Black Belt Prairie region of Mississippi and Alabama. Semi-natural grasslands managed for agriculture production including native-warm season grass (NWSG) used for livestock grazing, switchgrass (*Panicum virgatum*) monocultures and NWSG for biofuel production can also provide quality habitat for wintering grassland birds. We investigated space use for wintering sparrows across a gradient of common land-use types found within the Black Belt Prairie. During January – February 2012 we conducted flush-transect surveys in Monroe and Clay Co., MS—part of the Black Belt Prairie. Transects were visited every 1–2 weeks for 3 total visits per transect. Teams of 3 observers used a 25-m weighted rope to disturb vegetation and flush birds or disturbed the vegetation with 2-m poles when

existing vegetation precluded efficient rope-dragging. We also collected visual obstruction of vegetation along each transect using a Robel pole. We modeled probability of occurrence and detection probability for 3 sparrow species using the package *unmarked* in Program R. We constructed models including land-use type and, visual obstruction, as covariates for occurrence and detection probability. Occurrence for both Le Conte's Sparrow (*Ammodramus leconteii*) (ψ = 0.50, 0.06 SE) and Swamp Sparrow (*Melospiza georgiana*) (ψ =0.69, 0.08 SE) was more likely with increasing vertical structure. Le Conte's Sparrows also tended to occur more frequently in switchgrass and non-grazed NWSG. Savannah Sparrows (*Passerculus sandwichensis*) showed no trend in occurrence relative to structure or land-use (ψ = 0.98, 0.02 SE). Diversifying land-use in the Black Belt during winter with taller structure through grazing management and reduced mowing will likely improve wintering sparrow conservation. *Student Presentation*.

Denhof, Carol; *Conservation and Restoration of High Quality Understory in Longleaf Ecosystems*

The Longleaf Alliance, 958 Mercer St., Atlanta, GA 30316
Corresponding author contact: 678-595-6405, carol@longleafalliance.org

Longleaf pine forests are important for different reasons to different people. Some people value these lands for their value in supporting wildlife, others see the importance of the incredible aesthetics and plant diversity, while others will look at the marketable timber that can be produced from a properly maintained forest. The values provided by the system may vary but the underlying force that drives these values is the presence of a functioning understory component. Many people who are not familiar with the longleaf forest see a habitat consisting of a few grasses and pine trees. With closer examination, they soon discover one of the most diverse habitats in North America. More than 100 plant species may be found in an area of approximately ¼ of an acre. This plant diversity provides habitat for wildlife, pollinator food sources, and the fine fuels necessary for the fires that drive the ecosystem. Federal and state agencies, conservation organizations, and private landowners are increasingly aware of the need to consider understory communities in longleaf restoration projects. The goal of the Longleaf Alliance is to ensure a sustainable future for the longleaf ecosystem. The longleaf ecosystem is more than just pine trees. It's all of the organisms that inhabit this system that once dominated the landscape here in the southeast. The understory is key to restoring the function to the system. The demand for local ecotype native seed, technical assistance, and resources for understory restoration has increased dramatically in recent years. The Longleaf Alliance, along with our partners within the Southern Native Plant Restoration and Seed Increase Project (SNPRSIP), is working to address these needs across the longleaf range. SNPRSIP consists of governmental agencies, conservation organizations, research institutions, commercial seed producers, and other interested individuals that are active in understory restoration projects across the southeast.

Dollar, J.G.[1], S.K. Riffell[2]#*, T.J. Schauwecker[3], and L.W. Burger, Jr.[2]; *Effects of landscape history and disturbance on forb communities in semi-natural grasslands*

[1] The Xerces Society for Invertebrate Conservation & NRCS Cape May PMC, Cape May Courthouse, NJ 08210, USA
[2] Department of Wildlife, Fisheries & Aquaculture, Mississippi State, MS 39762
[3] Department of Landscape Architecture, Mississippi State, MS 39762
*Corresponding author contact: 662-325-0392, sriffell@cfr.msstate.edu

Semi-natural grassland plant communities may be surrogates for remnant prairies and may support plant species which evolved under environmental conditions characteristic of Blackland Prairie. We compared forb communities in semi-natural grasslands established on historical Mississippi Blackland Prairie sites with forb communities on semi-natural grasslands established on sites lacking documented prairie history. We also investigated effects of prescribed disturbance (disking, burning) on forb communities in semi-natural grassland buffer habitat within an agricultural ecosystem. We used standard 1-m^2 quadrats to sample plant communities to species level (percent cover and forb stem counts) in August 2007, May 2008, July 2008, August 2008, May 2009, July 2009, and August 2009. We used 1835 Bureau of Land Management reports to designate sampling areas which were located on historical prairie and those areas which were not. Redundancy Analysis (RDA) in CANOCO and general linear models were used to test hypotheses about the influence of landscape history and disturbance on forb communities. Semi-natural grasslands planted on historical prairie sites had more species-rich, prairie-associated forb communities compared to sites without prairie history. Forb richness responded positively to disking. Perennial forb stem counts responded positively to both disking and burning, but only with statistical significance during one sampling period. Annual forb stem counts responded positively to disking. However, treatment effects varied between years, with the fall 2007 treatment having a greater effect compared to the fall 2008 treatment, and the fall 2007 treatment effects carrying over into summer 2009. For annual forb stem counts, the burning treatment did not differ from controls except in July 2008 when annual forbs responded positively to both burning and disking. If increased native forb production is a management objective, land-owners should establish semi-natural grasslands on historical prairie sites, if possible, and use disking (and to a lesser extent, burning) as a disturbance tool.

Doxon, Elizabeth*#, Pat Keyser, Craig Harper, and Seth Barrioz; *Vegetation Response to Season of Prescribed Fire*

Department of Forestry, Wildlife and Fisheries, 2431 Joe Johnson Dr, Room 274, University of Tennessee, Knoxville, TN 37996
*Corresponding author contact: 865-974-7962, edoxon@utk.edu

Prescribed fire is an important tool for managing succession in the Southeast. Although fire occurs naturally over multiple seasons in the Southeast, no long-term study has examined the effects of timing of fire in restored grasslands. Current paradigms largely concentrate on dormant-season fire. The effects of growing-season fire on planted native warm-season grass (NWSG) communities are based on short-term studies. We examined the response of planted NWSG to timing of annual (2008 – 2011) burns (March, April, May, September, plus unburned control) in Tennessee. NWSG mixtures [grasses varied by site, but included big bluestem (*Andropogon gerardii*), indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), little bluestem (*Schizachyrium scoparium*), and sideoats grama (*Bouteloua curtipendula*)] were established prior to 2004 using NRCS-recommended planting rates at 3 locations. In 2007, we allocated burn treatments in a RBD with four replicates at each location. Since the initiation of burning in 2008, we monitored vegetation response each summer. We

analyzed the effect of treatment on each species of NWSG, bare ground, and forbs for each location separately using repeated measures ANOVAs (MIXED procedure). In general, NWSG did not respond to burn treatment. Forbs had more coverage in May-burned plots at one location (7% coverage for May burns vs. 1% coverage for remaining treatments), but did not respond to timing of burn at the other locations. In general, repeated prescribed fire, regardless of season of burning, over 4 years in dense, planted NWSG stands did not stimulate forbs or promote openness. Therefore, in high rainfall environments, it may be necessary to disturb the soil via disking or heavy grazing to reduce grass density and stimulate forb cover in dense stands of planted NWSG.

Echols, S. Lee[1]*#, Thomas E. Govus[2], Thomas S. Patrick[3], and Bobby T. Bond[4]; *The History and Current Status of Georgia Eocene Chalk Prairies in Oaky Woods Wildlife Management Area, Houston County, Georgia*

[1] North American Land Trust, Georgia Field Office, 2455 Woodridge Drive, Decatur, GA 30033
[2] 3711 Big Creek Road, Ellijay, GA 30536
[3] Georgia Department of Natural Resources, Wildlife Resources Division, Nongame Conservation Section, 2065 U.S. Hwy 278 SE, Social Circle, GA 30025
[4] Georgia Department of Natural Resources, Wildlife Resources Division, Game Management Section, 1014 Martin Luther King Blvd, Fort Valley, GA 31030
* Corresponding author contact: 706-338-2157, lee_echols@yahoo.com

Georgia Eocene Chalk Prairies represent a newly described plant community in central Georgia. Oaky Woods Wildlife Management Area (WMA) in Houston County holds the majority of known high quality chalk prairie remnants. The significance of the Oaky Woods prairies was first realized in the late nineties, when Georgia Department of Natural Resources staff was made aware of their uniqueness by local naturalists. Numerous rare and disjunct plant species were documented from these sites over the succeeding years. A detailed floristic inventory conducted on Oaky Woods prairies and associated vegetation during the 2005-2006 growing seasons yielded significant vascular plant species richness and additional rarities, including multiple state records. This research also highlighted unique floristic and geologic aspects of central Georgia prairies as compared to similar Black Belt Prairies in adjacent Alabama and Mississippi. Subsequent 2007 vegetation sampling for the Species at Risk project established these prairies as a distinct ecological association within the U.S. National Vegetation Classification System: Georgia Eocene Chalk Prairies. In 2010, the state of Georgia acquired over 10,000 acres of Oaky Woods WMA, including all known examples of chalk prairies within the property boundaries. This conservation success story provides an opportunity for further research and restoration of a critically imperiled plant community. The 50 Year Plan for Oaky Woods currently includes a restoration target of at least 500 acres of chalk prairies.

Entsminger, Edward D.[1]*#, John W. Guyton[1], and Jeanne C. Jones[1]; *Roadside Right of Way Plantings Appropriate for the Black Belt Prairie*

[1] Department of Wildlife, Fisheries & Aquaculture, Mississippi State University, Box 9690, Mississippi State, MS 39762, USA
*Corresponding author contact: 937-260-1378, eentsminger@cfr.msstate.edu

Native grasses and native wildflowers are on the decline in most of the United States in prairies and along roadsides rights-of-ways (ROW's) due to extensive mowing regimen and alternative practices. We compared native plants versus non-native plants in respect to percent cover, height of vegetation and species richness in mowed and unmowed test plots. Other factors such as site location (i.e.,

upland vs. riparian) within highway ROW's are being examined for wildlife safety under highway corridors in northeastern Mississippi. Roadside ROW's undergo regular disturbances such as mowing and road developments which affects soils, groundwater, surface hydrology and vegetation composition. Introduced plant species thrive with increased mowing, soil disturbances and bare ground. Most of the introduced species along the roadsides were originally used for agronomic purposes such as hay production and livestock forage. These agronomic grasses were used on ROW's in part because of their availability. However, reducing mowing along ROW's to one time per year in late fall will create attractive native prairie environments along Mississippi roadsides while reducing the abundance of human-wildlife collisions. Reduced mowing plots suggests an abundance of remnant native prairie grasses (i.e., broomsedge (*Andropogon virginicus*), little bluestem (*Schizachyrium scoparium*), etc.) that emerge after one year of leaving roadsides unmowed. Not only are native prairie grasses coming back but wildflowers such as primroses, buttercups, ironweeds, partridge peas, passionflower vines, asters, goldenrods and sunflowers are reappearing. Prairie remnant plants do not perform well with continual mowing or with the lack of fire. Lack of competition from mowing reduces introduced species productivity and allows natives to thrive in the ambient sunlight, moisture, nutrients and space. Research suggests increases in the proliferation of native prairie and wildflower species along roadsides with reduced mowing. *Student Presentation*.

Ervin, Gary[1]*# and Steven Hughes[2]; *Plant Species Distribution Modeling in the Blackland Prairie region of Mississippi*

[1] Department of Biological Sciences, PO Box GY, Mississippi State, MS 39762
[2] The Center for Bottomland Hardwoods Research, Southern Hardwoods Lab, 432 Stoneville Rd, Stoneville MS 38776
* Corresponding author contact: 662-325-1203, gervin@biology.msstate.edu

Blackland Prairie habitat has been reduced to < 10% of pre-Columbian presence, but there has been a recent resurgence in interest to conserve and restore this ecosystem type. The aim of this project was to evaluate Species Distribution Models (SDMs) as potential tools for identifying existing Blackland Prairie remnants or sites with conditions suitable for restoration. Plant species assemblages were surveyed at four remnant and two restoration sites to develop a list of Blackland Prairie plant species indicators. Two plant survey databases then were queried for presence and/or absence locations for those prairie plant species. Environmental variables including soil, canopy, and topography were taken from GIS databases: USDA NRCS SSURGO, SEGAP, and MARIS DEM. Regional landscape models predicting sites indicative of the previously surveyed Blackland Prairie remnant and restoration sites then were developed using multiple SDM approaches. Resulting models were evaluated by examining predictive success, sensitivity, specificity, Kappa value, and receiver operator characteristic curves. The best models were selected for validation based on a second set of plant surveys conducted at points broadcast randomly on publicly accessible land across the survey region. Preliminary assessment of those models indicated the best models incorporated data on tree canopy cover and either soil percent silt or percent clay composition. Those models tended to have a low likelihood of predicting suitable habitat where none exists, making them potentially desirable for use in a conservation planning context.

Estes, Dwayne*#; *A Revised Classification of Tennessee's Grasslands*

Department of Biology and Center of Excellence for Field Biology, Austin Peay State University, P.O. Box 4718, Clarksville, TN 37044
*Corresponding author contact: 931-217-5430, estesL@apsu.edu

Grasslands are communities dominated by graminoids (mostly grasses and sedges) and herbs and are predominantly maintained by edaphic conditions, fire, grazing, hydrology or other forms of disturbance. The term grassland, as used here for Tennessee, includes a variety of communities that have been referred to by various names including prairie, xeric limestone prairie, scour prairie, barrens, cedar barrens, river-scour, gladey meadows, wet meadows, savanna and grass balds. The late Dr. Hal De Selm has published extensively on Tennessee's grasslands, or barrens as he referred to them. In De Selm's published studies, some grassland types that are quite distinct physiognomically, vegetationally and floristically were lumped together without distinction. Field work conducted by the author has led to the development of a revised classification of Tennessee's grasslands in which approximately 20 grassland types are recognized. This new classification is compared to the prior studies of De Selm and the existing NatureServe classification. The distribution, ecology, dominant plant species, rare and endemic taxa, phytogeographic relationships, threats and conservation status of these grasslands are discussed.

Evans, Kristine O.[1]*, L. Wes Burger, Jr.[2], Mark Smith[3] and Sam Riffell[1]*; Response of Southeastern Overwintering Bird Communities to Targeted CP33 Upland Habitat Buffers* [POSTER]

[1] Department of Wildlife, Fisheries & Aquaculture, Box 9690, Mississippi State, MS 39762
[2] Forest and Wildlife Research Center, Box 9740, Mississippi State, MS 39762
[3] School of Forestry and Wildlife Sciences, 3301 Forestry and Wildlife Building, Auburn University, AL 36849
*Corresponding author contact: koevans@cfr.msstate.edu

Government subsidized conservation programs provide incentives to alter agricultural operations in favor of practices offering conservation benefits. Within these programs buffer practices are used to integrate conservation into agricultural productions systems. Conservation buffer practices targeted for wildlife have been shown to increase densities of many breeding bird species. However, few studies have evaluated whether buffer practices strategically designed for specific wildlife benefits actually increase densities of targeted species during the non-breeding season, particularly at a large spatial scale. We compared overwintering avian diversity and density and response to buffer width on buffered and non-buffered row-crop fields in 3 southeastern U.S. states from 2007-2008. Buffered fields were enrolled in Conservation Reserve Program practice Habitat Buffers for Upland Birds (CP33), which targets restoration of northern bobwhite (*Colinus virginianus*) and other upland species. Overall species richness did not differ on buffered vs. non-buffered fields in 2007, but was 29% greater on buffered fields in 2008. Total avian conservation value did not differ among buffered vs. non-buffered fields. Swamp sparrows (*Melospiza georgiana*), song sparrows (*Melospiza melodia*), field sparrows (*Spizella pusilla*), and red-bellied woodpeckers (*Melanerpes carolinus*) exhibited substantially (100-2707%) greater densities on buffered fields compared to non-buffered fields, with no species exhibiting substantial preferences for buffer width. Our results suggest a diminutive change in primary land use (≈7%) produced a disproportionate response by some overwintering bird species. Targeted buffers provided a direct source of winter habitat for several species and may be a pragmatic means to provide critical non-breeding habitat with little alteration of agricultural systems.

Gasaway, Robert D. *#, Ronnie Haynes, William Collier, and Matthew Landes; *Evolution of Wildlife Management in the South – The Re-recognition of the Importance of Private Lands*

U.S. Fish and Wildlife Service, Atlanta, Geogia
*Corresponding author Contact: 404-679-4169, Bob_Gasaway@fws.gov

Economics, the growth of an informed citizenry, expansion of international agriculture and a nationally evolving political model have provided new opportunities for wildlife managers to return to fundamental habitat improvement activities and general wildlife management. This presentation will discuss the impact of these forces of change. The geographic focal point of this change is property owned by the private landowner who wants to make a difference by managing land that he or she controls to benefit selected resources. In addition, priorities identified by State and Federal bureaucracies that were supported by individual landowners have enhanced agencies abilities to further comprehensive conservation strategies. This presentation will discuss the interaction of these factors and present a forward look at a potential large scale, corridor based, landscape conservation model for the restoration and management of native prairie habitat found historically in the Southeast. In addition, "design with nature" economic based, utilitarian objectives will be presented as options for private landowner cooperatives to consider. The costs of restoration and the value of partnerships based on results from the landowner incentive program (LIP) will be weighed and considered with a perspective financial generation model.

Gray, Toby *#[1] and Schauwecker, Timothy[2]; *The Use of General Land Office (GLO) Records to Locate Prairie Patches*

[1] Department of Geoscience Box 5448 Mississippi State, MS 39762
[2] Department of Landscape Architecture Box 9725 Mississippi State, MS 39762
*Corresponding author contact 662-722-0472, mtg83@msstate.edu

A search of Mississippi General Land Office (GLO) records was undertaken in 2008 with the goal of discovering historic prairie patch locations in the Jackson Prairie Region of Mississippi. Prairie entry and exit point data recorded in notes taken by surveyors in the 1820s and 1830s were translated into map coordinates using ArcGIS software. Over 200 patch locations were discovered and mapped. These locations were compared to those discovered by John Barone by scanning and digitizing GLO plat maps. They were also compared to an inventory of Jackson Prairie patches maintained by the Mississippi Natural Heritage Program (MNHP). Fifty-eight of these patch locations were visited in 2009. Of these, half were so intensively managed that any natural expression of prairie was suppressed. Of the other half, one third featured prairie indicator species, and one third were identifiable relict prairies. Of the relict prairies, 5 patches were not in the MNHP inventory and so could be considered new discoveries. The project is the subject of a Master's Thesis submitted to the Department of Landscape Architecture by Toby Gray in 2010. This thesis includes a discussion of the relative advantages of using plat maps versus survey notes in locating historic patches, along with a brief reference to digitized plat maps available online at the website of the Bureau of Land Management (BLM). In the period since the thesis was written, a great deal more material has become available at the BLM website, both in terms of plat maps and notes. This material can be used to validate both Gray and Barone, to search for more historic patches, and to reveal other features of a lost landscape. The presentation will include information on obtaining plat maps from the website and displaying them in ArcGIS, along with photographs of the new patch discoveries. *Student Presentation*.

Gruchy, John [1]*, Richard Hamrick[1], Daniel Coggin[2], Scott Edwards[1], and George Rowland[3];
Identifying Barriers and Possible Scenarios for Implementing Native Grass Forages on Private Lands in North Mississippi [POSTER]

[1]Mississippi Department of Wildlife, Fisheries, and Parks
[2]Mississippi Fish and Wildlife Foundation
[3]North Central Mississippi Resource Conservation and Development Council
*Corresponding author contact: john.gruchy@gmail.com

Native warm-season grasses (NWSG) provide increased benefits over non-native sod-forming grasses for soil and water conservation because they are deep rooted, adapted to local soil types, and require less fertilization and maintenance. Whereas non-native sod-forming grasses such as tall fescue and bermudagrass provide poor cover for many species of wildlife, properly managed NWSG can provide high-quality early successional habitat. Additionally, NWSG can be used for productive livestock forage. Many landowners in Mississippi are unaware of the benefits of NWSG forages or otherwise hesitant to convert portions of their forage base to NWSG. During 2010 – 2012, we provided financial and technical assistance for landowners interested in establishing NWSG forages in two geographic areas of Mississippi (North Central and the Black Belt Prairie). We established more than 400 acres of NWSG forages on 22 different farms using incentive rates of $75 per acre (North central Mississippi and $150 per acre (Black Belt region) in addition to 75% cost share on materials and labor. Regardless of incentive rate, landowner participation was low. However, satisfaction among participating landowners was high. We will discuss establishment methods for NWSG forages, barriers to landowner participation, and recommendations for delivering NWSG forages on private lands.

Hainds, Mark J#*; *Butterfly Pea, Slender Indian Grass, & Large Flower Partridge Pea in Native Herbaceous Restoration Projects of the Southeastern, US*

The Longleaf Alliance, 12130 Dixon Center Rd., Andalusia, AL 36420.
Corresponding author contact: 334-427-1029, mark@longleafalliance.org

Large flower partridge pea (*Chamaechrista fasciculata*) has been widely utilized in warm season grass mixes with longleaf pine plantings on former agricultural sites of the southeastern US. On several sites across Georgia and Alabama the partridge pea outcompeted native grasses and overtopped 1, 2, and even 3 year old longleaf pine seedlings. Dense stands of partridge pea created favorable conditions for a fungus named *Rhizoctonia* that infects longleaf pine seedlings. In 2011 The Longleaf Alliance installed an herbicide screening trial in Geneva County, Alabama. The study site had severe longleaf pine seedling mortality that was attributed to competition and shading from partridge pea; predisposing longleaf seedlings to infection and subsequent mortality from *Rhizoctonia*. Transline®, Milestone VM®, an Arsenal®/Oust® tankmix, and untreated check plots were measured for partridge pea control and survival of longleaf pine seedlings pre and post-treatment. Alternative species to large flower partridge pea are suggested for some agricultural and cutover sites. The Longleaf Alliance has examined several native herbaceous species that were included in previous direct seeding trials using native warm season grasses, legumes, and asters. Two species stood out in these trials: Slender Indian grass (*Sorghastrum elliottii*) and spurred butterfly pea (*Centrosema virginianum*).

Hamlington, Jeremy A.[1]#, Mark D. Smith[1]*, Brian S. Baldwin[2], and Christopher J. Anderson[1;] *Native Cane (*Arundinaria*) Propagation and Site Establishment*

[1] School of Forestry and Wildlife Sciences, 3301 Forestry and Wildlife Sciences, Auburn University, AL 36849
[2] Department of Plant and Soil Sciences, Box 9555, Mississippi State, MS 39762
*Corresponding author contact: 334-844-8099, mds0007@auburn.edu

Large monotypic stands of rivercane (*Arundinaria gigantea*), called canebrakes, are a disappearing ecosystem in the Southeast. With >98% loss of this ecosystem, canebrakes have become a conservation priority for many natural resource agencies. Current methods for restoring canebrakes (e.g., whole plant translocation) are cost prohibitive thereby impeding large-scale (e.g., 10-100s of hectares) restoration. However, innovative methods using rhizome sections may offer cost-effective production of rivercane propagules. The objectives of this study were to 1) facilitate and evaluate the transfer of propagation technology to the commercial sector, 2) measure growth and survival of propagules relative to fertilizer and hormone treatments, and 3) determine optimal infield planting densities. We collected mother plants from northern Alabama (2010) and western Tennessee (2011) and transported them to Roundstone Native Seed in Upton, Kentucky. We potted, periodically watered, and fertilized each plant throughout the growing season. In September 2010, we harvested ~20 three-node rhizome sections from each plant and ~13.5 sections/plant in 2011. Rhizome sections were planted and grown in a greenhouse until spring. Overall survival was 6.5% in 2011, varied by collection site, and did not differ with rooting hormone application (P=0.48). Propagules receiving a 20-20-20 fertilizer water solution were 1.94 times as likely to survive (P=0.002) and propagules receiving slow release 19-19-19 were 1.64 times as likely to survive (P=0.019) as propagules receiving granular 14-14-14 fertilizer. Low propagule survival was a result of poor drainage of planting media (subsequently rectified). In February 2011, we planted 298 cane propagules in north Alabama at 2.4m, 3.7m, and 4.6m spacings. Propagule survival was 27% eight months post-planting. Production of rivercane propagules from rhizomes currently provides the only method of generating significant quantities of propagules for large-scale canebrake restoration; however, further research will be required to refine propagation techniques (i.e., increase survival). *Student Presentation*.

Haynes, Ronnie J.; *Funding Opportunities for Native Prairie Restoration through the Partners for Fish and Wildlife Program*

Partners for Fish and Wildlife Program, U. S. Fish and Wildlife Service, 1875 Century Blvd, Suite 200, Atlanta, GA 30345
*Corresponding author contact: 404-679-7138, Ronnie_Haynes@fws.gov

The Partners for Fish and Wildlife (PFW) Program, administered by the U. S. Fish and Wildlife Service, can provide both technical and financial assistance to private landowners, non-government agencies, State agencies, and other partners to carry out voluntary on-the-ground conservation delivery on private lands and directed toward the native prairie and native grassland ecosystems of the Southeast Region. The PFW Program is not a grant program (there is no solicitation of proposals through a "request for proposals process"), but is a "direct federal financial assistance" program with substantial involvement from PFW Program biologists in helping to plan for, develop, and carry out habitat improvement projects. Thus, projects are developed in close coordination with local PFW biologists. Available funding can range from $25,000 for individual projects to as much as $200,000 for landscape or watershed efforts. A Program goal is to achieve at least a cash or in-kind match of project funds from

recipients, but this is not a legal mandate and exceptions are considered. Projects are ranked and selected by Service cross-program teams. Common conservation actions funded through the PFW Program include the planting of native prairie and grassland species, prescribed burning, and invasive species control or eradication. Limited funds are available for monitoring to determine success, and most monitoring efforts involve several partners. The PFW Program has recently developed, in cooperation with key stakeholders, a Strategic Plan for the time period of 2011 through 2016. This Strategic Plan identifies the priority ecosystems and geographic focus areas within these ecosystems that the PFW staff intend to work in over the five-year period of the Plan. Native prairies and grasslands are identified as one of the priority and imperiled ecosystems within the Southeast Region. The PFW Strategic Plan, a list of PFW contacts regionwide, and information about how to become a partner is available at: http://www.fws.gov/southeast/es/partners.

Hill, JoVonn G.; *Habitat Associations of Ants (Hymenoptera: Formicidae) and Grasshoppers (Orthoptera: Acrididae) in the Heterogeneous Cedar Glade Landscape of the Central Basin of Tennessee*.

Mississippi Entomological Museum, Molecular Biology, Biochemistry, Entomology and Plant Pathology, Box 9775, MSU, MS 39762
*Corresponding author contact: jgh4@entomology.msstate.edu

In the Central Basin Physiographic region of Tennessee, scattered outcroppings of Ordovician limestone bedrock and shallow soils results in conditions that favor herbaceous vegetation and limit tree growth to isolated individuals or scattered stands of eastern red cedar, *Juniperus virginiana,* and a few other woody species. These open "cedar glades" can be found in several southeastern states, but it is in the Central Basin of Tennessee where they are most prolific, occurring with xeric limestone prairies, eastern red cedar forests, and hardwood forests as part of an edaphically determined mosaic of habitats. These habitats are considered highly imperiled due to anthropogenic disturbances including fire suppression, and recreational driving, and suburban sprawl of the cities of Nashville and Lebanon. The ant and grasshopper communities of the remnant cedar glades and xeric limestone prairies were surveyed to provide a better understanding of the regional fauna, and also to help guide current management and future conservation/restoration projects in these imperiled systems. Grasshoppers were also surveyed in cedar-hardwood forests in the region. Twenty-six species of ants and twenty–five species of grasshoppers were collected during this survey. Eighteen species of ants were found in the cedar glade habitat; whereas, 18 species were found in the prairies. Eleven species of grasshoppers were found in the cedar glades, 12 species were collected in the xeric limestone prairies, and six species were collected from the cedar-hardwood forests. Six new state records for Tennessee (four grasshoppers and two ants) and a new species of grasshopper, that is a cedar glade endemic, were documented during this survey. Analysis of community composition revealed that each habitat supported a unique ant and grasshopper fauna. The uniqueness of the invertebrate communities of each floristically defined habitat of this heterogeneous environment lends further supports their separate conservation and management.

Hill, JoVonn G.[1]*, John Barone[2], and Lisa McInnis[3]; *Evaluation of Restoration Techniques in Black Belt Prairies of Mississippi* [POSTER]

[1] Mississippi Entomological Museum
[2] Columbus State University, Columbus, GA
[3] Natchez Trace Parkway
*Corresponding author contact: jgh4@entomology.msstate.edu

Surveys conducted by the General Land Office in the 1830's suggest that in the Black Belt region of Alabama and Mississippi, prairies once covered about 144,000 hectares. Since that time, more than 99% of these prairies have been lost to agricultural and urban development. A major threat to remaining prairies is the encroachment of eastern red cedar, *Juniperus virginiana* L. Cedars shade out prairie plants and allow other woody species to establish. Restoration and maintenance of remaining prairies requires the removal of cedars. An experiment designed to measure the effectiveness of several methods of removing cedar from small prairie remnants was established along the Natchez Trace Parkway in 2009. The experiment has four treatments: 1) a burn treatment; 2) a hand-thinning treatment; 3) a combination treatment in which the cedars were cut and left in place and then the remnant burned; and 4) a control. The restoration value of these differing management strategies will be evaluated based on changes in the plant, ant, and grasshopper communities. These three taxa are appropriate for evaluating the efficacy of the restoration; as they are locally diverse, include remnant dependant species, represent different trophic levels, and the composition of these communities is well known for Black Belt prairies. By examining these three groups simultaneously, the experiment will be able to assess the effectiveness of the different strategies more broadly. Baseline data were collected in 2009. Thinning treatments began in 2010, but the burns had to be delayed until the spring of 2011 due to wet winters. Initial post thinning data found small shifts in the ant and grasshopper communities. The plant community changed more dramatically. Sampling will continue through October of 2012, allowing for a more substantial assessment of the different approaches. The information presented here will consist of data collected through July of 2011.

Hodges, Malcolm; *The Coosa Valley Prairies/Flatwoods Complex (Floyd Co., Ga.): Discovery, Conservation & Management to Date*

The Nature Conservancy, 1330 West Peachtree St., Atlanta, Georgia 30309
Corresponding author contact: mhodges@tnc.org

The Coosa Valley prairies and flatwoods complex was discovered by Georgia botanists around 1990; 929 acres of a 7000-acre ecological site were partially protected via a conservation easement held by The Nature Conservancy in 2003. The site harbors a list of 30+ plant conservation targets as well as rare prairie barrens and calcareous savanna communities. The tract is managed using prescribed fire, within the context of an industrial timber operation modified by easement tenets. These have transformed the tract into an increasingly herb-dominated mosaic of woodlands, savannas and prairie barrens patches.

Keyser, Pat*#[1], Elizabeth Doxon[1], John Waller[2], and Gary Bates[3]; *Web-based Economic Decision Tool for Summer Forage Production*

[1] Department of Forestry, Wildlife and Fisheries, 2431 Joe Johnson Dr., Room 274, University of Tennessee, Knoxville, TN 37996
[2] Department of Animal Science, 2640 Morgan Circle Dr., University of Tennessee, Knoxville, TN 37996
[3] Department of Plant Sciences, 2431 Joe Johnson Dr., Room 252, University of Tennessee, Knoxville, TN 37996
*Corresponding author contact: 865-974-0644, pkeyser@utk.edu

Native warm-season grasses (NWSG) have been promoted as a low-input, low-maintenance alternative summer forage. Before adoption into a forage or grazing system, the economics of production should be examined to determine if they are conducive to the farm management. Because previous budgets have focused on switchgrass' (*Panicum virgatum*) use as a biofuel and may not be valid in a forage or grazing system, we developed an interactive, web-based decision support tool to be used by mid-South producers. This tool can be used to examine the impacts of fuel cost, seed cost and rates, herbicide cost and rates, and fertilizer price and application rates on the economics of short-duration grazing, continuous grazing, and haying for NWSG, bermudagrass, and summer annuals. Using published data and preliminary data from an ongoing NWSG forage project in Tennessee, we conducted a sensitivity analysis to compare various break-even points to examine NWSG's economic viability. During establishment, seed costs are the dominant expense (> 60% of total cost) with herbicide and fuel costs the next most expensive inputs (15 and 9%, respectively). For NWSG, our analyses suggest that NWSG are sensitive to fertilizer inputs. As an example, for each additional 10 lbs of nitrogen per acre, the total budget increased by 20%. As these results are preliminary, further research into the economics of NWSG production would be beneficial to mid-South producers.

Koch, Katie *[1], Soch Lor[2] Eric Lonsdorf[3], Evan Grant[4], Marissa Ahlering [5], Laurel Barnhill[6], Tom Dailey[7], Ryan Drum[8], Melinda Knutson[9], Connie Mueller[10], David Pavlacky[11], Christine Ribic[12], Catherine Rideout#[13], David Sample[14], Donna C. Brewer[15], Mike Runge[16]; *Delivering Grassland Bird Conservation throughout the Eastern and Central United States* [POSTER]

[1] USFWS and Midwest Coordinated Bird Monitoring Partnership, 3090 Wright St., Marquette, MI 49855
[2] USFWS, P.O. Box 25486, Denver Federal Center, Denver, CO 80225-0486
[3] Chicago Botanic Garden, 1000 Lake Cook Rd., Glencoe, IL 60022
[4] USGS, 12100 Beech Forest Rd., Laurel, MD 20708
[5] The Nature Conservancy, University of North Dakota, Biology Department
Grand Forks, ND 58202
[6] USFWS, 160 Phoenix Rd, Room 103, Athens, GA 30602
[7] National Bobwhite Conservation Initiative, University of Tennessee, 274 Ellington Plant Science Building, Knoxville, TN 37996-4563
[8] USFWS, 5600 American Blvd. West, Suite 990, Bloomington, MN 55437-1458
[9] USFWS, Upper Midwest Environmental Sciences Center, 2630 Fanta Reed Rd, La Crosse, WI 54603
[10] 8315 Highway 8, Kenmare, ND 58746
[11] Rocky Mountain Bird Observatory, P. O. Box 1232, Brighton, CO 80601
[12] USGS, 204 Russell Labs, 1630 Linden Drive, Madison, WI 53706-1598
[13] East Gulf Coastal Plain Joint Venture and USFWS, Auburn University, AL 36849
[14] Wisconsin Department of Natural Resources, 2801 Progress Rd. Madison, WI 53716
[15] National Conservation Training Center, Shepherdstown, WV, 25443
[16] USGS, Patuxent Research Center, Laurel, MD, 20708

Grassland birds are among the fastest and most consistently declining birds in North America. Many reasons for these declines have been suggested, including loss of perennial grassland habitats, but the problem is complex. To address this issue, a team of 11 individuals representing federal, state and non-governmental agencies and academia convened at the National Conservation Training Center in September 2011 to apply a structured decision making process to this issue. The group identified a fundamental objective of sustaining and restoring grassland bird populations that breed east of the Rocky Mountains, including Canada, across the annual cycle. We determined that a structured framework is needed that will help guide managers, scientists, and decision makers to integrate management efforts with human dimensions and create partnership opportunities to deliver the most effective conservation actions at local, regional, and national scales. This framework should transcend administrative boundaries and allow us to identify where grassland birds are most limited, which conservation actions are most effective for sustaining populations, and where partners could implement actions to elicit the greatest bird responses. A preliminary decision analysis indicated that land use policies can dramatically influence grassland bird population dynamics. Policies compensating landowners for providing ecosystem services, including bird-friendly practices, proved to be most successful in retaining habitat. The structured decision making framework may allow us to determine grassland conservation targets needed to support stable populations of grassland birds throughout their annual life cycle. The framework has many pieces (i.e. life cycle modeling, monitoring, land-owner choice, land-use change, and habitat management), and different partners will need to focus on these respective pieces. We outline a strategy for evaluating this complex conservation issue as a whole and suggest that there is an opportunity to link existing and emerging research and modeling efforts in an adaptive management framework.

Kurve, V.[1], P. Joseph[1], J.B. Williams[1], H. Boland[2], S.K. Riffell[3], M.W. Schilling[1]*#; *Effect of feeding native warm season grasses during the stocker phase on beef carcass characteristics and meat quality*

[1] Department of Food Science, Nutrition, and Health Promotion, Mississippi State University, Mississippi State, MS 39762
[2] Prairie Research Unit, PO Box 60, Mississippi State University, Prairie, MS 39756
[3] Department of Wildlife and Fisheries, Mississippi State University, Mississippi State, MS 39762
*Corresponding Author contact: Schilling@foodscience.msstate.edu

Native warm season grasses (NWSG) provide excellent wildlife habitat and are well adapted to the Southeastern United States. The objective of this study was to evaluate the effect of feeding NWSG to beef cattle during the stocker phase (110 days) on carcass characteristics and meat quality. Seventy-two British cross-bred cattle were randomly placed in paddocks such that three replications of eight animals were grazed on each pasture plot within a treatment which included Bermudagrass (CONT), Indiangrass monoculture (IND), and a mixture of NWSG including Big Bluestem, Little Bluestem, and Indiangrass (MIX). Cattle were finished on grain (180 days) in a commercial feedlot and carcass data were collected after harvest (542 days). With respect to quality grades, 94% of carcasses were categorized into 'choice', while the percentages of 'choice' were 100, 95.8, and 87 within MIX, CONT, and IND treatments, respectively. CONT had 4.2% 'select' grade carcasses, whereas IND had 13% 'select' carcasses. Three 1" rib eye steaks (*Longissimus* muscle) were obtained from each animal, aged under vacuum for 2 weeks, and subjected to simulated retail display with overwrap packaging for meat quality evaluation on 0, 3, 6, and 9 days. Steaks from CONT had greater ($P<0.05$) fat content, and lower ($P<0.05$) protein and moisture percentages when compared to steaks from IND and MIX treatments. Dietary treatments had similar ($P>0.05$) effect on L* value (lightness), a* value (redness), b* value (yellowness), and aerobic plate counts (APC). However, steaks from the MIX treatment had less ($P<0.05$) lipid oxidation than steaks from CONT and IND during the refrigerated display period. In all the treatments, meat redness and pH decreased ($P<0.05$), while lipid oxidation and APC increased ($P<0.05$) over the display time. Our results revealed that NWSG could be effectively incorporated into forage systems for stocker cattle without compromising carcass and meat quality attributes.

Lackey, G.# and T. Schauwecker*; *Discovering applications for prairie systems: an ecological approach to designing for urban biodiversity*

Department of Landscape Architecture, Mississippi State University, Box 9725, Mississippi State MS 39762
*Corresponding author contact: 662-325-7895, tschauwecker@lalc.msstate.edu

Harsh urban environments, often inhospitable to traditional horticultural planting approaches, pose multiple challenges to designers and managers who are interested in increasing habitat value, biodiversity and aesthetic appeal in developed landscapes. For solutions, we can examine regionally specific ecological systems that may serve as analogous habitat templates to overcome these challenges (Lundholm, 2006). Two experiments are being conducted at Mississippi State University in order to discover potential applications for prairie systems. One examines the unique microclimates associated with the Black Prairies of the southeastern United States as templates for the development of a non-irrigated, native green roof system that could provide an alternative to the accepted practice of using non-native Sedum monocultures for this application. Ten experimental green roof platforms (4' by 4' by 6"), have been constructed. Five contain only commercially available green roof growing media and five contain an addition of native prairie soil. A total of 26 locally indigenous, drought tolerant prairie species have been selected for establishment by either seed or plug and spontaneous

colonization has been allowed. The ecological structure of the resulting plant communities will be measured. Another experiment examines the effects of endomycorrhizae on the growth and establishment of 7 locally indigenous prairie species in blackland prairie demonstration plots at the MSU Arboretum at North Farm. Individual plants were randomly assigned to one of three treatments: commercially available mycorrhizal inoculum, native prairie soil inoculum, and no inoculum as a control. Plant cover was assessed using photographic analysis of individual plants. The aim of these experiments is to understand how prairie ecosystems could be transposed onto anthropogenically affected environments. The potential exists to transform urban ecosystems into reservoirs of biodiversity, providing places for local ecotypes to establish and reproduce. *Student Presentation*.

Lundholm, Jeremy T. 2006. Green Roofs and Facades: A Habitat Template Approach. *Urban Habitats* 40(1): 87-101.

Latino, Lindsay R.[1]#*, James A. Martin[1], Joshua W. Campbell[2], Samuel K. Riffell[1], Jerrold L. Belant[1], L. Wes Burger, Jr.[1]; *Pollinating Insect Communities in Semi-natural Grasslands Managed for Conservation and Production*

[1] Department of Wildlife, Fisheries & Aquaculture, Mississippi State University, Mississippi State, MS 39762, USA
[2] Department of Biology, High Point University, High Point, NC 27262 USA
*Corresponding author contact: 815-871-1640, llatino@cfr.msstate.edu

Pollination by invertebrates is a key component of reproduction in most plant species. Pollinators contribute $217 billion of ecosystem services to agriculture annually worldwide. Conservation practices designed to promote and enhance pollinator habitat have become an important measure to assure long-term persistence of pollinator populations. However, experimental quantification of pollinator response to conservation practices is limited. Additionally, a paucity of information exists about pollinator communities in feedstocks planted for biofuel productions. Our objectives are to quantify the number of potential pollinating insect species that use various conservation practices (e.g., conservation buffers, whole-field practices and prescribed grazing) and document visitation rates of potential pollinators. Data collection began in May of 2011 and will continue until October of 2013. Study areas include the Mississippi Alluvial Valley (Delta) and the Black Prairie Region in northeastern Mississippi. Colored bowl traps filled with a soap-water solution and video recordings are used to attract and enumerate insects, respectively. Preliminary trapping occasions have captured >12,000 potential pollinators including about 45 species of bees (Hymenoptera-Apoidea), 26 species of wasps (Hymenoptera), 13 species of butterflies (Lepidoptera), 10 species of beetles (Coleoptera) and 7 species of flies (Diptera). We expect our results to further our understanding of the importance of semi-natural grasslands to provide ecosystem services throughout the Southeast. *Student Presentation*.

Monroe, Adrian P.[1]*#, Samuel K. Riffell[1], James A. Martin[1], L. Wes Burger, Jr.[1], and Holly T. Boland[2]; *Converting Bermudagrass to Native Warm-Season Grass Pasture: Effects on Dickcissel Nest Success*

[1] Department of Wildlife, Fisheries & Aquaculture, Mississippi State University, Mississippi State, MS 39762
[2] Department of Animal & Dairy Sciences, Mississippi State University, Mississippi State, MS 39762
*Corresponding author contact: 757-784-8430, amonroe@cfr.msstate.edu

Native warm-season grasses (NWSG) are promoted as a viable forage alternative to non-native grasses, such as Bermudagrass (*Cynodon dactylon*), and may provide more suitable nesting structure for grassland birds. We investigated effects of nest microhabitat and pasture forage type on nest success of Dickcissels (*Spiza americana*), a grassland obligate species. We established four treatments at Mississippi State University's Prairie Research Unit, each replicated three times: grazed Bermudagrass, grazed NWSG, ungrazed NWSG (to test effects of grazing), and grazed Indian grass (*Sorghastrum nutans*) monoculture (to test effects of NWSG diversity). Between 16 May – 14 July, 2011, we monitored 86 Dickcissel nests, and characterized vegetation structure and composition at the nest site after nesting attempts were completed. We used a logistic-exposure method and hierarchical model selection to identify important vegetation parameters for Dickcissel daily nest survival rates and compare treatments. Apparent nest success was 11% in Bermudagrass, 22% in Indiangrass 33% in grazed NWSG and 42% in ungrazed NWSG. Daily survival rates decreased with nest age and increased with overhead concealment. In Bermudagrass, Dickcissels nested more frequently in shrubs, possibly obscuring any treatment effects on daily nest survival as these were not well supported in our models. Due to the recent establishment of NWSG we will continue our study over the next two summers to clarify effects of NWSG conversion on Dickcissel nest success. We will also quantify prey abundance and compare nestling condition among treatments because prey availability may differ due to pasture composition, affecting Dickcissel fitness. *Student Presentation*.

Oloyede ,B.S. [1]#, B.J. Rude[1]*, S. Riffell[2], J. Martin[2], H.T. Boland[1], and B.S. Baldwin[3]; *Nutritional Profile of Native Warm Season Grass Grown as a Mono- or Multi-Species Pasture*

[1] Department of Animal & Dairy Sciences, Mississippi State University, Mississippi State, MS 39762
[2] Department of Wildlife, Fisheries & Aquaculture, Mississippi State University, Mississippi State, MS 39762
[3] Department of Plant and Soil Sciences, Mississippi State University, 32 Creelman St. 117 Dorman Hall, Mississippi State, MS 39762
*Corresponding author contact: BRude@ads.msstate.edu

The objective of this study was to evaluate the nutritional profile of mono- or multi-species pastures of native warm season grasses (NWSG). Twelve pastures were randomly assigned to one of four treatments: 1) Bermudagrass (BG; *Cynodon dactylon*); 2) Indiangrass (IG; *Sorghastrum nutans*); 3) MIX G (Indiangrass, little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*)) established at 9.0 kg/ha seeding rate; and 4) MIX NG the same as MIX G but established at 4.5 kg/ha seeding rate. The fourth treatment (MIX NG) was not intended to have cattle grazing in order to facilitate a congruent wildlife research project. Growing steers (N = 225, BW = 237 ± 1.5 kg, 2.7 steers/ha) were randomly assigned to one of nine pastures. Grass samples were taken from all pastures every 28 days during four-month period and were analyzed for DM, NDF, ADF, OM, EE, and IVDMD. Dry matter was greater ($P < 0.05$) for all NWSG (33.6, 30.7, and 29.5 % for MIX G, IG, and MIX NG, respectively) compared to BG (27.5 %). However, OM was similar ($P > 0.05$) for all treatments. Neutral Detergent Fiber, ADF and hemicellulose were greater ($P < 0.05$) for all NWSG

(66.9, 67.8, and 66.6% NDF, 34.6, 35, and 33.5% ADF, 32, 32.8, and 33.1% hemicellulose for IG, MIX G, and MIX NG, respectively) compared to BG (63.6% NDF, 32.9% ADF, and 30.6% hemicellulose). Fat was similar ($P > 0.05$) for all treatments. Crude protein was less ($P < 0.05$) for NWSG (8.6, 8.2, and 8.6% for IG, MIX G, and MIX NG respectively) compared to BG (10.7%). Crude protein decreased ($P < 0.05$) with increased maturity while NDF, ADF, and hemicellulose increased ($P < 0.05$) with maturity. It appears that NWSG may offer a viable alternative to BG for grazing cattle during the summer. *Student Presentation*.

Pastorek, Marc1#*, Charles Allen[2], Malcolm Vidrine[3], Peter Loos[4], Gail Barton[5]; *Meadowmakers Prairie Seed Project, Pearl River County, Mississippi*

[1] Meadowmakers, 72322 Ingram Street, Covington, Louisiana 70435
[2] Colorado State University, Fort Polk, La 71459
[3] Louisiana State University, Eunice, La 70535
[4] Ecovirons, Chinero, Tx. 75937
[5] Yardflower, Meridian, Ms. 39304
* Corresponding author contact: 504 296 8162, meadowmakers@gmail.com

In 1997, approximately twelve acres were purchased in Pearl River County, Mississippi for the purpose of planting prairie species. The planting was designed as a refuge for prairie genetics. It also provided a bank so that seed could be harvested for future restoration projects. For three consecutive years, plantings were made with hand-collected Cajun Prairie seed. The field was broken into varying sized blocks and seed were established from different prairie remnants in Acadia, Jefferson Davis and St. Landry Parishes and from the Cajun Prairie Habitat Preservation Society restoration site in Eunice, Louisiana. Additionally, one acre was devoted to plots of Jackson Prairie and Black Belt Prairie species using seed collected from roadside prairie remnants in Scott, Clarke, Oktibbeha, and Noxubee Counties in Mississippi and from Sumter County, Alabama. Approximately one acre was left untouched as a control so that naturally occurring species could be monitored. Plugs of some species were dug from remnant prairies and introduced to the site to inoculate the soil with beneficial fungi. For twenty-five years prior to the purchase, the field had been maintained as a Bahia pasture which was grazed by cattle. The Bahia sod was tilled well prior to hand seeding. After ten years, experimental techniques common in the Midwestern prairie restoration were initiated to address stands of Chinese privet (*Ligustrum sinense*) that had dominated the wetter drainage areas. Ongoing eradication of Chinese privet and replanting with prairie species is still under way in these areas. Controlled burns have been used intermittently over the years to suppress woody plants in the field. Over 150 prairie species have been established on site. The restoration serves as a demonstration of practical techniques used to establish diverse grassland habitat from locally collected propagules.

Peacock, Evan *#; *Freshwater Mussel Faunas of the Mississippi Black Prairie Prior to Modern Impacts*

Department of Anthropology & Middle Eastern Cultures, PO Box AR, Mississippi State University, Mississippi State, MS 39762
Corresponding author contact: peacock@anthro.msstate.edu

Native inhabitants of prehistoric Mississippi consumed large quantities of freshwater mussels (Bivalvia: Unionidae), leaving behind dense accumulations of shell at archaeological sites. A recent compendium (Peacock et al. 2012) of archaeological shell in Mississippi includes data from sites in the Black Prairie. Not surprisingly, major changes have taken place in stream faunas with modern

impact. The archaeological record provides a baseline against which such impacts can profitably be measured.

Phillips, George E.; *Historical Ecology of the Mississippi-Alabama Black Prairie*

Museum of Natural Science, Mississippi Department of Wildlife, Fisheries & Parks, Jackson, MS
Corresponding author contact: 601-576-6035, george.phillips@mmns.state.ms.us

The Mississippi-Alabama Black Prairie is a distinctive physiographic and biogeographic district lying within the eastern Gulf Coastal Plain. A narrow, arcuate strip of lowland stretching from southwestern Tennessee to eastern Alabama, this once agriculturally critical region is steeped in history, prehistory, and politics. The characteristic and indigenous physical and biological associations of the Black Prairie district are products of its geology and climate, as well as the evolutionary history of the continent. The Black Prairie is geologically defined by near-surface calcareous Cretaceous age sediments belonging to the Selma Group. Both the chemistry and structure of these sediments, and their pedologic products, produce hydrologic systems that encourage the formation of prairies. Above floodplains, Selma sediments generate soils of the rendzina type, including the recalcitrant gumbo so familiar to farmers in the region. Since the land was first cleared and farmed in the 1830s, the rich, unstable, graminogenic soils of the Black Prairie have evolved through various stages of agricultural production and concomitant depletion. Although lying in the humid portions of the warm temperate zone, the Black Prairie experiences a moderate summer water deficiency. Unlikely to have ever supported open grasslands characteristic of seasonally drier climates, available evidence suggests that since the appearance of modern grassland ecosystems during the Miocene Epoch, the Black Prairie has probably always been a predominantly sylvan landscape, although interrupted by prairie islands of various sizes and contiguity. However, this forest-prairie mosaic may have peaked in prairie coverage during the Pleistocene Epoch, a time when mammalian megaherbivores coupled with cooler (and possibly drier) climate would have favored an increase in early successional herbaceous communities. Today, the Black Prairie is significantly altered from its pre-settlement condition and is in dire need of conservation and management strategies to preserve the few remaining prairie fragments and their indigenous species associations.

Prather, Chelse#* and Steve Pennings; *Relative Importance of Plant Communities and Nutrient Concentrations in Regulating of Prairie Herbivore Communities*

Department of Biology and Biochemistry, University of Houston, Houston, TX, 77004
* Corresponding author contact: 859-466-4044, chelse.prather@gmail.com

Similar to other grasslands, efforts to manage rare coastal tallgrass prairie fragments often focus on managing for native plant diversity, assuming that a diverse plant community will support higher trophic levels that are often conservation targets. This assumption is based upon a prevailing hypothesis in ecology that suggests herbivores should be more diverse and abundant where plants are more diverse and abundant; however, this prevailing hypothesis has led ecologists to overlook other factors that are potentially important to herbivore communities, such as micronutrient concentrations. We used a natural experiment to examine the relative importance of factors affecting herbivore community structure by measuring plant and herbivore biomass and diversity and plant, litter and soil macro- and micro-nutrients across a range of human influence in a coastal tallgrass prairie south of Houston. These data show that plant community attributes alone do not adequately predict density or richness of herbivores, but that plant micro-nutrients (specifically calcium) are important in mediating herbivore community structure. Most strikingly, areas with low plant richness and biomass due to

high amounts of calcium in soil have grasshopper diversity equal to areas with high plant species richness and biomass. Surprisingly, these areas with low plant richness and biomass had higher grasshopper abundance than areas with high plant richness and biomass. These results suggest that herbivore communities are not regulated solely by plant diversity and abundance, and therefore, managing for grassland plant diversity may not be sufficient to achieve high diversity and density of higher prairie trophic levels.

Rudolph, D. Craig[*1], Rusty Plair[2], Dan Jones[#3], J. Howard Williamson[1], Clifford E. Shackelford[4], Richard R. Schaefer[1], and Joshua B. Pierce[1]; *Restoration and Winter Avian Use of Isolated Prairies in Eastern Texas* [POSTER]

[1] USDA, Forest Service, Southern Research Station, 506 Hayter Street, Nacogdoches, TX 75965
[2] USDA, Forest Service, Sam Houston National Forest, 394 FM 1375, New Waverly, TX 77358
[3] Texas Parks and Wildlife Department, P.O. Box 1003, Huntsville, TX 77342
[4] Texas Parks and Wildlife Department, 506 Hayter Street, Nacogdoches, TX 75965.
*Corresponding author contact: 936-569-7981 ext. 4012, crudolph01@fs.fed.us

Numerous isolated prairies exist, or existed, on the West Gulf Coastal Plain east of the main distribution of the prairie ecosystem. Almost all of these prairies have been destroyed by changing land use patterns and suppression of wildfires. Intensified restoration and management of degraded prairie habitat on the Sam Houston National Forest in southeastern Texas have been ongoing since approximately 2004. As a result, encroaching woody vegetation has been substantially reduced and vegetation structure consistent with prairie habitat has been restored. Beginning in 2008, winter bird surveys were conducted on these prairies with the objective of quantifying avian use, especially by grassland sparrows of the genus *Ammodramus.* With improvement in prairie structure, winter use of these sites by *Ammodramus* spp. was rapidly established, typically following the first growing season post-restoration. Henslow's Sparrow (*Ammodramus henslowii*), a species of conservation concern, responded dramatically. Aggressive restoration of prairie remnants on the West Gulf Coastal Plain can rapidly reestablish prairie habitat and facilitate their re-colonization by at least some avian species characteristic of prairie habitats.

Russell, David*# and Brian Baldwin; *Rivercane (*Arundinaria gigantea*) Response to Cultural Management Practices Among Native and Exotic Competition*

Mississippi State University, Department of Plant & Soil Sciences, Mississippi State, MS
*Corresponding author contact: 601-757-5663, dpr13@pss.msstate.edu

Ecological restoration projects face challenges in both initial establishment and early growth phases of native plants, particularly native bamboo. Rivercane (*Arundinaria gigantea*) is a woody evergreen grass known for its cultural importance to the First Nations of the Southeast. Its occurrence has been reduced to small, remote, isolated populations. Successful re-establishment requires the understanding of appropriate management practices. Controlled burns for example, are a proven management tool favoring pioneer species. Fire within rivercane stands improves densities and reduces successional competition. As management practices continue to evolve, it is important to understand effects these practices have on species. An experiment was conducted in 2010 and 2011 to test rivercane's response to three management practices. Plots were established with rivercane planted in two grass types (native, exotic). Each plot contained four management treatments, which were randomly assigned to locations within the main plot. The treatments (sub-plots) were: November mowing, March burn, October burn, or control. Each sub-plot contained 16 established rivercane plants in each of two reps.

Data was taken each year before the October burn, to determine treatment effect on mean difference in above-ground growth [plant growth index; (PGI)]. Mean total PGI in the exotic grass plot was 33 percent of total above-ground biomass of the native grass plot. Among treatments, control plots had the greatest PGI, followed by March burn, October burn, and mowing, respectively. Data suggests that interference mechanisms, such as allelopathic chemicals found in *Sorghum* and competitive sod-forming growth of *Cynodon dactylon*, inhibited rivercane growth in exotic plots. In contrast, the clump-forming morphology of native grasses does not impede growth, but instead promotes rhizominal spread. *Student Presentation*.

Schotz, Alfred*# and Michael Barbour; *Ecological Assessment and Terrestrial Vertebrate Surveys for Black Belt Prairies in Alabama*

Alabama Natural Heritage Program, 1090 South Donahue Drive, Auburn University, AL 36849
Corresponding author contact: ARS0002@auburn.edu

The Black Belt Prairie Region, or Black Belt, is a geologically and biologically distinct area among the physiographic regions of the Coastal Plain. The Black Belt is a crescent shaped area extending from southwestern Tennessee south through east-central Mississippi and east-southeastward through central Alabama to near the Georgia border. This region is characterized by weathered rolling plains of relatively low relief developed on chalk and marl of the Cretaceous Selma chalk. Historically, the natural communities of the Black Belt consisted of a mosaic of various hardwood and mixed hardwood/pine forests, chalk outcrops and prairies. Approximately 144,000 ha of prairie were reported in land surveys from the 1830s, with approximately 73,060 ha in Alabama. The prairies ranged in size from small to extensive and were found scattered among the forest communities throughout the landscape in the Black Belt, forming a distinct and important ecosystem in the Southeast. However, Black Belt prairies have been devastated by land use alterations. By the end of the twentieth century, only scattered remnants of the native Black Belt prairie remained as the grasslands were converted to agriculture or pasture or were lost to development. The project identified 14,595 individual prairies in 265 sites covering 6,276 ha. The overwhelming majority of the extant prairies were small fragments; median prairie size was 0.14 ha. Prairies were distributed throughout the Black Belt, with the largest concentrations occurring in Dallas, Lowndes, and Sumter counties. Sizable acreage also exists elsewhere in the Black Belt, with prairies becoming least abundant in the eastern third of the region. Until recently, the Black Belt prairies had received little conservation attention, despite the high degree of imperilment for prairie habitats. This study was undertaken to assess the current extent and ecological integrity of extant prairies.

Seltzer, Jennifer *#; *Presenting an Alternative Natural Distribution for Osage Orange,* Maclura pomifera*, Based on Charcoal Identification from Lyon's Bluff, Oktibbeha County, Mississippi*.

Mississippi Entomological Museum, PO Box 9775, Mississippi State University, Mississippi State, MS 39762
Corresponding author contact: Jls30@entomology.msstate.edu

Current literature places the natural range of osage orange, *Maclura pomifera* (Raf.) C.K. Schneid., in the Red River drainage between Texas and Oklahoma, with some maps extending the range North to southern Missouri, east to the Mississippi River, and South to northern Louisiana (Betts 1929; Burton 1973; Collingwood 1939; Hough 1924). Prior to the Pleistocene, osage orange had a much larger range, covering most of North America, supported by dispersal from megafuana (Barlow 2001, 2001a; Blackwell et al. 1983; Schambach 2003). Postglacial repopulation was limited due to the decrease in

dispersal partners (Barlow 2001, 2001a). Schambach (2003) has proposed that the Red River drainage and associated grasslands in this area acted as refugia for osage orange, with the dispersal partners being replaced by water ways and open prairie areas. However, grasslands in the eastern half of North America have been neglected as possible refugia for this species. Pre-historic records of osage orange (charcoal, daub impressions, and pollen records) can be used to provide site records for this species.

Seltzer, Jennifer[1]*# and Evan Peacock[2]; *Assessing Cultural Bias in Wood Charcoal From Lyon's Bluff: A Prehistoric Site in the Mississippi Black Prairie*

[1] Mississippi Entomological Museum, PO Box 9775, Mississippi State University, Mississippi State, MS 39762
[2] Department of Anthropology & Middle Eastern Cultures, PO Box AR, Mississippi State University, Mississippi State, MS 39762
Corresponding author contact: Jls30@entomology.msstate.edu

Target baselines for environmental reconstruction may profitably be informed by data on plant and animal remains recovered from archaeological sites. One problem in such efforts is distinguishing to what extent such remains represent past environmental conditions as opposed to the preferential selection and use of particular species by humans: i.e., the "cultural filter." To assess cultural bias in archaeological materials, controls must be established. Here, we use the impressions of plants in daub (clay plaster from prehistoric houses) as a control for investigating cultural bias in wood selection as represented in charcoal from the Lyon's Bluff site, a prehistoric mound and village complex in the Black Prairie of Oktibbeha County, Mississippi.

Tomberlin, James[1]#*, Reggie Thackston[2], and Nick Brown[3]; Groundcover Assessment of CRP Continuous Practice 36 in Georgia

[1] Georgia Department of Natural Resources, 1945 Hwy 199 South, East Dublin, GA 31027
[2] Georgia Department of Natural Resources, 116 Rum Creek Dr, Forsyth, GA 31029
[3] Minnesota Department of Natural Resources, 20596 Highway 7, Hutchinson, MN 55350
*Corresponding author contact: 478-296-6176, james.tomberlin@dnr.state.ga.us

The Conservation Reserve Program (CRP) conservation practice 36 longleaf pine initiative (hereafter, CP36) began in 2006. Through CP36, private landowners receive financial incentives to remove eligible cropland from production and receive cost-share to establish longleaf pine (*Pinus palustris*) and a native warm season grass (NWSG)/forb mix to establish native groundcover and expedite conservation and wildlife benefits. A joint effort began in 2009 between Georgia Department of Natural Resources (GADNR), Georgia Forestry Commission (GFC), Georgia Farm Service Agency and Georgia Natural Resources Conservation Service (GANRCS) to assess the groundcover condition of fields enrolled in CP36. The study objectives were to: 1) survey a representative sample of CP36 fields after at least one growing season and evaluate the effectiveness of the practice design and implementation in restoring native ground cover; 2) assess the extent to which improved pasture grasses occur that could potentially dominate the site and negate programmatic intent; and 3) quantify and evaluate CP36 implementation results and provide feedback in order to facilitate optimizing cost/benefit. Approximately 20% of CP36 fields that had ≥1 growing season post-planting were systematically sampled between July 27, 2009 and October 15, 2009 by visually estimating percent cover for seven vegetative variables. Groundcover was dominated by forbs regardless of chemical site prep treatment. Improved pasture grasses were detected in approximately 44% of fields, with bermudagrass (*Cynodon dactylon*) being most common. Enrolled fields fallowed ≤1-year prior to site

preparation and planting had significantly greater coverage of improved pasture grasses than fields fallowed for >1-year (P=0.02). Improved pasture grasses tend to dominate sites, displace native vegetation and decrease diversity, reducing wildlife value. We provide site preparation recommendations to maximize control of improved pasture grasses prior to tree and native groundcover establishment so as to fulfill the intent of CP36 and optimize long-term natural resource benefits.

Varner, J. Morgan #*; *Tree Encroachment in Southeastern Prairies and Grasslands: Consequences and Prospect for Reversal*

Department of Forestry & Wildland Resources, Humboldt State University, Arcata, CA 95521. Corresponding author contact: 707-826-5622, jmvarner@humboldt.edu

Without frequent fire, many southeastern USA prairies and grasslands are prone to tree encroachment. Across the southeastern USA, past fire exclusion and land-use changes have reduced the extent of grasslands and prairies. Those prairies that remain are often invaded by woody shrubs and trees that reduce local plant species richness and impede subsequent fires. This positive feedback is somewhat understood for a few savannas and woodlands in the region, but to-date little information is known about this phenomenon in southeastern prairies. I review the positive feedback cycle in southeastern prairies, focusing on the invasion of native trees across three genera: *Quercus*, *Juniperus* and *Pinus*. For each genus, I explain their relative effects on plant species and forest floor establishment. In addition, the literature on each species' fire-caused mortality is summarized. A synthesis of research needs in small tree establishment and reversal is presented. Lastly, a conceptual model of tree encroachment in southeastern prairies is presented, with pathways for the application of prescribed fire and mechanical harvest. This work will be of utility to those faced with restoring and managing remnant southeastern prairies and grasslands and to the general understanding of positive feedbacks in fire-prone ecosystems.

Vidrine, Malcolm[1]#*, Charles Allen[2], Marc Pastorek[3], Peter Loos[4], Gail Barton[5], Jameel Al-Dujaili[6] and Domingo Jariel[6]; *The Cajun Prairie Gardens: A Model Landscape for Rural Homes*

[1] Department of Sciences and Mathematics, Louisiana State University Eunice, P. O. Box 1129, Eunice, LA 70535, and The Cajun Prairie Gardens, 1932 Fournerat Road, Eunice, LA 70535
[2] Colorado State University, Fort Polk Station, 1647 23rd St., Fort Polk, LA 71459
[3] Meadowmakers, , 72322 Ingram Street, Covington, LA 70435
[4] Ecovirons, Chireno, TX 75937
[5] Yardflower, Meridian, MS 39304
[6] Department of Sciences and Mathematics, Louisiana State University Eunice, P. O. Box 1129, Eunice, LA 70535
*Corresponding author contact: 337-550-1245 malcolmvidrine@yahoo.com

The Cajun Prairie Gardens in Eunice, Louisiana were established in 1996 in mowed lawn through a regimen of burning and seeding with native, hand-collected seeds from remnant prairies along railroad rights-of-way and from the Cajun Prairie Restoration Project in Eunice, Louisiana. The 1.0 hectare (2.5 acre) plot with a dozen subplots was enhanced by plugging with selected sod plugs and specific plantings of plant varieties, thus providing a resulting mix of more than 250 species of native plants. The site underwent 1.5 decades of ecological succession and currently appears very similar to native prairies. The gardens provide habitat for birds, butterflies, dragonflies and a myriad of insect pollinators. Smaller gardens (20' x 20') and larger gardens (100' x 150') are developed in both wet

and dry areas. An emphasis was placed upon growing as many available varieties as could be found for various native prairie species, including varieties with differing colors and growth habits. It is a biodiversity garden based upon native prairie. The Gardens are owned and maintained by Malcolm and Gail Vidrine under the auspices of a Limited Liability Company (L. L. C.). The gardens provide a variety of possible landscapes available for rural homes and yards.

Vidrine, Malcolm[1]#*, Charles Allen[2], Marc Pastorek[3], Peter Loos[4], Gail Barton[5] and Bruno Borsari[6];
The Cajun Prairie Restoration Project in Eunice, Louisiana: An Update on the Progress of the Project

[1] Department of Sciences and Mathematics, Louisiana State University Eunice, P. O. Box 1129, Eunice, LA 70535, and The Cajun Prairie Gardens, 1932 Fournerat Road, Eunice, LA 70535
[2] Colorado State University, Fort Polk Station, 1647 23rd St., Fort Polk, LA 71459
[3] Meadowmakers, , 72322 Ingram Street, Covington, LA 70435
[4] Ecovirons, Chireno, TX 75937
[5] Yardflower, Meridian, MS 39304
[6] Department of Biology, Winona State University, Winona, MN 55987
*Corresponding author contact: 337-550-1245 malcolmvidrine@yahoo.com

The Cajun Prairie Restoration Project in Eunice, Louisiana was established in 1988 on a railroad right-of-way in town previously grown over with exotic grasses. The recreation of prairie followed a regimen of herbiciding, plowing and seeding with native, hand-collected seeds from remnant prairies along railroad rights-of-way. The 4.0 hectare (10 acre) plot was enhanced by plugging with selected sod plugs from the same remnant prairie rights-of-way, thus providing a resulting mix of more than 200 species of native plants. The site underwent 2 decades of ecological succession and currently appears very similar to native prairie remnants. The primary maintenance was an annual burn. Extensive tree control was necessary in wetter areas. The site is administered by a non-profit organization (The Cajun Prairie Habitat Preservation Society) and serves as the source for seeds for other restoration projects. It is an excellent outdoor classroom equipped with a covered pavilion with a table and benches and paved, handicap-accessible trails and a paved parking lot. The project is a model for similar civic-oriented, nature-centered efforts to bring local ecosystems into park-like presentations.

Witsell, C. Theo*#, Thomas L. Foti, and Brent T. Baker; *Floristic Inventory of Tallgrass Prairie Remnants in the Grand Prairie Region of the Mississippi Alluvial Plain: A Baseline for Restoration Efforts*

Arkansas Natural Heritage Commission, 1500 Tower Building, 323 Center St., Little Rock, AR 72201
*Corresponding author contact: 501-324-9615, theo@arkansasheritage.org

The Grand Prairie Region of the Mississippi Alluvial Plain in east-central Arkansas covers approximately 900,000 acres, of which approximately 400,000 acres were open grassland at the time of Euro-American settlement. This stands in stark contrast to the surrounding Mississippi Alluvial Plain which was covered primarily by bottomland hardwood forests. The region is now largely converted to agricultural production and ecological processes that occurred historically (e.g., fire) are impaired. Approximately 450 acres of unplowed prairie remain in widely scattered remnants of varying quality, a loss of nearly 99.9%, making this one of the most highly degraded ecosystems in North America. Despite knowledge of the area by botanists for nearly two centuries, no intensive floristic inventory of prairie remnants in the Grand Prairie has ever been undertaken. The current work was conducted from 2000-2011 and relied on extensive field work as well as inventory of specimens

in state and regional herbaria. The authors' collections focused on protected prairie remnants in the area but also covered selected roadsides, ditches, and other areas where prairie flora has persisted. More than 600 taxa of vascular plants were documented from remnant prairies and associated woodlands and wetlands in the region. This total includes 75 non-native taxa and 30 taxa tracked as state elements of conservation concern. These data provide the best available baseline for ecological restoration work in the region, which is gaining interest and support with several projects ongoing. A summary of this research will be presented along with an overview of the flora, geomorphology and ecology of the region.

Witsell, C. Theo*#, William C. Holimon, Jennifer Akin, Bryan Rupar, and Thomas L. Foti; *Re-open for Business: Prairie, Glade, Woodland, and Other Open Habitat Restoration Projects on State Natural Areas in Arkansas*

Arkansas Natural Heritage Commission, 1500 Tower Building, 323 Center St., Little Rock, AR 72201
Corresponding author contact: 501-324-9615, theo@arkansasheritage.org

Naturally open habitats with an intact native herbaceous ground flora have declined dramatically in Arkansas since the time of European settlement. This has resulted in a corresponding decline in plant and animal species dependent on these habitats. The Arkansas Natural Heritage Commission has been active over the past decade in working to restore prairies, glades, open woodlands, savannas and other historically open habitats on appropriate sites throughout its System of Natural Areas. Management at these sites has consisted of a combination of prescribed fire, cedar removal, midstory thinning, herbicide application, "grinding" with timber mulching equipment and selective logging to create a more open structure and reduce leaf litter and duff on the ground. Ongoing projects include shale barrens and woodland restoration at Middle Fork Barrens Natural Area in the Ouachita Mountains; blackland prairie and woodland restoration at Terre Noire and Saratoga Prairie Natural Areas in the Gulf Coastal Plain; dolomite glade, woodland, and fen restoration at Rock Creek Natural Area in the Ozark Plateau; and loblolly pine flatwoods/savanna and saline barrens restoration at Pine City and Warren Prairie Natural Areas, in the Mississippi Alluvial Plain and Gulf Coastal Plain respectively. A summary of successful management techniques, use of various types of equipment and successful funding strategies will be discussed. Pre- and post-management photo points and plant community monitoring data will also be presented.

Vander Yacht, Andy [1]*#, Seth Barrioz[2], Pat Keyser[1], Craig Harper[1], Dave Buckley[1], and Roger Applegate[3]; *Groundcover Response to Canopy Disturbances and Spring/Fall Burns During Oak Woodland and Savanna Restoration*

[1] Center for Native Grasslands Management, University of Tennessee, 2431 Joe Johnson Dr., Rm 274, Knoxville, TN 37996-4563
[2] Missouri Department of Conservation, USDA-Marshall, 704 N. Miami, Marshall, MO, 65340
[3] Small Game Coordinator, Tennessee Wildlife Resources Agency, Ellington Agricultural Center, PO Box 40747, Nashville, TN 37204
*Corresponding author contact: avandery@utk.edu

Oak woodland and savannas in the South have declined dramatically due, in part, to fire suppression and subsequent successional advance. Restoration of these imperiled ecosystems requires re-establishment and maintenance of diverse ground-layer vegetation. We evaluated groundcover response, including herbaceous species richness and diversity, to 5 treatments allocated in 20-ha

experimental units under a CRD: a factorial combination of fall fire (FallF), spring fire (SpgF), light thinning (LT, 14 m2/ha residual basal area), heavy thinning (HT, 7 m2/ha), plus an unmanaged control. Our study area was located on the Cumberland Plateau in Tennessee. We monitored groundcover at 1-m intervals using 50-meter point-intercept transects (n = 15/stand/year) during 2008-2011; timber harvests were completed in September 2008 and prescribed fires on October 11, 2010 (FallF) and March 22, 2011 (SpgF). Overstory thinning level had a strong influence on ground-layer after the second growing season post-disturbance. Fire effects the first growing-season post-disturbance appeared to have less impact than thinning on key metrics. Combined across both burning treatments, grass cover increased from 1.8% ±0.53 (SE) to 17.4% ±1.83 and forbs from 0.4% ±0.20 to 11.9% ±1.42 while litter declined from 56.2% ±2.91 to 15.9% ±1.48 for control versus HT in 2011. Woody vegetation cover increased more between control and LT than between LT and HT across fire treatments (Control, 34.1% ±2.60; LT, 46.5% ±2.1; HT, 51.3% ±2.37). Herbaceous species richness increased more than 8-fold (from 0.7±0.16 to 5.8±0.46) and diversity more than 3-fold (from 1.2±0.09 to 4.4±0.32) when comparing control and HT in 2011 across fire treatments. Additional results and overall project direction will be presented. Our research includes additional sites and is designed to identify the most efficient management techniques for restoring healthy oak woodlands and savannas, including robust, native ground-layer vegetation.

Steering Committee

Scott Edwards – MS Dept. of Wildlife, Fisheries, & Parks

John Gruchy – MS Dept. of Wildlife, Fisheries, & Parks

Laura Andrews – Mississippi State University

JoVonn Hill – Mississippi State University

James Martin – Mississippi State University

Sam Riffell – Mississippi State University

Jeffery Lee – US Fish & Wildlife Service

Daniel Coggin – Wildlife Mississippi

Stephen Gruchy – Wildlife Mississippi