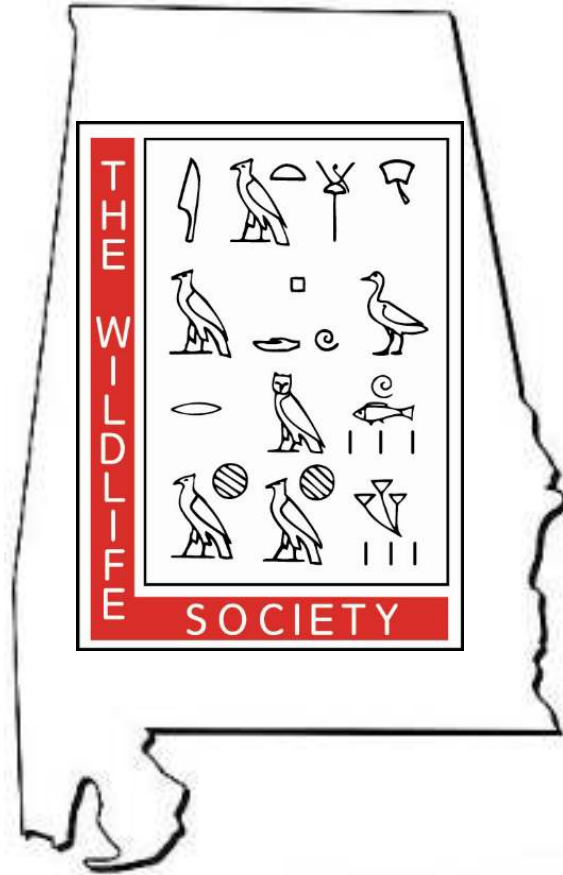


**Alabama Chapter of the Wildlife Society  
Annual Meeting  
April 14-15, 2016**



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**Alabama Chapter of the Wildlife Society  
2016 Annual Meeting  
April 14-15, 2016  
Solon Dixon Forestry Education Center**

**Day 1**

**April 14, 2016**

**Gjerstad-Johnson Longleaf Auditorium**

**TWS Certified Wildlife Biologist Renewal – Professional Development Program**

**Category I. Organized Activities (5 contact hours)**

- |               |  |
|---------------|--|
| 12:00-5:00 PM | Registration   |
| 12:00-1:00 PM | Alabama Permits, Regulations, Certification, Benji Elmore Alabama Forestry Commission  |
|               | Introduction to Prescribed Burn Manager Certification, John Stivers, Alabama Prescribed Fire Council   |
| 1:00-3:00 PM  | Burn Regimes on the Solon Dixon Center, Joel Martin & John Gilbert   |
| 3:00-5:00 PM  | Conecuh National Forest - Burn Planning, Wildlife Considerations & Tools of the Trade, Steve Johnson, Mary Owen and Ryan Shurette, US Forest Service |
| 5:00 PM       | Adjourn ( <i>Dinner 5-6 PM on your own or pre-paid on site</i> )   |
| 6:00 PM       | Informal Social at Solon Dixon Center  |
| 7:00 PM       | Scouting for Herps – Frog Walk with Stiles and Bailey – Meet in parking lot adjacent to Dining Hall  |

**Day 2**

**April 15, 2016**

**Gjerstad-Johnson Longleaf Auditorium**

**Technical Presentations**

**Category I. Organized Activities (5 contact hours)**

- |                |  |
|----------------|--|
| 6:00 - 7:00 AM | Rise and Shine with the Birds – Bird Walk with Soehren – Meet in parking lot adjacent to Dining Hall |
|                | <i>(Breakfast 7-8 AM on your own or pre-paid on site)</i>  |
| 8:00 – 8:30 AM | Registration   |
| 8:30 – 8:40 AM | Welcome and Housekeeping<br>Wes Stone, ACTWS Chapter President                                       |
| 8:40 – 9:00 AM | Solon Dixon Forestry Education Center<br>Joel Martin   |

9:00 – 10:30 AM Agency and Organizations Updates (10 minutes each)

Alabama Wildlife Federation  
Department of Defense  
Alabama Power Company  
US Forest Service  
Natural Resources Conservation Service  
USDA APHIS, Wildlife Services  
US Fish and Wildlife Service  
USGS Alabama Cooperative Fish & Wildlife Research Unit  
Alabama DCNR, Wildlife and Freshwater Fisheries  
Alabama DCNR, State Lands  
National Wild Turkey Federation  
Southeast Section of The Wildlife Society  
Alabama A&M University  
Alabama Bat Working Group

10:30 – 10:50 AM *Break/Poster Session*

### **Invited Speakers Special Session – Wildlife Responses to Prescribed Fire**

10:50 – 11:15 AM Pining for the Firebird, Theron Terhune, Tall Timbers Research Station & Land Conservancy

11:15 -11:40 AM Restoration of Wildlife Assemblages in Fire-suppressed Longleaf Pine Sandhills, David Steen, Auburn University

### **Technical Presentations**

11:40 – 11:55 AM Effects of Prescribed Fire on Herpetofauna: Two Alabama Studies, Jimmy Stiles

11:55 – 12:10 PM Effects of Door Width on Wild Pig Entrance into Traps, Matthew George\*

12:10 – 12:25 PM Conservation Status in Alabama of the Gopher Frog *Lithobates sevosus* and *L. capito*, Mark Bailey

12:25 – 1:25 PM *Lunch in the Dining Hall (provided)*

1:25 – 1:40 PM Patch and Landscape Characteristics Affect Susceptibility of White-tailed Deer Fawns to Coyote Predation, William Gulsby

1:40 – 1:55 PM Refuge Usage of the Flattened Musk Turtle (*Sternotherus depressus*) in Two Small Rivers, Joseph Jenkins\*

1:55 – 2:10 PM	Tools for Science-Based Management of Game and Non-game Wildlife, Barry Grand
2:10 – 2:25 PM	Movement of Green Salamanders ( <i>Aneides aeneus</i> ) in Northern Alabama, Rebecca John*
2:25 – 2:40 PM	Multi-Scale Habitat Features Affecting Grassland Vertebrate Occupancy in the East Gulf Coastal Plain, K.W. Ryer*
2:40 – 3:00 PM	<i>Break/Poster Session</i>
3:00 – 4:00 PM	Agency and Organizations Updates Continued (10 minutes each)
4:00 – 5:00 PM	Business Meeting
5:00 PM	Adjourn

\*Student Presentation

**POSTER PRESENTATIONS – Available during AM and PM breaks in the Classroom – Solon & Martha Dixon Foundation Learning Center**

## Oral Presentation Abstracts

### Pining for the Firebird

**Theron Terhune**, Game Bird Program Director, Tall Timbers Research Station and Land Conservancy, 13093 Henry Beadel Drive, Tallahassee, FL 32312, [theron@ttrs.org](mailto:theron@ttrs.org)

**Abstract:** Bobwhites remain the premiere game bird in the Red Hills and Albany areas as well as in Alabama and South Carolina. Thanks to dedicated land stewardship and application of the latest management techniques cultured from cutting-edge research bobwhite populations also are at historically high levels in the Red Hills and Albany regions. However, elsewhere this bird and its habitats are in serious trouble. Across their range bobwhite populations are only a small fraction of what they were just 40 years ago. The precipitous declines are due to changes in land use and the reduction of frequent prescribed fire on the landscape. Approximately 1 million and 2 million acres are burned annually in Georgia and Florida, respectively, with nearly 40% of those acres occurring in the Red Hills and Albany regions. In Georgia and Florida, about 7 million wild bobwhites were harvested annually in the 1960s whereas fewer than 100,000 are harvested today. Consequently, today's bobwhite densities in much of the Southeast are well below 1 bird per 30 acres whereas in the Red Hills and Albany areas the average density is >1.25 birds per acre. Focused management is required to maintain and restore bobwhite populations. Creating suitable habitat for sustaining bobwhites results in vegetative conditions profiting a large number of declining species, including birds, reptiles, amphibians, and plants. This is a major reason why quail lands across the southeast often are a bastion for conservation of threatened species on private lands. Considering that over 1 million acres are managed for bobwhites on private lands in the Southeast alone, there is considerable conservation value provided for such a management focus. As such, given the socio-economic importance of bobwhite to our area and its conservation value regionally, the Game Bird Program at Tall Timbers conducts a wide variety of research on projects to develop best management practices for bobwhites and grassland bird obligates. In this seminar, I will provide a brief overview of the Game Bird Program and focus in on current research projects to illustrate how the proper application of fire is key to maintaining and restoring a waning species.

### Restoration of Wildlife Assemblages in Fire-suppressed Longleaf Pine Sandhills

**David A. Steen**, Department of Biological Sciences, 1090 South Donahue Drive, Auburn University, AL 36849 [David.Steen@auburn.edu](mailto:David.Steen@auburn.edu).

**Abstract:** Fire surrogates and prescribed burning have been suggested as potential management strategies to restore fire-suppressed and hardwood-invaded longleaf pine forests; due to the unique effects of fire, it is generally suggested that prescribed burning should follow application of any hardwood removal treatment. To determine whether fire surrogates followed by prescribed burning affected wildlife populations and assemblages, we sampled for birds and reptiles within 20 experimental sites and six reference sites. Following initial treatment, all sites experienced over a decade of prescribed burning on an approximately two-year interval. Over the long-term, application of herbicide followed by prescribed burning was the only method that restored bird assemblages to the reference condition; however occupancy probabilities for longleaf pine specialists on all treatment sites became indistinguishable from those on reference sites by the conclusion of the study. Reptile assemblages at all sites became indistinguishable from those on reference sites over the long term except for assemblages on sites treated with herbicide, suggesting herbicide application was relatively ineffective at restoring reptile assemblages. A mark-recapture study of the six-lined racerunner (*Aspidoscelis sexlineatus*) also identified prescribed burning alone as an effective management strategy. Overall, effective restoration of wildlife

populations and assemblages in fire-suppressed longleaf pine sandhills was achieved and prescribed burning over approximately a decade was generally sufficient to achieve this result; fire surrogates did not provide a substantial benefit over the long-term.

### **Effects of Prescribed Fire on Herpetofauna: Two Alabama Studies**

**Jimmy Stiles**, Alabama Natural Heritage Program, 1090 South Donahue Drive  
Auburn, AL 36849 [stileja@auburn.edu](mailto:stileja@auburn.edu).

**Abstract:** The longleaf ecosystem contains more imperiled species of terrestrial reptiles and amphibians than any other system in Alabama. There have been several studies on how prescribed fire effects reptile and amphibian diversity in Alabama. Two of these studies further our knowledge of how fire and management activities effect species diversity, specifically in regards to species that are adapted to longleaf pine ecosystems. One study conducted at the Solon Dixon Forestry Center in the lower coastal plain focuses on the use of fire, herbicide, thinning, and mechanical midstory removal to manage longleaf systems. The other study conducted on the Oakmulgee district of the Talladega National Forest in the upper coastal plain examines how time since last burn affects diversity. Together these two studies reveal valuable information regarding how fire in concert with other forestry management practices can shape the landscape to benefit species that have specific habitat needs. Also, they show how, not just fire, but the frequency of the fire return interval can play an important role in providing habitats for some of Alabama's vulnerable species.

### **Effects of Door Width on Wild Pig Entrance into Traps**

**Matthew J. George**, School of Forestry and Wildlife Sciences, 3301 Forestry and Wildlife Sciences Building, Auburn University, AL 36849 [mjg0026@auburn.edu](mailto:mjg0026@auburn.edu)

**Mark D. Smith**, School of Forestry and Wildlife Sciences, 3301 Forestry and Wildlife Sciences Building, Auburn University, AL 36849

**Dana K. Johnson**, USDA Wildlife Services, 602 Duncan Drive, Auburn University, AL 36849

**Abstract:** Trapping is often the most cost- and time-effective means for managing local wild pigs (*Sus scrofa*) populations. Several studies examined the effects of trap type, trap door designs, and baits on trapping success; however, no studies have examined the effects of trap door width on wild pig entrance into corral style traps. Our objective was to determine entry rates of wild pigs into standard 3-panel corral traps with wooden guillotine trap doors with 0.81- or 1.22-meter wide openings. We placed these doors on 12 traps at 2 study areas in east-central Alabama and monitored wild pig behavior using a motion-sensitive triggered game camera at each trap from June-September of 2014 and 2015. We recorded the time when wild pigs initially visited the trap site until the first pig entered the trap, frequency and duration of subsequent visits to the trap, approximate age of individuals who first entered the trap, and the maximum number of pigs within the trap at any time during a visit. We used camera imagery data collected from 25 boars and 47 sounders to determine the effect of door width on the frequency that wild pigs enter into corral traps. Time until first entry for sounders did not differ between 0.81-meter (mean = 0.7 days) and 1.22-meter door (mean = 3.3 days;  $P = 0.624$ ) widths. Likewise, time of first entry was similar for boars. Our results suggest door width may not have as large of an impact of entrance rates into traps as previously thought.

## **Conservation Status in Alabama of the Gopher Frogs *Lithobates sevosus* and *L. capito***

**Mark A. Bailey**, Conservation Southeast Inc., Andalusia, AL 36420  
[mbailey@conservationsoutheast.com](mailto:mbailey@conservationsoutheast.com)

**Abstract:** Gopher frogs have been reported from 11 populations in eight Alabama counties. A century-old Mobile County literature record is all that exists for what is presumably the endangered Dusky Gopher Frog (*Lithobates sevosus*), and the species may be extirpated in the state. The Gopher Frog (*L. capito*) is known from 11 populations (Baldwin 1; Barbour 1; Covington 4; Escambia 3, and Shelby 2). Most have been lost to habitat destruction. The Baldwin and Barbour county records are over 40 years old and the only known Shelby County breeding site was destroyed 20 years ago. Only the Covington County population that has multiple breeding sites in Conecuh National Forest is known to be extant. Three other populations on private land, one in Covington County and two in Escambia County, are probably extant. Management has not traditionally taken the frogs' needs into consideration. Winter and early spring burning when migrating animals are at the surface may have impacted populations on lands otherwise managed for conservation. A concerted effort to document and protect any undiscovered populations is needed, and some work has been done using remote imagery to identify potential breeding wetlands in suitable habitat. Additional unknown populations of one or both species most likely still exist, but their discovery is complicated by property access limitations and continued habitat loss on private lands.

## **Patch and Landscape Characteristics Affect Susceptibility of White-tailed Deer Fawns to Coyote Predation**

**William D. Gulsby**, School of Forestry and Wildlife Sciences, 2331 Forestry and Wildlife Sciences, Auburn University, AL 36849 [wdg0010@auburn.edu](mailto:wdg0010@auburn.edu)

**John C. Kilgo**, USDA Forest Service, Southern Research Station, P.O. Box 700, New Ellenton, SC 29809

**Mark Vukovich**, USDA Forest Service, Southern Research Station, P.O. Box 700, New Ellenton, SC 29809

**James A. Martin**, Warnell School of Forestry and Natural Resources, University of Georgia, Athens, GA 30602

**Abstract:** Several management strategies, including habitat manipulation, have been recommended or implemented to reduce coyote predation on white-tailed deer fawns throughout the Southeast. Habitat conditions are important in predator/prey interactions among a variety of species, but the role of habitat in coyote predation on fawns in the Southeast is underexplored. We used cause-specific fawn mortality data collected in the Upper Coastal Plain of western South Carolina to determine the effects of patch and landscape characteristics on hazard ratios for a sample of 165 fawns captured immediately after birth. Hazard ratios increased as total edge in fawn home ranges decreased, and as mean patch size and mean forest patch size in fawn home ranges increased. Specifically, fawns with the least amount of edge in their home ranges were 2.23 times more likely to be killed by coyotes than fawns with the greatest amount of edge in their home range. Fawns with the greatest mean forest patch size were 1.6 times more likely to be killed by coyotes than fawns with the least mean forest patch size. Finally, fawns with the greatest mean overall patch size were 1.86 times more likely to be killed by coyotes than fawns with the least mean overall patch size. These results suggest managing habitat to increase heterogeneity in patch types and decreasing mean patch sizes may decrease coyote-induced fawn mortality in some areas.

## **Refuge Usage of the Flattened Musk Turtle (*Sternotherus depressus*) in Two Small Rivers**

**A. Joseph Jenkins**, Alabama Natural Heritage Program, Department of Biological Sciences, 1090 South Donahue Drive, Auburn University, AL 36849 [ajj0012@auburn.edu](mailto:ajj0012@auburn.edu).

**Abstract:** The Flattened Musk Turtle (*Sternotherus depressus*) is reliant on refuges for protection and hibernation. However, little has been published focusing on this key aspect of its natural history. Using radio telemetry, we followed 33 individuals in two small rivers (Sipsey Fork and Brushy Creek) in Bankhead National Forest. Refuge type was recorded for 654 observations from June of 2013 to August of 2014. At a site on Sipsey Fork, *S. depressus* was found to use crevices ( $p < .001$ ) and logs ( $p < .001$ ) significantly more than expected from refuge availability transect data. We discovered a strong correlation ( $p < .001$ ) between refuge usage diversity and the time scale of this study with diversity increasing in April and May, peaking in June, and decreasing as time progressed into the winter months. This supports our hypothesis that *S. depressus* is less particular about refuges in late spring and early summer, during increased reproductive and foraging efforts, than in the rest of the year. Turtles were also found to use crevices significantly more ( $p < .001$ ) in low activity and hibernation months than months of high activity. Rocks ( $p < .001$ ) and logs ( $p < .001$ ) were used significantly less during low activity and hibernation months. Loss of suitable habitat due to siltation filling in the preferred refuges of *S. depressus* is often cited as the species' greatest threat and the foremost cause for decline and extirpation across its range. Our study quantifies important aspects of refuge use in *S. depressus* that were previously anecdotal observations.

## **Tools for science-based management of game and non-game wildlife**

**James B. Grand**, U.S. Geological Survey, Alabama Cooperative Fish and Wildlife Research Unit, 3301 Forestry and Wildlife Sciences, Auburn University, AL 36849 [grandjb@auburn.edu](mailto:grandjb@auburn.edu).

**Amy L. Silvano**, Auburn University, Alabama Cooperative Fish and Wildlife Research Unit, , 3301 Forestry and Wildlife Sciences, Auburn University, AL 36849

**Abstract:** Since 2008, the Alabama Cooperative Fish and Wildlife Research Unit has been working closely with the Wildlife Section of the Alabama Department of Conservation and Natural Resources to develop decision analytic tools for the management of game and nongame species. In each case, a committee of ADCNR biologists, AU researchers, and graduate students was convened to employ a structured approach to addressing management problems. In each project, we started by defining the management problems to be addressed, the desired outcomes (objectives), a number of management alternatives for meeting objectives, and a model to predict the consequences of each alternative. The value of outcomes from alternatives were based on tradeoffs among biological objectives, and sometimes satisfaction of end users or cost. Often our efforts led to applied research intended to reduce uncertainty in expected outcomes. In this presentation, we will provide an overview of these projects with examples from harvest management for white-tailed deer (*Odocoileus virginianus*) and eastern wild turkeys (*Meleagris gallapavo sylvestris*) and the selection of project portfolios for State Wildlife Grants.



## **Movement of Green Salamanders (*Aneides aeneus*) in Northern Alabama**

**Rebecca R. John and Robert A. Gitzen**, School of Forestry and Wildlife Sciences, 602 Duncan Drive, Auburn University, AL 36849 [rrj0007@auburn.edu](mailto:rrj0007@auburn.edu)

**Abstract:** Green salamander (*Aneides aeneus*) have suffered localized declines over the past several decades resulting in increased conservation concern. This salamander is associated with rock outcrops buffered by mixed hardwood forest cover throughout the Appalachians. Taxonomy and morphology suggest that the species is highly mobile. However, limited studies have looked at movement patterns, critical for developing effective management plans for habitat and surrounding areas. To begin addressing this information gap, we examined nightly movement patterns at study sites in the W. B. Bankhead National Forest in northern Alabama between March-June 2015. Our objectives were to 1) quantify nightly movement patterns of male and female green salamanders and 2) determine rock crevice refugia and outcrop fidelity. Thirty three green salamanders were tracked with a harmless fluorescent powder, which is commonly used in movement studies, allowing us to follow individual salamanders. Both sexes exhibited extremely variable overnight distances with males moving on average 509 cm (SD 475 cm, n=19) and females moving on average 461 cm (SD 406 cm, n=14). Movement distances were not correlated with temperature, humidity, or size or differ by sex significantly. Evidence of fidelity to rock outcrop was present, but not necessarily to individual crevice refuge which supports the idea that these salamanders are territorial. With no previous movement studies on green salamanders, these results are novel scientific information for the species and other terrestrial salamanders. This study will continue in 2016 to increase the understanding of movement patterns, with additional work looking at gene flow among local populations.

## **Multi-Scale habitat features Affecting Grassland Vertebrate Occupancy in the East Gulf Coastal Plain**

**K. W. Ryer**, Alabama Cooperative Fish and Wildlife Research Unit, School of Forestry and Wildlife Sciences, Auburn University, Auburn, AL 36849 [kwr0005@auburn.edu](mailto:kwr0005@auburn.edu).

**Abstract:** Native grasslands have been almost entirely removed from the landscape in the southeastern United States and currently only a small percentage of grassland patches still remain. The Gulf Coastal Plains and Ozarks Landscape Conservation Cooperative (GCPO LCC) has made restoration of grassland for wildlife conservation a priority. The goal for this study is to provide the GCPO LCC with local and broad-scale habitat associations of grassland vertebrates that will help identify sites for grassland restoration to improve squamate, amphibian, and small mammal occurrence in the GCPO land area. We conducted repeated vertebrate surveys at 57 public and private sites throughout the East Gulf Coastal Plain (EGCP) from April – June 2015. Visual encounter surveys and track plates were used to detect vertebrate species at each site. Local-scale vegetation conditions were measured at all 57 sites. Broad-scale land cover data was compiled from the 2011 National Land Cover Database. We used 5 different spatial extents (200 m, 500 m, 1 km, 3 km, and 5 km) to analyze land cover type proportions around the 57 sites. We performed occupancy modeling for two small mammal species, the hispid cotton rat and oldfield mouse. We found that the hispid cotton rat was positively associated with woody wetlands in the surrounding landscape. Oldfield mouse occupancy was positively associated with mixed forests. Local-scale vegetation conditions were determined not to affect occupancy of both species. Selecting grassland restoration sites near woody wetlands could positively influence the occurrence of the hispid cotton rat in the Gulf Coastal Plain.

## Poster Presentation Abstracts

\* after poster title indicates student poster presentation

### Mesocarnivore Occupancy in the Talladega National Forest\*

**Zachariah Bell, William Cornelison, Austin Kirkland, Dr. Andrew Edelman**, University of West Georgia, 1601 Maple Street Carrollton, Ga 30118, [zbell1@my.westga.edu](mailto:zbell1@my.westga.edu)

**Abstract:** Longleaf pine, *Pinus palustris*, is a fire-adapted ecosystem that was once widely distributed in the southeastern United States. Today it covers less than 5% of its original range due to fire suppression and logging practices. In order to restore montane longleaf the Talladega National Forest in Alabama is utilizing prescribed fire management and thinning techniques. We used remote camera traps to estimate occupancy of mesocarnivores on different prescribed fire management plots within the Talladega National Forest. We sampled plots in four types prescribed fire intervals: 2-3 year, 3-8 year, 8-12 year, and plots with no recent burning. In total 48 plots were trapped with two camera stations on each plot. Camera traps were left on site for two weeks. Presence and absence data along with habitat variables were then used to develop occupancy models of the species. The main species recorded at camera traps were opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), gray fox (*Urocyon cinereoargenteus*), spotted skunk (*Spilogale putorius*), striped skunk (*Mephitis mephitis*), Coyote (*Canis latrans*), and bobcat (*Lynx rufus*). Results indicate that overall species richness was higher on wilderness plots, however occurrence of individual species on different plot types was highly variable. We recommend that a mosaic of management regimes continue to be implemented in this ecosystem to provide a range of habitats.

### What's Above When Living Below? A Look at Habitat Use of the Southeastern Pocket Gopher\*

**Mary E. Bennett<sup>1</sup>**, Robert Gitzen<sup>1</sup>, and Michael Barbour<sup>2</sup>

<sup>1</sup>School of Forestry and Wildlife Sciences, 3301 Forestry and Wildlife Sciences, Auburn University, AL 36849 [meb0083@auburn.edu](mailto:meb0083@auburn.edu)

<sup>2</sup>Alabama Natural Heritage Program, Auburn University Museum of Natural History, 1090 South Donahue Drive, Auburn, AL, 36849

**Abstract:** The southeastern pocket gopher (SEPG; *Geomys pinetis*) is an important ecosystem engineer native to southeast Alabama, southern Georgia, and Florida. In Alabama, the SEPG is of high conservation concern due to its limited distribution, conversion of suitable open pine habitat, and current absence from areas of restored habitat. The Barbour Wildlife Management Area and Wehle Forever Wild Tract in southeast Alabama, support significant populations of the SEPG, and make up an important conservation landscape for the species. In summer 2015, we measured habitat attributes of 62 occupied and 62 random sites in two portions of this landscape, with additional broad scale sampling planned for 2016. We identified areas used by SEPGs based on managers' reports and a survey of the landscape for evidence of pocket gopher mounds in GoogleEarth® imagery. Initial field observations indicated that a majority of SEPG mounds occurred within areas of open pine habitat that contained mixed shrub and forb/grass patches and some areas of recent longleaf pine restoration. Replanted, clear cut areas with dense shrub cover, as well as clear cut areas with altered non-woody vegetation, appeared to be less suitable for SEPGs. Preliminary analysis indicates an interaction between habitat selection and location within the study area which may correspond to variation in the availability of suitable habitat within each location. Additional work will help to identify specific habitat requirements for the SEPG, as well as provide management recommendations for increasing suitable habitat in this landscape and elsewhere in southern Alabama.

## **Home Range Size of *Spilogale putorius* in Talladega National Forest, Alabama\***

**William Cornelison**, Department of Biology, University of West Georgia, Carrollton, GA 30118  
[wcornell1@my.westga.edu](mailto:wcornell1@my.westga.edu).

**Abstract:** Due to a lack of ecological knowledge and an observed decline in abundance, Alabama has classified eastern spotted skunks as a state protected species of high conservation concern. Our objective is to conduct a telemetry-based study of eastern spotted skunks in Talladega National Forest, Alabama in order to provide knowledge of habitat use and home range size. To date 4 individuals equipped with radio collars have been monitored through the autumn season of 2015, and 3 individuals have been monitored through the winter season of 2015-16. We have constructed minimum convex polygons for the seasonal home ranges of each collared individual, and overlaid it with rough stand age and fire frequency data provided by the U.S. Forest Service in Talladega National Forest, Alabama. The average fall home range size was 61.4ha and ranged from 48.5ha to 81.8ha. The average winter home range size was 35.1ha and ranged from 26.4ha to 52.1ha. Live trapping is ongoing with the goal of collaring 10-20 individuals. Future analysis will examine spotted skunk habitat selection at individual home ranges, and usage within home range components. This detailed assessment of home range size and habitat selection will provide essential data for the development of a management plan for eastern spotted skunks in Alabama, and will assist in the creation of conservation strategies that may reverse the decline of populations in the region and eventually reestablish eastern spotted skunks as a furbearer species within the state.

## **New American Pygmy Shrew Records from the Bankhead National Forest in Lawrence County, AL**

**Helen A. Czech<sup>1</sup>, Allison A. Bohlman<sup>1</sup>, William B. Sutton<sup>2</sup>, and William E. Stone<sup>1</sup>**. Department of Biological and Environmental Sciences, 100 Drake Drive, ARC Building Room 101, Alabama A&M University, Normal, AL 35762; <sup>2</sup>Department of Agricultural and Environmental Sciences, 202G Farrell-Westbrook Building, Tennessee State University, Nashville, TN 37209 [helen.czech@aamu.edu](mailto:helen.czech@aamu.edu)

**Abstract:** The American Pygmy Shrew is found from Alaska to eastern Canada, with populations in the Northeast, Midwest and southern Appalachian regions of the United States. Despite a wide geographic range, it remains one of North America's most obscure mammals and at the southernmost periphery of its distribution, it is considered rare and poorly understood. In Alabama it is known only from Jackson County, and is considered a species of High Conservation Concern. We conducted pitfall trapping surveys to sample for Pygmy Shrews in Madison County, Alabama from April to October 2015, and in Lawrence County, Alabama from May to July and December 2015. In Madison County, six small mammal species were captured; no Pygmy Shrews were detected. In Lawrence County, one Pygmy Shrew was collected in the Bankhead National Forest from a thinned loblolly pine stand on a three year return interval burn prescription. Additionally, unidentified small mammal specimens stored at Alabama A&M University were examined. We discovered five Pygmy Shrew specimens in a 2008 collection from Lawrence County; four of the five specimens were collected from loblolly pine stands on a three year return interval burn prescription with varied thinning. These new records represent the southernmost records for the species, the first records for the species outside of Jackson County, and the first records in the state from prescribed burned areas. Expanded surveys are planned for the summer of 2016 to help clarify the distribution and habitat use of the Pygmy Shrew in the Bankhead National Forest.

## The Search for Meadow Jumping Mice in East-Central Alabama\*

Duston R. Duffie<sup>1</sup>, Robert A. Gitzen<sup>1</sup>, and Nicholas W. Sharp<sup>2</sup>

<sup>1</sup> School of Forestry and Wildlife Sciences, Auburn University, 602 Duncan Drive, Auburn, AL, 36849, [DRD0006@tigermail.auburn.edu](mailto:DRD0006@tigermail.auburn.edu)

<sup>2</sup> Alabama Department of Conservation and Natural Resources Division of Wildlife and Freshwater Fisheries, 21453 Harris Station Road, Tanner, AL 35671

**Abstract:** The meadow jumping mouse (MJM; *Zapus hudsonius*) is a species of high conservation concern within the state of Alabama due to lack of information about its current range and population size. Our primary objective was to begin assessing the occurrence of MJM in east-central Alabama where it was last documented in 1977. As a secondary objective, we compared the trapping efficiency of Sherman live traps and sooted track tubes. Sites were selected based on historical records and presence of suitable habitat for the species determined from an ArcGIS database and Google Earth imagery. Jumping mice inhabit areas with moist soils and dense cover of predominately herbaceous to shrubby vegetation. Therefore, our study focused on abandoned hayfields and grassy meadows along marshes, ponds, and streams. During summer 2015, 16 sites were sampled with trapping grids that alternated live traps and track tubes among trap stations. We did not capture or detect any MJM. We found no significant difference in trap efficiency between the three most common species (*Sigmodon hispidus*, *Oryzomys palustris*, and *Peromyscus gossypinus*) detected by both trap types. However, track tubes accounted for more overall detections and detected more species than live traps, including shrews, chipmunks, and herpetofauna. Given the sporadic nature of previous MJM captures, it is unknown whether the species has declined in east-central Alabama. For future studies of this species in Alabama, we intend to extend the geographic scale and increase trapping effort to provide further information about the MJM's current population and range throughout Alabama.

## Eastern Indigo Snakes Discriminate Among Prey Odors And Prefer Copperheads.\*

Scott M. Goetz<sup>1\*</sup>, James C. Godwin<sup>2</sup>, Fred Antonio<sup>3</sup> and David A Steen<sup>2</sup>

<sup>1</sup> Department of Biological Sciences, Auburn University, Auburn, Alabama, USA

<sup>2</sup> Alabama Natural Heritage Program, Auburn University Museum of Natural History, Auburn, Alabama, USA

<sup>3</sup> Central Florida Zoo, Sanford, Florida, USA

**Abstract:** Prey records indicate that the Eastern Indigo Snake (*Drymarchon couperi*) is a dietary generalist; however, we know little about diet selectivity of this imperiled species. In this study, we investigated dietary preferences using a sample of neonate Eastern Indigo Snakes (N = 55) from 11 clutches by assaying responses to chemical cues from several potential prey species. Specifically, we explored predatory response to cues from a mammal and representatives of two subfamilies of snakes (Colubrinae and Crotalinae). Snakes were presented with chemical cues of potential prey and preference was assessed using a tongue flick attack score using a repeated-measures design. We found that Eastern Indigo Snakes exhibited a significant overall preference for snakes over house mice (*Mus musculus*;  $P < 0.0001$ ), and a significant preference for Copperheads (*Agkistrodon contortrix*) over Ratsnakes (*Pantherophis spiloides*;  $P < 0.0001$ ). Our results demonstrate prey discrimination in Eastern Indigo Snakes and a preference for ophidian prey. Importantly, our findings indicate crotaline snakes may be a principal dietary component of wild populations. This information increases our understanding of the natural history of Eastern Indigo Snakes, the focus of numerous conservation and repatriation projects.

## **Habitat use and dispersal of neonatal Copperheads (*Crotalinae*; *Agkistrodon*) in a managed southeastern forest landscape.\***

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**Abstract:** Recent studies have identified the neonatal snake cohort as an important dispersal vector in several species. Unfortunately, the comprehensive examination of early-life characteristics in snakes is logistically challenging as a result of ineffective tracking techniques and low detection probabilities in wild populations. In this study, we will examine the activity patterns, overwintering habitat requirements, and survival of gravid female Copperheads (*Agkistrodon contortrix*) and their offspring that inhabit Bankhead National Forest in northern Alabama. Gravid snakes will be implanted with standard radiotransmitters and tracked continuously from early summer until hibernation. In advance of parturition (late August), gravid females will be placed in hardware cloth enclosures at their parturition sites until they give birth. Select neonates >4g will be tracked using harmonic direction finder (HDF) tags, which function by re-emitting incoming radio signals at a harmonic frequency that can be detected by a handheld transceiver and pinpointed using basic telemetry methods. These tags require no batteries, are lightweight (*ca.* 8 mg), and have a detection range appropriate for tracking small organisms. Macro- and microhabitat surveys will be conducted alongside tracking efforts of both age classes throughout the activity season. The simultaneous implementation of these methods will help us draw conclusions concerning vital snake nesting and overwintering habitat, and the variation in habitat use and survival across Copperhead age classes. Further application and development of the HDF system could address queries regarding the ecological role and characteristics of the neonatal snake cohort, and benefit future studies of rare, elusive, or endangered species.

## **Implications of Mid-Rotation Pine Plantation Treatments for Wildlife Habitat and Stand Profitability**

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**Abstract:** Much of the landscape of the Southeast is dominated by natural and planted pine forests, and the area planted in pines is expected to increase. Given the extensive coverage of pine plantations and significance of both timber revenue and wildlife management to many forest owners, balancing timber and wildlife objectives is a common challenge for wildlife biologists, foresters, and both industrial and non-industrial private forest owners. Mid-rotation treatments such as thinning and prescribed fire have important implications for these objectives as they affect both understory vegetation important to wildlife, and net present value (NPV) of the stand. Herein, we present an overview of our proposed research, designed to evaluate the effects of four mid-rotation timber harvest regimes, with and without prescribed fire, on habitat quality for northern bobwhite and white-tailed deer, two popular game species. We will also evaluate the effects of the same treatments on stand NPV. The primary objective of this research is to create an evidence-based decision tool to be used by landowners interested in joint management of pine plantations for financial and wildlife objectives.

## **Ecosystem management and fire ants: how do they interact? \***

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**Abstract:** Introduced in the 1930s, red imported fire ants (RIFA, *Solenopsis invicta*) are an invasive species ostensibly expanding in the face of habitat restoration efforts, especially disturbance-inducing management (e.g., prescribed fire, disking). RIFA provide a model taxa to assess how ecosystem restoration and maintenance may influence invasions. We will investigate how RIFA invasion interacts with habitat management approaches for Northern Bobwhites (*Colinus virginianus*) and subsequently impacts bobwhite nest success. Bobwhites are a ground nesting early-successional species subject to nest predation by RIFA. Prescribed burning is a common practice to promote and restore early-successional habitat for bobwhites, but may also increase RIFA abundance. Other factors such as soil type and proximity of bobwhite nests to RIFA mounds could also influence the impact of RIFA. We will conduct grid surveys on nine properties in the Red Hills region of Georgia and Florida to determine the impact of prescribed burns and soil type on RIFA abundance. Once mounds are located, we will use pit fall traps to determine the range of RIFA activity inside their territories. Artificial and wild bobwhite nests will be monitored to assess whether proximity to a RIFA mound increases the probability of RIFA predation on bobwhite nests. We expect higher RIFA abundance in frequently burned areas, higher RIFA activity in proximity to their mounds, and higher risk of nest predation closer to RIFA mounds. Quantifying these indirect factors that can influence the impact of RIFA on bobwhites will help land managers make informed management decisions for bobwhite conservation.

## **Cultural History of Alabama Wildlife**

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**Abstract:** Museum records and formal scientific accounts are essential, but not always sufficient, to adequately document the historical distribution, abundance, and human traditions associated with wildlife species. Though we know many species of conservation concern, including gopher tortoises, southeastern pocket gophers, eastern diamondback rattlesnakes, and indigo snakes, have declined alarmingly over the last 100 years in Alabama and adjacent states, little historical information on local distribution and abundance within this range is available. Such information does exist, however, in the memories of natural resource professionals and members of non-expert area residents. This kind of firsthand knowledge is a largely untapped source of wildlife information and can be especially valuable for species such as the southeastern pocket gopher, whose presence and relative abundance is often noticeable to observant non-experts. Because of their ties to the community, local non-experts are also likely to possess insider information about the rich cultural traditions associated with human-wildlife interactions that itinerant researchers do not. In this interdisciplinary project involving library, science, and humanities programs at Auburn University, we are interviewing natural resource professionals and knowledgeable

resident non-experts in Alabama and adjacent areas to document observations of past abundance, distributions, and traditions associated with our focal species. The information obtained from these interviews will have immediate use as a wildlife management tool for species of concern. Additionally, the interviews themselves will have lasting value as permanent cultural and ecological artifacts of this unique region and will be made publically available in a digital collection at Auburn University Libraries.

### **Changes in Feral Swine Activity in Response to Prescribed Burning in the William B. Bankhead National Forest, Alabama: Preliminary results.\***

**Patience Knight\***, **Helen Czech**, and **Dr. William E. Stone**. Department of Biological and Environmental Sciences, Alabama A&M University, AL, 35762. [patience.knight@amu.edu](mailto:patience.knight@amu.edu).

**Abstract:** Feral swine are a serious threat to biodiversity, especially in forested and riparian habitats, due to their destructive behaviors and depredation on many native species of plants and wildlife. Since invasive species tend to thrive after habitat disturbance, it is important to explore how forest management activities, such as prescribed burning, affect feral swine distribution and habitat use. I utilized a Distance sampling technique to investigate how feral swine activity in the forest and riparian area is influenced by prescribed burning in the William Bankhead National Forest, AL. I surveyed 1370-m long ( $\pm 10$ m), terrestrial hour-glass line transects to sample 8 prescribed burn forest stands and 9 control forest stands for pig sign (i.e. wallows, rooting, rubs, etc.) before and after burning. The riparian transects, 400-m long line transects within low-order streams, are similarly surveyed for pig sign in those same prescribed burn and control stands. Preliminary results show no significant difference in the abundances or areas affected of pig sign among burns, controls, terrestrial, and riparian transects, due to high variability. However, no pig sign was detected in terrestrial burn stands, while it was detected in 60% of the terrestrial control stands; pig sign was also detected in 60% of riparian control and 50% of riparian burn transects. Further research is certainly necessary for this topic. However, this research may be a useful starting point in informing future feral swine management, if prescribed burning is found to alter feral swine activity in the forest.

### **Amphibian Use of Road Ruts as Breeding Wetlands Located in Upland Hardwood Forests \***

**Lacy E. Rucker\*** and **Yong Wang**, Department of Biological and Environmental Sciences, Alabama A&M University, Normal, AL 35762, and **Callie J. Schweitzer** USDA Forest Service, Southern Research Station, Huntsville, AL 35801.

**Abstract:** Amphibians have been known to use a wide array of temporary and permanent bodies of water as breeding wetlands. The use of road ruts by amphibians as oviposition sites has yet to be fully explored. The purpose of this study was to evaluate road ruts located on a property access road with a wide variety of traffic. Our study site was located in an upland hardwood forest system on the mid-Cumberland Plateau in Grundy County, Tennessee. Road ruts were marked using a GPS unit prior to the 2015 field season, and randomized in Excel. Half of the marked road ruts were sampled during the peak breeding season of 2015 (May-September). Sampling events consisted of opportunistic encounter surveys, visual encounter surveys, hand captures, and dip-net surveys, and were conducted every 6-9 days. Damage for each road rut was delineated into one of five categories before each sampling event with I being little to no damage and VI being severe damage. The maximum length (m), width (m), and depth (mm) were recorded at every sampling event. Morphometric measurements were recorded on all collected individuals. The results of this study will improve our understanding of amphibian breeding in high traffic areas on primitive roads. This information will also provide land managers and private landowners the knowledge to help reduce negative impacts of road rut damage on amphibian populations on the Cumberland Plateau.

## **Population Responses of Small and Medium-sized Mammals in Streamside Forest Buffers to Forest Thinning and Burning Treatments Conducted in Upstream Watersheds.**

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**Abstract:** Quantification of downstream effects of forest management practices is needed to protect water quality and the integrity of ecosystems and wildlife communities in associated aquatic and riparian habitats. We surveyed small and medium sized mammals at nine stream sites using live traps and mist netting during the summers of 2009-2011 following tree thinning and/or prescribed burning treatments conducted in upland pine stands located in upstream watersheds during 2005-2008. Treated watersheds were compared to control sites (no thinning or burning upstream) using One-way ANOVAs for each year. Captured animals were identified, and if mammalian, they were weighed, measured, sexed, marked and released at the site. In 2009 and 2010, white-footed mouse (*Peromyscus leucopus*) was the most abundant (87% of all small mammals) species captured. In 2009, we trapped for 2880 trap nights and captured an average of 6, 11, and 14 white-footed mice in control, thinned and thinned + burned sites respectively. This was a significant difference ( $F_{2,8} = 9.8$ ,  $p=0.013$ ). Doubling our trapping effort (5760 trap nights) in 2010 produced an average of 12, 12, and 19 mice in control, thinned and thinned + burned sites respectively. These data were not significantly different ( $F_{2,8} = 1.87$ ,  $p=0.234$ ). In 2011, we ceased trapping of small mammals and increased trapping effort for medium sized mammals from 432 trap nights in 2009 and 2010 to 1890 trap nights. Mean abundance for all medium sized mammals (primarily raccoons, *Procyon lotor*, and opossums, *Didelphis virginiana*) in 2009 and 2010 averaged 1.2 and 0.9 animals per site respectively and did not differ significantly ( $F_{2,8} = 0.79$ ,  $p=0.50$  in 2009) by treatment type. In 2011, mean abundance for medium sized mammals were 4.0, 7.0, and 4.3 animals/site for control, thin and thin + burn treatments respectively. This difference was not significant ( $F_{2,8} = 0.51$ ,  $p=0.62$ ) by treatment type.

## **Habitat Connectivity Modeling to Inform Conservation of the Gopher Tortoise\***

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**Abstract:** The spatial distribution of organisms and their habitat across the landscape is often of concern to managers, especially when dealing with endangered species such as the gopher tortoise (*Gopherus polyphemus*). The gopher tortoise is a keystone species endemic to the southeastern United States that is federally listed as Threatened in the western portion of its range and is a candidate for listing throughout the remainder of its range. While many factors have contributed to population declines, tortoises in the western range periphery may also experience greater fragmentation of suitable habitat. We compared connectivity of gopher tortoise habitat across a portion of the species' range to test the prediction that connectivity would be lower in the western (federally listed) range periphery. We used a circuit theory-based approach with soil, hydrology, and urbanization datasets to assess connectivity across the tortoises' range in Louisiana, Mississippi, Alabama, and parts of Georgia and Florida. We also compared the distribution of soils in the federally listed and part of the non-listed portions of the range. Habitat connectivity was lower towards the western range periphery, but only at more northern latitudes. Additionally, soils rated as highly suitable for tortoises tended to be more clustered in the non-listed than in the federally listed portion of the range. We are currently using a similar approach to assess how





