



## 2022 Annual Meeting Alabama Chapter of The Wildlife Society

### ORAL ABSTRACTS

#### STUDENT

##### **Developing Methodologies for Evaluating Sex Ratios in Diamondback Terrapin Populations**

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**Abstract:** A variety of reptiles, including most turtles, possess temperature-dependent sex determination (TSD) in which the incubation temperature of the egg determines the sex of the hatchling. This form of sex determination has the potential to produce biased sex ratios, which can affect the reproductive ecology and conservation status of depleted populations. Therefore, it is advantageous to evaluate naturally occurring sex ratios and their impact in species with TSD. In the case of turtles, secondary sex characteristics are typically used to identify the sex of adults. However, it is often difficult or impossible to identify the sex of immature turtles. The purpose of the current study is to develop and evaluate methodologies for evaluating the sex ratio in the immature portion of diamondback terrapin populations. A variety of body morphometrics were recorded including tail length, head width, shell lengths, etc. from multiple age classes of “headstart” terrapins prior to their release into the wild. Additionally, blood samples were taken from each age class of terrapins and analyzed for testosterone concentrations. The results are providing insight on the chronology of secondary sexual characteristics development, and the use of testosterone levels as potential predictors of sex in immature diamondback terrapins. These findings have the potential of producing methodologies for estimating sex ratios in populations of diamondback terrapins throughout their range in the United States.

##### **Documenting the Stable Isotope Isoscape of Diamondback Terrapin Habitats in the Mississippi Sound of Alabama**

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**Abstract:** The saltmarshes of the Northern Gulf of Mexico, represent critical habitat for the diamondback terrapin, *Malaclemys terrapin pileata*. The diamondback terrapin is considered a species of highest conservation concern in the state of Alabama. Understanding the ecology of this species is a prerequisite for developing optimal management strategy. The purpose of the current study was to implement stable isotope technology in order to investigate the foraging ecology of the diamondback terrapin in the saltmarshes of Alabama. Adult female diamondback terrapins were captured, tagged, and released during the 2019, 2021, and 2022 nesting seasons at Cedar Point Marsh. Blood samples were obtained from the terrapins prior to their release. Additionally, tissue samples were obtained from a variety of potential prey items and primary producers from known terrapin habitat in the Mississippi Sound of Alabama. Carbon ( $\delta^{13}\text{C}$ ) and nitrogen ( $\delta^{15}\text{N}$ ) stable isotope values were documented for all samples to create an isotopic map (i.e., isoscape) of potential prey items and primary producers relative to terrapin stable isotope values. The results provide insight on the trophic ecology within the salt marshes of Alabama, including the foraging ecology of the diamondback terrapin.

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#### First Year Results on Gobbling Chronology across Alabama

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**Abstract:** Eastern wild turkey (*Meleagris gallopavo silvestris*) populations across the southeastern U.S. have experienced recent declines in harvest and poult-per-hen ratios, hence research on reproductive ecology is a key area of emphasis. Gobbling by male turkeys attracts mates and has an asymptote that occurs during egg laying and peak nest incubation by hens. Furthermore, hearing gobbles is also an important predictor of hunter satisfaction. Thus, understanding gobbling chronology and the factors influencing it can provide agencies with information on timing of reproduction and hunter satisfaction. Accordingly, we deployed 78 autonomous recording units across Alabama during March–June 2022. Units were deployed on paired public and private properties across the northern, central, and southern portions of the state. All ambient sound was recorded for 6 hours each day, from 1 h before sunrise to 5 hrs after. We used the machine learning technique known as a convolutional neural network to extract potential gobbles from recordings and then auditorily verified selections. We will examine the relationships among timing and magnitude of gobbling and hunting pressure, harvest density, ownership type, and landscape features. We will also compare gobbling activity to nesting chronology on a subset of study sites with GPS-tagged hens that were captured during winter 2022. We will present preliminary, first year data from a subset of these study areas and discuss future plans.

#### Evaluating Abiotic Associations and Seasonal Differences of Salamander Use of Caves in North Alabama

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**Abstract:** Lungless salamanders (family Plethodontidae) rely on cutaneous and buccopharyngeal gas exchange, which can be strongly influenced by temperature and moisture regimes. While many plethodontid salamanders have been documented to use caves for at least part of their life cycles, few studies have examined the factors that affect the abundance and diversity of salamanders in caves, and even fewer studies on salamander communities in caves of northern Alabama. This study aimed to determine the relationships between diversity and abundance of salamander and environmental variables of the northeastern Alabama caves. Surveys were conducted in 14 caves every season from July 2018 through June 2020, documenting salamanders found within the first 160 m and environmental conditions. Eleven salamander species were found with 2,943 detections. Species diversity and richness varied among caves ( $p < 0.001$ ). We also found that there were seasonal shifts for several species, such as *Plethodon glutinosus*, which was more prevalent in spring and summer months ( $p < 0.001$ ). Internal cave climate was found to vary by caves, seasons, and distance from the entrance. Also, species abundance related to the distance from the entrance was of interest as almost 90 % of all detections were within the first 40 m within caves. The findings of this study further our understanding of salamander ecology in cave ecosystems and will be of use when considering the conservation and management of plethodontid salamanders in karst landscapes.

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#### **First Year Results on Adult Male Wild Turkey Fertility in Alabama**

**Kevin N. Ostrander** ([kno0005@auburn.edu](mailto:kno0005@auburn.edu)), **Matthew S. Day**, and **William D. Gulsby**, College of Forestry, Wildlife and Environment, 602 Duncan Drive, Auburn University, AL 36849

**Abstract:** Eastern wild turkey (*Meleagris gallopavo silvestris*) populations have been in decline across the southeastern U.S. for >10 years, with state wildlife agencies reporting declining hunter harvests and poult-per-hen ratios. Some have postulated that intensive hunter harvest of males during the early breeding season may contribute by negatively influencing breeding dynamics and reproductive success. For example, a previous study found that only 35% of males in a Rio Grande wild turkey (*M. g. intermedia*) population participated in breeding. Another study reported that dominant males within coalitions perform most copulations in an unharvested population. Thus, it is possible that the removal of adult males during the early breeding season could negatively impact population level productivity. To assess this hypothesis, we collected >390 hunter-harvested male turkeys during spring 2022 from across Alabama, and hunters completed a paired behavioral observational survey for each bird. We necropsied each bird and collected the testes to determine testicle mass and pigmentation, which are indicators of reproductive status. We will present first year data on correlations between testicle mass and development with a variety of factors. These results will provide information on reproductive ecology of Eastern wild turkeys, with implications for season frameworks and management.

#### **Assessing the Utility of Evening Avian Point Counts with Simulation Modeling**

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**Abstract:** Currently, morning point count surveys are standard for studying breeding birds, but evening peaks in avian activity present another possible survey occasion. We aimed to evaluate if evening surveys are useful for estimating occupancy. To determine the effect of detection process components that may differ between mornings and evenings on occupancy estimates ( $\psi$ ), we decomposed detection ( $p$ ) into the probability of a species being available for detection given occupancy (availability;  $s$ ) and probability of detection given occupancy and availability (detectability;  $d$ ) in a single-season, single-species occupancy model. We simulated scenarios with different combinations of  $\psi$ ,  $s$ , and  $d$  values in mornings and evenings with different numbers of sites and/or temporal replicates. We simulated detection histories using morning surveys only, evening surveys only, and combinations of morning and evening surveys. When estimates were made using only morning or evening surveys, scenarios with high morning and low evening availability or detectability had imprecise and biased evening posterior distributions for occupancy even with 250 sites. Scenarios with high morning and moderate-to-high evening availability or detectability had unbiased posterior distributions for occupancy with  $\geq 50$  sites with 6 surveys each or  $\geq 150$  sites with 3 surveys each. For mixed morning and evening surveys, occupancy estimates were unbiased with  $\geq 100$  sites regardless of morning versus evening availability or detectability. The utility of evening surveys alone is uncertain if evening availability or detectability is not already known but these simulations suggest that mixing morning and evening replicates can be an appropriate use of evening surveys.

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#### Does nesting material affect wood duck reproductive ecology and microbial growth?

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**Abstract:** Wood ducks (*Aix sponsa*) are secondary cavity nesters that utilize natural and artificial cavities (hereafter referred to as nest boxes). Although nest boxes have been attributed to the re-establishment of wood duck populations, overuse can occur in areas with abundant nest boxes impacting egg hatchability from the buildup of bacteria, parasites, and other detrimental pathogens. To avoid this, managers are responsible for cleaning nest boxes and providing them with either pine, cedar, or aspen wood shavings as nesting materials. Currently, there are no studies researching the effects of shaving material on box use and selection, nest success, and microbial growth. From 2020-2021, we monitored nest boxes in Georgia and Florida and filled a random sample of boxes in each state with aspen or cedar shavings. Our objectives were to 1) determine if the use of different types of shavings had any effect on nest box use, nest success, and the number of duckling exodus, 2) determine if the use of shaving type had an impact on the growth of nest-box microbes, and 3) determine if there are any preventative measures managers may use to prevent microbial growth and infection of eggs. We collected sterile bacterial samples off eggs from 29 boxes in Florida and 21 boxes in Georgia. We found no statistical evidence, except for nest box use in Georgia during the 2020 field season, relating to the type of nest box shavings having any effect on nest box use, nest success, nor microbial densities from eggs in nest boxes.

## PROFESSIONAL

#### Cooperative Survey of Tributaries in Bankhead National Forest for Rush Darter (*Etheostoma phytophilum*)

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Dylan Shaw, Alabama Power Company

**Abstract:** The federally endangered rush darter (*Etheostoma phytophilum*) was discovered on the Bankhead National Forest in 2019. Biologists from the National Forest and Alabama Power Company set out to determine the extent of occupancy throughout the Clear Creek watershed and improve understanding of its life history. Rush darter were discovered in two tributaries to Clear Creek, primarily utilizing small vernal pools within the floodplains adjacent to the creek channel. Biologists found significant use of higher order streams, with possible subsurface travel to reach disconnected 1<sup>st</sup> and 2<sup>nd</sup> order streams. The use of vernal pools and wetlands was thought to peak during breeding and spawning seasons. However, individuals were captured throughout the year, underlying the importance of these habitats. Findings suggest that existing forest management including prescribed fire and generous riparian corridors buffering streams during timber harvest benefit this species. Active habitat management to prevent woody encroachment and enhance aquatic vegetation is planned for future years. Additionally, simplified habitat modeling of known sites is being used to identify new stream reaches to survey throughout the Forest and adjacent private land.

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**POSTER ABSTRACTS**

**STUDENT**

**Drivers of Beetle Occurrence and Abundance in Alabama's Black-Belt Prairies**

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**Abstract:** Grassland degradation in combination with insect declines threaten biodiversity and ecological stability. Restoration and conservation provide tools to address both issues; grasslands support insect diversity and insects exert high ecological influence in grasslands. Despite insects' influence in grasslands, drivers of occurrence and abundance are poorly resolved for most grassland insects; this must be addressed to increase efficacy of conservation and restoration projects. We surveyed beetle communities in Alabama's Black Belt Prairies to estimate effects of habitat features and restoration methods on beetle communities. We selected beetles, specifically Scarabaeidae and Carabidae, because of their taxonomic and ecological diversity. We collected beetles at 24 grassland sites in 2019. We analyzed detection/non-detection data for multiple species and analyzed abundance data for beetle families in a Bayesian framework. Burn frequency and years since burn were drivers of occupancy for many taxa in both families. Preliminary abundance model results indicate a negative effect of basal area on scarab abundance. For carabids, percent urban landcover surrounding grasslands was negatively associated with abundance, and burn frequency was positively associated with abundance. While models indicate taxa respond differently to habitat covariates, occupancy and abundance appear to be driven by fire and local landcover. Results imply landcover (within a radius of 200 meters of grassland sites) should inform site selection of grassland conservation and restoration projects, and prescribed burns should be included in management plans.

**Survival and Recruitment of an Adaptive Songbird in an Urbanized Landscape**

**Thomas R. Roverly**, College of Forest Resources, Mississippi State University, MS 39762  
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**Abstract:** Life cycles of songbirds in urban environments and the effects of urbanization on ecosystem structure and function have received limited attention. Common species, such as the Northern Mockingbird (*Mimus polyglottos*), may be experiencing declines where ancillary research posts apparent adult survival for this species at 36%. We combined mark-recapture observations to evaluate survival and productivity of Northern Mockingbirds across Mississippi State University's campus with intent to qualify this population as a potential source (replacing breeding adults given potential annual mortality) or sink. We located 9 accessible nests, then banded and collected morphological data on 26 chicks. We observed each nest every other day to determine nest survivorship. We also observed each chick every other day post-fledging to estimate apparent survival during a 26-day period initiated post-fledging. Estimates from our nest survival model, assuming a 24-day period from egg-laying to fledging, revealed the average probability that a nest fledged young was 22% (95% CI: 5 – 46%). Average apparent survival of young once fledged was 4% (95% CI: < 1 – 46%). Despite what appears to be an abundance of Northern Mockingbirds on Mississippi State University's campus, results from our analyses indicate

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that at least during 2022, and given only appreciation for the nesting and post-fledging period, MSU's campus does not produce young sufficient to replace breeding adults assuming apparent mortality is 36%. With future geospatial analysis, we hope that this data will allow us to assess how we can best support songbirds within an urbanized landscape such as MSU's campus.

#### **Leprosy and the Nine-banded Armadillo in Alabama**

**Olivia F. Sciandra** ([ofs0003@auburn.edu](mailto:ofs0003@auburn.edu)), **Wesley M. Anderson**, **Kelly H. Dunning**, **Sarah Zohdy**, College of Forestry, Wildlife and Environment, 3301 Forestry and Wildlife Sciences Building, Auburn University, AL 36849

**Abstract:** The nine-banded armadillo (*Dasypus novemcinctus*) is a reservoir of *Mycobacterium leprae* and *Mycobacterium lepromatosis*, causative agents of leprosy, or Hansen's disease. In Alabama, little is known about the prevalence of leprosy in armadillos and the spatial distribution of infection. In addition, armadillos are considered a nuisance species, causing damage to property that requires management; as a result, exposure to potentially infected individuals presents a public health concern. To record the prevalence of leprosy in Alabama populations, samples are taken from live and roadkill armadillos across the state. Armadillos in Lee County are collected from three zones, as determined by land imperviousness features: rural, suburban, and urban. Study sites include private property, Auburn University property, and public roadways. In addition, armadillos will be sampled from every region of Alabama. The minimum number to be collected from each zone or region is 36 to observe whether there is a significant difference in leprosy prevalence. Blood is collected from each armadillo and will be analyzed using ELISA to detect IgM antibodies of PGL1. Tissue samples of the ear, liver, and spleen are being collected for PCR assays. Body size and weight measurements are also collected for age determination. As of August 2022, 56 armadillos have been collected with 29 being roadkill and 27 being live captures. Future work will continue to explore the molecular detection of *M. leprae* and *M. lepromatosis* in armadillos as well as biogeographic and demographic associations.

#### **Breeding Ecology of Cerulean Warblers (*Setophaga cerulea*) in Bankhead National Forest**

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**Abstract:** In Alabama, Cerulean Warblers have been designated as a Priority One species of highest conservation concern. Once considered common breeders throughout multiple counties, Cerulean Warbler populations have been negatively impacted by factors such as the loss of mature contiguous deciduous forest. Bankhead National Forest is one of Cerulean's southernmost breeding locations in the U.S. and one of two breeding locations in Alabama. The objectives of this study are to assess Cerulean Warblers at Bankhead National Forest for their: 1) breeding ecology and population status, 2) habitat conditions and associations, and 3) avian community association. During the breeding season of 2022, we conducted preliminary bird surveys over a period of 17 days between May 12 to June 15, 2022. We detected male Cerulean Warblers at 18 locations, 7 of them had repeated sightings during subsequent surveys. All detections were in areas where habitat consisted of mature floodplain forests and mesic upland forests with complex forest structure and large-diameter hardwoods. Point counts were conducted at 10 of the 18 locations to help understand the Cerulean Warblers avian community composition. The most common avian species associated with Cerulean Warblers were Red-eyed Vireos (*Vireo olivaceus*) followed by Northern Parulas (*Setophaga americana*) and Northern Cardinals (*Cardinalis cardinalis*). For future studies, we will continue to focus on surveying historical sites as well as searching potential habitat at Hagood, Flannagin, Borden, Horse, and Montgomery Creeks. In addition, we will start surveys in the second to last week of April to detect male Cerulean Warblers demarcating territories.

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**PROFESSIONAL**

**Population Distribution and Conditions Supporting Wood Frog (*Lithobates sylvaticus*) in Georgia and Alabama; Insights to Species Distribution in Changing Climates**

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**Abstract:** Higher elevations can provide altitudinal analogs to latitude allowing range extensions of more northern species into areas south of their central range. The Wood Frog (*Lithobates sylvaticus*) is a widely distributed species within North America, with a distribution from the boreal forests to the southern Appalachian Mountains. It is a forest-dwelling species known for its use of ephemeral wetlands during their breeding season, coinciding with late winter/early spring. Several populations of Wood Frog occur at the southern terminus of their range, populations in isolated patches in northern Georgia and Alabama. Little is known about the landscape features that most influence the distribution of Wood Frog in these southern climes. Using historical occurrence records in Alabama and Georgia, coupled with fine spatial resolution (10m) landscape features measured and available for access through GIS, we studied the distribution of Wood Frog in these states. Among the landscape features examined (Elevation, Flow Accumulation, Aspect, and Terrain Roughness) we found that Elevation explained 92% of the variation in Wood Frog occurrence while other variables provided negligible predicative capacity for this frog. Species with northerly distributions that have range extensions into higher elevations at the southern portion of their range, such as the Wood Frog, may experience additional constriction to their ranges as climate conditions continue to change influencing temperatures and hydrology potentially forcing these species to further restricting refugia at higher elevations. Future studies should evaluate changes in Wood Frog distributions relative to hydrologic processes affecting the forest systems in which this species lives.