

Jan 16th, 12:00 AM

19. Zoology

Northeastern State University

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Northeastern State University, "19. Zoology" (2016). *Oklahoma Research Day Abstracts*. 16.
<https://dc.swosu.edu/ordabstracts/2016oklahomaresearchday/mathematicsandscience/16>

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Abstracts from the 2016 Oklahoma Research Day

Held at Northeastern State University

05. Mathematics and Science

19. Zoology

05.19.01 Population Structure and Reproductive Migration of Land Crabs (Brachyura: Gecarcinidae) on a Small Tropical Island

Tedford, Kinsey University of Central Oklahoma

Bass, David University of Central Oklahoma

The white land crab (*Cardisoma guanhumi*) and black land crab (*Gecarcinus ruricola*) are found throughout Grand Cayman, and concern has been expressed from the Cayman Department of Environment regarding their declining populations and current distributions. Possible causes of decline may be due to increases in vehicular traffic, habitat loss, over-exploitation, and isolation from resources. Goals of this study are to collect baseline data to estimate white and black land crab populations and determine their peak breeding seasons. A preliminary study during May 2015 indicated crab activity increased around dusk with rainfall enhancing these movements, and each species appeared to have different habitat requirements. The data collection will take place in summer 2016 on Grand Cayman where these land crab populations exist. Specimens will be captured by hand and biological characteristics will be recorded. Peak spawning periods and seasonal reproductive patterns will be determined by noting females with eggs. In addition, land crab remains (road kills) will be marked on a major highway that passes through the study area to estimate mortality rates caused by vehicles throughout the course of the study. Upon completion of this investigation, the data will be useful in establishing a conservation plan and monitoring land crab populations to ensure they remain sustainable.

05.19.02 Baseline Mammalian Survey of an Old-growth Crosstimbers Forest Preserve in Oklahoma

Coppedge, Bryan Tulsa Community College

Stie, F. Tulsa Community College

We used trail cameras to document the occurrence of medium to large bodied mammals in the Keystone Ancient Forest Preserve (KAFF) near Keystone Lake, Oklahoma from October 2015 to January 2016. We were able to document nine species of mammals in the KAFP during this timeframe: white-tailed deer, coyote, bobcat, fox and gray squirrels, armadillo, opossum, raccoon, and striped skunk.

05.19.03 The effects of climate change on the distribution of the red-spotted toad (*Anaxyrus punctatus*)

Butler,Chris *University of Central Oklahoma*

Curd,Michael *University of Central Oklahoma*

cheek,justin *University of Central Oklahoma*

Rapid climate change as a result of human activities will alter the distribution of most species over a relatively short period. Climatic warming may adversely affect amphibian distributions due to physiological constraints associated with their highly water-permeable skin and ectothermic life history. In the American Southwest, future climate predictions show precipitation and drought becoming more extreme which may pose a significant threat to the existence of amphibians inhabiting xeric rocky habitats such as *Anaxyrus punctatus*. We formulated current and projected (for 2050s and 2070s) climate suitability models for *A. punctatus* using a maximum entropy (Maxent) ecological niche modeling approach. We compared the current and future models for relative concentration pathways 2.6, 4.5, 6.0, and 8.5 to examine how climate change will affect the distribution of *A. punctatus*. Models were ranked based on AICc scores, and the best model included mean temperature of the coldest quarter, annual precipitation, and precipitation seasonality. Future models indicate suitable climate conditions will expand 12–54% and shift north-northwest in response to climate warming under all representative concentration pathways. Due to the limited dispersal ability of this species, full utility of newly suitable areas is unlikely. Furthermore, because of the highly patchy distribution of this species, dispersal between patches may become more or completely disconnected due to unsuitable areas

05.19.04 The effects of climate change on the wintering range of the American Tree Sparrow (*Spizella arborea*)

Curd,Michael *University of Central Oklahoma*

Butler,Chris *University of Central Oklahoma*

Anthropogenic climate change has shifted the ranges of many species in a relatively short period of time. Many avian species arrive earlier on breeding grounds, begin egg-laying early, exhibit prolonged breeding season, and alter timing and extent of migration in response to recent climate change. Based on Christmas Bird Counts from 1900-2014, the American Tree Sparrow (*Spizella arborea*) is declining in numbers at the southern extent of the wintering range and may be shifting north as a response to changing climate. We created centers of abundance for historic data to determine if the American Tree Sparrow range has shifted in response to climate. We also generated climate suitability models to investigate how the distribution may change under future climate scenarios. Historic data shows that distribution has been shifting north since at least 1950. Highly suitable areas (≥ 0.5) were primarily across northern United States and southern Canada. Projected models indicate expansion of highly suitable areas with variability in expansion direction. However, all models show parts of the southern extent of the range becoming decreasingly suitable.

05.19.05 Geometrically Compressed Habitat Patches Alter Territory Defense Demands in Male Collared Lizards

Braun, Cody *University of Central Oklahoma*

Baird, Troy *University of Central Oklahoma*

Theory predicts that the economics of territory defense should be influenced by variation in the spatial distribution of resources critical for survival and reproduction. In systems where animals are restricted to discrete habitat patches, the size and geometric shape of habitat patches defines their area and perimeter, factors that may influence the relationship between costs and benefits of spatial defense. We tested the influence of habitat geometry and topography on the social tactics of territorial and non-territorial male collared lizards, a species restricted to discrete rock outcroppings, by quantifying lizard behavior in wide and narrow habitat patches defined by markedly different area-to-perimeter ratios. Both male and female densities were much higher on narrow habitat patches. Even though acceptable habitat was compressed, non-territorial males remained within territorial neighborhoods by adopting subordinate social tactics rather than dispersing. Frequencies of male broadcast display and contests with rivals did not differ between the two habitat types. Males defending territories on narrow patches courted more different females, more frequently, and also traveled at higher rates. The compressed geometry of narrow patches appears to promote increased courtship opportunities while allowing males to deter rivals with little increase in costly defensive behaviors.

05.19.06 Changes in Social Interactions Between Captive Sumatran Orangutans

Jardine, Laura *Other*

Hosford, Alanah *Other*

Kauffman, Laurie *Other*

Although Sumatran orangutans (*Pongo abelii*) are critically endangered, there is lack of research on their maturation. Subadult males on the Tanjung Puting reserve have been known to sexually harass females frequently, an act rarely seen in adult males. The Oklahoma City Zoo has two captive orangutans- a 48 year old female, Toba, and a 15 year old subadult male, Elok. Recently Elok has displayed increased sexual behavior, which could potentially lead to adverse effects on Toba's health. The purpose of our research was to determine whether their social interactions have changed over time. We hypothesized that their social interactions increased as Elok matured. We collected data in 15 minute focals using an ethogram to describe the orangutan's behaviors. We specifically examined social play, allogrooming, resting social, and displacement. Using data from 2012 through the present, we found that three of the four studied social interactions increased over time. This research gives us further insight into breeding habits and social needs of orangutans in captivity and the wild, potentially leading to improved conservation efforts.

05.19.07 An Analysis of the Home Range Size of Scissor-tailed Flycatchers During the Breeding Season: Variation Between Nesting Phases, Habitat Types, and Habitat Variables

Stokes, Jared *Cameron University*

Roeder, Diane *University of Oklahoma*

Husak, Michael *Cameron University*

Oklahoma's state bird, the Scissor-tailed Flycatcher (*Tyrannus forficatus*), has been extensively studied in areas such as breeding biology and migration patterns. However, no previous studies have looked at the home range size during the breeding season and the variables that could influence size. We calculated home range sizes of nesting Scissor-tailed Flycatchers in native oak/elm (*Quercus/Ulmus*) savannahs and invasive mesquite (*Prosopis glandulosa*) savannahs in southwestern Oklahoma. Color-banded adults were followed during two breeding seasons and their perch locations recorded on a Garmin 62Csx handheld gps unit. Taking advantage of unique weather patterns, we were able to record data for the first season during a record drought and the second season's data were recorded post drought and after record rainfall. Aerial photographs were used to verify accuracy of gps points, and ArcGIS was used to determine home range size using minimum convex polygons. There was considerable variation in home range sizes (1.53 – 18.21 ha), but no significant differences were found between savannah types. Mean home range size (6.02 ha) was larger than has been implied previous literature. Additionally, a multiple linear regression model was used to examine potential effects of 1-ha scale habitat variables on home range size between nesting sites and years.