SCHEDULE AND PROGRAM – 2018 ANNUAL MEETING
OKLAHOMA STATE UNIVERSITY
STILLWATER, KANSAS
12-13 OCTOBER

12 October 2018

4:00 - 9:30 PM – **Social & Registration –** Lake Carl Blackwell

13 October 2018

7:00 – 9:00 AM – **Breakfast and Registration** – Oklahoma State University campus, Department of Natural Resource Ecology and Management, Agricultural Hall

9:00 – 9:05 AM – **Introduction** (Andrew Hope) – Introduce: Hosting institution; Session chair.

9:05 – 9:15 AM – **Welcome** – Jim Ansley, Department Head, Natural Resource Ecology and Management

9:15 – 10:15 AM – **Paper Session 1** – Session Chair: Sean Maher

9:15 AM **1. Kelly S. Boyer*[a] (MS), Stephen L. Webb[b], W. Sue Fairbanks[a],** Joshua A. Gaskamp[b], Charles Rohla[b]. *Damage and resource selection by wild pigs (*Sus scrofa*) in a pecan producing agricultural landscape.* [a]Department of Natural Resource Ecology and Management, Oklahoma State University. [b]Noble Research Institute, Ardmore Oklahoma.

9:30 AM **2. Holly Anderson* (MS), Rob Channell.** *Influence of landscape factors on the occurrence of pronghorn (*Antilocapra americana*) in Kansas.* Department of Biological Sciences, Fort Hays State University

9:45 AM **3. Jimmy J. Lovett* (PhD), Karen McBee.** *Foraging activity of* Peromyscus leucopus *in relation to exposure to different levels of light pollution.* Department of Integrative Biology and Collection of Vertebrates, Oklahoma State University.

10:00 AM **4. Kristy L. Meyer* (MS), Michelle Haynie.** *Reexamination of a pocket gopher (*Geomys*) contact zone and hybrid identification using microsatellite and mitochondrial DNA markers.* Department of Biology, University of Central Oklahoma.

10:15 – 10:45 AM – **Break**

10:45 AM – **Keynote Address**

Hayley Lanier, Ph.D. *Mammals on mountaintops: how complex landscapes and population histories shape evolution.* Assistant Professor and Assistant Curator of Mammals, Department of Mammalogy, Sam Noble Museum; Department of Biology, University of Oklahoma.

11:45 AM – 1:45 PM – **Lunch**

1:45 – 2:30 PM – **Paper Session 2** – Session Chair: Sean Maher

1:45 PM **5. Nathan J. Proudman*[a] (PhD), Dries P. J. Kuijper[b], Marcin Churski[b], Jakub W[b], Jan-Åke Nilsson[a].** *A landscape of fear: Behavioural responses in red deer (*Cervus elaphus*) to risk effects posed by wolves (*Canis lupus*) and human hunters in a European primeval forest.* [a]Department of Biology, Lund University. [b]Bubnicki, Mammal Research Institute, Polish Academy of Sciences, Białowieża.

2:00 PM **6. Dineesha L. Premathilake* (MS), Victoria L. Jackson.** *Does intraguild avoidance occur in mesocarnivores? Temporal activity pattern analysis of mesocarnivores in southcentral Oklahoma.* Department of Biology, University of Central Oklahoma.

2:15 PM **7. Natasha L. Prentiss* (UG), W. Sue Fairbanks,** *Giving up density as an indicator of black bear (Ursus americanus) food preference in the Ouachita National Forest, Oklahoma*. Department of Natural Resource Ecology and Management, Oklahoma State University.

2:30 – 4:30 PM – **Poster Session and Concurrent Field Trip**

Field Trip Host: Dr. Karen McBee. OSU Collection of Mammals, Life Sciences West, containing over 13,800 catalogued specimens from Oklahoma, all 50 U.S. states, and every major landmass except Antarctica.

2:30 – 3:00 PM – All poster presenters at posters.
3:00 – 3:45 PM – Museum Group 1 – Field Trip; All others at poster presentation
3:45 – 4:30 PM – Museum Group 2 – Field Trip; All others at poster presentation

8. Faith Starr (UG), Peter Eyheralde*. *Bobcat (*Lynx rufus*) behavioral response to olfactory stimuli.* Department of Biology, William Penn University.

9. Wesley Yoder (UG), Peter Eyheralde*. *Small Mammal Diversity and Abundance in Response to Oak Savanna Restoration.* Department of Biology, William Penn University.

10. Sarah Vrla* (MS). *Effects of varying amounts of food available on flight initiation distance in the fox squirrel (*Sciurus niger*).* Department of Biology, University of Central Oklahoma.

11. Anna M. Wagner*[a] (UG), Francisca M. Mendez-Harclerode[b], Gloria M. Caddell[a], Chad B. King[a], Michelle L. Haynie[a]. *Establishment of a long-term small mammal mark-recapture study at UCO's Selman Living Lab to identify factors impacting population and community persistence.* [a]Department of Biology, University of Central Oklahoma. [b]Department of Biology, Bethel College.

12. Robert A. Beers*[a] (UG), Addison G. Allen[a], Zachary P. Roehrs[b], R. Scott Seville[c], Hayley C. Lanier[a]. *Fire succession as a driver of small mammal community dynamics in the Greater Yellowstone Ecosystem.* [a]Department of Mammalogy, Sam Noble Museum; Department of Biology, University of Oklahoma. [b]School of Math and Sciences, Laramie County Community College. [c]Department of Zoology and Physiology, University of Wyoming Casper.

13. Brandon McDonald* (Faculty), Sarah Vrla. *Evidence of Elk (*Cervus elaphus*) Predation by a Solitary Coyote (*Canis latrans*) in SW Oklahoma and continued research.* Department of Biology, University of Central Oklahoma.

14. Addison G. Allen*[a] (MS), Daniel C. Allen[b], Zachary P. Roehrs[c], R. Scott Seville[d], Hayley C. Lanier[a]. *Is postfire succession correlated with ecological shifts in the North American deermouse (*Peromyscus maniculatus*)?* [a]Department of Mammalogy, Sam Noble Museum; Department of Biology, University of Oklahoma. [b]Department of Biology, University of Oklahoma. [c]School of Math and Sciences, Laramie County Community College. [d]Department of Zoology and Physiology, University of Wyoming at Casper.

15. Will Childress* (PhD), W. Sue Fairbanks. *Mapping the dispersal of the sarcoptic mange mite (*Sarcoptes scabeie*) in black bear (*Ursus americanus*) populations across the United States*. Department of Natural Resource Ecology and Management, Oklahoma State University.

16. Madeleine Cleary* (MS), Omkar Joshi, W. Sue Fairbanks. *Human dimensions of black bear (*Ursus americanus*) management in eastern Oklahoma: an assessment of cognitive hierarchy components, risk perceptions, and population tolerances.* Department of Natural Resource Ecology and Management, Oklahoma State University.

17. Carlie Jennings* (UG), Sarah Vrla. *A qualitative survey of ultraviolet (UV) reflective morphology in mammals.* Department of Biology, University of Central Oklahoma.

18. Brenna L. Lawless*[a] (UG), Morgan A. Noland[a], Curtis J. Schmidt[b], and Mitchell J. Greer[a]. *Small scale restoration of the Sternberg Natural Area: influences on small mammal communities.*

[a]Department of Biological Sciences, Fort Hays State University. [b]Sternberg Museum of Natural History, Fort Hays State University.

4:30 – 4:45 PM – **Break**

4:45 – 5:45 PM – **Business Meeting** – Society business and announcement of recipient of Student Research Presentation/Poster Awards - all are encouraged to attend!

6:30 – 9:30 PM – **Dinner and Social** – Lake Carl Blackwell

ABSTRACTS

KEYNOTE ADDRESS

Hayley C. Lanier, *Mammals on mountaintops: how complex landscapes and population histories shape evolution.* Department of Mammalogy, Sam Noble Museum; Department of Biology, University of Oklahoma.

Montane habitats present a classic and dramatic example of the natural fragmentation of populations by geological and environmental barriers. For many alpine small mammals, the lower elevation stretches that separate mountain ranges may often be impassable, leaving populations isolated from one another into 'sky islands' of suitable habitat. But the fact that separate populations of multiple alpine species exist on isolated mountains means that these habitats we not always impassable. I will present research focused on understanding the historical movements of five small mammal species (collared pikas, hoary marmots, Arctic ground squirrels, singing voles, and brown lemmings) among the alpine and sub-alpine areas they inhabit in Alaska and northern Canada. Using genomic data I will show how past, and in some cases present, connectivity have shaped populations and how this knowledge may help us predict future responses to changing climates. Given the rapid pace of warming in the Arctic, understanding the role of past isolation in shaping pockets of diversity may be critical in helping us to anticipate how regional populations will fare and plan for areas of conservation concern.

ORAL PRESENTATIONS

1. Kelly S. Boyer*[a] (MS), Stephen L. Webb[b], W. Sue Fairbanks[a], Joshua A. Gaskamp[b], Charles Rohla[b]. *Damage and resource selection by wild pigs (*Sus scrofa*) in a pecan producing agricultural landscape.* [a]Department of Natural Resource Ecology and Management, Oklahoma State University. [b]Noble Research Institute, Ardmore Oklahoma.

Pecans (*Carya illinoinensis*) are an economically important specialty crop that are managed and harvested where sympatric populations of wild pigs (*Sus* scrofa) occur. Through foraging behaviors such as rooting and digging, wild pigs may reduce harvestable yields. In this study we

quantified pecan harvest inefficiency resulting from wild pig damage and conducted a resource selection analysis that aligned with pecan availability. To assess harvest inefficiency of pecans, rooting damage was measured in pecan groves and orchards. Pecans within a 0.33-m^2 sampling frame were counted in damaged plots and control plots before and after pecan harvest. Rooting was the only significant predictor of harvest inefficiency. Inefficiency of pecan harvest (i.e., loss) was >30% in damaged areas compared to non-damaged areas. Thus, loss of harvested pecans to pig damage alone is considerable. We captured 29 adult sows, 2 per sounder, and fitted them with Vectronic Vertex Lite GPS collars. Collars took one GPS location every 30 min to monitor wild pig movements and selection of pecan groves and orchards. Collars were deployed pre-, during, and post pecan harvest in 2016 and 2017. Resource selection functions (RSF) were generated using generalized linear mixed model (GLMM). The resulting RSF indicated strong selection for riparian areas and areas with available pecans. Wild pigs also used areas near water, and rangeland and forests but under a narrower range of conditions. Using this information to map areas at risk will help to mitigate and prioritize areas for management intervention to reduce loss of pecans from wild pigs.

2. Holly Anderson* (MS), Rob Channell. *Influence of landscape factors on the occurrence of pronghorn (*Antilocapra americana*) in Kansas.* Department of Biological Sciences, Fort Hays State University

The extinction of major predators allowed pronghorn to flourish in Kansas. Pronghorn continued to thrive until the beginning of the twentieth century when their numbers began to diminish from harvesting by humans and habitat conversion for crop and livestock production. With reintroductions into the state in the 1960s, pronghorn numbers rose in the westernmost part of the state but the distribution has not expanded as expected. This study will investigate which landscape factors (e.g. roads, oil wells, food resources, etc.) have the greatest influence on distribution of pronghorn in Kansas. Pronghorn population data has been obtained from the Kansas Department of Wildlife, Parks and Tourism. This data includes population numbers and locations of pronghorn in Kansas from 2001 to 2017. Data from the Data Access & Support Center and the United States Geological Survey will be used to determine the land use/land cover and location of anthropogenic and natural features. A generalized linear model will be developed to determine which landscape factors influence where the pronghorn exist. This model should provide insight to why pronghorn distributions in Kansas are not expanding and contribute to future management plans.

3. Jimmy J. Lovett* (PhD), Karen McBee. *Foraging activity of* Peromyscus leucopus *in relation to exposure to different levels of light pollution.* Department of Integrative Biology and Collection of Vertebrates, Oklahoma State University.

Light pollution increasingly encroaches on natural areas. Increases in night-time light may affect nocturnal animals because it aids visual detection of prey by predatory species. Research suggests wild rodents in light polluted areas may behave differently than conspecifics from darker locations. We monitored nightly giving-up densities (GUD) at 16 foraging patches each at four locations in central Oklahoma that experience different levels of light pollution. We created a multiple linear regression model to predict mean GUD from eleven nights of data collected between the full

moon and new moon in November 2017. We found mean GUD varies with illumination from the moon, light pollution, % low vegetative cover, % canopy cover, and humidity (*F(6, 35) = 33.35, R^2 = 0.85*, *p << 0.001*). Light pollution and changes in moon illumination had the strongest impact on model prediction (*r = 1.65, p << 0.001; r = 0.08, p < 0.001)*. Mean GUD trended higher at sites experiencing the highest levels of light pollution while patch use at these sites was lower than at sites experiencing lower levels of light pollution.

4. Kristy L. Meyer* (MS), Michelle Haynie. *Reexamination of a pocket gopher (*Geomys*) contact zone and hybrid identification using microsatellite and mitochondrial DNA markers.* Department of Biology, University of Central Oklahoma.

Two species of pocket gophers, *Geomys bursarius* (plains pocket gopher) and *G. breviceps* (Baird's pocket gopher), are found in central Oklahoma. These species are suspected to hybridize in multiple contact zones across their distribution. Because they are cryptic species, molecular analysis is needed for species identification. This research was conducted in a previously described contact zone in Cleveland County to analyze the current *G. bursarius* and *G. breviceps* populations using molecular markers for species identification and genetic clustering analysis. We also compared the historic contact zone boundaries to the current boundaries using GPS and GIS. Three trapping zones were established in Cleveland County, with two including localities of previously identified hybrid individuals. Thirty-three adult and 10 fetus specimens were analyzed. RFLP analysis of the mitochondrial cytochrome b gene was used for species identification and all 43 samples were identified as G. *breviceps*. However, Structure analysis of nine microsatellite markers suggested two separate populations with four admixture individuals. Using the combined data set (mitochondrial and nuclear microsatellites), 39 individuals were identified as *G. breviceps* and 4 individuals were identified as putative hybrids. No admixture individuals were found in a trapping zone locale of a previous identified hybrid individual. Since all of the putative hybrids had the mitochondrial pattern of *G. breviceps*, the most likely explanation is that female *G. breviceps* are mating with male *G. bursarius* in this zone. Additional analyses need to be performed to further elucidate the current contact zone dynamics.

5. Nathan J. Proudman*[a] (PhD), Dries P. J. Kuijper[b], Marcin Churski[b], Jakub W[b], Jan-Åke Nilsson[a]. *A Landscape of Fear: Behavioural Responses in Red Deer (*Cervus elaphus*) to Risk Effects posed by Wolves (*Canis lupus*) and Human Hunters in a European Primeval Forest.* [a]Department of Biology, Lund University. [b]Bubnicki, Mammal Research Institute, Polish Academy of Sciences, Białowieża.

In Białowieża primeval forest (BPF) wolves supress red deer foraging via behaviourally-mediated, non-consumptive effects. Humans provide an additional risk factor differentially exhibited between areas devoid of human intervention and areas with high human hunting and foresting activity. The aim of the study was to test the behavioural responses of red deer to risk effects from both wolves and human hunters on a landscape and fine scale across two different management-type zones. Using a large database collected via camera trapping between 2009 and 2017, as well as video footage from a specified transect spanning 63km of BPF, the distribution and vigilance behaviour of red deer were calculated in response to gradients of human and wolf risk. Red deer avoided areas associated with high wolf presence and preferentially selected areas exhibiting

reduced human hunting and disturbance. This infers a trade-off of risk response between human and wolf related risk and is likely augmented by some degree of human shield effect, in which humans can indirectly provide deer with refuge areas from predators. Red deer also responded to increased likelihood of wolf encounter by increasing their vigilance behaviour in those areas. Females with dependent young showed the strongest response to wolf-related risk, both spatially and behaviourally, suggesting differential responses to risk between vulnerable sex/age groups. This study highlights the potential anthropogenic impacts on the anti-predatory behaviour between and within ungulate populations in conjunction with natural predation.

6. Dineesha L. Premathilake* (MS), Victoria L. Jackson. *Does intraguild avoidance occur in mesocarnivores? Temporal activity pattern analysis of mesocarnivores in southcentral Oklahoma.* Department of Biology, University of Central Oklahoma.

Camera trapping has been increasingly used to monitor different ecological aspects of wildlife, specifically for elusive, large carnivores. Relatively few studies have been conducted on temporal activity overlap between mesocarnivore species using camera-traps, and no such studies have been done in Oklahoma. My study was conducted at Oka' Yanahli Preserve (OYP), located in Johnston County, southcentral Oklahoma. Camera traps were used to collect photographs of mesocarnivores in the preserve during winter (November 2016 – February 2017) and summer (May – August 2017). Six remotely-triggered infra-red cameras were deployed for 4 weeks. After 4 weeks, cameras were moved to different, random locations. Half of the cameras were systematically baited using canned mackerel. A total of 1531 mesocarnivore pictures from winter and 1455 from summer were taken from 25 camera locations in winter and 18 camera locations in summer. Mesocarnivore species identified from both seasons were coyote (*Canis latrans),* raccoon *(Procyon lotor),* bobcat (*Lynx rufus)*, Virginia opossum (*Didelphis virginiana)*, and striped skunk (*Mephitis mephitis).* Temporal activity densities were higher for all species during winter than in summer (Circular Kernel Density Estimates) and all species were mostly nocturnal during winter. Temporal activities overlapped largely (Δ>0.7) between all species in winter, except for skunk. Contradictory to what I expected, the data show that mesocarnivore species present in this preserve do not necessarily avoid each other, rather they co-exist through resource partitioning. Large temporal activity overlap between species indicate that these species do not temporally avoid each other in this preserve.

7. Natasha L. Prentiss* (UG), W. Sue Fairbanks, *Giving up density as an indicator of black bear (Ursus americanus) food preference in the Ouachita National Forest, Oklahoma*. Department of Natural Resource Ecology and Management, Oklahoma State University.

Black bears tend to adopt anthropogenic food into their diet as they disperse into areas dominated by human development. In eastern Oklahoma, a major form of bear-human conflict is the destruction of deer feeders by black bears. We tested whether black bears in the Ouachita National Forest, Oklahoma, preferred anthropogenic or natural food using giving up density (GUD) as an indicator of preference. GUD techniques were employed using paired, modified horse toys each containing equal amounts of gelatin capsules with equal caloric value of food- one containing corn as the anthropogenic food option and the other containing a natural food such as acorns or

blueberries. The number of capsules left over after manipulation was considered the GUD. Black bears preferred corn to acorns but GUD for blueberries did not differ significantly from corn, perhaps due to small sample size. Duration of manipulation was also used as an indicator of preference, but the data did not yield any significant differences between corn and natural foods. Bear preference for corn over acorns in early summer corroborates findings from a similar study conducted in the Oklahoma Ozarks. Thus, during certain seasons, the destruction of deer feeders may be a matter of preference for anthropogenic food. As urban areas expand and black bear populations disperse, understanding black bear preference for anthropogenic food will help to mitigate bear-human conflicts.

POSTER PRESENTATIONS

8. Faith Starr (UG), Peter Eyheralde*. *Bobcat (*Lynx rufus*) behavioral response to olfactory stimuli.* Department of Biology, William Penn University.

The bobcat (*Lynx rufus*) is a medium sized carnivore found commonly across much of North America. Anecdotal evidence has led many researchers to believe that bobcats may be attracted to Chanel no. 5 perfume. This may be a novel scent in forest ecosystems that attract bobcat curiosity, although in the history of perfume manufacturing it was common to use varieties of animal musk bases for women's perfume. Commercial fur trappers often use scent lures composed of cat glands, rotten meat, fish oils, skunk secretions, or plant oils to attract bobcats and other fur bearing animals. This study was undertaken to measure bobcat behavioral response to novel olfactory stimuli. Our analyses of camera trap data collected November 2017- April 2018 addresses the hypothesis that bobcats will display a greater attraction toward Chanel no. 5 perfume than commercial trapping lure or control stations without scent. Our results indicated this hypothesis is not supported. A greater number of bobcats were detected at control sites without any scent, than at scent stations with bobcat trapping lure or Chanel no. 5 perfume. Although our results were not statistically significant, scent stations with perfume had the least amount of bobcats detected. Surprisingly, white-tailed deer showed strong attraction to the Chanel no. 5 perfume scent stations, with twice as many camera trap captures at perfume sets compared to control stations. White-tailed deer were attracted to the perfume scent more than any other mammal species encountered in this study.

9. Wesley Yoder (UG), Peter Eyheralde*. *Small Mammal Diversity and Abundance in Response to Oak Savanna Restoration.* Department of Biology, William Penn University.

Oak savanna ecosystems In the North American Midwest, are found in the transition zones between tallgrass prairie and deciduous forest. Today, due to conversion to agriculture, logging practices, dense tree growth in the absence of fire, and the prevalence of woody invasive vegetation, Midwestern oak savanna ranks as one of the rarest ecosystems in the world, covering just 0.02% of its original range. Widespread restoration efforts of these degraded ecosystems began in the early 1990's and continue today on public and private lands across the Midwest. While restoring the historical structure and diversity of plants to these sites should benefit native wildlife species, much of the effects of savanna restoration efforts to wildlife populations is

unknown. Our study was conducted to measure small mammal population response to oak savanna management practices. Results indicate that the abundance and diversity of small mammal species is similar in savanna restoration and unmanaged control sites. It's likely that small mammals are selecting habitats at scales smaller than we measured in this study. Future analyses are planned to further characterize habitat variable selection by small mammal species, including density of ground level vegetation, avian predator abundance, and parasite abundance.

10. Sarah Vrla* (MS). *Effects of varying amounts of food available on flight initiation distance in the fox squirrel (*Sciurus niger*).* Department of Biology, University of Central Oklahoma.

According to the Optimum Escape Theory (OET), prey species adjust flight initiation distance (FID) based on the risks and benefits of remaining and fleeing. Here, I analyzed the effects of food and directness of approach on FID of fox squirrels (*Sciurus niger*) in semi-urban parks of central Oklahoma. To determine the effects of varying energetic benefit (food presence and abundance) on FID, I observed and compared the distance at which 66 individual fox squirrels flee when in the presence of varying amounts of food or no food present. I approached squirrels either at a trajectory to intersect with the squirrel (direct approach) or at a trajectory to bypass the individual by 5 m (indirect approach) to determine effects of varying directness of approaches. Control groups had no food present, and experimental groups had access to 15 (low abundance) or 35 (high abundance) mature pecans (*Carya illinoinensis*). I analyzed data using ANOVA and Tukey's HSD test and observed a significant decrease in FID in the presence of food and when approached indirectly. This study exhibits the balance between predation risk and foraging benefits on antipredator behavior of fox squirrels. Results supported the hypothesis that FID decreased in the presence of a benefit (in this case food) and when presented with a lower threat level (indirect approach). These results present new data on the effects of food on antipredator behavior of fox squirrels that can be used in further investigation into these behaviors and decisions based on cost and benefit tradeoffs.

11. Anna M. Wagner*[a] (UG), Francisca M. Mendez-Harclerode[b], Gloria M. Caddell[a], Chad B. King[a], Michelle L. Haynie[a]. *Establishment of a long-term small mammal mark-recapture study at UCO's Selman Living Lab to identify factors impacting population and community persistence.* [a]Department of Biology, University of Central Oklahoma. [b]Department of Biology, Bethel College.

The purpose of this project is to monitor changes in rodent populations and communities over multiple generations and to determine what factors affect how the populations and communities change over time. In March of 2018, a permanent trapping web was established at the University of Central Oklahoma's Selman Living Lab (SLL). Two additional permanent webs were established in June of 2018. The SLL is located in the gypsum hills of Woodward County in western Oklahoma. Surveys of the three webs will be conducted for three nights, four times a year, for a minimum of five years. During each trip, each animal collected will be processed as follows: species identification; determination of sex, age, body condition, and reproductive condition; standard measurements; marking for permanent identification (done through tattooing); and ear punches (for DNA). In addition to animal data, climate and vegetation data will be obtained during every trip. To date, two trapping surveys have been conducted. In March 2018, a single web was

surveyed and 14 individuals representing six species were collected. In June 2018, all three webs were surveyed and 25 individuals (22 new, 3 recaptures) representing eight species were collected. A third survey will be conducted in October. Starting in 2019, surveys will be conducted in January, March, June, and October. The animal, climate, and vegetation data will be used to build mathematical models that can be used to determine which factors have the largest impact on population and community persistence.

12. Robert A. Beers*[a] (UG), Addison G. Allen[a], Zachary P. Roehrs[b], R. Scott Seville[c], Hayley C. Lanier[a]. *Fire succession as a driver of small mammal community dynamics in the Greater Yellowstone Ecosystem.* [a]Department of Mammalogy, Sam Noble Museum; Department of Biology, University of Oklahoma. [b]School of Math and Sciences, Laramie County Community College. [c]Department of Zoology and Physiology, University of Wyoming Casper.

Given the uptick in wildfire frequency and severity throughout the intermountain west it is increasingly important to understand the effect of wildfires on ecological communities. Understanding how wildfire succession shapes communities membership allows for better predictions of how future fires will influence species occurrence and interactions. Using 4 study grids initially established after the iconic 1988 Yellowstone fires, we examine on the effects of the 2016 Berry Fire on small mammal diversity (i.e., species richness and abundance), contrasting the two years prior to the fire to the two years following the fire. Prior to the 2016 fire, the communities were dominated by the Red-backed Vole (*Myodes gapperi*), with a mixture of other small mammal species, such as *Peromyscus maniculatus, Zapus princeps, Tamias amoenus, Thomomys talpoides,* multiple vole (*Myodes gapperi, Phenacomys intermedius,* and *Mictrotus* spp.) and shrews species (*Sorex* spp.). After the 2016 fire, species richness was similar but the relative abundance of different species was massively altered, with the North American Deermouse (*P. maniculatus*) dominating all four trapping grids. Preliminary results suggests that fire regime (timing and intensity) may be key to understanding community assembly after the fire. This type of study is critical for better predicting the effects future wildfires will have on ecological habitats and how they will shape the communities of species living within them.

13. Brandon McDonald* (Faculty), Sarah Vrla. *Evidence of Elk (*Cervus elaphus*) Predation by a Solitary Coyote (*Canis latrans*) in SW Oklahoma and continued research.* Department of Biology, University of Central Oklahoma.

Coyotes are capable of killing elk calves and deer fawns; however, the taking of larger prey has been demonstrated only through cooperative hunting strategies. Walters et al. (2005) gave the first verifiable account of an individual coyote killing an adult elk in the Wichita Mountains Wildlife Refuge in southwestern Oklahoma. Provided here is photographic evidence of the event (Fig. 1). The event in Figure 1 is a rare observation and raises many questions regarding coyotes in general and coyote populations inhabiting the Wichita Mountains. This attack is unique, involving a solitary coyote and large ungulate but the manner in which it occurred is an anomaly in particular. Verified coyote attacks on large ungulates involve coordinated efforts by multiple coyotes utilizing a series of attacks to various parts of the body, often the posterior, resulting in multiple injuries. Once injured, the prey animal is tracked over the course of hours and days until the prey animal

becomes weak and unable to flee or defend itself. As seen in Fig 1, the attack involved only one strike by the coyote to secure the elk by the throat and after a brief struggle, the elk expired. This mode of hunting is more typical of larger apex predators (e.g., wolf, cougar, etc). This raises many biological questions. Presented here are photographs of the attack and goals of our project examining the foraging ecology of coyotes int the area of the documented attack.

14. Addison G. Allen*[a] (MS), Daniel C. Allen[b], Zachary P. Roehrs[c], R. Scott Seville[d], Hayley C. Lanier[a]. *Is postfire succession correlated with ecological shifts in the North American deermouse (*Peromyscus maniculatus*)?* [a]Department of Mammalogy, Sam Noble Museum; Department of Biology, University of Oklahoma. [b]Department of Biology, University of Oklahoma. [c]School of Math and Sciences, Laramie County Community College. [d]Department of Zoology and Physiology, University of Wyoming at Casper.

Fires have become more prevalent in the U.S. over the last few decades, drastically changing habitats and impacting mammal communities. Studies on small mammals in the Yellowstone region indicate predictable community shifts associated with fire disturbances. Immediately following a fire, North American deermice (*Peromyscus maniculatus*) predominate in burned areas that were previously dominated by southern red-backed voles (*Myodes gapperi*). However, as post-fire succession progresses, relative abundance slowly shifts to favor *M. gapperi*. A new set of fires swept through our study sites in 2016, and in the 2017 field season *P. maniculatus* was restored to ecological dominance in newly burned areas. What is unknown is whether this dramatic ecological transition is correlated with, or possibly facilitated by, any dietary or morphological changes within *P. maniculatus*. For this project we investigated cranial morphology using geometric morphometrics and diet using carbon and nitrogen stable isotopes focused on comparing two groups: deermice collected in the years before the 2016 fire (pre-burn) and deermice collected the year immediately following the fire (post-burn). Results suggest significant differences in morphology based on the year a specimen was captured, but these shifts were not significantly related to the pre/post fire groupings. These results provide important insights into how the ecology of a dominant small mammal is impacted by fire succession and the degree to which dietary generalism facilitates early colonization post-fire.

15. Will Childress* (PhD), W. Sue Fairbanks. *Mapping the dispersal of the sarcoptic mange mite (*Sarcoptes scabeie*) in black bear (*Ursus americanus*) populations across the United States*. Department of Natural Resource Ecology and Management, Oklahoma State University.

After its first appearance in Michigan's black bear population in 1984, sarcoptic mange has become more prevalent in black bear populations across the northeastern United States. Little is known about how sarcoptic mange came to infest black bear populations, or even how the mites spread within populations. To date, Pennsylvania has been the epicenter for sarcoptic mange cases in black bear populations. Prior to the summer of 2018, sarcoptic mange was found only in black bear populations in the northeastern United States. Trapping efforts in Oklahoma's Ozark Highland population were successful in capturing a female with clinical sarcoptic mange. Arkansas also had confirmed cases within the same Ozark Highland population throughout the summer of 2018. To understand the extent of sarcoptic mange in black bear populations, we conducted

phone surveys with bear biologists in every state containing a viable black bear population in order to determine the presence/absence of sarcoptic mange within each state. Mapping presence/absence data will allow us to map the spread of sarcoptic mange across black bear populations in the United States. A more detailed, county level map was created to show the occurrence and distribution of sarcoptic mange through the Ozark Highland black bear population in Oklahoma and Arkansas.

16. Madeleine Cleary* (MS), Omkar Joshi, W. Sue Fairbanks. *Human dimensions of black bear (*Ursus americanus*) management in eastern Oklahoma: an assessment of cognitive hierarchy components, risk perceptions, and population tolerances.* Department of Natural Resource Ecology and Management, Oklahoma State University.

After a successful reintroduction in the 1960s, black bears have recolonized the Ouachita and Ozark mountains of Oklahoma. Since recolonization, anthropogenic habitat alteration has increased – creating overlap between black bears and humans in the rural and suburban parts of their range. As both human and black bear populations increase in eastern Oklahoma, the frequency of human-black bear interaction is expected to increase as well, which can cause human attitudes towards black bears to shift and can complicate management. Eastern Oklahoma offers a unique opportunity for human dimensions research because it represents a three-zone gradient of black bear presence and hunting conditions. For example, southeastern Oklahoma has a well-established black bear population and a bear hunting season, east central Oklahoma hosts a lower abundance of black bears and no hunting season, and northeastern Oklahoma has no black bears and thus no black bear hunting season. To understand how residents view black bears across this gradient, we administered a mail survey to collect information on risk perception, elements of the "value-attitude-behavior" cognitive hierarchy, and social carrying capacity from residents of eastern Oklahoma. Study design and research protocol are discussed. Survey results will inform black bear management and direct outreach initiatives.

17. Carlie Jennings* (UG), Sarah Vrla. *A qualitative survey of ultraviolet (UV) reflective morphology in mammals.* Department of Biology, University of Central Oklahoma.

Communication in the ultraviolet (UV) has an array of adaptive functions such as foraging, social signaling, sexual selection, nectar-location, territory marking, etc., and is known to occur in a wide variety of taxa including plants, insects, reptiles, birds, and mammals. Communication in the UV requires some form of signaling mechanism, in the form of UV reflective morphology (i.e. hair) as well as a visual system capable of interpreting wavelengths in the upper UV range (390 nm). Reflection of ultraviolet light by morphological markings in the kangaroo rat, *Dipodomys ordii*, has been confirmed (McDonald et al., unpublished). This UV-reflective morphology has been validated quantitatively through UV-VIS photospectrometery and subsequently corroborated qualitatively with UV-photography. McDonald et al. also found UV-reflectivity in gophers (Geomyidae) and jerboas (Dipodidae) qualitatively using the same UV-photography protocol. This method incorporates the UV-reflective standard Fluorion to visually discriminate between UV-reflectivity and absorption while also allowing us to estimate the degree of reflectivity observed. Using this approach, we examined UV-reflective morphology in a variety of mammalian species. We

investigated UV-reflective morphology in Order Rodentia (Families Cricetidae, Sciuridae, and Muridae), Order Eulipotyphla (Families Talpidae and Soricidae), Order Chiroptera (Families Vespertilionidae, Molossidae, and Pteropodidae), and Order Carnivora (Families Canidae, Felidae, Procyonidae, Mephitidae, and Mustelidae). Here we present our preliminary findings of species that exhibit some degree of UV reflective morphology. These results qualitatively suggest UV-reflection among these species, though further study is needed to determine if any of these morphologies have any adaptive significance or are the product of neutral selection.

18. Brenna L. Lawless*[a] (UG), Morgan A. Noland[a], Curtis J. Schmidt[b], and Mitchell J. Greer[a]. *Small scale restoration of the Sternberg Natural Area: influences on small mammal communities.*
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Human influences, such and urbanization and land use change, have drastically altered the structure and function of grassland ecosystems. Conservation and restoration of these areas are vital in preserving diversity across the Great Plains. The Howard Reynolds Natural Area, located on the Sternberg Museum property Hays, KS, USA, has undergone numerous restoration efforts (e.g. tree removal, prescribed burning, and forb garden establishment) to increase the ecological integrity of the area as well as appeal to stakeholders for outdoor recreation. Our objective was to determine if these restoration activities are having an influence on the small mammal community. Trapping seasons consisted of four trap nights per season, with five transects each containing twenty Sherman live traps spaced ten meters apart, with three season per year (May, September, and November). Preliminary results have shown that both species richness and number of individuals have decreased from the last two consecutive years (May and September comparisons) of trapping. Specifically, hispid cotton rat (*Sigmodon hispidus*) has declined. This cotton rat decline may be due, in part, to the increased precipitation amount and frequent flooding to the area during the late summer months. The decrease in species richness is most likely due to the low number of captures for some species, making them easy to miss in a single trapping season. For future research, a long-term monitoring plan is crucial in determining the small mammal response to restoration activities, as great variability has been seen year to year.