Abstracts of Paper Presentations, KOS Fall 2020 Virtual Meeting

Breeding provenance of non-harlani dark morph Red-tailed Hawks wintering in Kansas

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Wintering Red-tailed Hawks (*Buteo jamaicensis*) in Kansas exhibit a large amount of plumage variation, leading ornithologists to believe that five subspecies winter in the state. Due to our incomplete knowledge of both breeding distribution and plumage variation in certain subspecies, assigning wintering birds to subspecies can be problematic. Two phenotypes of dark morph Red-tailed Hawks regularly winter in Kansas, one has been assigned to subspecies harlani and the other to the western subspecies calurus. However, some authorities suggest that instead of calurus, this phenotype represents an undescribed dark morph of the abieticola subspecies breeding in northern Canada. In late winter 2020 we deployed GPS-GSM transmitters on two dark morph (non-harlani) Red-tailed Hawks in northeastern Kansas to determine their breeding provenance. We tracked both birds to northern British Columbia in May, where they last passed through cell coverage. Once these birds return south this fall, data on breeding localities should be available via cell towers.

Window-bird strikes at a nature center: An unfortunate (and ironic) case study

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Window strikes by birds have been well documented as a significant source of mortality. With more than 50 floor-to-ceiling exterior window panels, the Kansas Wetlands Education Center (KWEC), in Barton County, KS, has first-hand experience of the deleterious effects of windows on birds. Starting in December 2009, KWEC staff began tracking bird-window strikes. Date, species, and location of strikes for each incident were recorded. In 10 years, 142 total window strikes were documented (48% of the strikes were observably fatal), including strikes by 27 species of birds. This dataset will provide baseline data for evaluating future mitigation efforts at KWEC.

Closing a Major Biogeographic Barrier: The Great Plains of North America

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The Great Plains has been considered as one of the major biogeographic barriers of North America, dividing the temperate forests of eastern and western North America with broad grassland areas. However, the Great Plains has seen massive change, with small and large cities and other settlements providing forest islands, and fire suppression causing broad afforestation across major portions of the region. Here, we analyze temporal dimensions of range expansion by eastern forest-associated bird species into the Great Plains and attempt to separate effects of changing land cover patterns, changing climates, and latitude, in enabling or braking these range expansions.

Climatic variability explains interannual variation in breeding distributions of Grasshopper Sparrows

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Grassland bird populations are declining rapidly and understanding the causes of population declines is critical to help conserve them. However, understanding causes of declines is made more difficult as grassland birds have low site fidelity relative to birds in other systems. Low site fidelity complicates measures of population size, as smaller local abundance does not necessarily mean lower population sizes, and birds may simply have dispersed elsewhere. Because of the difficulty teasing out the effects of site fidelity and population declines, understanding the causes of grassland birds' low site fidelity is critical. We used citizen science data from eBird to compare the distributions of central Grasshopper Sparrows (*Ammodramus savannarum perpallidus*) across the Great Plains of the central United States, as well as weather and phenology data from PRISM and MODIS, respectively. We predict that (a) lower temperatures on the wintering grounds in winter will result in a greater degree of change in local abundance, due to a higher rate of winter mortality. We also predict that (b) lower temperatures on the breeding grounds during spring migration (April) will result in a decrease in local abundance, as it may be more efficient for birds to leave than weather the cold. Third, we predict that (c) the larger the difference in precipitation in the preceding year, the larger the difference in vegetation, and therefore the larger the difference in local abundance. Finally, the earlier the start of the growing season, we predict (d) a larger difference in local abundance, as birds will be able to make more informed decisions about what conditions will be like later in the year. Understanding which local weather or phenological variables have the greatest effect on Grasshopper Sparrow local abundance will give us a better prediction of where sparrows will go in a given year and can allow us to allocate management efforts accordingly.

Apparent survival is correlated with lagged precipitation in a mobile grassland songbird

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In mobile species, population growth rates are determined by birth, death, immigration, and emigration. Many factors may influence demographic rates, particularly for migratory birds that face pressures on different vital rates throughout their range. In midcontinental grasslands, disturbance (e.g. fire and grazing) and precipitation drive variation in grassland structure and function, but mechanistic links between precipitation and demographic rates remain inconclusive. Grasshopper Sparrows (*Ammodramus savannarum*) are a highly mobile, migratory songbird that exhibit within-season dispersal rates of over 50% and interannual return rates of anywhere between 0-80%. Over a 7 year period, we collected capture histories for 1505 individually-marked Grasshopper Sparrows at Konza Prairie, Kansas. We related estimates of detection and apparent survival to a priori sets of precipitation metrics to 1) determine the times and locations throughout the annual cycle most strongly influencing demographic rates, and 2) evaluate putative alternative drivers of movement and mortality. We found precipitation from two years prior to be most strongly associated with apparent survival estimates, suggesting habitat structure mediated by multi-year climatic histories is among the strongest drivers of local demography. Given the relative importance of movement to mortality in this system, these environmental factors likely influence immigration and emigration. Our study elucidates the lasting effects of climatic variability, providing insights for avian community responses as weather becomes increasingly unpredictable.

Do Behavioral Tendencies Present Reproductive Tradeoffs in Dickcissels?

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Intraspecific variation in behavior can have important evolutionary and ecological consequences. Such variation might involve tradeoffs, potentially affecting some, but not all demographic parameters (e.g., components of reproductive success or survival). Using the dickcissel (*Spiza americana*) as a model organism, we are investigating how behavioral tendencies might affect multiple sources of variation in reproductive success. Specifically, we are exploring how variation in two behavioral types (boldness and activity) relate to three components of dickcissel reproductive success: nest predation, brood parasitism, and nestling condition. Boldness and activity might be positively or negatively correlated with one another, which may affect the degree with which each behavioral type affects each component of reproductive success. The observed patterns will give us a better understanding of how selection might act on certain behavioral tendencies. Data collection is taking place on the Tallgrass Prairie National Preserve during the breeding seasons of 2020 and 2021 from mid-May to early August each year. During the 2020 field season, we located 82 nests. Each nest was visited twice a week where multiple metrics of boldness and activity, as well as nest contents were recorded. Preliminary results have shown that females who tend to be more bold or active in one metric are also more bold or active in another metric, respectively. Additionally, females who tend to be bolder also tend to be more active. Our future analyses will use multi-factor analysis to develop composite scores of boldness and activity, which in turn will be compared to reproductive indices.

Great Horned Owl Diversity in the Americas and in Kansas

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Great Horned Owls (*Bubo virginianus*) are known for considerable geographic variation in both plumage and size. This variation has led to the recognition of 15 subspecies, but little is known about genetic diversity and how close these differences are associated with described morphology. I used thousands of genetic markers to examine genetic diversity across this wide-ranging species, from Canada to southern Argentina. These markers confirmed suspicions that the Magellanic Horned Owl is both behaviorally and genetically distinct enough to be considered a separate species. These results also indicated that there is little genetic differentiation throughout much of North America despite considerable plumage and size differentiation. The genetic similarity across these populations begs several evolutionary questions. Two different-looking populations of B. virginianus meet in Kansas and form a contact zone. I plan to examine this contact zone to look at whether plumage patterns match genetic patterns and whether the parasites associated with this species are more closely associated with the genetics of their hosts or the plumage patterns. Preliminary quantitative photography data on Kansas *B. virginianus* show an observable difference in plumage characteristics across the state that will be used in conjunction with future genetic data of owls and their feather lice to address these questions.

Evaluating the avian and vegetative communities of Mined Land Wildlife Areas in Cherokee and Crawford counties

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The Mined Land Wildlife Areas (MLWAs) of Southeast Kansas represent a diverse patchwork of ecosystems in varying stage of succession, including grasslands, shrublands, and forests. The goal of our study is to assess the conservation value of strip-mined land vegetation for bird communities. During this 2020 pilot season, we conducted point counts and vegetation sampling at 67 locations in Crawford and Cherokee counties that were previously mined. A total of 74 species were detected, including fourteen species of greatest conservation need, as identified in the Kansas Wildlife Action Plan. We also located and monitored 48 nests from 8 species 11 of which fledged young. In the future, we will focus our nest searching efforts on Bell's vireos (*Vireo bellii*) because of its scarcity in the state of Kansas and its presence on the species of greatest conservation need list. Preliminary analyses indicate that reclaimed mined land may support similar bird communities to those adjacent unmined areas. However, it remains unclear if sites dominated by invasive species are negatively affecting individual species. Ongoing work will continue to evaluate the relationships between mined land vegetation and avifauna communities to inform habitat restoration on the MLWAs.

Is grassland always grassland? Spatial variation in the selection of grassland patches by lesser prairie-chickens during the breeding season

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United States grasslands have experienced large-scale declines since European settlement, which have led to habitat loss and fragmentation for many wildlife species. Lesser Prairie-chickens (*Tympanuchus pallidicinctus*) have been especially affected, as their occupied range and population abundance have declined by ~90%. Informing management strategies to ensure the long-term persistence of Lesser Prairie-chickens requires unbiased estimates of resource selection. Lesser Prairie-chickens generally select for grasslands, but vegetation cover and structure of grassland patches depend on many factors, including grazing and burning regime, soil type and elevation. Moreover, grasslands experience large spatiotemporal variation in precipitation and temperature. The structure and composition of available grassland patches will therefore likely vary throughout the Lesser Prairie-chicken range. We assessed spatial variation in breeding season resource selection by Lesser Prairie-chickens at 4 sites in Kansas and Colorado, representing 3 of the 4 currently occupied ecoregions. During 2013–2018, we equipped Lesser Prairie-chickens with VHF or GPS transmitters and used selection ratios to test within-home-range selection of grassland patches. We found that Lesser Prairie-chickens selected ungrazed

rangeland, CRP fields, and grasslands containing >10% shrub cover at sites in eastern Colorado and northwestern Kansas, where annual precipitation and resulting vegetation height were low. In contrast, Lesser Prairie-chicken at more eastern sites in south-central Kansas selected for forb-rich grasslands and against shrubby grasslands in most years. Differences in resource selection among populations complicates the conservation of Lesser Prairie-chickens. However, our estimates of resource selection could help to find suitable management strategies for local grasslands for current populations to persist.

Supporting grassland birds using spring cover crops

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Conflicts between agricultural producers and wildlife are spreading and intensifying. Managers must search for compromises between these competing interests so both can flourish through land sharing within a limited landscape. Cover crops offer potential common ground. Cover crop benefits for farmers are widely documented and varied while benefits for wildlife are widely assumed but have little evidential support. We worked with landowners from 2017 – 2019 in western Kansas to gather evidence on the influence of spring cover crops on local wildlife. Planted in March and terminated in June, spring cover crops transform a barren, chemical fallow field into a potential source of cover and food for wildlife species. Study fields were divided into 4 treatments consisting of 3 cover crop seed mixes and a chemical fallow control plot. Our cover crop mixes included Chick Magnet (a warm-season, broad-leafed forb mix designed for precocial chicks), GreenSpring (an agricultural forage mix with cool-seasoned peas and oats), and a Custom Mix (designed to be adaptive with ten species). We monitored vegetation structure, vegetation composition, and insect abundance weekly. Resources in cover crop fields differed from chemical fallow and Conservation Reserve Program fields, offering a different set of resources to wildlife.

Greater Prairie-chicken habitat selection within a mosaic burning regime on Fort Riley Military Reservation

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Greater Prairie-chickens (*Tympanuchus cupido*) face large-scale disturbances in the form of habitat loss and conversion of the prairies in which they reside. Even large tracts of remaining grasslands, such as the Flint Hills ecoregion, are not free from disturbances caused by contemporary land management practices such as ranching. Some ranching practices implement annual burning or intensive grazing regimes that may decrease habitat availability for Greater Prairie-chickens. Fort Riley Military Reservation in Riley and Geary counties, KS may prove to be a refuge for Greater Prairie-chickens as grazing is not allowed and burn regimes are characterized as a mosaic style, leaving a heterogeneous matrix of vegetation on the landscape. This heterogeneous landscape prompted us to assess relative use of available habitat types by Greater

Prairie-chickens on the reservation. We tracked the movements and space use of 38 females from April-August 2019 and 2020. Females predominately selected for frequently burned areas (every 1 to 2 years). We also found used and nest locations to be in similar areas on the landscape in 2019 and 2020 despite annual shifts in burn frequencies in those areas. This shift in burn frequencies led to a significant difference in nest success between frequently and moderately burned areas (9% and 21% respectively). Information on the influence of the mosaic burning regime on habitat selection by Greater-Prairie chickens will aid in the development of specific management recommendations for the conservation of Greater Prairie-chickens on Fort Riley Military Reservation.