
Abstracts
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MARSH WREN SALINE WETLAND PROJECT

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ABSTRACT.—Marsh Wren encompasses approximately 150 acres and contains approximately 48 acres of categorized saline wetlands on the north edge of the City of Lincoln. It is owned by the Lower Platte South NRD. A saline wetland restoration project was initiated in 2014. Construction commenced in 2016 and will be completed by the fall of 2017. The comprehensive project included traditional restoration methods but also includes a supplemental saline water distribution system derived from two saline wells.

RAPTOR MIGRATION IN THE MISSOURI RIVER VALLEY: RECENT CHANGES IN MIGRATION PATTERNS

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ABSTRACT .—The Hitchcock Nature Center is located on the Iowa side of the Missouri River across from Ft. Calhoun, Nebraska. Clem Klaphake, a 15 year veteran of the Hitchcock Nature Center's Annual Fall Hawkwatch, will present the most recent information from the count results of migratory common and rare raptor species. Questions that will be dealt with are: why are numbers of some species declining? Why do some remain unchanged and others increase? Clem is a birder, does live raptor programs for Fontenelle Forest, is a Master Naturalist and is a raptorophile.

ECOSYSTEM SERVICE TRADEOFFS ASSOCIATED WITH EASTERN REDCEDAR IN NEBRASKA

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ABSTRACT.—Invasive species have been widely documented to alter ecosystem services (hereafter ES). To maintain current suites of ES, communities often place a high priority on preventing the spread of invasive species. However, most invasive species benefit at least one ES, but have an overall negative impact on ES provisioning. This often results in groups establishing contrasting viewpoints, manifesting in contradicting invasive species management practices. This represents a major issue for natural resource management. Here, we focus on the invasion of eastern redcedar (*Juniperus virginianus*; hereafter cedar) into Nebraska's grasslands where some agencies spend millions of dollars on cedar removal while others plant cedar. Our objectives were to contrast the ES costs and benefits associated with cedar planting and the subsequent invasion. Additionally, we wanted to document Nebraskan's opinion of cedar expansion. To accomplish this, we synthesized findings from the scientific literature and reports regarding the impacts of cedar invasion, and in 2016 we surveyed the public's opinion on cedar expansion in Nebraska. Results revealed an ES tradeoff between the ES gains at the scale of a shelterbelt and losses at the scale of rangelands. At the shelterbelt, cedar provides an ~60–160-m region of shelter downwind, ES gains were constrained to this region. Primary ES gains were an increase in water-use efficiency for crops, a 6–44% increase in crop yields, wind erosion control, and a savings of ~25% in residential heating costs. Major ES losses in rangelands were a loss in native diversity, wildfire control, stream flow reductions and up to a 99% loss in herbaceous forage. Forage production in Nebraska's rangelands is directly linked to livestock production, associated income, jobs, and funding for K–12 education. Despite the negative ecosystem impacts, only 36% of Nebraskans see juniper invasion as an issue. ES gains at the shelterbelt scale have likely led to management practices that promote cedar persistence and therefore the loss of ES in rangelands. Findings here suggest that natural resource agencies should coordinate management practices that promote the provisioning of ecosystem services most valued by Nebraskans.

INTEGRATED MONITORING IN BIRD CONSERVATION REGIONS IN THE PLAYA LAKES JOINT VENTURE
REGION: YEARS ONE (2016) AND TWO (2017) SAMPLING FROM THE PANHANDLE OF NEBRASKA

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ABSTRACT.— We report on results from the first season of data collection under the Integrated Monitoring for Bird Conservation Regions protocol (IMBCR) in the Playa Lakes Joint Venture. IMBCR is a statistically robust sampling design for collecting breeding bird data. Each randomly located sample unit is a 1-km² grid, within which point counts are conducted at 16 stations. Count and distance to each bird are recorded for 6 minutes in 1-minute intervals using a removal design, allowing for use of a variety of modeling methodologies. In addition, coarse vegetation data are also collected at each point count location; these data can be used with the bird data to answer questions about habitat use. In Nebraska, data were collected in the Sand Sage Biologically Unique Landscape (BUL), Pine Ridge BUL, Wildcat Hills BUL, and all other lands. We will discuss the IMBCR sampling protocol, the successful 2016 and 2017 field seasons, and how PLJV is working with NGPC to answer management questions with these data.

EXTREME FIRE RESTORES BIOMASS PRODUCTION IN JUNIPER-INVADDED GRASSLANDS

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ABSTRACT.—In landscapes co-dominated by grassland and closed-canopy juniper woodland, high-intensity prescribed fire is capable of surpassing the fireline intensity-juniper mortality threshold and causing the collapse of a juniper-woodland state. However, the long-term trajectory of biomass production following the collapse of a juniper-woodland state (via extreme fire) has yet to be identified. This is the first study to track the quantity and composition of above-ground herbaceous biomass following the collapse of a juniper-woodland state via extreme fire. This study was conducted in the Loess Canyons Biologically Unique Landscape near Curtis, Nebraska. We focus our sampling in landscapes co-dominated by eastern redcedar (*Juniperus virginiana*) woodland and mixed-grass prairie. Above-ground herbaceous biomass was harvested from 21 burn units ranging from 0–15 years since fire. In each burn unit, biomass was harvested both directly beneath a collapsed-juniper woodland patch

(tree skeletons, no crown foliage) and within an adjacent grassland patch. Biomass was harvested from 10 0.1-m² plots randomly placed underneath a closed-canopy juniper woodland or within an open grassland patch (20 plots per burn unit). We repeated this process for five, intact juniper woodland patches to serve as a reference point. Biomass was dried for 72 hrs in a 70°C convection oven and weighed. Samples were then separated into graminoids and forbs and re-weighed. Average biomass underneath intact juniper-woodland was 5.05 g/m², with 95% of the biomass consisting of graminoids. One year following extreme fire, biomass underneath collapsed-juniper woodlands increased 97% (from intact woodlands) to 234.37 g/m² with 50% of the biomass consisting of graminoids and 50% consisting of forbs. Average biomass in collapsed-juniper woodland reached a maximum of 352.98 g/m² after 7 years since extreme fire with 98% consisting of graminoids. Results from the adjacent grassland patch have yet to be finalized. The results from the adjacent grassland patches will help contextualize our data to the actual site potential (in terms of biomass production) for each burn unit and serve as a tool for measuring if restoration goals have been met using extreme fire.

SANDHILL CRANE ROOST LOCATIONS IN RELATION TO FLOW AND CHANNEL WIDTH ALONG THE CENTRAL PLATTE RIVER

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ABSTRACT.—Wide channels with short bank vegetation, access to nearby foraging habitat, and absence of disturbance features are factors commonly associated with suitable roost sites for Sandhill Cranes (*Antigone canadensis*). However, since channel width has typically been evaluated independently of channel depth or flow, it is possible that use of narrow channels is not limited so much by a requirement for wider channels but by deeper water that flows through these narrow channels. We used a discrete-choice modeling framework and 9 years of data of roost locations of Sandhill Cranes to evaluate the influence channel-width measures and flow per linear unit of channel width have on roost-site selection. Roost site selection was influenced by maximum unvegetated channel width and flow per unit length of total unvegetated channel width (unit discharge). The relative selection ratio increased as maximum unvegetated channel width increased but was statistically similar for maximum unobstructed channel widths ≥ 719 ft. The relative selection ratio was maximized when flows were at the lowest unit discharge levels observed during our study. While we do not advocate for a dry channel, our results indicate increasing flows in the Platte River during the spring staging period (Mar– Apr) would decrease habitat suitability for Sandhill Cranes. While Sandhill Cranes stage within the central Platte River valley for a longer time interval in the spring, Whooping Cranes also use the Platte River as a stopover point. Both species share similar indices for roosting habitat such as unobstructed channel width and shallow water depths. Results of this investigation could be used to establish flow targets that optimize roosting habitat for Sandhill Cranes and potentially Whooping Cranes along the central Platte River.

SOCIAL-ECOLOGICAL DYNAMICS OF REDCEDAR ABUNDANCE IN NEBRASKA

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ABSTRACT.—Encroachment of eastern redcedar (*Juniperus virginiana*) threatens Nebraska's grasslands. While redcedar is manageable through fire, haying, and manual removal, management success is largely relegated to the field scale (~100 ha; 10 year). The Southern Great Plains region, for instance, has experienced severe redcedar encroachment and associated loss of rangeland ecosystem services even in light of this management knowledge. Regional scale (>100,000 ha; many decades) management failure may be attributable to a lack of management frequency/intensity, social variables (e.g., windbreak plantings), underlying ecological variables (e.g., soil type), or other unknowns in the system. This uncertainty must be urgently addressed in order to protect Nebraska's rangelands. To reduce this uncertainty, we will use a multi-model inference framework to assess which of an array of social-ecological indicators and combinations thereof best explain county-level redcedar abundance. These results will contribute to a growing understanding surrounding why existing management knowledge was insufficient to halt and reverse redcedar encroachment in the southern Great Plains, so that Nebraska's rangelands do not meet a similar fate.

SITE OCCUPANCY AND BEHAVIOR OF MIGRATORY SHOREBIRDS IN AGRICULTURE FIELDS IN THE RAINWATER BASIN, NE.

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ABSTRACT.—Some upland shorebird species are undergoing population declines. During northward migration, these species stopover in agricultural landscapes. These landscapes are typically lower in resources, which could compromise energy demands during migration, and may carry risks associated with agricultural practices. We lack information on what landscape features influence where species stop and how species use agricultural habitats. To close this gap, I compared landscape features between agriculture fields where species were present and absent and developed models to predict migratory stopping sites. I focused on three species: American Golden-Plover (*Pluvialis dominica*), Buff-

breasted Sandpiper (*Calidris subruficollis*), and Upland Sandpiper (*Bartramia longicauda*). I recorded flock and individual behavior to document how these species use sites. While all three species use upland sites, each responds to different landscape features and displays different behaviors. American Golden-Plovers occupied sites with greater variation in slope, and flocks and individuals spent significantly more time resting and preening in these fields compared to the two other species. Buff-breasted Sandpipers occupied sites that were flatter and higher in elevation, and spent most of their time feeding. Buff-breasted Sandpipers engaged in more social activities and spent more time displaying courting behavior than the other two species. Upland Sandpipers occupied sites with higher elevations. They spent much of their time feeding and moving around in the fields. Individual Upland Sandpipers display more territorial behavior than the other two species. My results show that, while agriculture fields may appear homogenous, fields vary in ways that elicit responses from the birds, and how shorebirds use agricultural fields varies among species.

A STATEWIDE ASSESSMENT OF AWARENESS OF *JUNIPERUS VIRGINIANA* INVASION AND
MANAGEMENT IN NEBRASKA

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ABSTRACT.—A characteristic of many biological invasions is a period of rapid population growth following introduction. Management and control of the invading species is most likely to be successful if it occurs prior to that period of rapid growth. In Nebraska, the woody species *Juniperus virginiana* (eastern redcedar, ERC) is spreading into grasslands and rangelands where it was not historically present and has the potential to seriously disrupt Nebraska's unique prairie systems and the local economy. Cedar can be controlled in a variety of ways, including hand or mechanical removal, chemical removal, and prescribed burning. It is critical that the public understands the seriousness of the ecological and economic costs of ERC invasion and the importance of supporting appropriate management on both private and public lands. Scientific information about the hazards and management of ERC in Nebraska can be found as far back as the mid-1970s; however, we know little about how literate Nebraskans are on the topic. We utilized the 2015–2016 Nebraska Annual Social Indicators Survey to determine overall ERC literacy of Nebraskans, as well as to identify which demographics, if any, would benefit from future ERC awareness efforts. Preliminary results show that Nebraskans are more likely to say ERC is not a problem and that Nebraskans who live in open country that is not farmland are the most likely to say that ERC is not a problem. Of the respondents, 41% manage ERC, and they indicate that time (39%) is the biggest barrier to management, followed by money (23%). Curiously, lack of knowledge of control

options is not a major barrier (12%). The implication of these results is that awareness of ERC invasion in Nebraska is low, despite its seriousness.

LIFE HISTORY AND PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM CONTRIBUTIONS TO THE
CONTINUED EXISTENCE OF INTERIOR LEAST TERNS AND PIPING PLOVERS ALONG THE CENTRAL PLATTE
RIVER

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ABSTRACT.— Endangered interior Least Terns (*Sternula antillarum athalassos*) and threatened Piping Plovers (*Charadrius melodus*) nest on barren sandbars, shorelines, and off-channel habitats throughout their range. Given the high productivity of interior Least Terns and Piping Plovers on constructed off-channel nesting sites along the central Platte River in Nebraska, USA, and the possibility of creating similar habitats at other locations within their breeding range, understanding how these species use off-channel nesting habitats is important. We used data collected along the central Platte River in Nebraska, USA, over a 15-year period (2001–2015), and a discrete-choice modeling framework to assess the effects of physical site attributes and inter- and intra-specific associations on off-channel nest-site selection by interior Least Terns and Piping Plovers. We found that Piping Plovers avoided nesting near each other, whereas colonial interior Least Terns selected nest sites near those of conspecifics. In addition, the relative probability of use for both species was maximized when distance to the nearest predator perch was ≥ 150 m and elevation above the waterline was ≥ 3 m. Probability of use for nesting by interior Least Terns increased as distance to water increased, whereas the probability of use by Piping Plovers was maximized when distance to water was ~ 50 m. Our results suggest that important features of constructed, off-channel nesting sites for both species should include no potential predator perches within 150 m of nesting habitat and nesting areas at least 3 m above the waterline. Efficient site designs for interior Least Terns would be circular, maximizing the area of nesting habitat away from the shoreline, whereas an effective site design for Piping Plovers would be more linear, maximizing the area of nesting habitat near the waterline. An efficient site design for both species would be lobate, incorporating centralized nesting habitat for interior Least Terns and increased access to foraging areas for nesting and brood-rearing Piping Plovers. We also used 15 years of data at off-channel sites along the central Platte River to assess the influence of several biotic and abiotic factors on the survival of nests and broods. We observed high survival rates for interior Least Tern and Piping Plover nests and broods, as 2/3 of interior Least Tern and 3/4 of Piping Plover nests were successful and 3/4 of all interior Least Tern and Piping Plover broods were successful. We found productivity of interior Least Terns and Piping Plovers was reduced during both the nesting and brood rearing stage by climatic factors rather than factors that can be controlled. As such, we conclude habitat management activities

implemented at off-channel sites such as tree removal, predator trapping, construction of a water barrier surrounding the nesting area, and installation of predator fences are sufficient for maintaining high levels of productivity for interior Least Terns and Piping Plovers along the central Platte River.

AVIAN COMMUNITY RESPONSES TO MANAGEMENT OF *JUNIPERUS VIRGINIANA* IN THE LOESS CANYONS
OF NEBRASKA

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ABSTRACT.—Woody encroachment in grassland ecosystems of the Great Plains of North America, driven primarily by invasion of eastern redcedar (ERC; *Juniperus virginiana*), is resulting in reduction of suitable habitat for many grassland-dependant species, particularly grassland birds. Though ERC is native to the Great Plains region, widespread planting and fire suppression have allowed the species to spread into grassland areas where it was not found historically. ERC is now widespread in the Great Plains and is negatively impacting grassland-dependent ecosystem services, including forage production for the cattle industry. In the Loess Canyons region of Nebraska, landowners are working to restore rangeland for cattle production by using high intensity prescribed burns. This ~180,000-acre landscape is one of the largest restoration efforts in the Great Plains. We compared the avian communities between three zones within the Loess Canyons region: an ERC-dominated zone with little management intervention, the restoration zone managed intensively with prescribed burning, and a grassland-dominated zone, managed for cedar prevention. We used data from breeding season point count surveys conducted between 2009–2016 and non-metric multidimensional scaling to compare avian communities between the three zones. While there was overlap in similarity of avian communities between all three zones, sites tended to group based on zone, with many sites within the restoration zone approaching similarity to sites in the grassland-dominated zone. Both the ERC-dominated zone and the grassland-dominated zone contained species that were not found in the other two zones. Our results indicate that restoration efforts utilizing high intensity prescribed burning may be shifting avian communities towards a pre-ERC invasion state, potentially at broader scales than can be achieved with other restoration methods such as mechanical tree removal. Results from this study will help inform conservation efforts throughout Nebraska and the broader Great Plains region.

THE NEBRASKA CONSERVATION AND ENVIRONMENTAL REVIEW TOOL

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ABSTRACT.—This presentation provides an overview and demonstration of the Nebraska Conservation and Environmental Review Tool (CERT), an online interactive tool for conservation planning and conducting environmental reviews. The CERT provides conservation information on biological diversity, protected lands, and other natural resources for planning purposes. Users can query data layers and download tables with query information. Users can also make and download maps using the existing data layers or in combination with layers they upload. In addition, the CERT allows users to submit proposed projects for an automated environmental review from the Nebraska Game and Parks Commission and the U.S. Fish and Wildlife Service. The review will evaluate the project's location and activities for potential impacts to state and federally listed threatened and endangered species as well as other at-risk species. The CERT is available for anyone to use. To be able to submit projects for environmental review, users will need to register on the site. Making maps and querying data layers do not require registration.

MONITORING FOR FUTURE UNCERTAINTY

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ABSTRACT.—Across the planet, ecological uncertainty is rapidly increasing because of human land use, climate change, and invasions of exotic species. This uncertainty is manifesting as more and more cases of shifts from desirable ecological regimes (i.e., ecological states or communities such as native grasslands, ponderosa pine forests) to undesirable regimes (e.g., eastern redcedar-invaded grasslands, completely burnt ponderosa pine forests). Ecological monitoring methods able to detect or predict these so-called "regime shifts" (i.e., abrupt and persistent changes in system structure or function) from desirable to undesirable regimes would enable land managers to prioritize management actions and potentially prevent regime shifts. However, current monitoring methods, while amenable to

statistical rigor, lag behind this ecological uncertainty and often cannot detect landscape-scale effects, making regime shift prevention impossible. Novel statistical methods called "regime shift indicators" have proven capable of detecting and predicting continental-scale regime shifts over time and space, but they have never been tested at small scales such as individual conservation areas. With tree density, vegetation structure, and plant community data collected along 4-km transects spanning invaded pasturelands, burned ponderosa forest, riparian areas, oak-elm-basswood forest, and Sandhills grasslands at the Niobrara Valley Preserve, we 1) use regime shift indicators to identify ecological communities in space (i.e., spatial regimes) along the 4-km transect and 2) discuss spatial regimes and regime shift indicators as a basis for monitoring efforts that explicitly incorporate future surprise and ecological change, potentially provide early warnings of regime shifts, and reveal ecological drivers/perturbations.

BUILDING SUBURBAN DIVERSITY AND CONNECTIVE HABITAT

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ABSTRACT.—In the coming years, some ¾ of U.S. residents will live in or near cities. How will urban planners and landscape architects plan not only for sustainability but healthy environments for wildlife and humans? In this presentation, we will explore strategies to convert lawn into native plant landscapes that provide aesthetic delight for us and ecological function for the environment. From carbon sequestration to filtering water, to reducing mechanical inputs and home energy use, we will look at several home landscapes that are both low maintenance and highly functional habitats. As we face climate change and mass extinction, connecting such urban habitats will not only provide wildlife refuges, but also migratory corridors that will benefit all who share the urban experience.

THE ROLE OF EDUCATION IN THE BIGGER BIODIVERSITY PICTURE

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ABSTRACT.—Achieving a biodiverse ecosystem requires sound habitat management, rigorous scientific inventories and research, and quality education for a broad range of constituents. This session will focus on biodiversity education initiatives and their goals of educating the public about Nebraska's

species. Additionally, this session will focus on the current and future initiatives and how they play into the larger habitat and research realm as well as the education world in Nebraska.

TREE SPECIES DISTRIBUTION MODELS IN INDIAN CAVE STATE PARK

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ABSTRACT.—In the Missouri River bluffs of southeastern Nebraska, more than a century of fire suppression has transformed open-canopied oak (*Quercus* spp.) savannas and oak–hickory (*Carya* spp.) woodlands to closed-canopied forests dominated by more shade-tolerant tree species. To regain and maintain oak presence and dominance in these ecosystems, prescribed fire and manual understory and midstory tree thinning have been implemented in order to increase light availability for oak seedlings and sprouts. In addition to light availability, the geographic distributions of mature tree species are factors of interest in oak conservation and restoration; however, information on landscape-scale tree species distributions is sparse. In this chapter, I model and map the geographic distributions of mature individuals of 14 tree species in Indian Cave State Park (ICSP) in southeastern Nebraska with an ensemble modeling approach. Results indicate that no modeling technique within the ensembles consistently outperformed any other; however, predictive performance was consistently better for certain species, particularly American basswood (*Tilia americana*), red oak (*Quercus rubra*), chinkapin oak (*Quercus muehlenbergi*), black oak (*Quercus velutina*), and bur oak (*Quercus macrocarpa*), the predicted distributions of which largely correspond with prior descriptions in the scientific literature. When paired with predicted distributions of trees in smaller size classes, the results of this chapter could contribute useful information to ongoing oak restoration activities in ICSP.

THE IMPACTS OF MANAGEMENT DECISIONS ON PLANT DIVERSITY IN TALLGRASS PRAIRIES

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ABSTRACT.—The new Prairie Corridor on Haines Branch stretches 13 miles southwest of Lincoln, Nebraska and will eventually connect, protect, and restore thousands of tallgrass prairie acres. The corridor includes existing conservation areas (Pioneers Park Prairie and Spring Creek Prairie), replanted grasslands of various ages and histories, and privately owned hayfields and grazing land. When

completed, the prairie corridor will serve as an educational and recreational resource for the public and as habitat for pollinators and other wildlife species dependent on grasslands. The corridor's grasslands have diverse management histories including grazing, prescribed fire, haying, low-diversity CRP plantings, and high diversity local ecotype plantings. In partnership with Lincoln Parks and Recreation, Audubon's Spring Creek Prairie, and private landowners, we began assessing plant diversity across 20 grassland units in the Prairie Corridor in 2016. Results to date are intriguing: 1) "virgin" prairies under conservation management are not necessarily the most diverse; 2) recently burned, grazed, or hayed grassland units often have similar high-diversity communities, 3) replanted prairies have relatively high diversity but a different plant community compared to high quality prairie remnants. Our results should help the Prairie Corridor's land managers maintain prairie diversity within individual grassland units, as well as across the larger landscape.

POST-FIRE MANAGEMENT LEGACY EFFECTS IN SEVERELY BURNED PONDEROSA PINE SAVANNA

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ABSTRACT.—Multiple severe wildfires have occurred in recent decades within the ponderosa pine savannas of the Pine Ridge region of Nebraska. Post-fire management is a common tactic used in severely burned areas to decrease future wildfire risks and promote grazing or pine reestablishment. However, it remains unclear if post-fire treatment legacy effects persist multiple years after treatment application and how treated and untreated stands differ in stand structure, community composition, and pine recruitment. We measured a range of variables reflective of these characteristics across three different stand categories within and surrounding the 2006 Dawes Complex wildfire perimeter: (1) unburned ponderosa pine forests, (2) untreated ponderosa pine stands that burned at high to moderate severity, and (3) stands that burned at high to moderate severity and were subsequently treated with post-fire management. Preliminary analysis demonstrates marked differences in community composition, habitat characteristics, and pine recruitment across stand types, including differences in bird communities, coarse woody debris, and the number of pine seedlings. Our results highlight that post-fire management legacies persist for multiple years after treatment application and display both intended and inadvertent changes to the ecology of severely burned ponderosa pine stands.

RECRUITMENT, SURVIVAL, AND PARASITISM OF MONARCHS IN RESIDENTIAL GARDENS AND
CONSERVATION AREAS

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ABSTRACT.—Monarch butterflies (*Danaus plexippus*) are suffering from declining populations because of habitat loss. To help offset this habitat loss, conservationists have encouraged planting milkweed gardens to increase the availability of host plants for larvae. However, little is known about how these gardens benefit monarchs. Understanding the influence gardens can have on monarch recruitment, larval survival, and parasitism is vital to evaluating their effectiveness as a conservation strategy. A leading cause of mortality for later larvae instars is parasitism, mainly from *Lespesia archippivora*, a tachinid fly. I am quantifying egg/larval abundance and demography at conservation areas and residential gardens. Additionally, I am collecting and rearing monarch larvae to compare parasitism rates in both areas. In summer 2016, I successfully collected 130 larvae, with 32 larvae parasitized by *L. archippivora*. My preliminary results suggest that there is no significant difference between these two land use types in larval survival and parasitism. Currently, a second year of data is being collected.

A STAND SCALE ASSESSMENT OF NEBRASKA'S WILDCAT HILLS FORESTS, WOODLANDS, AND MIXED-
GRASS PRAIRIE

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ABSTRACT.—Nebraska's Wildcat Hills support an intact mosaic of ponderosa pine forests, woodlands, and mixed-grass prairie. It is home to one of Nebraska's Rocky Mountain bighorn sheep populations and contains several thousand acres of recreational land open to the public. The Wildcat Hills face multiple threats including climate change, wildfire, drought, pine beetles, and invasive species. In particular, ponderosa pine woodlands have experienced extreme wildfires throughout the western U.S. in recent decades. Fortunately, the Wildcat Hills have not seen the high intensity wildfires that the Niobrara River Valley and Pine Ridge have recently faced. Although there have been assessments of the plant communities in the Wildcat Hills, simple land cover classifications provided by state and federal agencies are the only data available to evaluate preliminary wildfire models. Neither of these assessments have evaluated the population density and age structure of ponderosa pine and competing invasive junipers. The age and size structure of Wildcat Hills woodlands affect both the ecology and the

potential fire behavior at both the stand and landscape scale. In addition, natural and post-fire tree regeneration is poorly understood in Nebraska's pine woodlands. Our study assesses the age structure, density, basal area, and health of ponderosa pine stands in the Wildcat Hills. This is part of a larger project contrasting the current status and fire behavior of the Wildcat Hills, the Pine Ridge, and Niobrara Valley. Insights from this study will help scientists and land managers understand the interactions of wildfire, climate change, and management in Nebraska's ponderosa pine landscapes.

THE EFFECTS OF BOBWHITE AND POLLINATOR CONSERVATION ON GRASSLAND SONGBIRDS IN
NEBRASKA

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ABSTRACT.—Grassland birds are one of the fastest declining groups of songbirds in North America, and the amount of suitable habitat available to them is shrinking. The remaining grasslands are often managed to meet multiple needs including human recreation and wildlife conservation. Privately owned lands managed to benefit bobwhite and other gamebirds for hunting could also provide habitat for native grassland songbirds. Similarly, plantings of wildflowers intended to benefit bees, butterflies, and other pollinators could improve habitat for songbirds. However, the effects of management for these different types of economically valuable wildlife on grassland songbirds have never been evaluated and compared. I propose to measure the effects of gamebird management and wildflower pollinator plantings on breeding songbird territory sizes, placement, and densities. I will also measure bobwhite habitat use and density, and estimate densities of nectar sources available to pollinators. This study will be the first to evaluate the effects of gamebird and pollinator conservation on both the main targets of conservation and non-target grassland songbirds. My findings will help habitat managers evaluate which types of habitat alterations benefit the largest group of vulnerable species.

HABITAT MANAGEMENT FOR BATS AND OTHER WILDLIFE IN THE PINE RIDGE BIOLOGICALLY UNIQUE
LANDSCAPE

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ABSTRACT.—The Pine Ridge Biologically Unique Landscape (BUL) is a rocky escarpment that rises several hundred feet from the surrounding plains in Sioux, Dawes, and Sheridan counties in northwest Nebraska. Being a pine-dominated escarpment within the Great Plains grassland, the Pine

Ridge supports many at-risk species that are not generally found in non-forested regions, including western bat species. Concern about the continuing threat of White Nose Syndrome (WNS) and other threats to bats has led to bat species, such as the federally listed northern long-eared bat (*Myotis septentrionalis*) and other species identified in the Nebraska Natural Legacy Project, being identified as conservation targets for the Pine Ridge BUL. Conservation actions include both research and habitat improvement. Research efforts by others including researchers from University of Nebraska – Lincoln and University of Nebraska–Kearney to assess the status of bat species in Nebraska, identify characteristics of bat maternity and summer roosts, and assess the risk of WNS in Nebraska and Wyoming are ongoing. We will be implementing habitat projects across the Pine Ridge to help address conservation concerns to bats. Our habitat improvement objectives will include enhancing foraging areas, addressing the need for a diverse forest, incorporating clean water, open areas, edges, roost locations, and minimizing potential threats to habitat. In addition to improving and providing available habitat, project sites will also be monitored pre and post implementation using AnaBat Express™ stationary passive acoustic bat detectors to assess bat use on the sites. This multi-partner/multi-state effort exemplifies conservation strategies that make use of a variety of land management practices, which will benefit not only bats but many other at-risk wildlife species as well.

PROPAGATION OF NATIVE MUSSELS IN NEBRASKA

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ABSTRACT.—Because of the severe decline of native freshwater mussel populations in Nebraska in the last 100 years, interest in propagation and augmentation of populations has increased. In 2014, an initial attempt was made to propagate Plain Pocketbook (*Lampsilis cardium*). Success was somewhat limited but set the stage for successful production in the years since. The North Platte Hatchery is currently culturing two species, Plain Pocketbook and Fatmucket (*Lampsilis siliquoidea*). These are being cultured both intensively, in staff designed systems, and also extensively in fish culture ponds. The first year of releases into the waters of Nebraska took place in the fall of 2016 with mussels cultured in 2015. A variety of tags were utilized to identify all released mussels as well as PIT (Passive Integrated Transponder) tags to allow monitoring of stocked individuals. The University of Nebraska-Lincoln and the Nebraska Game and Parks Commission are collaborating to monitor released mussels. During the fall of 2017, a mussel culture facility is being built at North Platte Fish Hatchery with funds from a “State Wildlife Grant” (USFWS), the Nebraska Environmental Trust, and the Game and Parks Commission. A “Nebraska Mussel Reintroduction Plan” is in the works and will serve as the leading document, hopefully by the spring of 2018.

NEBRASKA NABAT: A MODEL FOR UTILIZING VOLUNTEERS FOR BAT RESEARCH

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ABSTRACT.—Bats are facing many threats in the United States today. Threats such as White Nose Syndrome, wind energy, and habitat loss have made this a critical time to determine the habitat requirements and relative abundance of the bats in Nebraska. Because of the urgency of data collection and limited resources for funding, Citizen Scientists have been utilized to implement the North American Bat Monitoring Program in Nebraska. This presentation will outline the framework used for managing and supervising volunteers for in-depth habitat and population assessments of Nebraska's bats. It will also cover the time commitment of volunteers and the monetary investments required by governing agencies. This will also provide an opportunity to present preliminary results of the project and plans/steps to move the project forward into the future.

MONITORING REINTRODUCED FRESHWATER MUSSELS IN NEBRASKA

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ABSTRACT.— The freshwater mussel Plain Pocketbook *Lampsilis cardium* has been listed as a Tier I species in the Nebraska State Wildlife Action Plan since 2005. Propagation of this species, in accordance with the Plain Pocketbook Fatmucket Restoration Plan, led to initial stockings of subadults in four Nebraska streams during fall 2016. Monitoring by the University of Nebraska began the following spring to determine population demographics as well as factors affecting survival and incremental growth. Stream sites are being sampled for uniquely tagged individuals and habitat characteristics, and preliminary results provide insight on reintroduction success. Additional stockings took place in June 2017 and sampling is already underway to quantify immediate survival. Monitoring biological changes as well as environmental conditions will help us understand their interactions and can direct conservation efforts to be most beneficial for this species and other at-risk mussels.