
Abstracts

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SONGBIRD ACOUSTIC ACTIVITY IN A WIND ENERGY FACILITY-GRASSLAND MATRIX

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ABSTRACT.— A human-altered acoustic environment can render habitat unsuitable for natural communities, especially for species that use vocalizations to communicate. We studied the vocalizations of a set of common breeding songbirds occupying areas near Greater Prairie-Chicken (*Tympanuchus cupido p.*) leks in the vicinity of the wind energy facility south of Ainsworth, NE. We aurally identified the songbird species assemblage in three control and three wind facility sites within audio recordings. A recently-developed acoustic diversity index, Acoustic Complexity Index (ACI), was applied to all recordings. The ACI is an algorithm-based value representing an index of avian community complexity. We did not observe differences at assemblage level (univariate metrics of diversity: mean species richness (3.48 vs. 3.25 species per recording event) and Whittaker β_w index (6.03 vs. 5.85 species turnover of habitat-type) or acoustic community complexity (ACI:0.17 vs. 0.15). The limited habitat perforation caused by wind turbines and roads (1.25% in area of wind energy facility) and the low-frequency noise emitted by operational wind turbines did not appear to affect the breeding bird communities in this largely unfragmented landscape.

THE CRAYFISH OF NEBRASKA

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ABSTRACT.— Nebraska has five native and three non-native crayfishes. As a consequence, this presentation would be quite short without a lot of filler material. Eastern North America has the highest diversity of crayfishes in the world with over 300 species. The next highest diversity is in Australia/New

Zealand/ New Guinea with some 100 species. In contrast, Europe has seven species while Africa, southeast Asia, and South America have none or almost none. Crayfish are a crustacean and, as such, have an exoskeleton which must be periodically shed to permit growth. The shedding and building of an exoskeleton needs lots of calcium and other foodstuff, so crayfish are omnivorous and voracious eaters, consuming everything from phytoplankton to fish with a strong preference for snails and bugs. In turn, a whole host of predators is out there looking to snag and snarf down a crayfish, so crayfish tend to be nocturnal and secretive. Crayfishes are burrowers, but different species vary in the intensity of burrowing. Some dig deep and spend most of their lives underground coming out only to feed and mate. Others dig burrows only to survive drought or winter freezing. Some do not burrow much at all. Burrows are used by quite a few other critters as refuge from searing droughts, raging grass fires, or the howling gales of November and numbing cold of winter. To identify the sex of a crayfish, you flip it over and look between its legs at the naughty bits. The shape of the male's naughty bits also are the primary means of identification. Breeding is usually in the fall with the transfer of sperm to the female. The female will lay her eggs in the spring and carry them glued to her swimmerets. After crayfish hatch, the young stay with the female through their first few molts. At the time of leaving home, juvenile crayfishes look like miniature adults. Key features to note for identification do not include color as this can be quite variable. The five native species include *Orconectes virilis* (Northern crayfish), *Orconectes immunis* (Calico crayfish), *Orconectes neglectus* (Ringed crayfish), *Cambarus diogenes* (Devil crayfish), and *Procambarus gracilis* (Prairie crayfish). The non-natives are *Orconectes rusticus* (Rusty crayfish), *Procambarus clarki* (Red Swamp crayfish), and *Procambarus acutus* (White River crayfish).

RIVERINE HABITAT SELECTION OF WHOOPING CRANES DURING MIGRATION: IMPLICATIONS FOR MANAGING HABITAT ALONG THE CENTRAL PLATTE RIVER

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ABSTRACT.— A portion of the “Big Bend” reach of the central Platte River has been identified as critical habitat for the survival of the endangered whooping crane (*Grus americana*). Management intervention is now underway to rehabilitate habitat form and function on the central Platte River to increase use and thereby contribute to the survival of whooping cranes. Within several stretches of river, the Platte River Recovery Implementation Program (Program) owns land or has management agreements that allow for the ability to alter physical features such as unobstructed channel width, distance to nearest forest, and total channel width of an area through mechanical intervention. Through the Fish and Wildlife Service’s Environmental Account, the Program also has access to a limited amount

of water that, through timed releases, could be used to influence unit discharge and thus several hydrologic metrics. The objectives of our analyses were to develop habitat models that could be used to direct management activities along the central Platte River. As such, we focused our analysis on metrics the Program has the ability to influence to some degree. We used whooping crane roost site data collected via systematic aerial surveys of the central Platte River from 2002-2013 and an *a priori* set of models to evaluate the influence of various metrics on the probability of whooping crane use. We found unobstructed channel width and distance to the nearest forest were good predictors of whooping crane use. We also used telemetry data obtained from a sample of 68 birds over the course of five years (2010-2015) to provide an unbiased evaluation of whooping crane use of riverine habitat throughout the migration corridor. We evaluated the influence of unobstructed channel width and distance to nearest forest on whooping crane selection of riverine habitat throughout the North-central Great Plains. Based on results of both analyses, it appears maintaining unobstructed channel widths of 600–650 feet and unforested corridor widths of $\geq 1,000$ feet would result in highly favorable whooping crane riverine roosting habitat and thus increased use of the central Platte River.

ALL EARS: UTILIZING AN ACOUSTIC GRID TO QUANTIFY BAT ACTIVITY OVER AGRICULTURAL FIELDS

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ABSTRACT.—Bats provide valuable ecosystem services to the agricultural industry through pest suppression. Within the last decade, researchers have begun to extrapolate the monetary values of these services from small localized studies to a national or even global scale. These studies have been important in justifying bat conservation, but they lack an understanding on how bats forage over large agricultural tracts and operate under the assumption that fields are homogeneously utilized. To better understand how bats utilize agricultural fields, we simultaneously deployed 62 acoustic bat detectors in a 100-m grid across an entire quarter section (~64 ha) of agricultural land planted with corn, alfalfa, and soybean. Contrary to prior assumptions, our study field did not receive uniform bat activity. Activity varied by species and night and was highly concentrated around shelterbelts and water. Understanding how bat species utilize an agricultural landscape can increase the accuracy of the assessments of ecosystem services provided by bats. It can also provide insights to farmers interested in increasing bat activity over their fields.

PREDICTIONS OF FUTURE WATERBIRD STOPOVER HABITAT

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ABSTRACT.—This study explored factors that affect wetland ponding during spring waterbird migration in the Rainwater Basin Biologically Unique Landscape. Statistical models explaining variation in ponding from 2004–2009 were developed and used to make predictions about future stopover habitat availability under regional climate change scenarios.

BURNING ISSUES: TRIALS AND SUCCESSES OF PRESCRIBED FIRE IN A WILDLAND URBAN INTERFACE

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ABSTRACT.— In the absence of fire and other disturbances over the past 150 years, Fontenelle Forest's (FF) prairies, oak savannas, and oak woodlands have been invaded by fast-growing, shade-loving trees and invasive species which out-compete native plants and decrease ecological diversity. To confound issues, human population growth throughout the 20th century brought homes and businesses directly into Fontenelle Forest's wildland urban interface (WUI). An oak woodland restoration project was initiated during late 2015 and early 2016 intended to restore oak woodlands, increase oak regeneration and native plant diversity on Fontenelle Forest properties using prescribed fire and other management tools. The WUI poses constant challenges because every fire and its associated smoke has the potential to impact humans, homes, roads, farms, businesses, airports, power lines, railroads, and our trails and nature centers. To address challenges prior to initiating prescribed fire on FF properties, the FF stewardship department created and implemented an outreach and operational plan and worked closely with the Bellevue, Ponca Hills, and Ft. Calhoun fire departments, city officials, and neighbors. With support from our conservation partners, the community, staff and Board members, we successfully burned 240 acres of oak woodlands and savannas for the first time in 150 years. We discuss the challenges faced, community reaction, and provide real-world recommendations to implement prescribed fire in an urban setting.

USING TIME-LAPSE IMAGERY TO CAPTURE WETLAND INUNDATION AND VEGETATION PHENOLOGY

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ABSTRACT.— Monitoring ecosystem changes at a landscape scale is essential for effective management and necessary to quantitatively assess human impacts to natural systems. Time-lapse imagery offers a multifunctional method to document and visualize changing systems over time. In collaboration with the Platte Basin Time-lapse project, high-resolution time-lapse cameras captured changes in wetland water inundation and vegetation occurring in the Central Platte River Basin. We assessed the relationship between water inundation and water-quality measurements using correlation and time-series analysis. Vegetation was examined using the Green Chromatic Coordinate vegetation index. To visually depict ecological change, the resulting time-series datasets were coupled with time-lapse images to create interactive data visualizations, or time-lapse data sequences. Our findings highlight the dual scientific and communicative capabilities of time-lapse imagery to aid in ecological understanding and management.

SMALL ANIMALS, BIG PICTURE: WHAT ZOOPLANKTON CAN TELL US ABOUT THE INFLUENCE OF HETEROGENEOUS LANDSCAPES ON WETLAND BIODIVERSITY

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ABSTRACT.— Communities are structured by a variety of processes occurring at multiple scales. Therefore, in order to understand how communities are structured within a single habitat patch (local level), one must also look to the surrounding landscape (regional level). The influence of dispersal on biodiversity and community composition is influenced by the degree of environmental heterogeneity across the landscape. The Nebraska Sandhills contain thousands of wetlands ranging from freshwater to hyper-saline/alkaline. The region consists of a longitudinal heterogeneity gradient in which the eastern Sandhills represents a homogenous landscape with only freshwater wetlands, the central Sandhills represents a low-heterogeneous landscape with freshwater and low salinity wetlands, and the western Sandhills represents a high-heterogeneous landscape with freshwater, low-salinity, and high-salinity wetlands. Zooplankton are often used as indicators of ecosystem health in lacustrine systems; however,

they are used less often in temporary habitats, despite being some of the only organisms that can maintain permanent populations in temporary habitats by producing resting eggs. Zooplankton egg banks serve as archives of biodiversity and can be used to identify long-term environmental trends. Since 2013, we have sampled both emergent and egg bank zooplankton communities in wetlands across the Nebraska Sandhills to determine how the east-west landscape heterogeneity gradient influenced local and regional biodiversity. We found that biodiversity declined westwards in both freshwater and saline pools in both the emergent and egg bank communities. We speculate that the westward decline in freshwater wetland biodiversity was driven by the westward decrease in the availability of freshwater wetlands, while the westward decline in saline wetland biodiversity was driven by increases in salinity. We suggest that western freshwater wetlands should become a focus for conservation as they are naturally rare, and further loss of these wetlands could be detrimental to local and regional biodiversity.

CRIPPLING AND NOCTURNAL BIASES IN A STUDY OF SANDHILL CRANE (*GRUS CANADENSIS*) COLLISIONS WITH A TRANSMISSION LINE

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ABSTRACT (poster).—Collisions with power lines are a widely documented cause of avian mortality. Estimating total mortalities from counts of carcasses is usually accomplished by quantifying biasing factors, but neither crippling nor nocturnal biases are well understood. From 4 March through 13 April 2009, data were collected on Sandhill Crane (*Antigone canadensis*, formerly *Grus canadensis*) collisions involving a 69-kV transmission line crossing the Platte River in Nebraska, USA, at a major migration stopover area. The line was marked with devices designed to increase visibility to Sandhill Cranes, and thus reduce collisions. Numbers of carcasses detected via traditional searches beneath the line were compared to numbers recorded by visual observation through binoculars and night vision spotting scopes, and by electronic Bird Strike Indicators (BSI). Seventeen carcasses were found during traditional surveys, 117 were observed visually, and 321 were recorded by BSIs. Most collisions occurred at night, with crippled Cranes departing survey transects. Total mortality including crippling and nocturnal biases, was 2.8 to 3.7 times greater than indicated by a traditional corrected-count mortality estimator. Neither crippling bias nor nocturnal bias were adequately considered by the traditional estimator. Consistent with other studies of avian collision, line marking was only partially successful in reducing collisions.

MACROINVERTEBRATE DIVERSITY AND COMMUNITY STRUCTURE IN ALKALINE WETLANDS OF THE
NEBRASKA SANDHILLS

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ABSTRACT.— The Nebraska Sandhills is a unique region composed of grass-stabilized sand dunes. Aquatic ecosystems of the Sandhills are also unique, with two regions, the Cherry County Wetlands and the Sandhills Alkaline Lakes, recognized as Biologically Unique Landscapes by the Nebraska Natural Legacy Project. The purpose of this research was to support the NNLP objectives by documenting biodiversity of wetlands within the two BULs. Macroinvertebrates were surveyed over two seasons, spring and summer of 2013. Seventeen samples were collected from 10 wetlands. Most sites were located in the Valentine National Wildlife Refuge or the Crescent Lake Wildlife Refuge. Semi-quantitative sampling following established methods focused on catch per unit effort along shoreline vegetation to maximize the collection of macroinvertebrates. All wetlands sampled were small and shallow systems devoid of fish. Data on wetland size, conductivity, elevation, location, and vegetative cover were collected. Specimens from 41 families of macroinvertebrates were collected. Non-biting midges, narrow-winged damselflies, and a type of crustacean called a side-swimmer were the numerically dominant macroinvertebrates in the study, whereas caddisflies were rare. Multivariate analyses indicated that conductivity was the strongest predictor of variation in overall species richness. Also, conductivity was the strongest predictor of community structure, particularly structuring fly communities composed of brine flies and non-biting midges. Percent vegetative cover also drove communities characterized by water loving beetles, caddisflies, and a variety of snails. Wetland size had minimal influence in structuring communities. This study identified a new state record for a predaceous diving beetle and a new species of non-biting midge and unique communities of non-biting midges and brine flies. Results corroborate other recent and on-going studies of these wetlands indicating that strong salinity gradients are important drivers of diversity and community structure.

CONSERVATION EDUCATION IN THE NEBRASKA PANHANDLE

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ABSTRACT.— The Nebraska Wildlife Education Coordinator for the Bird Conservancy of the Rockies in partnership with Nebraska Game and Parks Commission will be presenting the full scope of all the education and outreach events that take place in the panhandle. These Nebraska Environmental Trust funded programs help students, families, and the general public broaden their understanding and connection to the unique wildlife and habitat that call the panhandle home.

AN ON-LINE CONSERVATION PLANNING AND ENVIRONMENTAL REVIEW TOOL

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ABSTRACT.—The Conservation and Review Tool (CART) is an on-line GIS tool designed to aid in conservation planning and automate the environmental review of proposed projects. The CART hosts a variety of natural resource data layers (at-risk species, natural communities, watersheds, etc.) as well as a selection of basemaps including aerial imagery, relief, and USGS topo maps. The tool has an array of map making, navigation, and search functions to support exploration and query of map layers and development of maps and tables for export. The environmental review component of the CART produces PDF reports including embedded maps, summary tables, and documentation of required conservation measures in cases where the project is likely to adversely affect listed species.

DROUGHT DECREASES METACOMMUNITY STABILITY DRIVEN BY PYRIC HERBIVORY

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ABSTRACT.—For the majority of North American grasslands, climate change models forecast an increase in frequency and severity of growing season droughts by the end of the century. Metacommunity theory predicts that greater temporal stability in aboveground plant biomass production occurs in landscapes with greater spatial variability at the patch-scale and lower spatial

variability at within-patches. Pyric herbivory, defined as the relationship between fire and grazing, promotes temporal (metacommunity) stability in plant biomass production by increasing spatial variability among-patches and decreasing spatial variability within-patches through a series of scale-dependent feedback loops. However, in landscapes with pyric herbivory, investigations concerning temporal stability and spatial variability have not been conducted under weather conditions consistent with climate change. In this study, we take advantage of an extreme drought event in 2011 and 2012 to investigate the influence of drought on metacommunity stability by testing for: (1) increased temporal (metacommunity) variability in plant biomass, (2) a reduction in the strength of the fire-grazer relationship, as evident by the presence of significant long-term temporal autocorrelation in plant biomass following focal fire and grazing, (3) decreased among-patch variability in plant biomass and forage quality, and (4) increased within-patch variability in plant biomass. We conducted our study in replicate experimental landscapes managed with fire and grazing for the past 15 years. We measured plant biomass and crude protein during 2011 and 2012 and compared it to data collected at the same site before the drought in 2009. During drought, we observed: (1) increased temporal (metacommunity) variability in plant biomass, (2) a reduction in the strength of the fire-grazer relationship, (3) decreased among-patch variability in plant biomass, and (4) increased within-patch variability in plant biomass. Our study also suggest that landscapes with pyric herbivory allow feedback loops to switch the scales at which they operate during periods of extreme drought.

WILDFIRE RECOVERY AT THE NATURE CONSERVANCY'S NIOBRARA VALLEY PRESERVE; OBSERVATIONS,
DATA, AND TIME-LAPSE PHOTOGRAPHY

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ABSTRACT.— In late July 2012, the Fairfield Creek Fire burned tens of thousands of acres along the Middle Niobrara Valley, including almost 30,000 acres of The Nature Conservancy's Niobrara Valley Preserve. Following the fire, the Conservancy worked to document the aftermath and ecological recovery of the site through a combination of data collection, observations, and photography – including timelapse photography. While data have reassured scientists of the resilience of the landscape, visual imagery has been a more powerful tool for sharing what the recovery has really been like. This presentation will showcase both the images and the stories they have told.