Colorado Field Ornithologists

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Scientific Paper Session—Saturday, June 6

Abstracts are permanently archived online at the CFO website:

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Time	**Speaker**	**Title of Presentation**
1:30-1:35	Christy Carello, session moderator	Welcome to the paper session
1:35-1:50	Duane Nelson	The Status of Piping Plovers and Least Terns in Colorado
1:50-2:05	Vinson Turco	Eavesdropping on other species: Nuances in avian understanding
2:05-2:20	Anna Mangan	The importance of birds in Colorado's apple orchards: Agents of pest control or fruit depredation?
2:20-2:35	Nat Warning	The link between tool use and nest construction: A new paradigm
2:35-2:50	Tyler Williams	Clark's Nutcracker seed use and limber pine meta-population dynamics
2:50-3:15	BREAK	
3:15-3:30	Patrick Magee	Effects of thinning treatments on piñon-juniper woodland birds in the Arkansas River Valley
3:30-3:45	Nora Covy	Canyon Wrens and Cliff Swallows: Observations of and research on a local heterospecific relationship
3:45-4:00	Amber Carver	Modeling nest-survival in shortgrass steppe passerines
4:00-4:15	Lynn E. Wickersham	The second Colorado Breeding Bird Atlas: Final results

Amber Carver. Modeling nest-survival in shortgrass steppe passerines. University of Colorado–Denver, 5598 South Grant Street, Littleton, Colorado 80121; amber.carver@ucdenver.edu.

Avian nest survival is influenced to varying degrees by environmental features, some of which can be manipulated and some that are outside our control. Land managers commonly employ habitat manipulation to promote population growth in target species. However, features such as weather that are not manipulable may exert equal or greater influence on nest survival. I estimated nest survival for three species of ground-nesting shortgrass steppe passerine in northern Colorado, and I modeled survival based on environmental features of known or suspected importance. I compared the applicability of two non-mutually-exclusive hypotheses: (1) nest survival is strongly influenced by weather, and (2) nest survival is strongly influenced by nest-site vegetation. After identifying the most influential temporal variables—which would account for unmeasured influences to survival—I fit separate sets of weather- and vegetation-based models. Weather variables exerted equivalent moderate influence. Vegetation variables were mostly unimportant, except for bare ground and dead vegetation. A model containing both dead vegetation and bare ground best explained survival, and it was not improved by the addition of weather variables. Nest survival declined with increasing extent of bare ground and dead vegetation. These finding support the idea that habitat manipulation can be used to promote population growth in the nesting phase.

Nora Covy. Canyon Wrens and Cliff Swallows: Observations of and research on a local heterospecific relationship. School of Biological Sciences, University of Northern Colorado, Ross Hall, Room 2480, Campus Box 92, 501 20th Street, Greeley, Colorado 80639; nora.covy@gmail.com.

There is evidence of a locally-occurring heterospecific relationship between a migratory and a non-migratory avian species, based on ongoing research from 2011 through 2015. We have observed Canyon wrens nesting and foraging in Cliff swallow nests in various locations in Larimer County at different times throughout the year. Canyon wren occupation of suitable habitat is also positively correlated with presence of Cliff swallow nest colonies. Cliff swallow nest colonies harbor a variety of ectoparasites and other insects that could serve as a year-round food

source for Canyon wrens, increasing their chances of winter survival in this area. Furthermore, if Canyon wrens are consuming ectoparasites, this suggests that there may be a mutually beneficial relationship between these two species. In order to better understand this association, we are monitoring the occurrence of Canyon wrens using Cliff swallow nests as shelters and foraging locations. Currently, we are assessing the relative abundance of insect prey in Cliff swallow colonies and collecting wren fecal samples to determine presence/absence of DNA from Cliff swallow ectoparasites. This project will be useful in describing behaviors and life history strategies for the Canyon wren, a low-density, charismatic species and it will provide novel information about how structures built by one species may influence heterospecific interactions.

Anna M. Mangan[1, 2]**, Liba Pejchar**[2]**,** *and* **Scott J. Werner**[3]**.** The importance of birds in Colorado's apple orchards: agents of pest control or fruit depredation? [1, 3]United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, National Wildlife Research Center, 4101 LaPorte Avenue, Fort Collins, Colorado, 80521; [1]annamangan@gmail.com. [2]Colorado State University, Department of Fish, Wildlife and Conservation Biology, Campus Delivery 1474, Fort Collins, Colorado 80523.

Birds provide important and sometimes irreplaceable functional roles in ecosystems and declining populations can impact ecosystems, agriculture and the economy. Organic fruit farmers face many challenges but among the most impactful are insect and animal pests. Orchard birds have the potential to consume a major apple insect pest, the codling moth (*Cydia pomonella*), thereby reducing crop damage; however, birds also feed on the fruit. Our research examines these tradeoffs to understand the role of birds in apple orchards, and to help farmers make better informed management decisions. Specifically, our questions are: (1) which bird species contribute to insect pest control and fruit damage? and (2) what orchard or landscape features contribute to the rate and magnitude of these services and disservices? To answer these questions, we are investigating foraging habits and fruit damage in three organic apple orchards in the North Fork Valley of Colorado. First, to determine the relative importance of fruit- and insect-consuming birds, we are observing the time spent foraging, and quantifying the number of fruits damaged, as well as collecting fecal samples from birds captured in mist-nets. Using genetic sequencing, we will determine the occurrence of codling moths in these fecal samples. Second, we are estimating occupancy and density of bird species involved in pest control or fruit depredation. Third, we are using nets to exclude birds from apples and comparing levels of damage by birds and codling moths within and outside these exclosures. Finally, we will integrate these data to compare the rate and magnitude of pest control and damage as a function of location within the orchard, and surrounding land cover. Our findings should help advance understanding of ecological linkages between bird communities and food production in an era of unprecedented interest in the role of nature in human well-being.

Patrick Magee[1] *and* **Jonathan Coop**[2]**.** Effects of thinning treatments on piñon-juniper woodland birds in the Arkansas River Valley. Department of Natural and Environmental Sciences, Western State Colorado University, Gunnison, Colorado 81231; [1]pmagee@western.edu, [2]jcoop@western.edu.

Piñon-juniper woodlands are the largest forest type in Colorado hosting at least 70 breeding bird species. Many birds within the piñon-juniper ecosystem are specialists including: Black-chinned Hummingbird, Gray Flycatcher, Piñon Jay, Juniper Titmouse, Bewick's Wren, and Black-throated Gray Warbler. Recently, the Royal Gorge Field Office (RGFO) of the BLM and other partners have thinned piñon-juniper woodlands to reduce potential for intense wildfires. Since 2003, some stands have been thinned with a hydroaxe (which mulches the wood), whereas others were hand-thinned with chainsaws and subsequently the branches were scattered or piled and burned. How these treated woodlands impact bird communities in the RGFO is unknown. We sampled 39 paired plots that each included a treated and control site. We visited each plot three times and conducted 10 minute point counts at each point count station (four per plot) to determine species composition and occupancy of birds. We also measured a variety of vegetation parameters to determine effects of treatments on habitat composition and structure. In 2014, 67 bird species were recorded at the 232 sample points, including five piñon-juniper obligates. More species occupied treated sites than control sites. A multi-scale occupancy analysis is underway to determine if treatments influence the distribution of birds at the landscape scale and the site scale. Lark sparrows had significantly higher occupancy in treated landscapes and used flatter sites. They occupied 15% of untreated piñon-juniper landscapes compared to 92% treated areas. The piñon-juniper obligate, black-throated gray warbler showed a reversed pattern with higher occupancy in control than treated landscapes, although occupancy was high in both (control=100%, treatment=91%). Results of this study will inform land managers regarding biological responses to piñon-juniper removal.

Duane Nelson. The Status of Piping Plovers and Least Terns in Colorado. U.S. Army Corps of Engineers and Colorado Parks and Wildlife, 342 East 6th Street, Las Animas, Colorado 81054; dnelson1@centurytel.net.

Protecting federally listed Piping Plovers and Least Terns nesting in Colorado requires the implementation of various management strategies. Habitat loss constitutes the primary threat, manifested by drought and invasive plant invasion to critical habitat. Secondary threats include depredation, flooding, extreme weather events and human recreational pressure impacting nest sites. Responses to these threats have included creation of nesting islands, mechanical, manual and chemical restoration of nesting habitat, as well as closing nesting areas to the general public and patrolling nesting areas. In 2014, the statewide population of Piping Plovers increased to ten pairs for the first time since monitoring began in 1990. Least Tern populations in Colorado have decreased, largely due to lakes shrinking or disappearing, eliminating much of their former Colorado habitat.

Vinson Turco. Eavesdropping on other species: Nuances in avian understanding. Department of Biology, Metropolitan State University of Denver, Campus Box 53, Denver, Colorado 80217; vturco@msudenver.edu.

Many animals are able to communicate the presence of a potential predator through vocal signaling. It is known that Black-capped Chickadees (*Poecile atricapilla*) are able to not only advertise the presence of a potential threat but can also indicate varying levels of risk associated with a threat through a complex alarm call. While it has been shown that some birds eavesdrop on the alarm calls of other species it would greatly benefit heterospecifics living in sympatry with Black-capped Chickadees to understand the degree of danger being communicated as well; fleeing in response to non-urgent calls wastes both energy and time. In this study we performed playbacks of various Chickadee alarm calls and measured the response in a number of other bird species to determine which if any are able to discern between the different degrees of urgency being communicated. Songbirds living in close sympatry with Black-capped Chickadees have shown the greatest ability to distinguish between urgent and non-urgent calls with the most urgent calls eliciting the greatest response. Birds were significantly more likely to flee the most urgent alarm over either the less urgent call or the control. Additionally, birds were significantly more likely to exhibit alert or defensive behavior (including but not limited to fleeing) in response to only the most urgent alarm. Although the response of animals to heterospecific alarm calls has been demonstrated, the ability of one species to interpret and respond to variations within a call has only recently begun to be explored and has potentially great implications for avian ecology.

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Nat Warning. The link between tool use and nest construction: A new paradigm. City of Longmont, Natural Resources Department, Longmont, Colorado; natwarning@gmail.com.

In studies of evolutionary biology most researchers have assigned tool use in non-humans a special biological distinction, implying that tool users inherently possess high levels of cognitive complexity, and provide significant insights into the evolution of human culture. Conversely, nest construction behaviors have typically been excluded from discussions of the evolution of tool use because the materials remain static, and are not manipulated during use. Increasingly though, many scientists are viewing tool use as a form of construction behavior, recognizing that the differences between tool behaviors and construction practices are largely arbitrary. Here I give a brief overview of nest construction behaviors in birds, emphasizing my own research on Rock Wrens (*Salpinctes obsoletus*), and compare nest building to using tools. I assert that nest building is of equal or greater ecological importance than tool use in animals, and that nest construction behaviors should be placed, with tool use, into the larger context of "material culture."

Lynn E. Wickersham. The Second Colorado Breeding Bird Atlas: Final Results. San Juan Institute of Natural and Cultural Resources, Fort Lewis College, 1000 Rim Drive, Durango, Colorado 81301; Wickersham_L@fortlewis.edu.

When repeated at regular intervals, Breeding Bird Atlases provide valuable data on changes in bird distribution, habitat use, and breeding phenology over time. Field work for Colorado's first Breeding Bird Atlas (Atlas I) was initiated in 1987, and the results were published in 1998. Atlas I represented the state's largest and most comprehensive study on breeding birds. Data collection for the second Colorado Breeding Bird Atlas (Atlas II) was initiated in 2007, 20 years after Atlas I, and continued through 2012. In both Atlases, field workers surveyed priority blocks uniformly distributed across the state, encompassing approximately 10 m^2. Atlas protocol suggested three to five visit per block (~20–40 hours) over the course of one or more breeding seasons, with at least one nocturnal survey for owls and crepuscular species. During each visit, field workers recorded each species detected with associated breeding evidence and habitat codes. Breeding evidence codes categorized each species as a Possible, Probable, or Confirmed breeder within each block.

Over 700 volunteers participated in Atlas II, logging over 54,000 field hours, and recording over 195,000 breeding observations. Field workers spent an average of 28.1 person-hours per priority block, compared with 38.6 in Atlas I. Despite the reduced effort, Atlas II reported about 14% more observations and documented 11 more species than Atlas I. Atlas II field workers reported 14 "new" species (not reported in Atlas I), but failed to document 11 rare species reported in Atlas I. Comparing the number of priority blocks with breeding evidence per species, 56.6% of species showed apparent gains, 40.7% showed losses, and 2.7% remained the same. The top five most widely reported species included the Mourning Dove, American Robin, and Red-tailed Hawk, Western Meadowlark, and Brown-headed Cowbird. Atlas II data suggest notable range expansions for Wild Turkey, Osprey, Black-chinned Hummingbird, Black Phoebe, and Great-tailed Grackle, to name a few, and possible declines for Mountain Plover, Long-billed Curlew, Western Screech-Owl, Lewis's Woodpecker, and Belted Kingfisher.

Tyler Williams[1] *and* **Diana Tomback**[2]**.** Clark's Nutcracker seed use and limber pine meta-population dynamics. [1]901 North Sherman Street, Apartment #708, Denver, Colorado, 80203; Tyler.2.Williams@ucdenver.edu. [2]Department of Integrative Biology, University of Colorado, Campus Box 171, P.O. Box 173364, Denver, Colorado, 80217-3364; Diana.Tomback@ucdenver.edu.

The Clark's Nutcracker (*Nucifraga columbiana*) is an iconic species of the West because of its importance as a seed disperser of several high-elevation pines, including limber pine (*Pinus flexilis*). Its diet primarily consists of conifer seeds; within Colorado, the large seeds of limber pine are preferred over other conifer seeds.

Limber pine stands comprise meta-populations—i.e., regional populations composed of local populations subject to extinction, colonization, and recolonization. We are studying how the limber pine meta-population in Rocky Mountain National Park (RMNP) is maintained by long distance seed dispersal (colonization) by the nutcrackers and how disturbance might lead to local population extinctions. Historically, fire and ecological succession primarily caused local population extinctions, but current threats for the limber pine RMNP meta-population include mountain pine beetle (*Dendroctonus ponderosae*) outbreaks, wildfires, and white pine blister rust (a non-native pathogen, *Cronartium ribicola*). Extensive tree mortality will result in the loss of an important nutcracker food source and may reduce nutcracker seed dispersal, complicating meta-population persistence.

Our primary goal is to clarify the dynamics of the RMNP limber pine meta-population, focusing on the factors that affect colonization. From mid-June to late October, 2014, we investigated nutcracker dietary preferences within RMNP by examining: 1) Cone production via distance sampling from five limber pine stands, three ponderosa pine (*Pinus ponderosa*) stands, and three Douglas-fir (*Pseudotsuga menziesii*) stands, conifers with seeds that nutcrackers routinely use. 2) Nutcracker stand visitation via point counts. 3) Nutcracker seed harvest and caching by focal behavior sampling. This information would identify the conifer species responsible for keeping nutcrackers within RMNP and could serve as a proof of concept that nutcrackers are the primary seed disperser of limber pine within RMNP. We have also constructed the RMNP limber pine meta-population from GIS layers.

The 2014 data indicate that limber pine and ponderosa pine seed productivity ranged from high to low throughout our study stands, while Douglas-fir productivity was primarily low. Nutcrackers began foraging on limber pine in early August; caching of limber pine seeds commenced in early September. Nutcracker foraging and caching observations shifted from limber to ponderosa pine in October; no foraging or caching was observed for Douglas-fir. Because both pines do not produce cones every year, together they are significant resources for nutcrackers and are important for keeping them within RMNP.

In 2015 we will radio-track nutcrackers to collect data on nutcracker home range sizes, seed dispersal distances, and caching locations for meta-population connectivity information.