Nesting Success of a Common Habitat Generalist, the American Robin (*Turdus Migratorius*), In Southwest Colorado

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The American Robin (*Turdus migratorius*) is one of the most widely-recognized, and most widespread, avian species in all of North America. However, population trends demonstrated in the Breeding Bird Survey, and reproductive activity observations completed for the Colorado Breeding Bird Atlas II, indicate that its numbers may be decreasing in both the Southern Rocky Mountains and in Colorado. For example, in the Southern Rockies/Colorado Plateau region, their numbers have significantly decreased 1.19 % per year (from 1966 to 2012), and in Colorado, their populations have also significantly decreased 0.87 % per year over this same time period. In addition, Colorado Breeding Bird Atlas II data indicate a decrease of 5.4 % in the number of priority blocks with breeding observations between Colorado Breeding Bird Atlas I (published in 1998) and Atlas II (in preparation). These apparent decreases in population numbers and reproductive distribution may be surprising given that the American Robin is a habitat generalist, and these observations suggest the need to better understand the nesting success of this species in Colorado. From 1992 to 2004 (n = 471 nests), we found very few significant differences in their basic reproductive success according to nest substrate, habitat type, grazing intensity, and year. In addition, other parameters (e.g., clutch size, timing of breeding within the breeding season, substrate height, and nest height, etc.) will be examined for their potential contributions to the nesting success of this common avian species.

Habitat use by Mountain Plovers During Nest Incubation

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The Mountain Plover (*Charadrius montanus*) is a species of conservation concern throughout its range, native to short-grass prairie habitat of the western Great Plains. Mountain Plovers prefer to nest in recently disturbed areas with bare ground, short vegetation, and little to no slope. Historically, formation of these conditions was facilitated by native grazers such as Bison (*Bison bison*) and prairie dogs (*Cynomys spp.*). Over the past 150 years, local extirpation of these native grazers and the expansion of agriculture across the prairie have greatly reduced the availability of suitable native habitat. Mountain Plovers, however, will readily nest on agricultural fields, whether fallow or with low-growing crop.

During the 2014 and 2015 breeding season, we will deploy GPS-tags on nesting Mountain Plovers to estimate home-range size and habitat use during the nest incubation period. Our study site consists of private, mostly agricultural land in Kimball Co., Nebraska and Weld Co. Colorado. Do these crop fields support plover foraging needs in addition to providing nesting habitat, or do plovers nesting on cropland travel to nearby native rangeland to meet their foraging needs? We aim to better understand how plovers are utilizing the agricultural landscape matrix that has supplanted much of their native breeding range.

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The Effect of Adaptive Livestock Grazing on McCown's Longspur Nest Survival

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McCown's Longspur (*Rhynchophanes mccownii*) is a ground-nesting migratory songbird that relies on grasslands throughout its life cycle. The extent and quality of this species' breeding habitat has declined due to agriculture. There is evidence that the abundance of the species has dropped. As a result of habitat loss and the apparent population trend, McCown's Longspur is now a species of conservation concern in Colorado and Nebraska.

It is thought that restoring native grazing patterns will increase the quality of breeding habitat for this species. Rangeland scientists at the Central Plains Experimental Range (CPER) in northern Colorado have begun a long-term application of Adaptive Grazing as a tool for increasing grassland biodiversity. The CPER is located on shortgrass steppe, a semi-arid environment with low-stature grasses. Prior to the arrival of European settlers, bison were numerous in that ecosystem. Bison grazed in dense, mobile herds, and this intense transient herbivory led to heterogeneous vegetation cover. This created an array of niches, and shortgrass birds occupy the full range of niches on this disturbance spectrum. McCown's Longspur has higher nest success in recently grazed areas.

The premise of Adaptive Grazing is that cattle can be used as ecosystem engineers, simulating the effects of bison. The treatment involves high-intensity, intra-seasonal rotational grazing. Adaptive Grazing pastures are paired with traditional, uniformly grazed pastures. Adaptive Grazing should provide a higher number of optimal patches for McCown's Longspur breeding. I have located and monitored nests in both pasture groups during the first year of the project. I have also gathered data on nest-site, pasture-level, and individual factors. I will present preliminary findings on McCown's Longspur nest survival and its relationship to grazing regime, nest-site characteristics, and parent bird condition.

Status of the Eastern Warbling-Vireo (*Vireo g. gilvus*) and Western Warbling-Vireo (*V. g. swainsoni*) in Colorado

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The widespread Warbling Vireo (*Vireo gilvus*) comprises two subspecies-groups: eastern *gilvus* and western *swainsoni*. These two subspecies-groups are distinct in various ways, and may represent separate species, the Eastern Warbling-Vireo and Western Warbling-Vireo, respectively. Both occur in Colorado, but their status in the state has been little studied until recently. Moreover, it is possible that one or both taxa have undergone range shifts in Colorado in recent years.

In this presentation, I review the historical record of occurrence of both taxa in Colorado, and I present the results of audio sampling from Colorado, 2011–2014. In the northern Front Range region of Colorado, Eastern Warbling-Vireos appear to dominate east of the mountains, with Western Warbling Vireos being restricted primarily to the mountains and foothills. Because song is learned in vireos, this result is best considered to be preliminary; banding and genetic studies will be necessary to confirm results from recent studies based on audio sampling.

Birders and field ornithologists are able to advance our understanding of the relative ranges in Colorado of the Eastern and Western warbling-vireos. Thus, I include in this presentation a primer on how to separate the taxa by song, how to easily and inexpensively make recordings of their songs, and how to analyze their songs (i.e., how to identify them) with widely available freeware.

Mourning Doves in the Arid Southwest:
Breeding Biology, Habitat, and Effects of Noise

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According to the Breeding Bird Survey (BBS), in Colorado, Eurasian-collared Doves (*Streptopelia decaocto*) have increased by 68% per year from 2002-2012, while during the same time, Mourning Doves (*Zenaida macroura*) have significantly declined. BBS trend maps indicate that in the northeastern United States and southeastern Canada, where Eurasian-collared Doves have not invaded, Mourning Doves have increased. While we do not yet fully understand the potential competition between these dove species, the significant decline of Mourning Doves throughout most of their range accentuates the need for a comprehensive understanding of their breeding biology, their preferred habitats, and environmental threats they face. We conducted two breeding biology studies that included Mourning Doves: one in southwestern Colorado and one in northwestern New Mexico. The study in New Mexico focused on the effects of gas well compressor noise on nesting birds. We found that Mourning Doves clearly avoided noise from gas well compressors. We located 22 of 23 dove nests on sites without gas well compressors; the one dove nest at a compressor site was 369 m from the compressor. Twenty-one pairs selected Utah juniper (*Juniperus osteosperma*) for nest trees, and only two selected piñon (*Pinus edulis*), which is significantly disproportionate from availability. The study in Colorado focused on the effects of livestock grazing. Grazing did not appear to affect the success of nests. Most pairs nested in narrow-leaf cottonwood (*Populus angustifolia*), or riverbirch (*Betula fontinalis*). Nest success did not differ between these two most-used trees. Comparisons of nest success between these two studies will be discussed.

Crossing the "Great American Desert", Range Limits of the Rock Wren (*Salpinctes obsoletus*)

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The distributions of species have developed over evolutionary time scales, but are not static, and are determined by many factors including climate tolerances, environmental gradients, resource availability, and interactions with competing species. Knowing the determinants of species range limits is necessary to predict and manage for potential shifts in the face of climate change. Here I explore the range limits of the Rock Wren (*Salpinctes obsoletus*), a partially migratory songbird, using historical biogeography and ecology. The Rock Wren is a good species in which to study range limits because it is a wide ranging rock habitat specialist with generalized foraging behaviors, with no strong ecological replacement to the east. Documented northern and eastern occurrences of Rock Wrens outside of their known distribution are frequent, and may be increasing. I used historical data and geographically weighted regression in Arc GIS to chronicle and analyze vagrancy records from 1890-2013, and compared these to records for five other western bird species. Proximity analysis revealed that sightings were correlated with railways, quarries, and reservoir dams, suggesting that the quarrying and movement of massive quantities of rock may have facilitated increased Rock Wren dispersal across the Great Plains. I surveyed and sampled habitat in a west to east transect across the plains to assess habitat occupancy and quality, frequency of suitable nesting cavities, and nest stone availability. I also evaluate the claims that Rock Wrens have been transported in railroad boxcars.

Colorado Songbirds: Do They Duet?

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Some species of birds perform vocal duets, where two individuals coordinate their songs with predictable, consistent timing. Because duets are often intricate, energetically expensive and conspicuous, they are excellent subjects for researchers studying how and why complex animal communication signals evolve. Research suggests that avian vocal duets function in mate attraction, mate coordination and mate retention. Ecology, life history, and breeding behavior are strong drivers of duet evolution, with duets occurring most often among non-migratory monogamous species that defend territories year-round. As a result of this, the majority of duetting species are found in tropical and sub-tropical latitudes where permanent residents have evolved complex duet repertoires. In Colorado few passerine songbirds fit the typical life-history profile of a duetting species, yet several local species have been reported to duet. In this presentation I will assess the occurrence of vocal duetting in Colorado songbirds and I will discuss what we can learn about duet evolution by examining the form, function and life-history context of duets in temperate latitudes.