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Lois Webster Fund 2014 Final Report

Project Description and Background: Habitat Use by Mountain Plover During Nest Incubation

Over the last 150 years, grasslands of the Great Plains have undergone many changes, including conversion to agriculture and loss of native grazers (e.g. bison). This has, in part, led to the decline of numerous grassland-endemic birds. The Mountain Plover (*Charadrius montanus*) is a species of conservation concern in both Colorado and Nebraska, and is native to the short-grass prairie. Currently, plovers breeding in northern Colorado and southwestern Nebraska are presented with a mosaic of habitat cover-types for nesting. This landscape, mostly privately owned, consists of a mix of agricultural fields, rangeland and land enrolled in the Conservation Reserve Program. My research in collaboration with Rocky Mountain Bird Observatory (RMBO) is investigating how Mountain Plover make use of this modern landscape matrix during the breeding season. The study area consists of private land in Kimball County, Nebraska and Weld County, Colorado.

Previous research of habitat use by Mountain Plover has focused on the post-hatch period; when adults are moving around the landscape with broods. My research focuses on tracking adults during the nest-incubation period. Adult home-range size during this time period is unknown, and may be different than home-range size estimates based on when adult plovers are raising broods. Incubating adults are not tethered to their brood, and thus may have opportunity to travel farther than adults with broods. We are particularly interested in where the adult plovers are foraging. Do adults nesting on agricultural fields forage there as well, or do they travel to nearby rangeland that consists of mostly native short-grass prairie?

This report will summarize my findings from the 2014 field season, including preliminary analyses of home-range size. I am planning one more field season of data collection in 2015 before final data analysis.

2014 Field Season

With support from the Lois Webster Fund, I was able to purchase GPS-tags (Pinpoint 50, Lotek) to deploy on nesting adult plovers. GPS-tags small enough for Mountain Plover have only recently become available, and they are ideally suited to studying short-term movements of plovers on the breeding grounds. We deployed the tags by trapping and banding nesting plovers; the plovers must be

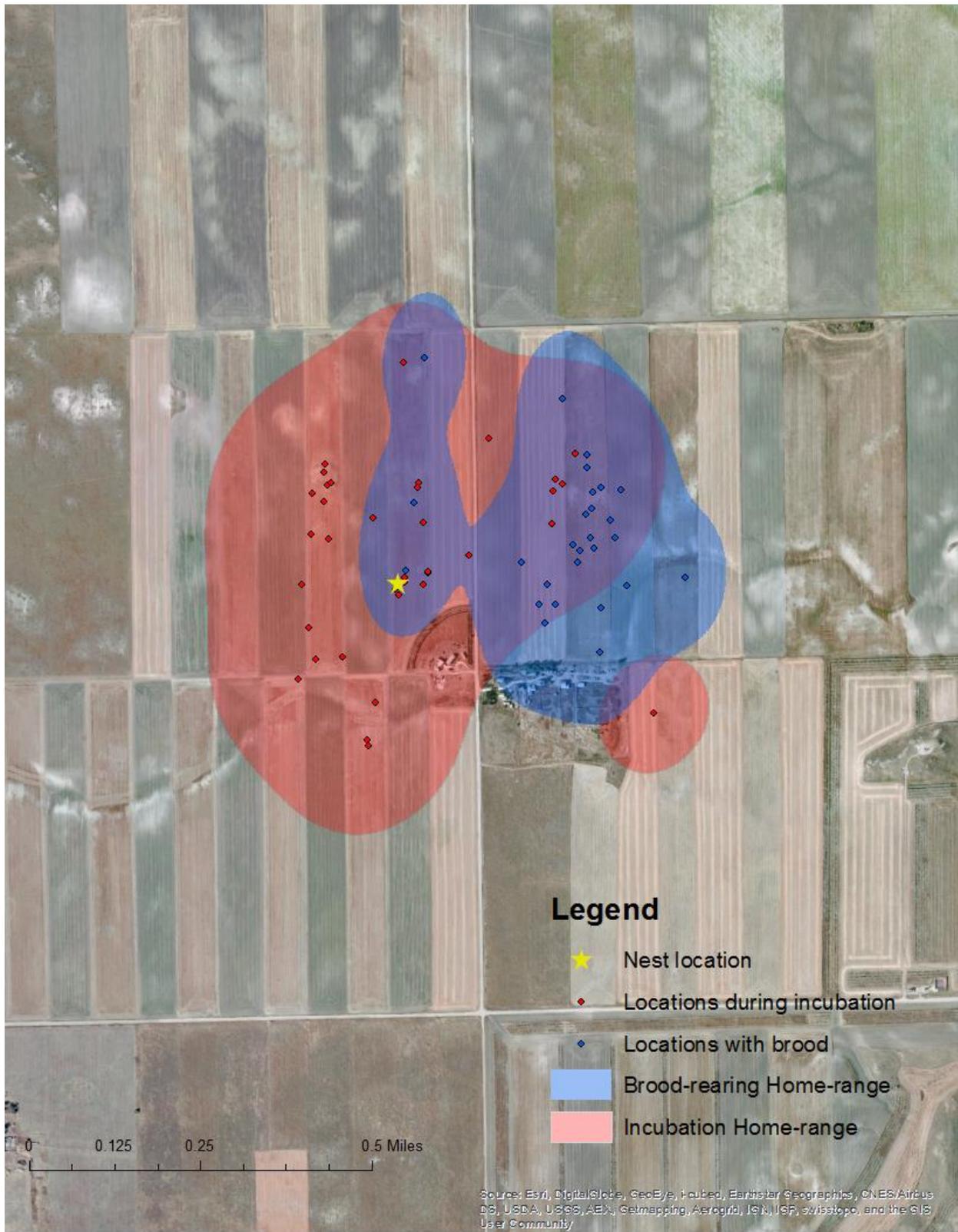
re-caught to recover the GPS-tag. Mountain Plover in our study area have high nest-survival and we thus expected a high tag-recovery rate. In the 2014 field season, we found a total of 58 Mountain Plover nests, 39 of which successfully hatched. Additionally, we caught and banded 58 plovers with a unique color-band combination. Our numbers of nests were down from previous seasons, mainly due to unusually rainy weather limiting our ability to work in the field.

I deployed 8 GPS-tags, and was able to successfully recover 6 of them (see figure 1 for tag deployment). These 6 tag recoveries yielded spatial data on 3 individual nesting birds (2 deployments/bird). Each plover that was tagged with GPS during nest incubation was then also tracked with a radio-transmitter during brood-rearing. This allows for comparison of home-range size and habitat use during these two distinct time periods of the breeding season. To estimate home-range size during incubation and brood-rearing, we used the fixed-kernel method with least squares cross validation to determine the smoothing parameter. Home-ranges are based on a 95% contour of the kernel density (see figure 2). Figure 2 shows a home-range map constructed from GPS-tag and radio-telemetry data points. I will construct similar maps for each tagged bird. Additionally, I've collected habitat data which will be used to build a utilization distribution for each tagged bird to estimate habitat use and preference.

Figure 1: Adult Mountain Plover with attached GPS-tag



Figure 2: Home range during incubation and brood-rearing for an individual Mountain Plover



Future research

We have one more field season planned in 2015 in which we will be deploying the remaining GPS-tags to gather more spatial data on habitat use. Additionally, I will be using our plover nesting data to estimate daily nest survival with consideration of a number of covariates (precipitation, daily temperatures, habitat characteristics, sex of the incubating adult etc.) Currently I am preparing feather samples for stable isotope analysis and molecular sexing.

I would like to thank the Lois Webster Fund for supporting this research on Mountain Plovers. This research also would not be possible without collaboration from Rocky Mountain Bird Observatory, Nebraska Game and Parks Commission, Nebraska Environmental Trust, and Colorado Field Ornithologists. I presented a poster with my preliminary findings at the 2014 American Ornithologists Union meeting in Estes Park, CO. I look forward to completing my research and presenting my findings to the scientific community and the general public via both publications and presentations.

Thank you again,

A handwritten signature in black ink that reads "Colin Wooley". The signature is written in a cursive, slightly slanted style.