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Student Engagement Fund Project: Grassland Birds

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For my Summer 2018 SEF Project, I worked under Heather Herakovich who is studying grassland bird response to bison and prairie vegetation restoration. Heather Herakovich has been conducting this study for many years at Nachusa Grasslands, a tallgrass prairie restoration where bison have been recently reintroduced in 2014. For the 2018 summer season, I was fortunate to accompany her on her field work.

Nachusa Grasslands is divided into several "sites" which will be mentioned throughout this paper. There are sites in which bison are able to roam, which will be called "bison sites," and sites that bison are fenced off from, called "non-bison sites." This is significant to the research as we can easily compare the impact of the bison to the ungrazed restoration.

The field work I participated in at Nachusa Grasslands had several aspects to it. One of the major aspects was to search for bird nests in bison sites and non-bison sites. The designated sites within the bison and non-bison sites were divided into 3 of each type. The objective was to search in all sites an equal amount of time, so that data could be compared between non-bison and bison sites.

Our main method of searching was to walk transect lines through each site, standing a good distance apart, and using bamboo sticks to extend our searching range. In sites where transect lines were less applicable (sites that were not very rectangular in shape), we would walk haphazardly, covering the area as best as we could. In order to make sure we would not overlap our previous path in either method, we made use of a GPS that recorded our path.

A secondary method to walking through the prairie and hoping to encounter a nest in our path was to watch the birds' behavior. Before we would begin searching through a site, we would first identify all of the birds singing in the area. This would give us an idea of what birds

were active in the site at the time we were there. A common behavior that often helped us find a nest was seeing a bird holding food in its mouth. This reveals the possibility of the bird going to feed hatchlings in a nest. When a bird like this is sighted, we would simply watch it until it lands somewhere that is likely to be a nest. From there, we would go directly to that spot and hopefully find a nest. Another behavior that has proven useful is to follow birds carrying nesting material. This can lead to the discovery of a nest being built, which will likely have eggs in it soon after.

Once a nest was found, we would mark it on the previous mentioned GPS. After finding a nest, we had to follow the progress of the nest for necessary data. There would be 3-4 days between each nest check, where we would quickly walk up to the nest, identify the bird, count the eggs or chicks, and check for the presence of cowbird eggs. Excess human presence around the nest could force the bird to abandon the nest, so we never stayed around it for too long. Following the fledging of the hatchlings or the abandonment of the nest, we would do vegetation measurements. This process involved placing a 1.5-meter pole with a string attached to it on top of the nest and measuring the height of the vegetation surrounding it at 3 different segments of the string at each cardinal direction. The purpose of this was to see if obstruction of view of the nest by vegetation can contribute to predation or lack thereof.

The final objective I often helped with was the placement, checking, and collection of artificial nests. The purpose of the artificial nests was to observe possible nest predators at Nachusa Grasslands. The artificial nests were constructed with dead grass from Nachusa Grasslands laid within a metal wire frame, taking the shape of a real nest. We would set these out on a Tuesday in one bison site and one non-bison site. On the following Thursday, we would then bait them with two Japanese Quail eggs and two clay eggs. The purpose of the clay eggs was to see the teeth marks of the predators that tried to infiltrate the nest. Furthermore, each site

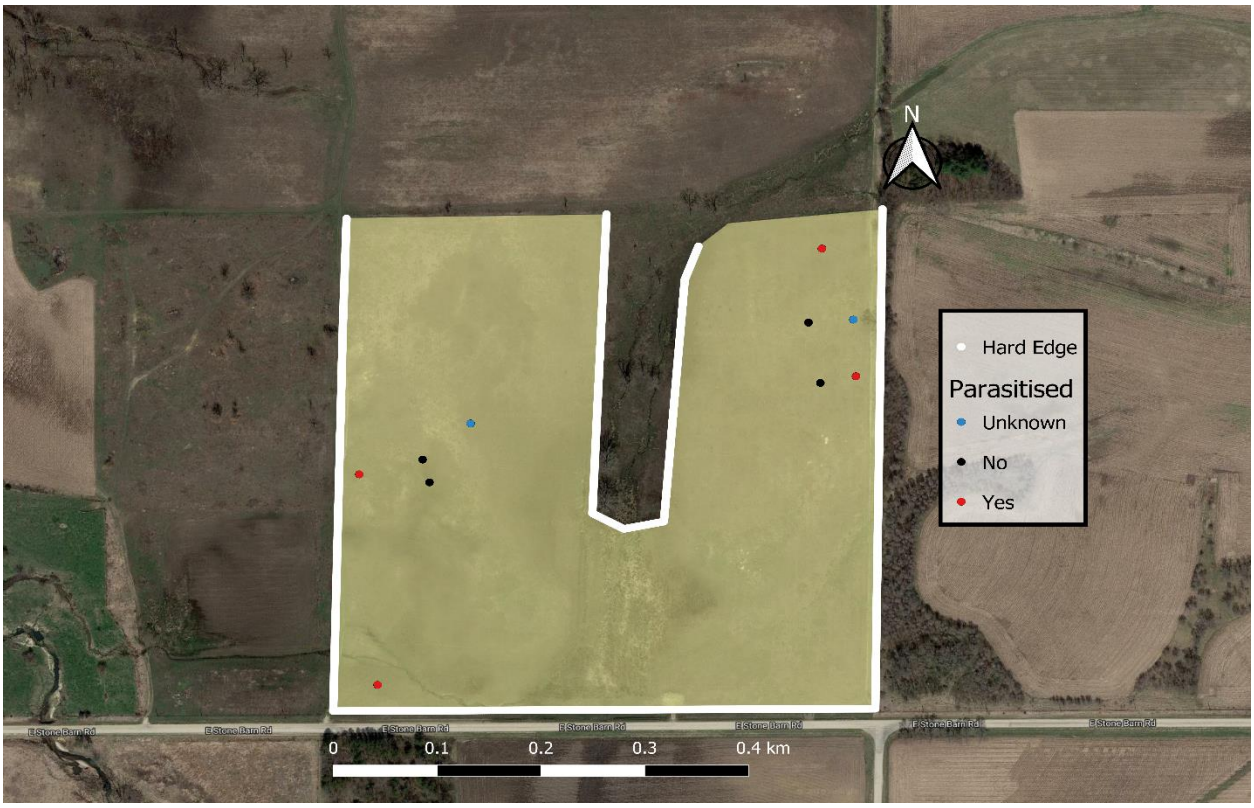
would receive one camera observing an artificial nest to take pictures of any predator that may approach. While the nests were out, we would periodically check them to see if they had been depredated, in which case we would go ahead and collect it early. We also checked them in order to repair them if they had been weathered too dramatically. After 2 weeks of the nests being out, we would collect all of them, placing the clay eggs in plastic bags for later analysis.

After completing the field work, I decided to make my own analysis on some of the data we collected. I wanted to look specifically at how different factors are affecting the amount of parasitism of field sparrows by brown-headed cowbirds. Brown-headed cowbirds (*Molothrus ater)* are a species of bird that lay their eggs in other birds' nests and leave care of their offspring entirely to the affected birds. This is a type of parasitism called brood parasitism (Patten et al. 687). Brown-headed cowbirds have proven to be a large issue in the matter of songbird conservation, which includes the species we will be looking at: the field sparrow (*Spizella pusilla*) (Goguen and Mathews 1533). The brown-headed cowbird received its name for the way it eats food among livestock; however, before the introduction of livestock to North America, it is thought that they would have fed among the grazing bison (*Bison bison*). In a prairie restoration where bison have been reintroduced, this can lead to a higher presence of cowbirds, thus higher parasitism of species like the field sparrow. Not only is it possible for bison to increase their population in these areas, but factors such as perches and edge habitat have also shown an increase in parasitism (Bernath-Plaisted et al. 170036).

There are several factors that were taken into consideration for the parasitism of field sparrow nests: presence of bison and number of nests in each type of site, and average distance from the edge of a site. Based on the results of the study, it was shown that the presence of bison was significant to the parasitism of field sparrows, but conversely of what was expected. In total,

there were 29 field sparrow nests found in non-bison sites, and 28 in bison sites. Out of these, 8 were parasitized in the non-bison sites while only 1 was parasitized in the bison sites. This data fails to support the hypothesis that the presence of bison would increase nest parasitism of field sparrows by cowbirds; furthermore, there is a possibility that the non-bison sites being in closer proximity to cow pastures than the bison sites had an effect on the number of parasitism cases. However, this cannot be confirmed without making closer observations of cowbird activity with bison compared to cows.

Distance from the hard edge of habitats, characterized by tree lines, roads and other infrastructure, has shown to have an effect on rates of parasitism by brown-headed cowbirds (Patten et al. 687). After an analysis of data and visual representation in GIS, distance from hard edges of our sites was shown to have no significant effect on parasitism of field sparrow nests overall.



However, a non-bison site known as Sand Farm, shows that the nests closer to hard edges are more likely to be parasitized. Compared to the other sites, Sand Farm is surrounded by more hard edge, which could contribute to the higher rate of parasitism present here.

In conclusion, further research should be conducted on the brown-headed cowbirds within and surrounding Nachusa Grasslands. The previously discussed factors have been shown to have an effect on parasitism in other studies, but perhaps this landscape must be approached in a different manner. A similar study to Goguen and Mathews could be conducted, measuring the average commute distance of cowbirds from feeding ranges to breeding ranges (1862).

My original objectives of participating in this SEF Project under Heather Herakovich were to simply get a grasp on what field work was like for a research scientist in ecology, and to learn about wildlife. I really do now understand what sort of work goes into being a field researcher in this sort of environment. I experienced the physical and mental difficulties that go into the job, along with the wealth of knowledge one must have in order to be in this field. It is very fun work to me, and I may seek out this type of work in the future. Also, learning about wildlife was one of the main reasons I was interested in Heather's project, as birds are the focal point. This is important to me as I have a goal of becoming a wildlife veterinarian.

The SEF program had a great impact on my academic experience. Not only was it a way to keep up on scientific knowledge throughout the summer, but I learned so much from my mentor as well. None of the questions I asked went unanswered, and thus I learned a whole lot, including things I would have never thought of asking. Overall, this program showed me what is was like to be a field researcher, gave me experiences that the average person would not get to experience, and taught me a lot about biology.

Works Cited

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