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# Avian Use of Harvested Crop Fields During Spring Migration Through the Southern Drift Plains of North Dakota

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## Introduction

In the Southern Drift Plains of North Dakota, land put into crop production has increased greatly over the last century. Of the approximately 70,000 square miles of land area in North Dakota, about 32,000 square miles are used for harvested cropland. Because of changes in the landscape, the diversity of habitat available for migrant birds has diminished, and migrants are now limited to choosing habitats for stopover sites that are uncharacteristic of those used at other times of the year. With reduced diversity of habitat a birds choice of feeding and resting areas greatly affects success at migration. Choice may depend on many factors including the tillage practices that occurred the preceding fall, the amount of food available within a field, the energy value provided by that food, habitat surrounding the field, and climatic conditions. These factors as well as type of crop will be analyzed to determine what migrants are using at a time when energy demands are high, surroundings are unfamiliar, and weather is unpredictable.

## Methods

Sixty quarter sections located in the Southern Drift Plains of North Dakota were surveyed in the spring of 2003. Field habitat within each of these quarter sections was surveyed in order to assess avian use. Thirty of these fields were harvested sunflower fields (oil or confectionary), and the remaining thirty were harvested non-sunflower (soybean, corn, or small grain). Field characteristics, including field type (sunflower (oil), sunflower (non-oil)), soybean, small grain, corn, or sorghum), till type (No Till or Till) and size were recorded. The species and abundance of birds within the fields were recorded along transects located every 100 meters perpendicular to the shortest axis of the field. Each field was surveyed twice throughout the period from mid-March to the end of April. In addition to bird surveys, habitat within 0.75 miles surrounding the center point of the study field will be estimated using aerial photographs and a non-mapping technique for estimating proportions of several habitat categories. Logarithmic transformations were performed on bird abundance data to adjust for deviations from normality and then back-transformed for presentation in figures. Bird abundance was further analyzed using students' t-test, analysis of variance, and Duncan's multiple comparison test to detect if there were any differences among the different field types. All statistical tests were conducted using an alpha level of 0.05.

## Results

A total of 10,200 birds were seen throughout the study period. A total of 33 different bird species were seen. The Horned Lark, the Lapland Longspur, and their associations with each other and unknowns, constituted a majority of the observations throughout the study period, with about 67% of the total observations (Fig. 1). Blackbirds, including the Red-winged Blackbird, the Yellow-headed Blackbird, the Common Grackle, and the Brown-headed Cowbird comprised about 17% of the observations (Fig. 1). All other species represented less than 3% of the observations. In survey period 1, we observed a significantly greater number of birds in sunflower than non-sunflower in both untilled and tilled fields (Fig. 2). The number of birds observed was significantly greater in the untilled sunflower fields but not in the tilled sunflower fields in survey period 2. Because there was no difference between till types in either of the survey periods, we pooled the values for untilled and tilled fields. We also compared our numbers of birds seen in the different field types in each of the survey periods (Fig. 3). In the second survey period, many of the study fields were plowed resulting in a decrease in the sample size and a reduction in statistical power.

## Species Seen throughout the Study Period

Species	# of Observations
Horned Lark	2539
Horned Lark/Unkn	1505
Red-winged Blackbird	1246
Lapland Longspur	1098
Lapland Longspur/Unkn	900
Horned Lark/Lapland Longspur	750
Unidentified Species	740
Unidentified Blackbird	316
Canada Goose	150
Killdeer	134
Snow Goose*	100
Unidentified Sparrow	86
Dark-eyed Junco	64
American Tree Sparrow	61
American Robin	60
Sharp-tailed Grouse	49
Common Grackle	48
Western Meadowlark	47
Yellow-headed Blackbird	44
Mallard	43
Vesper Sparrow	35
Savannah Sparrow	32
Brown-headed Cowbird	28
Gray Partridge	26
Song Sparrow	24
Ring-necked Pheasant	24
Mourning Dove	13
Sandhill Crane*	12
Field Sparrow	5
Northern Pintail*	4
Northern Harrier	4
Rock Dove	3
Unidentified Gull*	2
Red-tailed Hawk*	2
American Crow	2
Unidentified Woodpecker	1
Northern Flicker*	1
Common Snipe	1
Brewer's Blackbird	1
Total	10200
Total in sunflower	7596

\* Species not seen in sunflower.

## % Observations by Species

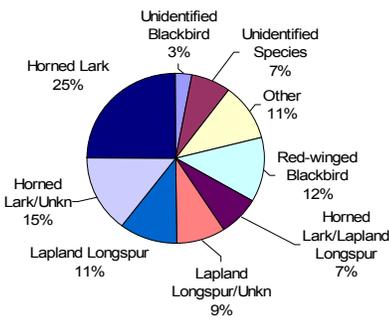


Figure 1. Percent Observations by species when percent observations was greater than 3%.



Examples of Field Types Surveyed

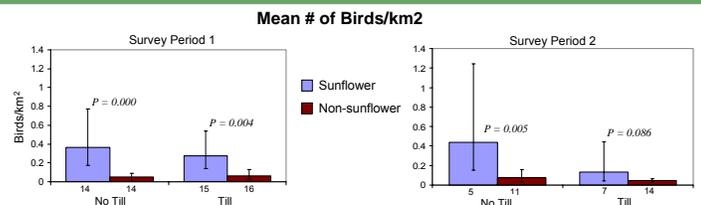
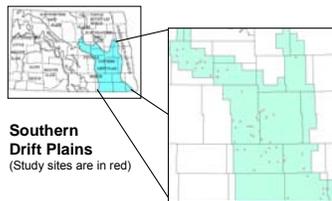


Figure 2. Comparison of avian use numbers and 95% CI between sunflower and non-sunflower field types using students' t-test.  $\alpha=0.05$

## Study Area North Dakota



Southern Drift Plains (Study sites are in red)

USDA National Wildlife Research Center  
Great Plains Field Station  
& ND/SD Wildlife Services

## Comparison of Mean # of Birds/km<sup>2</sup>

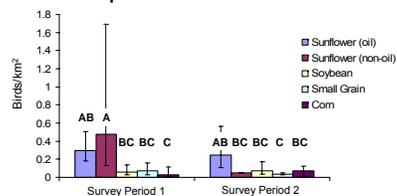


Figure 3. Comparison of avian use numbers and 95% CI using a Duncan's multiple comparison test with till types pooled. Field types with different letters are significantly different.  $\alpha=0.05$

## Conclusions

Based on avian use, Horned Larks, Lapland Longspurs, and their associations with each other and unknowns, are the dominant bird species using harvested crop fields. This may be attributed to the fact that both these species prefer open areas with little or no vegetation. We found a significantly greater number of birds in sunflower fields than non-sunflower fields, which indicates that either there is a greater amount of food, more shelter available surrounding these fields, or that sunflower provides a better food resource than the other crops. Because much of the Southern Drift Plains Region is covered with cropland, harvested fields (especially sunflower) could provide a good source of food and stopover habitat for migrating birds.

## Acknowledgements

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