Forest Breeding Bird Grid Census 2023 Report

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Introduction

Since 1984, the Beaverhill Bird Observatory (BBO) has been monitoring the movements and populations of migratory songbirds at its research and education station near Tofield, Alberta. In the last 50 years, bird populations in North America have declined 30%, and declines have been especially dramatic among aerial insectivores (Bird Studies Canada, 2019). The aspen parkland forest that dominates much of the area surrounding the BBO is home to several species of aerial insectivore, as well as other songbird species.

Since 2016, the BBO has conducted territory mapping censuses in this aspen forest to give a more complete picture of forest songbird abundance and population trends in the Beaverhill Natural Area. Territory mapping censuses cover the same area repeatedly and uses the position of singing male birds to deduce the approximate boundaries of birds' territories, allowing the total number of individuals or each species breeding in an area to be determined (Kennedy et al, 1999).

Methods

Study Area

The census was conducted in a predetermined 25 hectare forested area in the Beaverhill Natural Area. The area is almost entirely mixed age aspen and balsam poplar forest, bordered by Beaverhill Lake to the north and Lister Lake to the southeast. The area is divided into a 10 x 10 grid of census points, each point being roughly 50 meters apart.

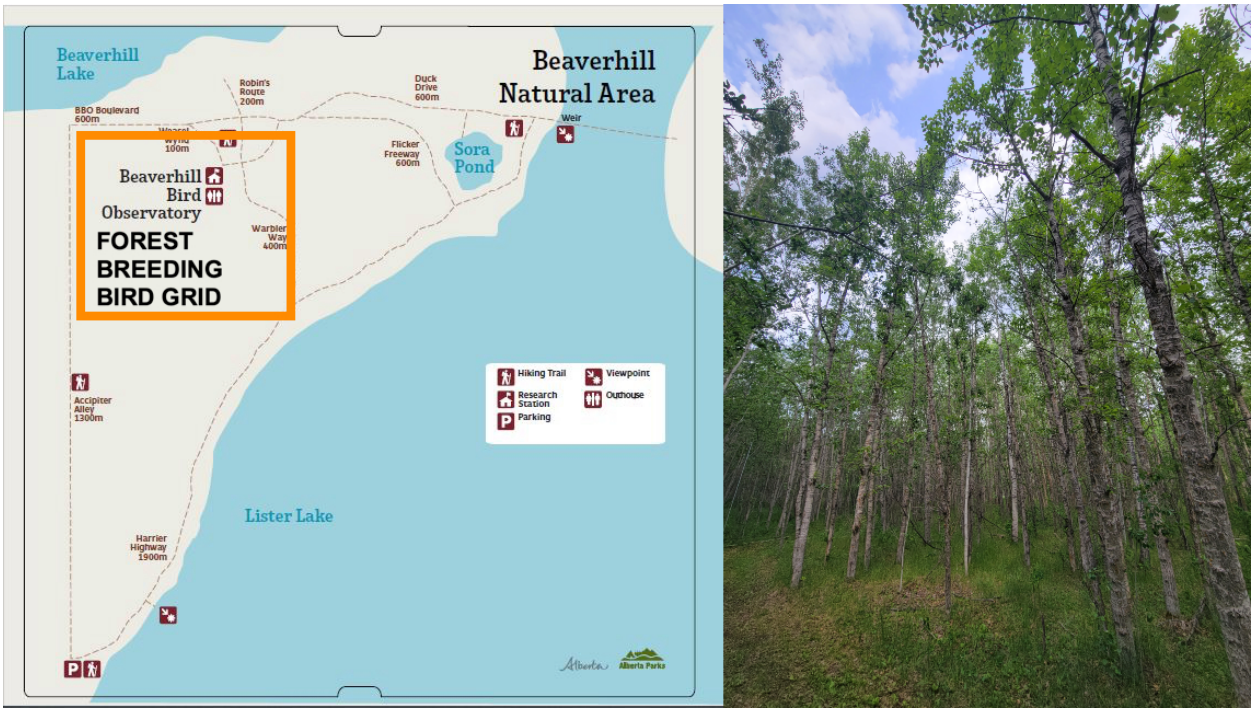

Figure 1. A map of the study area (left) and a photo of the typical habitat structure of the study area (right, photo by Geoff Holroyd)

Survey Methodology
6 censuses of the grid were completed between June 16 and July 9, 2023. During each survey, the author navigated to each point in the grid and marked the position of any birds that were seen or heard on a paper map of the census area. When two or more birds could be heard singing simultaneously, a dotted line was drawn between the relevant individuals.

The starting point and direction of travel was varied for each census so that no one point was consistently surveyed earlier than another. Censuses began at sunrise to coincide with peak birdsong activity and took 3-4 hours to complete. No censuses were conducted on days with excessive wind or rain, as birds tend not to sing in these conditions.

Data Analysis
Species-specific sightings maps were created for species detected on at least 50% of censuses and for which at least one territory boundary could be clearly delineated. Territory boundaries were determined based on clustered sightings across multiple censuses and the location of simultaneous singing events. Territories on the edge of the census area were only counted as half a territory, since the full area of that territory likely extend outside of the census grid.

Results

132 total territories were defined for 6 different species. As in previous years Least Flycatchers were the most abundant species with 66 territories identified throughout the entire study area. Yellow Warblers remained abundant with 37 territories, these being more concentrated at the northern edge of the census grid where more willow habitat is present. House Wrens were also quite common as a grid of nest boxes for this species is present within the census area. Other species for which territories were determined were Baltimore Oriole, Warbling Vireo, and Red-eyed Vireo (Table 1).

Table 1. Summary of territory numbers and densities for 6 species in the forest breeding bird grid

Species	# of territories	Territory density (# / ha)
Least Flycatcher	66	2.64
Yellow Warbler	37	1.48
House Wren	16.5	0.66
Baltimore Oriole	5.5	0.22
Warbling Vireo	4.5	0.18
Red-eyed Vireo	2.5	0.10

The overall number of territories detected in this year's censuses were lower than the previous two years (Table 2). There were also fewer territories for each individual species compared to the previous two years.

Table 2. Territory numbers for 6 species in the forest breeding bird grid over the last 5 years

Species	Territories (2023)	Territories (2022)	Territories (2021)	Territories (2020)	Territories (2019)
Least Flycatcher	66	91	148	43	80
Yellow Warbler	37	51	60	10	38
House Wren	16.5	28	24	24	13
Baltimore Oriole	5.5	12	8	1	9
Warbling Vireo	4.5	10	14	4	15
Red-eyed Vireo	2.5	8	17	0	0

Discussion

While lower than the previous year's results, the density of Least Flycatchers in the Beaverhill Natural Area is still higher than has been published in similar studies for other areas (Van Brempt et al, 2024). This suggests that the Beaverhill Natural Area is high quality habitat for this species, which is noteworthy due to the overall population declines of aerial insectivores in North America.

The previous years of census data suggest that some degree of local population decline has occurred for forest songbirds in the Beaverhill Natural Area over the last 3 years. However, these results should be interpreted with some caution. The territory mapping technique has a high degree of variability inherent in its protocol due to observer bias, as determining the exact boundaries of territories from a map of sightings is slightly subjective.

As well, only 6 of the desired 8 censuses could be completed this year due to extended periods of adverse weather. Had a higher number of censuses been completed, more territory boundaries likely could have been determined. Further research should include a revisiting of census data from previous years to apply more consistent criteria for territory determination.

Literature Cited

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Kennedy, J.A., Pam Dilworth-Christie and A.J. Erskine. 1999. The Canadian Breeding Bird (Mapping) Census Database. Technical Report Series No. 342, Canadian Wildlife Service, Ottawa, Ontario.

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