Forest Breeding Bird Census Report

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Introduction

The Beaverhill Natural Area includes important habitat for many species of plants and animals, and many migratory and breeding birds as shown by the very high breeding density of birds like Least Flycatchers, the several hundred bird species that use this habitat, and its designation by RAMSAR as a wetland of international importance. Because of these factors, naturalists have been monitoring birds in this area for many decades, which led to the establishment of Beaverhill Bird Observatory (BBO) over 40 years ago. During that time, the BBO has been monitoring birds using a variety of programs. The most prevalent and long-term of these are the banding programs; however, banding can only reveal so much, leading to the creation of many other programs including the Forest Breeding Bird Census (FBBC) which was completed for the ninth time this year.

The FBBC involves the repeated surveying of a standardized grid of forest in the Beaverhill Natural Area throughout the breeding season to determine the number and size of territories held by each species. The aim of completing these surveys year after year is to reveal how the breeding populations of birds change over time and what might be causing these changes.

One question that FBBC has yet to answer is how the difficulty of detecting breeding birds increases as the breeding season progresses. It is logical to assume that male birds will defend their territories less aggressively as the breeding season comes to an end and this would make detecting these territories more difficult. The years of historical data from the FBBC could help answer this question.

Table 1. A list of common names, alpha codes, and scientific names for the six target species of the FBBC.

Common Name	**Alpha Code**	**Scientific Name**
Least Flycatcher	LEFL	*Empidonax minimus*
Northern Yellow Warbler	NYWA	*Setophaga aestiva*
Northern House Wren	NHWR	*Troglodytes aedon*
Baltimore Oriole	BAOR	*Icterus galbula*
Eastern Warbling Vireo	EWVI	*Vireo gilvus*
Red-eyed Vireo	REVI	*Vireo olicaceus*

Of the over 200 species of birds that have been observed around the BBO, only a fraction regularly use the forest as their breeding grounds. The FBBC includes all birds that are seen and heard through the breeding season but focuses on the six target species that regularly breed within the survey area (Table 1.).

Methods

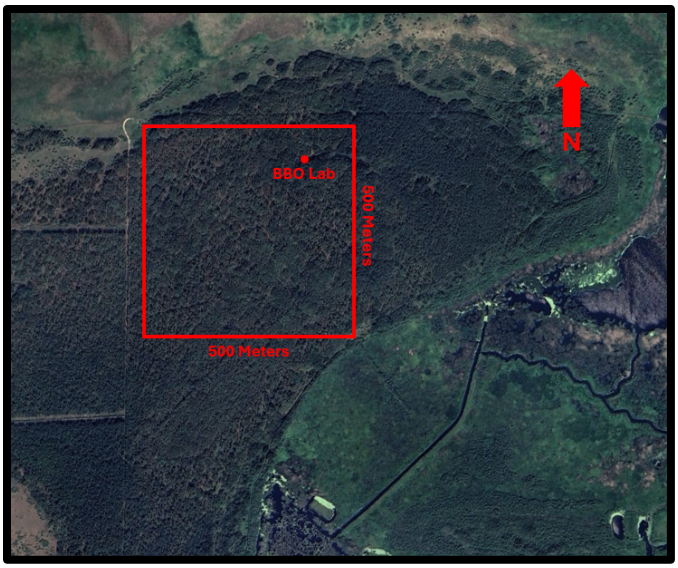

Figure 1. The red box represents the study area for the FBBC within the Beaverhill Natural Area. BBO Boulevard runs along the north side of the study area while Accipiter Alley runs along the West.

The FBBC has been conducted yearly since 2016. The goal of the census is to map the location and number of territories of the bird species that breed in the census area. To complete this, a 25-hectare (500-meter by 500-meter) area was chosen in the Aspen and Poplar forest around the Beaverhill Bird Observatory lab (Figure 1.). This area contains a grid of points spread 50 meters apart equating to a total of 100 points.

Each survey starts at dawn and involves using a GPS to navigate between each of the 100 points. Whenever a bird was detected, its location was noted on a map and specified whether the bird was singing, calling, or silent, and if it was stationary or moving. This process was repeated six times throughout the breeding season of 2025. For the FBBC, the breeding season is considered to be from June 1 to July 10.

After the surveys were completed, territory maps were created for each target species. To create these maps, the individuals detected for each target species across all six surveys were compiled onto one map per species; then, a circle was drawn around any cluster of detections from multiple surveys to represent a territory.

One piece of methodology new to this year of the FBBC was the comparison of detections as the breeding season progresses. The first step to help determine this was compiling data from previous years of the FBBC. Data from 2025, 2024, 2023, 2022, 2021, and 2019 were all readily available and used for this purpose. Next, the breeding season was divided into five seven-day periods to represent its progression. This data was used to create a table that, for each target species, shows the percentage by which the detections for each period differ from the

mean detections between all periods. Thus, showing the trend of detections throughout the breeding season.

Results and Discussion

Six FBBC surveys were completed during the 2025 breeding season. These surveys were completed on June 12 (Period 1), June 25 (Period 3), June 29 (Period 4), July 5 (Period 4), July 7 (Period 5), and July 10 (Period 5). Due to weather and scheduling, the final two periods contained most of the surveys this year.

Table 1. The number and density of territories for each target species during the 2025 FBBC.

Species	Number of Territories	Territories per Hectare
LEFL	73.5	2.94
NYWA	58.5	2.34
NHWR	20	0.80
BAOR	5.5	0.22
EWVI	18.5	0.74
REVI	2.5	0.10

This year, territories for all six target species were detected. Unsurprisingly, there were high numbers of both LEFL and NYWA territories (Table 1.). In fact, these two species comprised over 70 percent of the territories detected in the study area. Besides these target species, no other species had territories that were detected during the census. Despite this, a White-throated Sparrow (WTSP) territory was found near the lab building outside of FBBC surveys. The WTSP pair were seen feeding a Brown-headed Cowbird chick later in the season. In addition, early in the breeding season, a Myrtle Warber (MYRW) was incidentally heard singing South of the lab though a territory was never confirmed. One possible reason that these two species weren’t detected during the FBBC could be how late in the season most surveys were conducted.

Table 2. Comparison of the number of territories detected for each species in the last seven years of the FBBC within the 25-hectare study area.

Species	Territories 2025	Territories 2024	Territories 2023	Territories 2022	Territories 2021	Territories 2020	Territories 2019
LEFL	73.5	75.5	66	91	148	43	80
NYWA	58.5	42	37	51	60	10	38
NHWR	20	15	16.5	28	24	24	13
BAOR	5.5	12	5.5	12	8	1	9
EWVI	18.5	11	4.5	10	15	4	15
REVI	2.5	1	2.5	8	17	0	0
MYRW	0	1	0	0	0	0	0
WTSP	0	1	0	0	0	0	0

For most species, the number of territories detected in 2025 are slightly higher than 2024. The exceptions to this are LEFL and BAOR. Neither of these had large decreases however, with LEFL dropping less than 2 percent and BAOR matching what was detected in 2023 (Table 2.). In fact, for most species the variation is within the range seen in previous years of the FBBC. The only exception to this is EWVI which showed an all-time high count for territories in 2025. When considering these results, it is important to note that 2025 was the first year that Xavier Quantz was responsible for the FBBC so differences between observers could confound analysis.

Table 3. For each target species, this table shows the percentage by which the detections for a period differ from the mean detections between all periods. Colour scheme used to emphasize decreases from the mean with red and increases with green.

Period	LEFL	NYWA	HOWR	BAOR	EWVI	REVI
1	0.94	-2.04	6.40	44.71	-18.61	137.10
2	17.53	10.78	30.83	63.27	-4.26	27.78
3	-14.28	9.75	-3.49	21.17	-1.57	-62.58
4	5.22	13.05	-9.56	-17.37	12.69	-17.11
5	-9.19	-21.72	-16.48	-65.25	3.18	-35.94

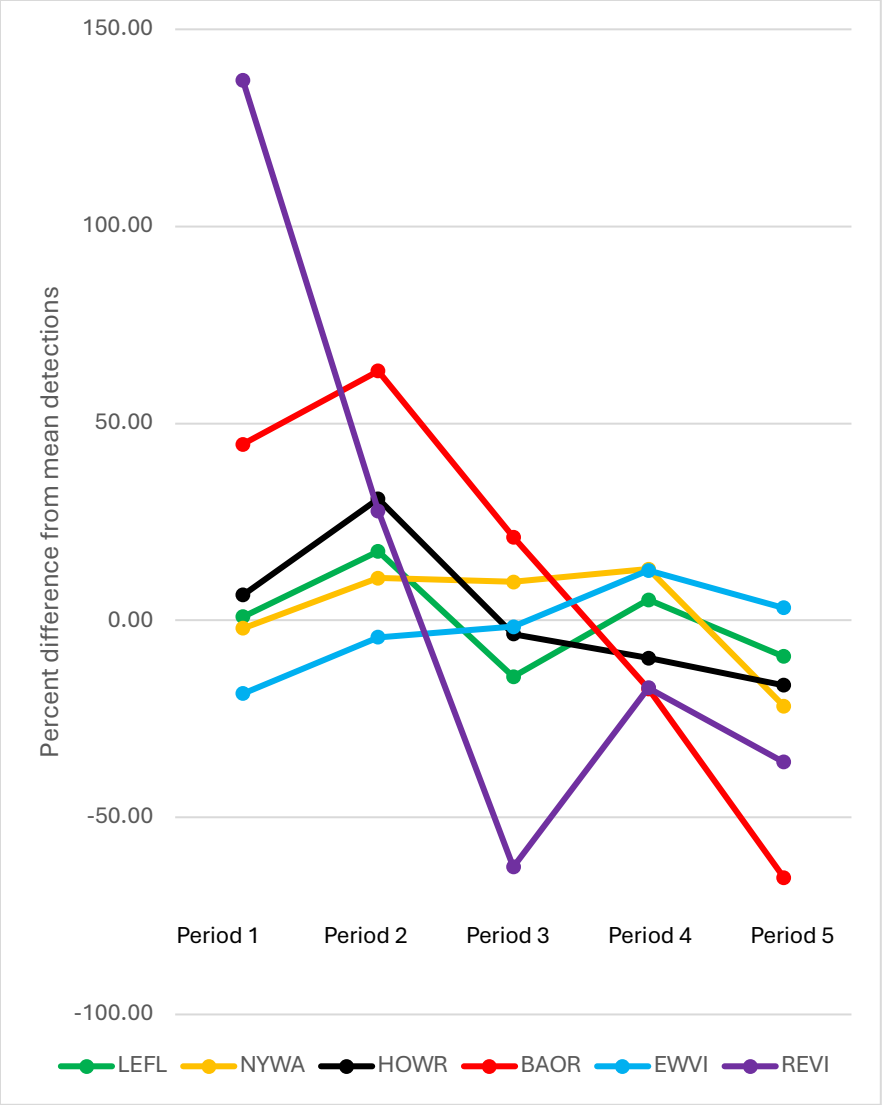

Figure 2. The trends of detections shown in Table 3. represented visually. The horizontal axis shows the five periods of the breeding season. The vertical axis shows percentage differences for each period from the mean of all periods. Each colour represents one of the target species.

As hypothesized, when taking into account all species, there is a general trend for lower detections from one period to the next; however, the results are more nuanced than this (Figure 2). For all species other than REVI, Period 2 has higher detection than Period 1 (Figure 2). This fact helps support the idea that the FBBC captures the peak of breeding season. On the opposite side of the season, for all species, Period 5 has lower detections than period 4; thus, more evidence that the peak of breeding season is effectively captured by the timing of the FBBC.

To further break down the trends seen in Figure 2., LEFL, HOWR, BOAR, and REVI follow the general trend for lower detections as the season progresses, although both LEFL and REVI have the lowest detections during Period 3 (Figure 2.). On the other hand, NYWA and EWVI show the opposite trend with increasing detections through the breeding season until

Period 5 (Figure 2). Furthermore, while NYWA shows only small changes in detections between Period 2 and 4, EWVI shows a much stronger trend (Table 3). For EWVI, this upward slope coupled with heavy surveying during Periods 4 and 5 could help explain the very high number of territories detected this year (Table 2). On the other hand, REVI shows a strong downward trend but the number of territories in 2025 are higher than in 2024.

One aspect of the data that limits its usefulness and may be responsible for opposing points in the previous paragraph is the small sample size. Specifically, two of the species that have the strongest trends, REVI and BAOR, are also species that have some of the lowest detections. The opposite is also true with LEFL and NYWA having smaller differences from Period to Period and the highest detections among all species. This may call into question the results of this part of the study.

Conclusion

Overall, the results of the 2025 FBBC showed a rather typical year for the Beaverhill Natural Area. The number of territories detected largely matches recent years and only territories of the six target species were found. The surveys this year did reveal the presence of several species of interest that weren't detected consistently enough to create territories. Some of these include Western-wood Pewee, Ruby-throated Hummingbird, the threatened Sprague's Pipit, and the irruptive Black-billed Cuckoo.

In addition to the typical report, this report includes a breakdown of how timing during the breeding season affects detections. This is especially relevant this year as surveys were mostly conducted late in the breeding season. This fact could explain some differences seen between years and may have caused the MYRW and WTSP territories to be missed during the surveys. This analysis also helped to show that the timing of the FBBC effectively captures the peak of detectability during the breeding season. This part of the FBBC was not without its limitation however as small sample size seemed to have an effect on the results. All things considered, the FBBC was successful for a ninth time in 2025.

Finally, detections of breeding birds could potentially be improved by completing sampling by July 5. This analysis may also apply to the BBO's Grassland Breeding Bird Census and could be a beneficial addition to those reports.

Appendix A. All bird species detected in or flying over the FBBC study area.

Number	Common Name	Species Code	Scientific Name
1	Northern Pintail	NOPI	*Anas acuta*
2	Blue-winged Teal	BWTE	*Spatula discors*
3	Ruffed Grouse	RUGR	*Bonasa umbellus*
4	Killdeer	KILL	*Charadrius vociferus*
5	Spotted Sandpiper	SPSA	*Actitis macularius*
6	Marbled Godwit	MAGO	*Limosa fedoa*
7	Wilson's Snipe	WISN	*Gallinago delicata*
8	Franklin's Gull	FRGU	*Leucophaeus pipixcan*
9	Ruby-throated Hummingbird	RTHU	*Archilochus colubris*
10	Black-billed Cuckoo	BBCU	*Coccyzus erythrophthalmus*
11	Unknown Hawk	UNHA	*Accipitrinae sp.*
12	Hairy Woodpecker	HAWO	*Leuconotopicus villosus*
13	Downy Woodpecker	DOWO	*Drybates pubescens*
14	Yellow-bellied Sapsucker	YBSA	*Sphyrapicus varius*
15	Least Flycatcher	LEFL	*Empidonax minimus*
16	Western Wood-pewee	WWPE	*Contopus sordidulus*
17	Eastern Warbling Vireo	EWVI	*Vireo gilvus*
18	Red-eyed Vireo	REVI	*Vireo olivaceus*
19	American Crow	AMCR	*Corvus brachyrhynchos*
20	Common Raven	CORA	*Covus corax*
21	Black-capped Chickadee	BCCH	*Poecile atricapillus*
22	Northern House Wren	NHWR	*Troglodytes aedon*
23	European Starling	EUST	*Sturnus vulgaris*
24	American Robin	AMRO	*Turdus migratorius*
25	Gray Catbird	GRCA	*Dumatella carolinus*
26	American Goldfinch	AGOL	*Spinus tristis*
27	Red-breasted Nuthatch	RBNU	*Sitta canadensis*
28	Tree Swallow	TRES	*Tachykineta bicolor*
29	Purple Martin	PUMA	*Progne subis*
30	Cedar Waxwing	CEDW	*Bombycilla cedorum*
31	Sprague's Pipit	SPPI	*Anthus spragueii*
32	Clay-colored Sparrow	CCSP	*Spizella pallida*
33	White-throated Sparrow	WTSP	*Zonotrichia albicollis*
34	Brown-headed Cowbird	BHCO	*Molothrus ater*
35	Baltimore Oriole	BAOR	*Icterus galbula*
36	Red-winged Blackbird	RWBL	*Agelaius phoeniceus*
37	Northern Yellow Warbler	NYWA	*Setophaga aestiva*
38	Rose-breasted Grosbeak	RBGR	*Pheucticus ludovicianus*