The Effect of Anthropogenic Disturbance and House Wren Competition on Tree Swallow Nesting Success

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Abstract

Habitat fragmentation and deterioration are one of the main causes for wildlife population decrease. As human expansion rises into the once wildlands with infrastructure and agriculture, wildlife is pushed into lesser quality habitats or living in edge habitats, competing with other species which are more fit for it, such as the House Wren. *Tachycineta bicolor (*Tree Swallow) has been studied throughout the years as it is one of the easier birds to monitor by providing artificial nest opportunities like nest boxes. A total of 166 nest boxes were surveyed through a three-month period within two grids (Road and New Grids) inside the Beaverhill Natural area with the objective of finding the reproductive success as well as predation and abandonment in the nesting boxes in both grids. A one-way ANOVA (Analysis of Variance) was performed to compare clutch and nestling success between both grids. It was found that by comparing both grids with different landscape structures they differed in egg clutch but not in nestlings and that the predation and abandonment rates in the Road Grid were higher than the New Grid.

Introduction

Human disturbance is one of the main causes of wildlife extinctions. When industrialization first occurred, the expansion of human settlements, infrastructure, and the changes in agriculture practices boomed (Government of Canada, 2013). These forces gave way to pollution, large-scale deforestation, industrial farming (and use of pesticides), and landscape structure changes, which in turn affected the ecosystems of wildlife (Sciencing, 2017).

With global population increase, agriculture and infrastructure are much needed in today's society; without them people would not be able to live the way they do. The changes in landscape composition for human use have been known to cause fragmentation and degradation of habitats (Benítez-López et al. 2010) affecting species diversity (Campos et al. 2013) and reproduction (Ghilain & Bélisle, 2008). Landscapes which took centuries to develop, are changed within a few years (Vos & Meekes, 1999). The presence of roads and railways create edge habitats (Ludwig et al. 2012) and agricultural intensification decreases habitat availability and quality for nesting (Robillard et al. 2013) (Strasser & Heath, 2013). Both of these combined in the creation of edge habitats increase predation rates on nests, resulting in decreased nesting success (Lahti, 2001). These habitats are usually called "ecological traps" in which there is an abundance of generalist predators and higher predation rates (Pasitschniak-Arts & Messier, 1995). Around 82% of studies about nest predation in forests show that nest predation increases with proximity to edges and decreases with fragment size (Ibarzabal & Desrochers, 2001). Other studies found that there was little to no evidence of edge related nest predation in spite of the test areas being near roads, power lines, or logging activities (Nour et al. 1993; Ibarzabal & Desrochers, 2001).

Tachycineta bicolor, commonly known as the Tree Swallow, is part of the Order Passeriformes and the Hirundinidae family. They are one of the birds affected by the changes in landscape as they need preconstructed tree cavities from other wildlife to breed. They are small songbirds that are easily recognized by their iridescent blue-green color on the back and their white underside (The Cornell Lab of Ornithology, 2017). They have long pointed wings and short squared tails with a slight notch on the end. Adult males and females look very similar, the only difference being that females have a duller coloring. An adult Tree Swallow measures 12-15 cm in length and weighs approximately 16-25g (The Cornell Lab of Ornithology, 2017). Their wingspan stretches 30-35 cm (The Cornell Lab of Ornithology, 2017). Juveniles are brown in coloring and sometimes have a gray-brown streak on their chest (The Cornell Lab of Ornithology, 2017). They live and breed near water (marshes, meadows, lakes, shorelines, beaver ponds etc.) in tree cavities or nest boxes (which makes them easier to study and monitor) but they can also live in open habitats where there is available food. (The Cornell Lab of Ornithology, 2017). Their diet usually consists of insects, berries, and seeds (National Audubon Society, 2018). Another main problem with breeding success in Tree Swallows is nest predation or nest destruction, which is can be caused by House Wrens (*Troglodytes aedon*) as they breed at the same time of year in nest boxes and can be very aggressive when competing for nesting space. House Wrens will tear apart nests and puncture the eggs of other competing birds such as Tree Swallows (Ibarzabal & Desrochers, 2001).

This study was conducted at the Beaverhill Natural Area (BNA). The BNA, located 9km from Tofield, is a provincial natural area. The Beaverhilll Bird Observatory is located within the natural area and was established in 1984. It is the second oldest migration monitoring station in Canada (Beaverhill Bird Observatory, 2018). Every year, changes in bird populations, migratory routes, breeding success, and survivorship are tracked (Beaverhill Bird Observatory, 2018). The natural area is recognized internationally as an Important Bird Area and designated as a RAMSAR site (Convention on Wetlands of International Importance). The objective of this study is to determine the reproductive success of Tree Swallows near human disturbed areas and compare two different locations and the respective predation rates.

Methods

A total of 116 Tree Swallow nest boxes (Figure 1) were checked weekly from May 11, 2018 to July 25, 2018 at the Beaverhill Bird Observatory Road Grid and at the New Grid. The Road grid, located along Rowan's Road (~3 km total distance) and Range Road 183, was composed of 66 nest boxes meanwhile the New grid, located inside the natural area, was composed of 50 boxes. Each nest box in the Road Grid was located on wooden posts 1m from the ground and the distance between each nest box varied (from 3m to 30m). The nest boxes in the new grid were fixed on metal posts and were 1m or more from the ground. They were approximately 10-15m apart and were lined up in order. The area around the nest boxes consisted of the road in front of each box then a farmer's field (of canola) at the back (for the Road grid) (Figure 2).

Figure 1. Tree Swallow nest box.

In the case of the New grid the nest boxes were in an open grassland on the edge of a forest. Nests were categorized as active (where there was evidence of a nest being occupied), or inactive (with no evidence of a nest being occupied). Active nests were further categorized as building (nest in progress without eggs or young), then subcategorized into partial (either feathers or grass), lined (only grass), and full (feathers and grass in cup shaped).

After the first few weeks, once the tree swallows began to breed and eggs were found in the nest (Figure 3), we recorded an "E" for egg and the number of eggs followed by "W" for warm or "C" for cold (e.g. 4W 3C).

Figure 2. Road Grid where nest boxes were located.

If nestlings were present, an "N" for nestling, how many were present (e.g. 3N), and the age (in days) were noted using the aging guide at the Tree Swallow Projects webpage (Tree Swallow Project, 2018). If the nest was inactive it was marked as empty or abandoned if previously occupied. If an adult was present in the nest at the time of observation, a "P" was written and if absent, an "A" would be recorded.

Each set of data (Road grid and New grid) gathered was inputted into Excel and run through a one-way ANOVA to compare the number of eggs and nestlings hatched at each grid to see the reproductive success. To calculate the nestlings' success the number of nests that had eggs was divided by the total number of available nest boxes and multiplied by 100. The hatching success was calculated by the number of nestlings divided by the number of eggs multiplied by 100. The predation signs (i.e. destroyed eggs or parts of bird in the nests) and abandonment of nests were also taken into account.


Figure 3. Tree Swallow eggs.

Predation was observed if any eggshells (broken eggs) or pieces of dead parents were found in the nests. Abandonment was analyzed at the end of the reproductive season by observing if eggs had hatched or eggs were cold whenever each intern checked the nests.

Results

Single factor ANOVA between the Road and New grid groups of eggs show that there is significant difference between both (Fcrit $<$F, α= 0.05) (Figure 4). The average clutch size for the Road grid was 4.01 (4 eggs) and for the New grid was 5.52 (5 eggs). Single factor ANOVA for the nestlings show that there was no significant difference between both locations and the nestlings in each (Fcrit >F, α= 0.05) (Figure 5). The average hatchling number was 2.62 for the Road grid meanwhile 2.64 for the New grid (2 hatchlings average in each). The nesting success for the Road Grid was 72.72% and for the New Grid was 90%. The hatching success for the Road Grid was 68.20% and for the New Grid it was 47.82%. In the 66 nest boxes of the Road grid, 18 were unoccupied, seven showed evidence of nest predation, and ten were abandoned. In the 50 nest boxes of the New grid, five were unoccupied, two showed evidence of predation, and two were abandoned.

Table 1. One-way ANOVA results of egg clutch.

Anova: Single Factor						
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Eggs Road Grid	66	265	4.01515	8.07669		
Eggs New Grid	50	276	5.52	3.84653		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	64.4231	1	64.4231	10.2938	0.00173	3.92433
Within Groups	713.465	114	6.25846			
Total	777.888	115				

Table 2. One-way ANOVA results of nestlings.

Anova: Single Factor						
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Nestlings Road Grid	66	173	2.62121	7.71585		
Nestlings New Grid	50	132	2.64	6.03102		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.01004	1	0.01004	0.00144	0.96984	3.92433
Within Groups	797.05	114	6.99167			
Total	797.06	115				

Discussion

The statistical analysis of the data showed a significant difference comparing egg numbers at each grid. This could be due to the preference of habitat in each of them. Here we can see a higher occupancy in the New grid (90%) compared to the Road grid (72.72%). This could be due to the abundance in vegetation surrounding each grid (Waterhouse et al. 2002), exposure of nests, disturbance levels, or food availability (Dawn & Nol, 1998)**.** For example, the Road grid is surrounded by less vegetation because of the road and the agricultural field, thus nests are more exposed to climate (sun, wind, etc.) (Preston & Rotenberry, 2006). The Road grid is generally more disturbed than the New grid because of vehicles passing by and machinery working in the fields, and food might not be as available closer to the nests (which is critical as swallows tend to stay closer to their nests when brooding). On the other hand, the statistical analysis for hatchlings in each grid showed that there was no significant difference. This is due to both being highly predated or abandoned, as a result showing no significant differences.

Possible predation causes are the change in landscape structure which affects the ecology of tree swallows, making them more vulnerable to predation and increasing competition for cavity nesters as there are fewer spaces for them to nest in. Nests closer to cropland and forest edges increases predation rates (Winter et al. 2000; Shake et al. 2011) and in turn it decreases the reproductive success of the species. Nest abandonment was another cause of lower reproductive success. Female birds perceive the predation risk (Holt, 1994) and assess the reproductive attempt if the costs exceed the benefits of rearing a brood, if the attempt shows a low or reduced reproductive success, they are more likely to desert the nest (Verboven & Tinbergen, 2002).

Conclusion

In conclusion, data gathered throughout the three-month period of this study gave some important findings. First of all, the comparison in clutch sizes in both grids were found to be significantly different. Second, when comparing nestlings at each grid it was found that there was no significant difference but looking at the brood success percentage it was found to be different. The predation and abandonment rates at the Road grid were found to be higher than in the New grid. We recommend to keep studying these areas and nest boxes in the coming years to see how it changes but to also include the disturbance (levels, frequency, and types), the availability of food at each grid, the common species around, the vegetation density, larger number of boxes, weather, and to check the boxes more often. All of these factors will allow for better results in term of reproductive success.

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Appendix 1

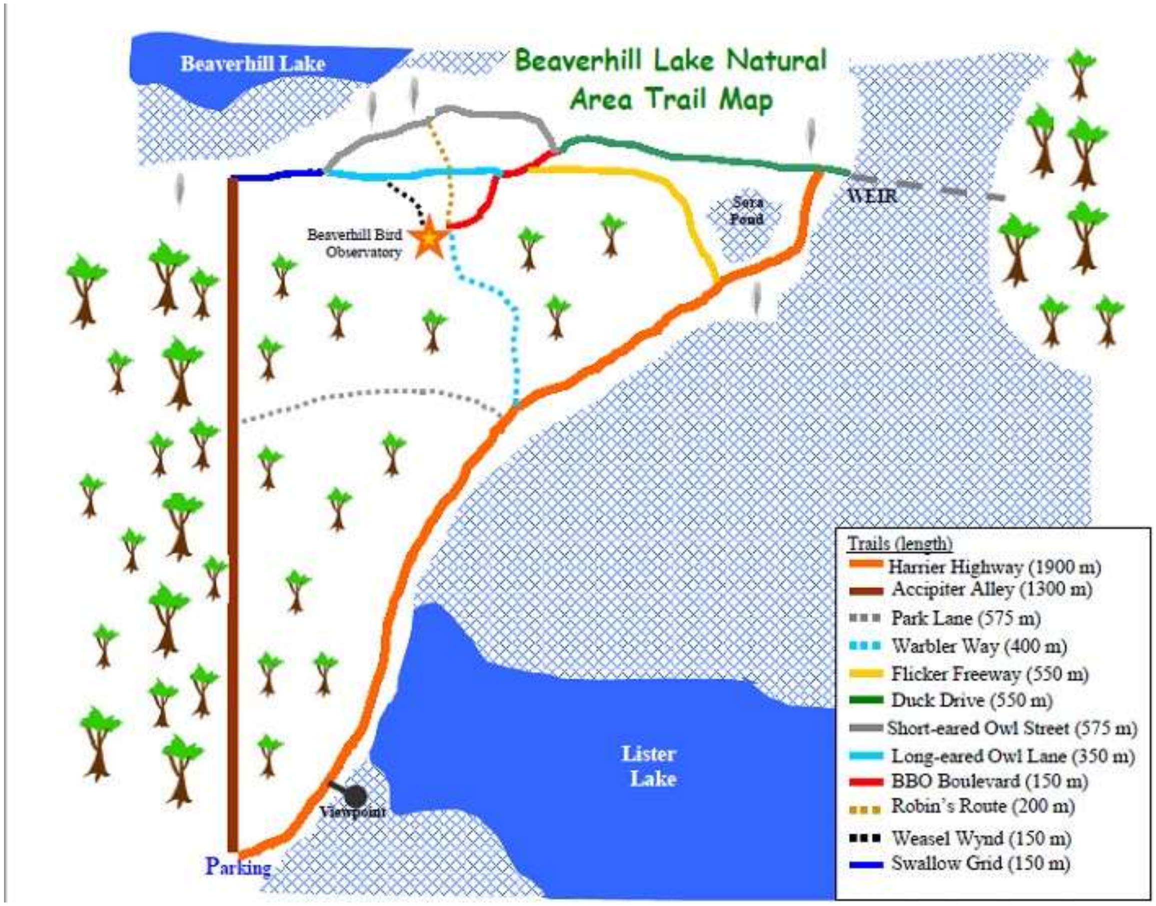

Figure 4. BBO area map.

Appendix 2

Table 3. Road grid observations made on May 12, 2018.

Nest box #	Spp.	Nesting State Active (B‹f, p,l›, E, N)	Inactive	Egg # + Temp. (W/C)	Adult (P/A)	Nestling #	Nestling Age (days)
46	TRES	A-Bf	–	–	A	–	–
blank box'	TRES	A-Bf	–	–	P-vicinity	–	–
44	TRES	A-Bf	–	–	A	–	–
43	TRES	A-Bl	–	–	A	–	–
42	TRES	A-Bp	–	–	A	–	–
41	TRES	–	Inactive	–	–	–	–
40	TRES	–	Inactive	–	–	–	–
39	TRES	A-Bp	–	–	A	–	–
38	TRES	A-Bp	–	–	P-flushed	–	–
37	TRES	A-Bl	–	–	P-flushed	–	–
36	TRES	A-Bl	–	–	A	–	–
35	TRES	A-Bl	–	–	A	–	–
blank box'	TRES	–	Inactive	–	–	–	–
34	TRES	A-Bl	–	–	A	–	–
33	TRES	A-Bp	–	–	A	–	–
32	TRES	A-Bf	–	–	P-flushed	–	–
31	TRES	A-Bl	–	–	A	–	–
30	TRES	A-Bf	–	–	A	–	–
29	TRES	–	Inactive	–	–	–	–
28x	TRES	–	Inactive	–	–	–	–
28	TRES	A-Bl	–	–	A	–	–
blank box'	TRES	A-Bf	–	–	P-vicinity	–	–
20	TRES	A-Bp	–	–	A	–	–
21	TRES	A-Bf	–	–	P-flushed	–	–

22	TRES	A-Bf	_	_	P-vicinity	_	_
23	TRES	A-Bf	_	_	A	_	_
24	TRES	A-Bf	_	_	A	_	_
25	TRES	A-Bp	_	_	A	_	_
26x	TRES	_	Inactive	_	_	_	_
26	TRES	A-Bf	_	_	A	_	_
19	TRES	A-Bf	_	_	A	_	_
18x	TRES	A-Bl	_	_	A	_	_
18	TRES	A-Bl	_	_	A	_	_
17	TRES	A-Bf	_	_	A	_	_
16x	TRES	A-Bp	_	_	A	_	_
16	TRES	A-Bp	_	_	A	_	_
15x	TRES	_	Inactive	_	_	_	_
15	TRES	_	Inactive	_	_	_	_
14x	TRES	A-Bp	_	_	A	_	_
14	TRES	A-Bp	_	_	A	_	_
13x	TRES	A-Bf	_	_	A	_	_
13	TRES	A-Bl	_	_	A	_	_
12x	TRES	A-Bl	_	_	A	_	_
12	TRES	A-Bp	_	_	A	_	_
11x	TRES	A-Bp	_	_	P-flushed	_	_
blank box'	TRES	A-Bp	_	_	A	_	_
10x	TRES	_	Inactive	_	_	_	_
10	TRES	A-Bp	_	_	A	_	_
9x	TRES	A-BF	_	_	A	_	_
9	TRES	A-Bf	_	_	A	_	_
8x	TRES	A-Bf	_	_	A	_	_
8	TRES	A-Bp	_	_	A	_	_
7x	TRES	A-Bl	_	_	A	_	_
7	TRES	A-Bl	_	_	A	_	_

6x	TRES	A-Bl	_	_	P-flushed	_	_
6	TRES	A-Bl	_	_	P-flushed	_	_
5x	TRES	A-Bl	_	_	P-flushed	_	_
5	TRES	_	Inactive	_	_	_	_
4x	TRES	_	Inactive	_	_	_	_
4	TRES	A-Bl	_	_	P-flushed	_	_
3x	TRES	A-Bl	_	_	P-flushed	_	_
3	TRES	_	Inactive	_	_	_	_
2x	TRES	A-Bl	_	_	P-flushed	_	_
2	TRES	A-Bp	_	_	P-flushed	_	_
1x	TRES	_	Inactive	_	_	_	_
1	TRES	_	Inactive	_	_	_	_

Table 4. Road grid observations made on May 19, 2018.

Nest box #	Spp.	Nesting State Active (B‹f, p,l›, E, N)	Inactive	Egg # + Temp. (W/C)	Adult (P/A)	Nestling #	Nestling Age (days)
46	TRES	A-Bf	_	_	A	_	_
blank box'	TRES	A-Bf	_	_	A	_	_
44	TRES	A-Bf	_	_	A	_	_
43	TRES	A-Bf	_	_	P-flushed	_	_
42	TRES	A-Bf	_	_	A	_	_
41	TRES	_	Inactive	_	_	_	_
40	TRES	A-Bf	_	_	A	_	_
39	TRES	A-Bp	_	_	A	_	_
38	TRES	A-Bf	_	_	P-flushed	_	_
37	TRES	A-Bl	_	_	P-flushed	_	_
36	TRES	A-Bp	_	_	A	_	_
35	TRES	A-Bl	_	_	A	_	_

blank box'	TRES	_	Inactive	_	_	_	_
34	TRES	A-Bf	_	_	A	_	_
33	TRES	A-Bf	_	_	P-flushed	_	_
32	TRES	A-Bf	_	_	P-remain	_	_
31	TRES	A-Bf	_	_	P-flushed	_	_
30	TRES	A-Bf	_	_	P-flushed	_	_
29	TRES	_	Inactive	_	_	_	_
28x	TRES	A-Bf	_	_	A	_	_
28	TRES	A-Bf	_	_	P-flushed	_	_
blank box'	TRES	A-Bf	_	_	P-remain	_	_
20	TRES	A-Bf	_	_	A	_	_
21	TRES	A-Bf	_	2C	A	_	_
22	TRES	A-Bf	_	1C	A	_	_
23	TRES	A-Bf	_	_	A	_	_
24	TRES	A-Bf	_	_	A	_	_
25	TRES	A-Bf	_	_	A	_	_
26x	TRES	_	Inactive	_	_	_	_
26	TRES	A-Bf	_	_	A	_	_
19	TRES	A-Bf	_	_	A	_	_
18x	TRES	A-Bl	_	_	A	_	_
18	TRES	A-Bf	_	_	A	_	_
17	TRES	A-Bf	_	_	P-remain	_	_
16x	TRES	A-Bf	_	_	A	_	_
16	TRES	A-Bf	_	_	A	_	_
15x	TRES	A-Bl	_	_	A	_	_
15	TRES	_	Inactive	_	_	_	_
14x	TRES	A-Bl	_	_	A	_	_
14	TRES	A-Bf	_	_	A	_	_
13x	TRES	A-Bf	_	_	A	_	_
13	TRES	A-Bf	_	_	A	_	_

12x	TRES	A-Bl	_	_	A	_	_
12	TRES	A-Bf	_	_	A	_	_
11x	TRES	A-Bf	_	_	A	_	_
blank box'	TRES	A-Bf	_	_	A	_	_
10x	TRES	A-Bf	_	_	P-remain	_	_
10	TRES	A-Bp	_	_	A	_	_
9x	TRES	A-Bf	_	_	A	_	_
9	TRES	A-Bf	_	_	A	_	_
8x	TRES	A-Bf	_	_	A	_	_
8	TRES	A-Bf	_	_	A	_	_
7x	TRES	A-Bl	_	_	A	_	_
7	TRES	A-Bf	_	_	A	_	_
6x	TRES	A-Bl	_	_	A	_	_
6	TRES	A-Bf	_	_	A	_	_
5x	TRES	A-Bl	_	_	A	_	_
5	TRES	A-Bl	_	_	A	_	_
4x	TRES	_	Inactive	_	_	_	_
4	TRES	A-Bl	_	_	A	_	_
3x	TRES	_	Inactive	_	_	_	_
3	TRES	_	Inactive	_	_	_	_
2x	TRES	A-Bf	_	_	A	_	_
2	TRES	A-Bf	_	_	P-flushed	_	_
1x	TRES	A-Bf	_	_	A	_	_
1	TRES	A-Bf	_	_	A	_	_

Table 5. Road grid observations made on May 27, 2018.

Nest box #	Spp.	Nesting State Active (B‹f, p,l›, E, N)	Inactive	Egg # + Temp. (W/C)	Adult (P/A)	Nestling #	Nestling Age (days)
46	TRES	A-Bf	-	-	A	-	-
blank box'	TRES	A-Bf	-	-	A	-	-
44	TRES	A-BfE	-	4W	P-flushed	-	-
43	TRES	A-BfE	-	3W	P-flushed	-	-
42	TRES	A-BfE	-	4W	P-flushed	-	-
41	TRES	-	Inactive	-	-	-	-
40	TRES	A-BfE	-	3W	A	-	-
39	TRES	A-Bf	-	-	A	-	-
38	TRES	A-BfE	-	7W	P-flushed	-	-
37	TRES	-	Inactive	-	-	-	-
36	TRES	A-Bf	-	-	P-remain	-	-
35	TRES	A-Bf	-	-	P-remain	-	-
blank box'	TRES	-	Inactive	-	-	-	-
34	TRES	A-BfE	-	6W	A	-	-
33	TRES	A-BfE	-	?	P-remain	-	-
32	TRES	A-BfE	-	?	P-remain	-	-
31	TRES	A-BfE	-	5W	A	-	-
30	TRES	A-BfE	-	7W	A	-	-
29	TRES	-	Inactive	-	-	-	-
28x	TRES	A-BfE	-	?	P-remain	-	-
28	TRES	A-BfE	-	-	P-remain	-	-
blank box'	TRES	A-BfE	-	6W	P-flushed	-	-
20	TRES	A-BfE	-	?	P-remain	-	-

21	TRES	A-BfE	_	5C	A	_	_
22	TRES	A-BfE	_	?	P-remain	_	_
23	TRES	A-BfE	_	7W	A	_	_
24	TRES	A-BfE	_	4W	A	_	_
25	TRES	A-BfE	_	?	P-remain	_	_
26x	TRES	_	Inactive	_	_	_	_
26	TRES	A-BfE	_	?	P-remain	_	_
19	TRES	A-BfE	_	7W	P-vicinity	_	_
18x	TRES	_	Inactive	_	_	_	_
18	TRES	A-BfE	_	5W	P-flushed	_	_
17	TRES	A-BfE	_	?	P-remain	_	_
16x	TRES	A-BfE	_	?	P-remain	_	_
16	TRES	A-Bf	_	_	A	_	_
15x	TRES	A-Bf	_	_	A	_	_
15	TRES	_	Inactive	_	_	_	_
14x	TRES	A-BfE	_	1C	P-vicinity	_	_
14	TRES	A-BfE	_	?	P-remain	_	_
13x	TRES	A-BfE	_	4W	A	_	_
13	TRES	A-BfE	_	4W	A	_	_
12x	TRES	A-BfE	_	?	P-remain	_	_
12	TRES	A-BfE	_	1W	A	_	_
11x	TRES	A-BfE	_	1W	A	_	_
blank box'	TRES	A-BfE	_	?	P-remain	_	_
10x	TRES	A-BfE	_	2W	A	_	_
10	TRES	A-Bl	_	_	A	_	_
9x	TRES	A-BfE	_	2W	A	_	_
9	TRES	A-Bf	_	_	A	_	_
8x	TRES	A-BfE	_	2W	P-flushed	_	_
8	TRES	A-BfE	_	?	P-remain	_	_
7x	TRES	_	Inactive	_	_	_	_

7	TRES	A-Bf	–	–	A	–	–
6x	TRES	–	Inactive	–	–	–	–
6	TRES	A-BfE	–	4W	P-flushed	–	–
5x	TRES	A-Bl	–	–	A	–	–
5	TRES	A-Bl	–	–	A	–	–
4x	TRES	–	Inactive	–	–	–	–
4	TRES	A-Bl	–	–	A	–	–
3x	TRES	A-Bl	–	–	A	–	–
3	TRES	A-BfE	–	1W	A	–	–
2x	TRES	A-Bf	–	–	A	–	–
2	TRES	A-BfE	–	5W	P-vicinity	–	–
1x	TRES	A-BfE	–	?	P-remain	–	–
1	TRES	A-BfE	–	4W	A	–	–

Table 6. Road grid observations made on June 6, 2018.

Nestbox #	Spp.	Nesting State Active (B‹f, p,l›, E, N)	Inactive	Egg # + Temp. (W/C)	Adult (P/A)	Nestling #	Nestling Age (days)
46	TRES	A-Bf	–	–	A	–	–
blank box'	TRES	A-Bf	–	–	A	–	–
44	TRES	A-BfE	–	6W	A	–	–
43	TRES	A-BfE	–	7W	A	–	–
42	TRES	A-BfE	–	7W	A	–	–
41	TRES	–	Inactive	–	–	–	–
40	TRES	A-BfE	–	7W	P-remain	–	–
39	TRES	A-Bf	–	–	A	–	–
38	TRES	A-BfE	–	7W	P-flushed	–	–

37	TRES	_	Inactive	_	_	_	_
36	TRES	A-BfE	_	?	P-remain	_	_
35	TRES	A-BfE	_	?	P-remain	_	_
blank box'	TRES	_	Inactive	_	_	_	_
34	TRES	A-BfE	_	7W	A	_	_
33	TRES	A-Bf	_	_	A	_	_
32	TRES	A-Bf	_	_	A	_	_
31	TRES	A-Bf	_	_	A	_	_
30	TRES	A-BfE	_	7W	A	_	_
29	TRES	_	Inactive	_	_	_	_
28x	TRES	A-BfE	_	7W	A	_	_
28	TRES	A-BfE	_	6W	A	_	_
blank box'	TRES	A-BfE	_	?	P-remain	_	_
20	TRES	A-BfE	_	?	P-remain	_	_
21	TRES	A-BfE	_	5W	A	_	_
22	TRES	A-BfE	_	?	P-remain	_	_
23	TRES	A-BfE	_	?	P-remain	_	_
24	TRES	A-BfE	_	?	P-remain	_	_
25	TRES	A-BfE	_	?	P-remain	_	_
26x	TRES	_	Inactive	_	_	_	_
26	TRES	A-BfE	_	?	P-remain	_	_
19	TRES	A-BfE	_	7W	P-vicinity	_	_
18x	TRES	_	Inactive	_	_	_	_
18	TRES	A-BfE	_	6W	A	_	_
17	TRES	A-BfE	_	7W	A	_	_
16x	TRES	A-BfE	_	?	P-remain	_	_
16	TRES	A-Bf	_	_	A	_	_
15x	TRES	A-BfE	_	6W	P-flushed	_	_
15	TRES	A-Bl	_	_	A	_	_
14x	TRES	A-BfE	_	?	P-remain	_	_

14	TRES	A-BfE	–	?	P-remain	–	–	
13x	TRES	A-BfE	–	?	P-remain	–	–	
13	TRES	A-BfE	–	?	P-remain	–	–	
12x	TRES	A-BfE	–	?	P-remain	–	–	
12	TRES	A-BfE	–	5W	A	–	–	
11x	TRES	A-BfE	–	4W	A	–	–	
blank box'	TRES	A-BfE	–	6W	A	–	–	
10x	TRES	A-BfE	–	6W	P-vicinity	–	–	
10	TRES	A-Bl	–	–	A	–	–	
9x	TRES	A-BfE	–	7W	A	–	–	
9	TRES	A-Bf	–	–	A	–	–	
8x	TRES	A-BfE	–	?	P-remain	–	–	
8	TRES	A-BfE	–	?	P-remain	–	–	
7x	TRES	–	Inactive	–	–	–	–	
7	TRES	A-BfE	–	1W	A	–	–	
6x	TRES	–	Inactive	–	–	–	–	
6	TRES	A-BfE	–	7W	P-flushed	–	–	
5x	TRES	A-Bl	–	–	A	–	–	
5	TRES	A-Bl	–	–	A	–	–	
4x	TRES	A-BfE	–	?	P-remain	–	–	
4	TRES	A-Bl	–	–	A	–	–	
3x	TRES	A-Bl	–	–	A	–	–	
3	TRES	A-BfE	–	4W	P-flushed	–	–	
2x	TRES	A-BfE	–	5W	A	–	–	
2	TRES	A-BfE	–	7W	A	–	–	
1x	TRES	A-BfE	–	?	P-remain	–	–	
1	TRES	A-BfE	–	?	P-remain	–	–	

Table 7. Road grid observations made on June 8, 2018.

Nest box #	Spp.	Nesting State Active (B‹f, p,l›, E, N)	Inactive	Egg # + Temp. (W/C)	Adult (P/A)	Nestling #	Nestling Age (days)
46	TRES	A-Bf	_	_	A	_	_
blank box'	TRES	A-Bf	_	_	A	_	_
44	TRES	A-BfE	_	6W	A	_	_
43	TRES	A-BfE	_	7W	A	_	_
42	TRES	A-BfE	_	?	P-remain	_	_
41	TRES	_	Inactive	_	_	_	_
40	TRES	A-BfE	_	6W	P-flushed	_	_
39	TRES	A-Bf	_	_	A	_	_
38	TRES	A-BfE+N	_	3W	P-flushed	3	0-2
37	TRES	_	Inactive	_	_	_	_
36	TRES	A-BfE	_	5W	P-flushed	_	_
35	TRES	A-BfE	_	6W	A	_	_
blank box'	TRES	_	Inactive	_	_	_	_
34	TRES	A-BfE	_	?	P-remain	_	_
33	TRES	A-Bf	_	_	A	_	_
32	TRES	A-Bf	_	_	A	_	_
31	TRES	A-Bf	_	_	A	_	_
30	TRES	A-Bf	_	_	A	_	_
29	TRES	_	Inactive	_	_	_	_
28x	TRES	A-Bf	_	_	A	_	_
28	TRES	A-BfE	_	6C	A	_	_
blank box'	TRES	A-BfE	_	6W	A	_	_
20	TRES	A-BfE	_	4W	P-flushed	_	_
21	TRES	A-BfN	_	_	A	3?	3-5

22	TRES	A-BfN	_	_	P-vicinity	?	0-2
23	TRES	A-BfE+N	_	1?	A	3?	0-2
24	TRES	A-BfE	_	?	P-remain	?	_
25	TRES	A-BfE	_	4W	A	_	_
26x	TRES	_	Inactive	_	_	_	_
26	TRES	A-BfE	_	5W	P-flushed	_	_
19	TRES	A-BfE	_	2W	A	1	0-2
18x	TRES	_	Inactive	_	_	_	_
18	TRES	A-BfE	_	6W	P-flushed	_	_
17	TRES	A-BfE	_	_	P-flushed	5	0-2
16x	TRES	A-BfE+N	_	?	P-remain	?	_
16	TRES	A-Bf	_	_	A	_	_
15x	TRES	A-BfE	_	?	P-remain	_	_
15	TRES	A-Bf	_	_	A	_	_
14x	TRES	A-BfE	_	5W	A	_	_
14	TRES	A-BfE	_	?	P-remain	_	_
13x	TRES	A-BfE	_	?	P-remain	_	_
13	TRES	A-BfE	_	7W	A	_	_
12x	TRES	A-BfE	_	4W	A	_	_
12	TRES	A-BfE	_	5W	A	_	_
11x	TRES	A-BfE	_	5W	P-remain	_	_
blank box'	TRES	A-BfE	_	6W	A	_	_
10x	TRES	A-BfE	_	6W	A	_	_
10	TRES	A-Bl	_	_	A	_	_
9x	TRES	A-BfE	_	?	P-remain	_	_
9	TRES	A-BfE	_	_	A	_	_
8x	TRES	A-BfE	_	4W	A	_	_
8	TRES	A-BfE	_	?	P-remain	_	_
7x	TRES	_	Inactive	_	_	_	_
7	TRES	A-BfE	_	?	P-remain	_	_

6x	TRES	_	Inactive	_	_	_	_
6	TRES	A-BfE	_	7W	P-flushed	_	_
5x	TRES	A-Bl	_	_	A	_	_
5	TRES	A-Bl	_	_	A	_	_
4x	TRES	A-BfE	_	6W	A	_	_
4	TRES	A-Bl	_	_	A	_	_
3x	TRES	A-BfE	_	?	P-remain	_	_
3	TRES	A-BfE	_	8W	A	_	_
2x	TRES	A-BfE	_	?	P-remain	_	_
2	TRES	A-BfE	_	?	P-remain	_	_
1x	TRES	A-BfE	_	?	P-remain	_	_
1	TRES	A-Bf	_	_	A	_	_

Table 8. Road grid observations made on June 16, 2018.

Nest box #	Spp.	Nesting State Active (B‹f, p,l›, E, N)	Inactive	Egg # + Temp. (W/C)	Adult (P/A)	Nestling #	Nestling Age (days)
46	TRES	A-Bf	_	_	A	_	_
blank box'	TRES	A-Bf	_	_	A	_	_
44	TRES	A-BfE	_	?	P-remain	?	_
43	TRES	A-BfN	_	1W	A	5?	0-2
42	TRES	A-BfE	_	7C	A	_	_
41	TRES	_	Inactive	_	_	_	_
40	TRES	A-BfN	_	_	P-remain	?	_
39	TRES	A-Bf	_	_	A	_	_
38	TRES	A-BfN	_	_	A	7	6-8
37	TRES	_	Inactive	_	_	_	_
36	TRES	A-BfE+N	_	?	P-flushed	?	_
35	TRES	A-BfE+N	_	3W	A	3	0-2

blank box'	TRES	_	Inactive	_	_	_	_
34	TRES	A-BfE	_	7W	A	_	_
33	TRES	A-Bf	_	_	A	_	_
32	TRES	A-Bf	_	_	A	_	_
31	TRES	A-Bf	_	_	A	_	_
30	TRES	A-Bf	_	_	A	_	_
29	TRES	_	Inactive	_	_	_	_
28x	TRES	A-Bf	_	_	A	_	_
28	TRES	A-BfE	_	6W	A	_	_
blank box'	TRES	A-BfE	_	6W	A	_	_
20	TRES	A-BfE+N	_	1W	A	4	0-2
21	TRES	A-BfN	_	_	A	5	9-11
22	TRES	A-BfN	_	_	P-vicinity	7	9-11
23	TRES	A-BfN	_	_	A	6	6-8
24	TRES	A-BfN	_	_	P-remain	?	_
25	TRES	A-BfN	_	_	A	5	0-2
26x	TRES	_	Inactive	_	_	_	_
26	TRES	A-BfN	_	_	P-flushed	5	6-8
19	TRES	A-BfE	_	2C	A	1	0-2
18x	TRES	_	Inactive	_	_	_	_
18	TRES	A-BfN	_	_	A	5	6-8
17	TRES	A-BfN	_	_	A	6	9-11
16x	TRES	A-BfN	_	_	A	6	6-8
16	TRES	A-Bf	_	_	A	_	_
15x	TRES	A-BfN	_	_	A	5	0-2
15	TRES	A-Bf	_	_	A	_	_
14x	TRES	A-Bf	_	_	A	_	_
14	TRES	A-BfE	_	2W	A	3	0-2
13x	TRES	A-BfE+N	_	?	P-remain	?	_
13	TRES	A-BfE+N	_	?	P-remain	?	_

12x	TRES	A-BfE	_	4W	A	_	_
12	TRES	A-BfE	_	5W	A	_	_
11x	TRES	A-BfE+N	_	?	P-remain	?	_
blank box'	TRES	A-BfE+N	_	?	P-remain	?	_
10x	TRES	A-BfN	_	_	A	6	0-2
10	TRES	A-Bl	_	_	A	_	_
9x	TRES	A-BfE+N	_	?	P-remain	?	_
9	TRES	A-BfE	_	_	A	_	_
8x	TRES	A-BfE	_	4W	A	_	_
8	TRES	A-BfN	_	_	A	4	6-8
7x	TRES	_	Inactive	_	_	_	_
7	TRES	A-BfE	_	6W	A	_	_
6x	TRES	A-Bl	_	_	P-remain	_	_
6	TRES	A-BfN	_	?	P-remain	?	_
5x	TRES	A-Bl	_	_	A	_	_
5	TRES	A-Bl	_	_	A	_	_
4x	TRES	A-BfE	_	6W	A	_	_
4	TRES	A-Bl	_	_	A	_	_
3x	TRES	A-BfE	_	1W	P-flushed	_	_
3	TRES	A-BfE	_	5W	P-flushed	_	_
2x	TRES	A-BfE+N	_	?	P-remain	?	_
2	TRES	A-BfE+N	_	?	P-remain	?	_
1x	TRES	A-BfE+N	_	?	P-remain	?	_
1	TRES	A-BfE	_	6W	A	_	_

Table 9. Road grid observations made on June 24, 2018

Nest box #	Spp.	Nesting State Active (B‹f, p,l›, E, N)	Inactive	Egg # + Temp. (W/C)	Adult (P/A)	Nestling #	Nestling Age (days)
46	TRES	A-Bf	_	_	A	_	_
blank box'	TRES	A-Bf	_	_	A	_	_
44	TRES	A-BfE	_	?	P-remain	?	_
43	TRES	A-BfN	_	_	A	4	10-12
42	TRES	A-BfE	_	7W	A	_	_
41	TRES	_	Inactive	_	_	_	_
40	TRES	A-BfN	_	_	P-vicinity	6	10-12
39	TRES	A-Bf	_	_	A	_	_
38	TRES	A-BfN	_	_	A	5	12+
37	TRES	_	Inactive	_	_	_	_
36	TRES	A-BfN	_	_	A	5	9-11
35	TRES	A-BfE	_	3W	A	_	_
blank box'	TRES	_	Inactive	_	_	_	_
34	TRES	A-BfE	_	7W	A	_	_
33	TRES	A-Bf	_	_	A	_	_
32	TRES	A-Bf	_	_	A	_	_
31	TRES	A-Bf	_	_	A	_	_
30	TRES	A-Bf	_	_	A	_	_
29	TRES	_	Inactive	_	_	_	_
28x	TRES	A-Bf	_	_	A	_	_
28	TRES	A-BfE	_	6W	A	_	_
blank box'	TRES	A-BfE	_	3W	A	_	_
20	TRES	A-Bf	_	_	A	_	_

21	TRES	A-Bf	_	_	A	_	_
22	TRES	A-Bf	_	_	A	_	_
23	TRES	A-Bf	_	_	A	_	_
24	TRES	A-BfN	_	_	A	3	9-11
25	TRES	A-Bf	_	_	A	_	_
26x	TRES	_	Inactive	_	_	_	_
26	TRES	A-BfN	_	_	P-flushed	5	6-8
19	TRES	A-BfE	_	_	A	_	_
18x	TRES	A-Bl	_	1W	A	_	_
18	TRES	A-Bf	_	_	A	_	_
17	TRES	A-Bf	_	_	A	_	_
16x	TRES	A-Bf	_	_	A	_	_
16	TRES	A-Bf	_	_	A	_	_
15x	TRES	A-BfN	_	_	A	6	6-8
15	TRES	A-Bf	_	_	A	_	_
14x	TRES	A-Bf	_	_	A	_	_
14	TRES	A-BfN	_	_	A	6	6-8
13x	TRES	A-BfE+N	_	1W	A	1	9-11
13	TRES	A-BfN	_	_	A	6	9+
12x	TRES	A-BfE	_	4W	A	_	_
12	TRES	A-BfE	_	5W	A	_	_
11x	TRES	A-BfE+N	_	_	A	5	6-8
blank box'	TRES	A-BfN	_	_	A	6	9-11
10x	TRES	A-BfN	_	_	A	5	9-11
10	TRES	A-Bl	_	_	A	_	_
9x	TRES	A-BfE+N	_	_	A	7	9-11
9	TRES	A-Bl	_	_	A	_	_
8x	TRES	A-Bl	_	_	A	_	_
8	TRES	A-BfN	_	_	A	4	9-11
7x	TRES	_	Inactive	_	_	_	_

7	TRES	A-BfE	_	?	P-remain	?	_
6x	TRES	A-Bl	_	_	A	_	_
6	TRES	A-BfN	_	_	A	6	9-11
5x	TRES	A-Bl	_	_	A	_	_
5	TRES	A-Bl	_	2W	A	_	_
4x	TRES	A-BfE+N	_	2W	A	4	0-3
4	TRES	A-Bl	_	_	A	_	_
3x	TRES	A-BfE	_	?	P-remain	_	_
3	TRES	A-BfE	_	?	P-remain	_	_
2x	TRES	A-BfE+N	_	?	P-remain	?	_
2	TRES	A-BfE+N	_	_	A	7	9-11
1x	TRES	A-BfE+N	_	_	A	6	6-9
1	TRES	A-BfE	_	6W	A	_	_

Table 10. Road grid observations made on June 29, 2018.

Nest box #	Spp.	Nesting State Active (B‹f, p,l›, E, N)	Inactive	Egg # + Temp. (W/C)	Adult (P/A)	Nestling #	Nestling Age (days)
46	TRES	A-Bf	_	_	A	_	_
blank box'	TRES	A-Bf	_	_	A	_	_
44	TRES	A-BfE	_	?	P-remain	?	_
43	TRES	A-BfN	_	_	A	5	12+
42	TRES	A-BfE	_	7W	A	_	_
41	TRES	_	Inactive	_	_	_	_
40	TRES	A-BfN	_	_	P-vicinity	6	12+

39	TRES	A-Bf	_	_	A	_	_
38	TRES	A-BfN	_	_	A	6	12+
37	TRES	_	Inactive	_	_	_	_
36	TRES	A-BfN	_	_	A	5	12+
35	TRES	A-BfE	_	3W	A	_	_
blank box'	TRES	_	Inactive	_	_	_	_
34	TRES	A-BfE	_	7W	A	_	_
33	TRES	A-Bf	_	_	A	_	_
32	TRES	A-Bf	_	_	A	_	_
31	TRES	A-Bf	_	_	A	_	_
30	TRES	A-Bf	_	_	A	_	_
29	TRES	_	Inactive	_	_	_	_
28x	TRES	A-Bf	_	_	A	_	_
28	TRES	A-BfE	_	6W	A	_	_
blank box'	TRES	A-BfE	_	3W	A	_	_
20	TRES	A-Bf	_	_	A	_	_
21							
22							
23							
24	TRES	A-BfN	_	_	A	1	12+
25							
26x	TRES	A-BfE	_	1W	A	_	_
26	TRES	A-BfN	_	_	A	5	11+
19	TRES	A-BfE	_	_	A	_	_
18x	TRES	A-Bl	_	1W	A	_	_
18							
17							
16x							
16	TRES	A-Bf	_	_	A	_	_
15x	TRES	A-BfN	_	_	A	6	11+

15	TRES	A-Bf	_	_	A	_	_
14x	TRES	A-Bf	_	_	A	_	_
14	TRES	A-BfN	_	_	A	6	9-11
13x	TRES	A-BfE+N	_	?	A	?	_
13	TRES	A-BfN	_	_	A	6	11+
12x	TRES	A-BfE	_	2W	A	_	_
12	TRES	A-BfE	_	5W	A	_	_
11x	TRES	A-BfE+N	_	_	A	5	8-10
blank box'	TRES	A-BfN	_	_	A	5	11+
10x	TRES	A-BfN	_	_	A	5	11
10	TRES	A-Bl	_	_	A	_	_
9x	TRES	A-BfE+N	_	_	A	6	11+
9	TRES	A-Bl	_	_	A	_	_
8x	TRES	A-Bl	_	_	A	_	_
8	TRES	A-BfN	_	_	A	3	11+
7x	TRES	_	Inactive	_	_	_	_
7	TRES	A-BfE+N	_	1W	A	5	6-8
6x	TRES	A-Bl	_	_	A	_	_
6	TRES	A-BfN	_	_	A	6	9-11
5x	TRES	A-Bl	_	_	A	_	_
5	TRES	A-BlE	_	2W	A	_	_
4x	TRES	A-BfE+N	_	_	A	6	3-6
4	TRES	A-Bl	_	_	A	_	_
3x	TRES	A-BfE	_	6W	A	_	_
3	TRES	A-BfE+N	_	1W	A	3	0-3
2x	TRES	A-BfN	_	_	A	6	3-4
2	TRES	A-BfN	_	_	A	5	11+
1x	TRES	A-BfE+N	_	_	A	6	6-9
1	TRES	A-BfE	_	?	P-remain	_	_

Table 11. Road grid observations made on July 5, 2018.

Nest box #	Spp.	Nesting State Active (B‹f, p,l›, E, N)	Inactive	Egg # + Temp. (W/C)	Adult (P/A)	Nestling #	Nestling Age (days)
46	TRES	A-Bf	_	_	A	_	_
blank box'	TRES	A-Bf	_	_	A	_	_
44	TRES	A-BfE	_	?	P-remain	?	_
43	TRES	A-BfN	_	1W	A	_	_
42	TRES	A-BfE	_	7W	A	_	_
41	TRES	_	Inactive	_	_	_	_
40							
39	TRES	A-Bf	_	_	A	_	_
38							
37	TRES	_	Inactive	_	_	_	_
36	TRES	A-BfN	_	_	A	5	12+
35	TRES	A-BfE	_	3W	A	_	_
blank box'	TRES	_	Inactive	_	_	_	_
34	TRES	A-BfE	_	7W	A	_	_
33	TRES	A-Bf	_	_	A	_	_
32	TRES	A-Bf	_	_	A	_	_
31	TRES	A-Bf	_	_	A	_	_
30	TRES	A-Bf	_	_	A	_	_
29	TRES	_	Inactive	_	_	_	_
28x	TRES	A-Bf	_	_	A	_	_
28	TRES	A-BfE	_	5W	A	_	_
blank box'	TRES	A-BfE	_	3W	A	_	_
20	TRES	A-Bf	_	1*	A	_	_

21							
22							
23							
24	TRES	A-Bf	_	_	A	_	_
25							
26x	TRES	A-BfE	_	5W	A	_	_
26							
19	TRES	A-BfE	_	_	A	_	_
18x	TRES	A-Bl	_	1W	A	_	_
18							
17							
16x							
16	TRES	A-Bf	_	_	A	_	_
15x	TRES	A-BfN	_	_	A	3	12+
15	TRES	A-Bf	_	_	A	_	_
14x	TRES	A-Bf	_	_	A	_	_
14	TRES	A-BfN	_	_	A	4	?
13x	TRES	A-BfE+N	_	2W	A	_	_
13							
12x	TRES	A-BfE	_	3W	A	_	_
12	TRES	A-BfE	_	5W	A	_	_
11x	TRES	A-BfN	_	_	A	4	8-10
blank box'							
10x							
10	TRES	A-Bl	_	_	A	_	_
9x							
9	TRES	A-Bl	_	_	A	_	_
8x	TRES	A-Bl	_	_	A	_	_
8							
7x	TRES	_	Inactive	_	_	_	_

7	TRES	A-BfN	_	_	A	?	12+
6x	TRES	A-Bl	_	_	A	_	_
6	TRES	A-BfN	_	_	A	6	12+
5x	TRES	A-Bl	_	_	A	_	_
5	TRES	A-BlE	_	1W	A	_	_
4x	TRES	A-BfN	_	_	A	6	6+
4	TRES	A-Bl	_	_	A	_	_
3x	TRES	A-BfE	_	?	P-remain	?	?
3	TRES	A-BfE+N	_	_	A	3	6-8
2x	TRES	A-BfN	_	_	A	6	6-8
2							
1x							
1	TRES	A-BfN	_	_	P-remain	5	3-4

Table 11. Road grid observations made on July 18, 2018.

Nest box #	Spp.	Nesting State Active (B‹f, p,l›, E, N)	Inactive	Egg # + Temp. (W/C)	Adult (P/A)	Nestling #	Nestling Age (days)
46							
blank box'							
44	TRES	A-N	-	-	A	5	12-14 days
43	TRES	-	Inactive	-	-	-	-
42	TRES	-	Abandoned	7C	A	-	-
41							
40							
39							
38							
37							
36	TRES	-	Inactive	-	-	-	-

35	TRES	-	Abandoned	3C	A	-	-
blank box'							
34	TRES	-	Abandoned	7C	A	-	-
33							
32							
31							
30							
29							
28x							
28	TRES	-	Abandoned	6C	A	-	-
blank box'	TRES	-	Inactive	-	-	-	-
20							
21							
22							
23							
24							
25							
26x	TRES	A-N	-	-	A	5	2 days
26							
19							
18x	TRES	-	Abandoned	1C	A	-	-
18							
17							
16x							
16							
15x							
15							
14x							
14							
13x	TRES	-	Abandoned	2C	A	-	-

13								
12x	TRES	-	Abandoned	3C	A	-	-
12	TRES	A-E	-	4C	A	-	-
11x								
blank box'								
10x								
10								
9x								
9								
8x								
8								
7x								
7	TRES	-	Inactive	-	-	-	-
6x								
6								
5x								
5	TRES	-	Abandoned	1C	A	-	-
4x	TRES	-	Abandoned	-	A	-	-
4								
3x	TRES	-	Abandoned	-	A	-	-
3	TRES	-	Inactive	-	-	-	-
2x								
2								
1x								
1	TRES	-	Inactive	-	-	-	-

Table 12. Road grid observations made on July 25, 2018.

Nest box #	Spp.	Nesting State Active (B‹f, p,l›, E, N)	Inactive	Egg # + Temp. (W/C)	Adult (P/A)	Nestling #	Nestling Age (days)
46							
blank box'							
44	TRES	A-N	-	-	A	1	14+ days
43							
42							
41							
40							
39							
38							
37							
36							
35							
blank box'							
34							
33							
32							
31							
30							
29							
28x							
28							
blank box'							
20							
21							
22							

23							
24							
25							
26x	TRES	A-N	-	-	A	3	8 days
26							
19							
18x							
18							
17							
16x							
16							
15x							
15							
14x							
14							
13x							
13							
12x							
12	TRES	A-E	-	5C	A	-	-
11x							
blank box'							
10x							
10							
9x							
9							
8x							
8							
7x							
7							
6x							

6							
5x							
5							
4x							
4							
3x							
3							
2x							
2							
1x							
1							

Table 13. New grid observations.

Date	11-May	15-May	24-May	29-May	19-Jun	28-Jun	05-Jul	12-Jul
1	0	L	C	3E	5E 2YG	2YG		
2	G	C	3E	UNK	5YG			
3	G	C	3E	7E	5E 1YG			
4	L	G	1E	6E	2E	5E	2E 3YG	
5	L	C	1E	4E	1E 2YG			
6	G	C	3E	UNK	8YG			
7	G	G	C	0	5E	1E 3YG		
8	L	C	1E	UNK	3YG			
9	G	L	C	4E	7YG			
10	L	C	3E	UNK	2E 4YG			
11	L	C	2E	6E	3E 1YG			
12	L	C	3E	7E	7YG			
13	G	L	C	5E	6YG			
14	L	C	2E	7E	3E	5E	5E	
15	C	C	UNK	UNK	2YG			

16	G	L	1E	6E	4E	5E	2E 3YG	
17	0	G	C	3E	6YG	6YG		
18	0	G	C	5E	0	0	0	0
19	G	L	2E	6E	4E	4E	4YG	
20	G	L	3E	0	5E	2E 3YG		
21	G	G	1E	6E	8YG			
22	G	L	1E	6E	4E	6E	9E	6E
23	L	L	3E	6E	0	0	0	0
24	G	L	C	4E	5YG			
25	G	C	2E	UNK	6YG			
26	L	C	1E	1E	6E	7YG		
27	L	C	C	C	6E	5YG		
28	G	C	C	0	0	0	0	0
29	G	G	C	UNK	6E	4E	4E	4E
30	G	G	C	3E	4E	5E	5E	5E
31	G	C	C	3E	0	0	0	0
32	G	L	3E	7E	4YG			
33	0	L	2E	5E	7E	10E	9E 1YG	
34	G	L	2E	7E	4YG			
35	G	L	1E	3E	3E 3YG	3YG		
36	C	C	3E	7E	4YG			
37	L	C	2E	7E	5YG			
38	L	C	3E	5E	3E	3E	3E	3E
39	G	G	C	4E	1YG	UNK		
40	G	G	L	C	4E	3E	2E	4E
41	G	L	2E	7E	6E	6E	6E	5E
42	G	G	C	5E	3E 1YG	UNK		
43	0	0	0	1E	0	0	0	0
44	G	G	0	C	2E	2E	1E	2E
45	L	C	4E	5E	4E	UNK	6E	2E 3YG

46	G	C	5E	UNK	3YG	[redacted]		
47	G	L	C	1E	4E	4YG	[redacted]	
48	L	C	5E	6E	4E	4E	4E	4E
49	G	G	2E	4E	2E	3E	2E	1YG
50	G	0	0	0	2E	6E	6E	5YG