Nest destruction rates in house wren residing in man-made nest boxes and correlation to the proximity of human activity

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Table of Contents

Intro

House wrens (*Troglodytidea aedon*) are a species common to Canada and western United States in the summer where they breed and nest when insects are plentiful. Wrens as a species are identifiable by their squat brown body and distinctly down-curved beak, house wrens can be identified by their gray-brown colour and lack of a white stripe in the eye area. It is rare to see the wren before you hear its song or warning call, it scolds with a harsh churring call and defends its territory with a varying and bubbling song. It prefers open, deciduous woodlands with plenty of bushes and undergrowth to hide away in as well as old dying trees with cavities to make nests in. However, old trees are easily supplemented with man-made nest boxes as proven by the scientists at the Beaverhill Bird Observatory (BBO). Wrens will lay between 5 and 8 eggs, these eggs are small and pink in colour with dark red speckling.

Founded in 1984, the Beaverhill Bird Observatory has undergone a number of different classifications as well as name changes before becoming what it is today. One of the most significant changes was the construction of a weir and a lab in 1984. BBO encompasses an ideal ecosystem for birds, many shallow lakes and ponds with dense shore cover offer nesting sites and open woodlands provide feeding sites and cover. In the summer months the open water is ideal for aquatic larvae, so the mosquitoes, mayflies and other aquatic breeding insects become plentiful, attracting many perching birds. BBO runs a number of tagging and nesting programs around the site, from the several grids of nest boxes for tree swallows and house wrens to tagging migratory birds. The first two grids of house wren nest boxes were created in 2013 and the second grids across the weir were constructed in 2014-2015.

This report aims to explore if there is a greater risk of nest destruction in grids that are closer to human habitation and daily rounds as opposed to nest boxes that are relatively far from human activity. This idea is based around the fact that nesting birds may find human disturbances such as sound stressful causing them to be over defensive of territory and/or destructive to their own nests. With the alternate hypothesis being that, there is no difference in nest destruction between locations. Data on the house wren grids will also be presented (appendix), however, it must be noted that due to seasonal weather and the weir flooding, Grids C and D were inaccessible halfway through the study.

Methods

The house wren grids are divided up into 4 distinct grid areas identified as Grid A and B (2013), C (2014), and D (2015). Three grids consist of a 5x5 layout of nest boxes that are attached to trees between 10 and 20 meters apart. Grid B however is laid out in a 3x8, distances however remain somewhat consistent. The next boxes are standard throughout the grid creating favourability only in location.

The next boxes were checked every 7-9 days. When the nest boxes were examined, partially or completely built nests were recorded. If there were eggs, the temperature (hot or cold) was recorded in term of whether or not the parent had been incubating them recently. If the parent was present this was also noted. When the eggs hatched the nestlings were counted and aged using an aging guide. A date for tagging was provided to the head biologist and that nest box was deemed uncheckable until the nestlings had been tagged and fledged out.

Other abnormalities such as bats, flying squirrels and tree swallows were also noted. The tree swallow nests were also monitored however this report will simply present the data on tree swallows.

Due to flooding, data from grids C and D will not be analyzed, it will be present in the appendix.

Observations

June 3: There are eggs in Grid A and B (AA5, BB5), they were early in the season however not unexpected due to an abnormally early spring. There are a number of boxes that smell of rotting flesh or have a carcass in them (BB2, BC4). There are a number of tree swallow nests, four in total.

June 10: Eggs present in a number of houses (AA2, AA5, AC5, AE1, BA5, BB1, BB5, BC6), numbers ranging between three to seven eggs. The amount of tree swallow nest has remained consistent. Brooding wrens tend to stay on the nest till the nest box is opened. In the event that its nest boxes is opened the wren tends to flush towards the intruder.

June 16: Eggs present in nest boxes: AA2, AA5, AC5, AE1, BA5, BB1, BB5, and BC6. The number of tree swallow nests has remained consistent. There was a bat in AA1 as well as a number of bees and wasps residing in the nest boxes.

June 25-27: Eggs have begun to hatch, however there is still eggs in AA2 (note: data for AA5 is lacking, there are eggs in this nest box however there is a misreporting in data), BB3, and BC2. Nestlings are in AE1 and BC6. An adult tree swallow was found dead on its nest in BB4.

July 8: eggs in AA5, BB3 and BC2 as well as nestlings in AA2, BB1, and BC6. The BC6 fledglings flushed out of the nest box when it was opened. At this point the weir became flooded.

July 15: eggs in AA5 and nestlings in AA2 and BB3. The nesting season is coming to the end. Another bat has taken up residence in AA1.

July 20: There is still eggs in AA5 however all other birds have hatched and fledged out. The nests are empty now. There was a bat in AA1 and BA3.

July 30: the eggs in AA5 are most likely abandoned as they are still there. The temperature of these eggs has been cold for the past 3 weeks, presumably the wren pair is no longer incubating the eggs. There is a bat in AA1.

Nest boxes were cleaned out on August 19, grids C and D were still unreachable.

Grid B is between forty to fifty meters away from a main path that is frequented by staff and visitors on a semi regular basis. This grid is only exposed to passing conversations and the boxes at the far end of the grid have no noise exposure.

Grid A is about thirty meters away from the main lab building, exposing it to consistent noise as well as traffic in the nearby areas as there are a number of main paths circling it.

Results

A preliminary look at the data reveals that there is no difference in egg loss between the two grids however the number of nests built and then used differs significantly. It is important to note that nest box AA5 actually had two failed nests each of 6 eggs. This boosts the number of eggs lost in grid A to 18 over the 12 eggs lost in grid B. However, it cannot be proven that this was nest destruction or simply a failed nest. Gird A had an 80% nest use rate while Grid B had a 55% use rate. With a small data set, the null hypothesis was rejected and the alternate hypothesis that human activity does not affect nest destruction in house wrens at BBO.

Nest Box	#eggs lost
AA5	6
AA2	0
AC5	6
AE1	0
BA5	6
BB1	0
BB3	0
BB5	6
BC6	0

Grid	Nests Created	Nests unused
A	5	1
B	9	4

Discussion

In previous studies, (Smith-Castro & Rodewald, 2009) it has been shown that nesting birds are likely to flush in the vicinity of humans. The likelihood is greatly increased or decreased depending on how the nest is approached. In the study performed by Smith-Castro and Rodewald (2009), the cardinals being studied were most likely to flush when approached directly as well as if their nest was nearer to the ground. This is proven to extend to house wrens by consistent flushing of BBO house wrens upon being approached or the nest box being opened.

Smith and Castro state "The tendency of nesting birds to flush in our study did not appear to increase the vulnerability of nests to predation" (2009). However they do not explore the idea that consistent approaching and disturbance of nests could induce stress and nest destruction behaviour in smaller territorial birds. A study performed at BBO in 1989 found that house wrens have a tendency to pierce and eject eggs from nest boxes to claim a nesting site (Quinn & Holroyd, 1989). This maybe what is seen in nest box AA5 when a nest of 6 eggs disappeared only to be re-laid, perhaps by a different individual shortly after. Quinn and Holroyd's communication reveals that it is more likely for a polygynous male to remove other competing nests to make room for multiple females in his territory. No evidence of polygynous males was seen during checks. Another reason for nest destruction is poor nesting environment as well as a shortage of insects.

However as stated by Belles-Isles and Picman "house wrens prefer to nest in sparse vegetation" (1986, p. 485). The environment in BBO is open woodlands, with sparse shrubby undergrowth and many stands of aspen trees. There may be competition between birds to claim the best nest boxes and some house wrens may have resorted to inter-species nest destruction to claim cavities

created by woodpeckers or other small birds. If this were the case however, there would be a lack of tree swallow nests in the vicinity of the house wrens grids and we found that there were consistent number of tree swallow nests that not only had eggs but nestlings as well. There was a lack of proper foraging for the wrens, it was a very dry, then wet summer allowing for a number of different species of insects to proliferate in the forest surrounding BBO.

Data from this report cannot be used to make generalizations about BBO nesting sites. The data set is too small and specific to make general assumptions about house wren nesting as a whole. The limitations include a small data set, too many variables impacting nesting behaviour and infrequent nest box checks. More in-depth studies must be done in the future to explore whether or not human induced stress can cause wrens to destroy their own nests or other nearby nests. An experiment that would explore this concept should be done in a controlled environment to eliminate other stress and causes of nest destruction such as, competition over nesting sites and food as well as predation by small mammals on the nests.

Conclusion

This report aims to present data on the house wren grids located at the Beaverhill Bird Observatory and to examine if nearby human activity cause stress on the birds that would in turn induce intra-species nest destruction. The null hypothesis was rejected due to a lack of significant data indicating that there was significant nest destruction in either of the grids analyzed. It can be concluded that more research in the topic must be done in a more controlled environment and over a number of years. This research is relevant to bird observatories and natural preserves in Alberta as industries that increase human traffic near sites expand and a rise in birdwatching may bring more visitors to the reserves and observatories themselves, head scientists and rangers must be aware of the impact of human traffic and noise on nesting birds. If this is left unexplored there may be dire consequences in the future as birds will be forced into remote locations creating a high demand for nest sites increasing the likelihood of nest destruction.

Appendix

June 3rd: Grid A

Nestbo	Spp.	Nesting State	Columr	Egg # and Temp	Adult	Nestlin	Nestlin	Comments
		Active (B<f or p>, L, N)	Inactive					
A1			•					
A2	HOWR	Bp			A			
A3	TRES	Bp			A			
A4			•					
A5	HOWR	L		4, cold	A			One egg outside nesting area
B1	TRES	Bp			A			
B2			•					Carrion Beetles present
B3			•					Wasp nest removed
B4	WBNH							Do Not Check!
B5			•					
C1			•					
C2			•					
C3			•					
C4			•					Replace wire
C5			•					Replace wire
D1			•					Replace wire, Removed wasp nest
D2			•					Replace wire
D3			•					
D4			•					Replace wire
D5			•					Replace wire
E1	HOWR	Bp			A			
E2			•					Replace wire
E3			•					
E4	TRES	Bf			A			
E5								

June 3rd: Grid B

Nestbo	Spp.	Nesting State	Columr	Egg # and Tem	Adult	Nestlin	Nestlin	Comments
		Active (B<f or p>, L, N	Inactive					
A1	HOWR	Bp			A			
A2			•					
A3			•					
A4			•					Large black and white moths present
A5	HOWR	Bf			A			
A6			•					
A7			•					
A8			•					
B1			•					
B2			•					Carrion beetle inside, stinks, feathered carcass
B3	HOWR	Bp			P			
B4	TRES	L		1 egg, cold	A			Outer box was wet and wood inside was damp, needs a number
B5	HOWR	L		1 egg, cold	A			Very low nest with cup
B6			•					Lid off, replaced it
B7			•					
B8			•					
C1	HOWR	Bf			A			Flooded with water
C2			•					
C3			•					Back needs tightening
C4			•					Dead bird inside
C5	HOWR	Bp			A			Longer wire
C6	HOWR	Bf			A			Replace wire
C7			•					Smells
C8			•					

June 3rd: Grid C

Nestbox #	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling #	Nestling a	Comments
		Active (B<f or p>, L, N)	Inactive					
A1	HOWR	L		4, cold	A			
A2	TRES	L		6, warm	A			
A3	TRES	L		6, warm	P			
A4			•					
A5			•					Longer wire needed
B1	TRES	Bp			A			
B2			•					
B3	TRES	Bp			A			Lid needs repairs, nest appears old
B4	HOWR							
B5			•					Wasp nest removed
C1	TRES	L		4 eggs, cold	P			Could use a better lid
C2	HOWR	Bf			A			
C3	HOWR	L		1egg, cold	A			Bark nest
C4	HOWR	Bf			P			
C5			•					
D1	HOWR	Bp		A				
D2	TRES	Bp		P				
D3			•					
D4			•					
D5	HOWR	Bp			P			Needs wire
E1			•					
E2			•					
E3	HOWR	Bf			A			
E4			•					
E5			•					

June 3rd: Grid D

Nestbox #	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling #	Nestling a	Comments
		Active (B<f or p>, L, N	Inactive					
A1			•					
A2	HOWR	Bp			A			
A3			•					
A4	HOWR	Bp			A			Box loose on tree
A5			•					
B1			•					
B2			•					
B3			•					
B4			•					
B5			•					
C1			•					
C2			•					
C3			•					
C4			•					Dropping in box (Squirrel?)
C5			•					
D1	TRES	L			P			Adult on nest
D2	HOWR	Bf			P			
D3	TRES	L		6, warm	A			
D4			•					
D5			•					
E1	HOWR	Bf			A			
E2	HOWR	Bf			A			
E3			•					
E4	WBNH							Chicks dead, no carcass present
E5			•					

June 10th: Grid A

Nestbox #	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling #	Nestling age	Comments
		Active (B<f or p>	Inactive					
A1			•					
A2	HOWR	L		3, cold	A			
A3	TRES	Bp			A			
A4			•					
A5	HOWR	L		5, warm	A			
B1	TRES	L		Unknown	P			Adult on nest
B2			•					
B3			•					Lid open
B4			•					
B5			•					
C1			•					Wasp nest
C2			•					
C3			•					
C4			•					Wasp nest
C5	HOWR	L		3, cold	A			
D1			•					
D2	TRES	L		Unknown	P			Adult on nest
D3			•					
D4	HOWR	Bp			A			
D5			•					
E1	HOWR	L		4, cold	A			
E2			•					
E3			•					
E4			•					
E5	HOWR	Bf			P			

June 10th: Grid B

Nestbox #	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling #	Nestling age	Comments
		Active (B<f or p>	Inactive					
A1	HOWR	Bf			A			
A2			•					
A3			•					
A4			•					
A5	HOWR	L		6, warm	A			
A6			•					
A7			•					
A8			•					
B1	HOWR	L		4, warm	A			
B2	--							
B3	HOWR	Bp			A			
B4	TRES	L		7, warm	P			Mom flushed
B5	HOWR	L		6, warm	P			Mom flushed
B6			•					
B7			•					
B8			•					
C1	HOWR	Bp			A			
C2			•					
C3			•					
C4			•					
C5			•					
C6	HOWR	L		5, warm	P			Mom flushed
C7			•					
C8			•					

June 10th: Grid C

Nestbox #	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling #	Nestling age	Comments
		Active (B<f or p>	Inactive					
A1	HOWR	L		7, warm	A			
A2	TRES	L		Unknown	A			Adult on nest
A3	TRES	Bp			P			
A4	HOWR	L		2, cold	A			May be inactive
A5			•					
B1	TRES	Bp			A			
B2			•					
B3	TRES	L		3, cold	P			
B4	HOWR	Bf			A			
B5			•					
C1	TRES	L		Unknown	P			Adult on nest
C2	HOWR	L		6, cold	A			
C3	HOWR	L		7, warm	P			
C4	HOWR	L		4, warm	P			
C5			•					
D1	HOWR	L		2, cold	A			
D2	TRES	Bp			A			
D3	TRES	L		2, cold	A			
D4			•					
D5	HOWR	L		2, cold	A			
E1			•					
E2	TRES	L		5, warm	A			
E3	HOWR			1, cool	A			Black stuff on egg
E4			•					
E5			•					

June 10th: Grid D

Nestbox #	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling #	Nestling age	Comments
		Active (B<f or p>	Inactive					
A1	HOWR	Bp			A			
A2	HOWR	Bp			A			
A3			•					
A4	HOWR	Bp			A			
A5			•					
B1	Unknown	Bp			A			Nest is all old leaves
B2	HOWR	Bp			A			
B3			•					
B4			•					
B5			•					
C1			•					
C2			•					
C3			•					
C4			•					
C5			•					
D1	TRES	L		7, warm	P			Mom flushed
D2	HOWR	Bf			A			
D3	TRES	L		6, warm	P			mom flushed
D4			•					
D5			•					
E1	HOWR	L		3, warm	A			
E2	HOWR	Bp						
E3			•					
E4	--							
E5			•					

June 16th: Grid A

Nestbo	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling #	Nestling a	Comments
		Active (B<f or p>, L, N)	Inactive					
A1			•					Bat in box
A2	HOWR	L		7, warm	P			
A3	TRES	L		1, warm	P			
A4			•					
A5	HOWR	L		6, warm	A			One oustide of nest
B1	TRES	L		1, cold	A			
B2			•					
B3			•					
B4			•					
B5			•					
C1			•					Wasp on nest
C2			•					Bees
C3			•					
C4			•					
C5	HOWR	L		6, warm	P			Mom flushed
D1			•					
D2	TRES	L		5, warm	A			
D3			•					
D4	HOWR	Bp			A			
D5			•					
E1	HOWR	L		7, warm	P			Mom flushed
E2			•					
E3			•					Bees
E4	HOWR	Bp			A			
E5	HOWR	Bf			A			

June 16th: Grid B

Nestbo	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling #	Nestling a	Comments
		Active (B<f or p>, L, N)	Inactive					
A1	HOWR	BF			A			
A2			•					
A3			•					
A4			•					
A5	HOWR	L		6, warm	A			
A6			•					
A7			•					
A8			•					
B1	HOWR	L		9, warm	A			
B2			•					
B3	HOWR	BP			A			
B4	TRES	L			P			Mom on Nest
B5	HOWR	L		6, warm	P			Lots of feathers
B6			•					
B7			•					
B8			•					
C1	HOWR	Bp			A			
C2			•					
C3			•					
C4			•					
C5			•					
C6	HOWR	L		7, warm	A			
C7			•					
C8			•					

June 16th: Grid C

Nestbox I	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling I	Nestling :	Comments
		Active (B<f or p>, L, N)	Inactive					
A1	HOWR	L		7, warm	P			
A2	TRES	N		2, unknown	A			
A3	HOWR	L		2, lukewarm	A			
A4	TRES	L			P			Mom on nest
A5			•					
B1	TRES	Bp			A			
B2			•					
B3	TRES	L			P			Mom on nest
B4	HOWR	Bf			A			
B5			•					
C1	TRES	L			P			Mom on nest
C2	HOWR	L		8, warm	P			
C3	HOWR	L		7, warm	P			
C4	HOWR	L		5, warm	P			
C5			•					
D1	HOWR	L		8, cold	A			
D2	TRES	Bp			A			
D3	TRES	L		1, cold	A			
D4			•					
D5	HOWR	L		5, cold	A			
E1			•					
E2	TRES	L			P			Mom on nest
E3	HOWR	Bf			A			
E4			•					
E5	?	Bp			A			

June 16th: Grid D

Nestbox I	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling I	Nestling :	Comments
		Active (B<f or p>, L, N)	Inactive					
A1	HOWR	Bp			A			
A2	HOWR	Bp			A			
A3			•					
A4	HOWR	Bp			A			
A5			•					
B1			•					
B2			•					
B3			•					
B4	HOWR	Bp			A			
B5	TRES	Bp			A			
C1			•					
C2			•					
C3			•					
C4			•					
C5			•					
D1	TRES	L		7, warm	A			
D2	HOWR			4, cold	P			
D3	TRES			6, warm	A			
D4			•					
D5			•					
E1	HOWR			5, warm	P			
E2	HOWR			Bp	A			
E3			•					
E4	X							
E5			•					

June 25th: Grid A

Nestbox #	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling #	Nestling age	Comments
June 27		Active (B<f or p>	Inactive					
A1			•					
A2	HOWR	L		7, warm	P			
A3	TRES	L		Unknown	P			
A4			•					
A5	HOWR	Bf			P			
B1	TRES	Bp			A			
B2			•					
B3	TRES	Bp			A			
B4			•					
B5			•					
C1			•					
C2			•					
C3			•					
C4			•					
C5	HOWR	Bp			A			
D1			•					
D2	TRES	N			P	5	1	
D3	HOWR	Bp			A			
D4	HOWR	Bp			A			
D5			•					
E1	HOWR	N				7	1	
E2	HOWR	Bp			A			
E3			•					
E4	HOWR	Bp			A			
E5	HOWR	Bf			P			

June 25th: Grid B

Nestbox #	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling #	Nestling age	Comments
		Active (B<f or p>	Inactive					
A1	HOWR	Bf			A			
A2			•					
A3			•					
A4			•					
A5	HOWR	Bf			A			
A6			•					
A7			•					
A8			•					
B1								
B2								
B3	HOWR			5, warm	A			
B4	TRES							Adult dead on eggs
B5			•					
B6			•					
B7			•					
B8			•					
C1	HOWR	Bp			A			
C2	HOWR	L		1, cold	A			
C3	HOWR	Bp			A			
C4			•					
C5			•					
C6	HOWR	N			P	8	3	
C7			•					
C8			•					

June 25th: Grid C

Nestbox #	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling #	Nestling age	Comments
		Active (B<f or p>	Inactive					
A1	HOWR	N			A	7	6	
A2	TRES	N			P	6	9	
A3	HOWR	L		6, warm	A			
A4	TRES	L		6, warm	P			
A5			•					
B1	TRES	Bp			A			
B2			•					
B3	TRES	L		6, warm	A			
B4	HOWR	Bf			P			
B5			•					
C1	TRES	N			A	6	9	
C2	HOWR	N		4, warm	P	4	Hatchling	
C3	HOWR	N			P	5	3	
C4	HOWR	N		1, warm	P	3	Hatchling	
C5			•					
D1	HOWR	L		9, warm	A			
D2	TRES	Bp			A			
D3			•					
D4			•					
D5	HOWR	L		4, cold	A			
E1	HOWR	Bp			A			
E2	TRES	N			P	4	1	
E3	HOWR	Bf			A			
E4	HOWR	L		5, warm	P			
E5	HOWR	Bp			A			

June 25th: Grid D

Nestbox #	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling #	Nestling age	Comments
		Active (B<f or p>	Inactive					
A1	HOWR	Bf			P			
A2	HOWR	Bf			A			
A3			•					
A4	HOWR	Bf			A			
A5			•					
B1			•					
B2	HOWR	Bp			A			
B3			•					
B4			•					
B5			•					
C1	HOWR	Bf			P			
C2			•					
C3			•					
C4			•					
C5			•					
D1	TRES	N			P	5	9	
D2	HOWR	L		5, warm	P			
D3	TRES	N			A	3	9	
D4			•					
D5			•					
E1	HOWR	L		5, warm	A			
E2	HOWR	Bf			A			
E3			•					
E4			•					
E5			•					

July 8th: Grid A

Nestbox #	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling #	Nestling age	Comments
		Active (B<f or p>	Inactive					
A1			•					
A2	HOWR	N			P	7	8	
A3	TRES	N			A	6	1	
A4			•					
A5	HOWR	L		4, warm	A			
B1	TRES	Bp			A			
B2			•					
B3	TRES	L		4, warm	A			
B4			•					
B5			•					
C1			•					
C2			•					
C3			•					
C4			•					
C5			•					
D1			•					
D2	TRES	N			P	5	12	Do not check anymore
D3	HOWR	Bp			P			
D4			•					
D5			•					
E1								Banded, do not check
E2	HOWR	Bp			P			
E3			•					
E4	TRES	Bp			A			
E5	HOWR	Bf			A			

July 8th: Grid B

Nestbox #	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling #	Nestling age	Comments
		Active (B<f or p>	Inactive					
A1	HOWR	Bf			A			
A2			•					
A3			•					
A4			•					
A5	HOWR	Bf			A			
A6			•					
A7			•					
A8			•					
B1*	HOWR	N			P	9	11	Do not check
B2			•					
B3	HOWR	L		8, warm	A			
B4	TRES	Bf			A			
B5	HOWR	Bp			A			
B6			•					
B7			•					
B8			•					
C1	HOWR	Bf			A			
C2	HOWR	L		1, cold	A			Large brown spots on edge of egg
C3	HOWR	Bf			A			
C4			•					
C5			•					
C6	HOWR	N			P			flew out when opened; old
C7			•					
C8			•					

July 15th: Grid A

Nestbox #	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling #	Nestling age	Comments
		Active (B<f or p>	Inactive					
A1								Bat in box
A2	HOWR	N			P			Old; did not check
A3	TRES	N			A		6 7	
A4			•					
A5	HOWR	L		6 , warm	A			
B1	TRES	Bp			A			
B2			•					
B3	TRES	N			P	Unknown	~ 1 day	Mom on nest
B4			•					
B5			•					
C1			•					
C2			•					
C3			•					
C4			•					
C5	HOWR	Bp			A			Likely inactive; nest looks old
D1			•					
D2	TRES	N			P			Old; did not check
D3	HOWR	Bp			A			
D4	HOWR	Bp			A			
D5			•					
E1	HOWR	Bf			A			
E2	HOWR	Bf			A			
E3			•					
E4	TRES	Bp			A			
E5	HOWR	Bf			A			

July 15th: Grid B

Nestbox #	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling #	Nestling age	Comments
		Active (B<f or p>	Inactive					
A1	HOWR	Bf			A			
A2			•					
A3			•					
A4			•					
A5	HOWR	Bf			P			
A6			•					
A7			•					
A8			•					
B1			•					
B2			•					
B3	HOWR	N			A		8	2
B4	TRES	Bp			A			Old nest
B5			•					
B6			•					
B7			•					
B8			•					
C1	HOWR	Bf			A			
C2	HOWR	Bf			A			
C3	HOWR	Bf			A			
C4			•					
C5			•					
C6	HOWR	Bf			P			
C7			•					
C8			•					

July 20th: Grid A

Nestbox #	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling #	Nestling age	Comments
		Active (B<f or p>, L, N)	Inactive					
A1	BAT							
A2	HOWR	BF						
A3	TRES	N			A	5	Fully Fledged	
A4			•					
A5	HOWR	L		6, cold	A			Abandonded
B1	TRES	BF						
B2			•					
B3			•					
B4			•					
B5			•					
C1			•					
C2			•					
C3			•					
C4			•					
C5	HOWR	Bp						
D1			•					
D2	TRES	BF						
D3	HOWR	BF						
D4			•					
D5	BAT							
E1	HOWR	Bp						
E2	HOWR	Bf						
E3			•					
E4	HOWR	Bp						
E5	HOWR	Bf						

July 20th: Grid B

Nestbox #	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling #	Nestling a	Comments
		Active (B<f or p>, L, N	Inactive					
A1	HOWR	Bf						
A2			•					
A3	BAT	1						
A4			•					
A5	HOWR	Bf						
A6			•					
A7			•					
A8			•					
B1	HOWR	Bf						
B2			•					
B3			•					
B4	TRES	Bf						
B5			•					
B6			•					
B7			•					
B8			•					
C1	HOWR	Bf						
C2	HOWR	Bf						
C3	HOWR	Bf						
C4			•					
C5			•					
C6	HOWR	Bf						
C7			•					
C8			•					

July 30th: Grid A

Nestbox #	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling #	Nestling age	Comments
		Active (B<f or p>, L, N)	Inactive					
A1	BAT							
A2	HOWR	BF						
A3	TRES	BF						
A4			•					
A5	HOWR	L		6, cold				
B1	TRES	Bf						
B2			•					
B3			•					
B4			•					
B5			•					
C1			•					
C2			•					
C3			•					
C4								
C5	HOWR	Bp						
D1			•					
D2	TRES	BF						
D3	HOWR	Bf						
D4			•					
D5			•					
E1	HOWR	Bp						
E2	HOWR	Bf						
E3			•					
E4	HOWR	Bp						
E5	HOWR	Bf						

July 30th: Grid B

Nestbox #	Spp.	Nesting State	Column1	Egg # and Temp	Adult	Nestling #	Nestling a	Comments
		Active (B<f or p>, L, N	Inactive					
A1	HOWR	BF						
A2			•					
A3			•					
A4			•					
A5	HOWR	Bf						
A6			•					
A7			•					
A8			•					
B1	HOWR	BF						
B2			•					
B3	HOWR	BF						
B4	TRES	BF						
B5			•					
B6			•					
B7			•					
B8			•					
C1	HOWR	BF						
C2	HOWR	BF						
C3	HOWR	BF						
C4			•					
C5			•					
C6	HOWR	BF						
C7			•					
C8			•					

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