Friends of Blackfoot Bat House Project

2021 Year-end Report

May 2022

Friends of Blackfoot Society
52365 Range Road 210
c/o Cooking Lake - Blackfoot Provincial Recreation Area
Sherwood Park AB T8G 1A6

Executive Summary

Ongoing observations at the bat house research site at Waskehegan staging area of the Cooking Lake Blackfoot continue to prove useful, informative, and valuable for research, citizen science, and pubic education purposes.

Background

In December 2017 the Friends of Blackfoot (FoB) received a research permit from Alberta Parks to test bat house designs relative to bat occupancy (FoB 2020). In general the approach involves installation and monitoring of bat houses at Waskehegan staging area of the Cooking Lake Provincial Recreation Area (CLPRA), east of Ardrossan Alberta. The project is designed to document bat occupancy, compare use of two different house designs and sizes (single chamber, multiple chamber, large and small), and provide benefits to CLPRA visitors through natural history information and citizen science activities associated with bats and the project.

On July 31, 2018 four bat houses were installed on the communications tower adjacent to the FoB Heritage Interpretive Centre. Monitoring was limited in 2018 but extensive each year since then. The report herein provides the data and experiences of this ongoing program in 2021.

Methods

Observations and data records are standardized. Records are created the same day observations are made. FoB volunteers assess the research site whenever they are working at the information centre. Generally FoB members are on site at the centre each weekend between the long weekends in May and September. Additional site visits specifically to check the bat houses are made through May as well as September until there are three consecutive visits with no evidence of bat activity.

A survey form (Appendix 1) is used to track site assessments and record: date, observer(s), bat evidence (Yes/No), evidence type (guano, # in roost [LEFT lower house, RIGHT lower house]) and general comments and weather descriptions. In addition, occurrence of guano is documented and mapped on a standardized image of the research site (Appendix 2). The image is partitioned by a vertical midline that delineates left and right, in direct association with the two large bat houses attached to the tower. **The large multiple chamber house occurs on the LEFT and the large single chamber house on the RIGHT**.

Observers are asked to provide general descriptive comments about the droppings seen, document the number and location of all droppings on the image provided (including those on the concrete pad and the tower uprights and cross-pieces), and sweep the entire site clean after the counts are completed each observation day.

Mid-way through the 2021 bat season, a new monitoring tool was added to the repertoire. A high intensity flashlight was affixed to a slender 8' pole. The light can be directed into the bottom of each large bat house and any occupants are illuminated. All bats are counted and documented as to whether they were in the left or right large bat house. Use of this monitoring tool was somewhat hit and miss in conjunction with the weekend guano reports.

Observers also are asked to record general descriptions of weather conditions, such as temperature, wind speed, cloud cover, and precipitation. In 2021, there were no thermo-recorders inside the bat houses. The closest weather station to the research site is Elk Island National Park (EINP). Standard daily measurements for temperature, precipitation, and wind at the EINP station for 2021 were downloaded from the Environment Canada web pages in May 2022.

Results

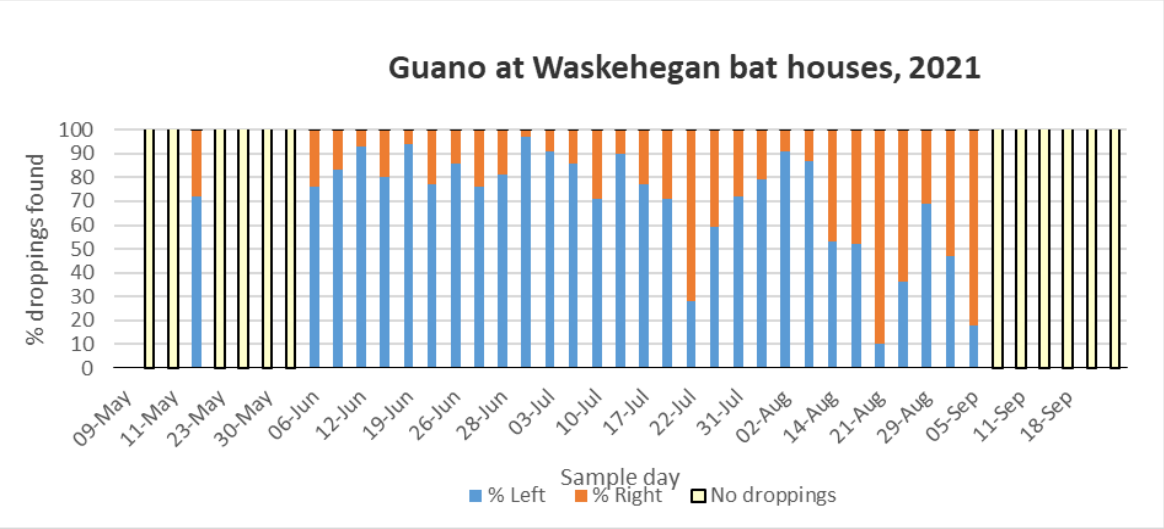
Observations began on May 9 2021 and continued through to September 25 (Figure 1). Evidence of bat presence at the site was detected May 10 and consistently to May 16 (Table 1, 2). No droppings were found May 23 to 30. Droppings were present again on June 5 and there found consistently on all observation days through to Sept 11. There was no evidence of activity through mid to late September. Observations were discontinued after September 25. Eight FoB members were involved in the data collection, as well as Greg Elzinga from AB Parks. Volunteers were very diligent in recording and mapping their observations.

Figure 1. Observation days at Waskehegan bat house site, 2021.

Presence or absence of bat guano below the houses was assessed at least one day each weekend, and generally both Saturday and Sunday, from May 9 to September 25, inclusive. Thus the interval between observations generally was a week, but involved consecutive two to four days on multiple occasions. In some cases presence of guano was assessed twice on the same day. In the latter situations, droppings at the second observation were direct evidence that the house was occupied that afternoon. In these situations, the cumulative daily total was tallied and recorded as the daily observation. The great majority of bat droppings occurred on the concrete pad directly below one or both lower bat houses. The remaining droppings were stuck to the lower tower uprights and crosspieces below the houses. All were included in the total for that observation date. Although assessed only a few times, no droppings were seen on the roof of either of the lower houses (implying no bats used the small upper houses and all droppings came from bats in the large lower houses).

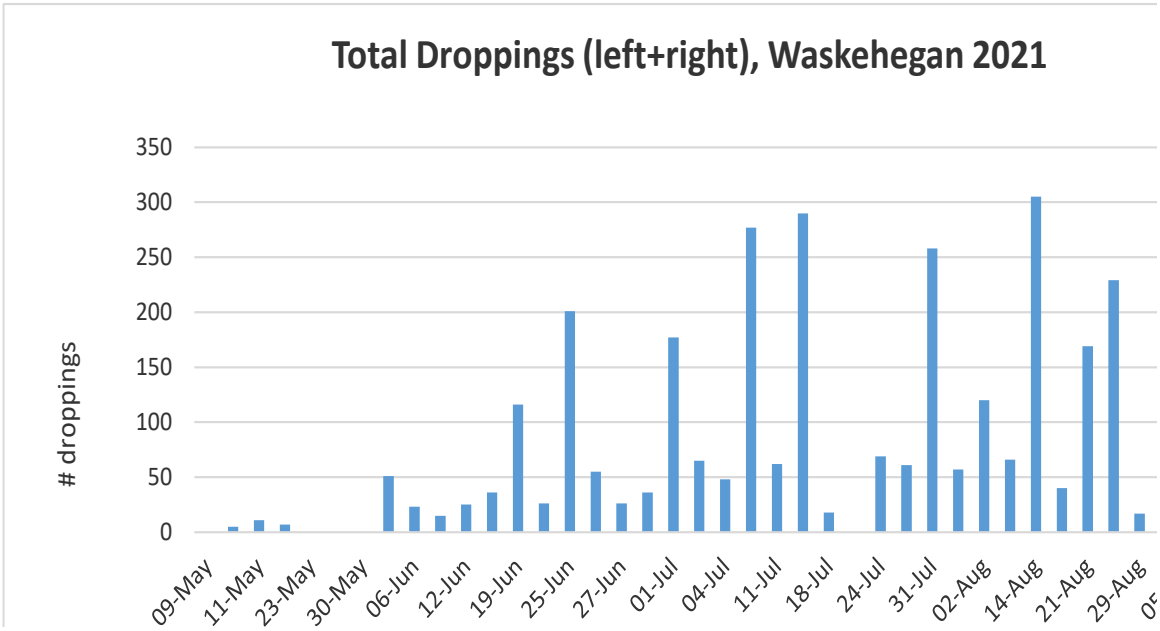
As in 2020, the proportion of droppings found on the left (below the multi-chambered bat house) or the right (below the single-chambered bat house) was determined as the percentage of total droppings on each occasion found to the left or right of the vertical median line (Figure 2). Daily counts of less than 10 droppings were not included in the proportional data. On June 19 observers recorded total # but did not map the droppings, and July 22 only the live bat component was checked so spatial distribution (left or right) could not be determined on these days.

Figure 2. Proportional distribution of guano under left (multi) or right (single) bat houses.



Throughout the summer, the great majority of droppings in 2021 were on the left side (72% of total left/right count), under the multi-chambered house (Table 2). Of 30 observations with proportion data, four (13%) approached even distribution on the left and right, and three (10%) had higher percentage on the right, under the single-chambered house. Once bat activity was detected in mid May, observations indicated continuous occupancy other than the last week of May. There was considerable variation this year in the total number of droppings from day to day, ranging from over 200 some days in July and August but interspersed with days of less than 50 in between (Figure 3). However, variable time intervals between observations may affect totals counts and obscure temporal patterns.

Figure 3. Total droppings throughout the summer, 2021

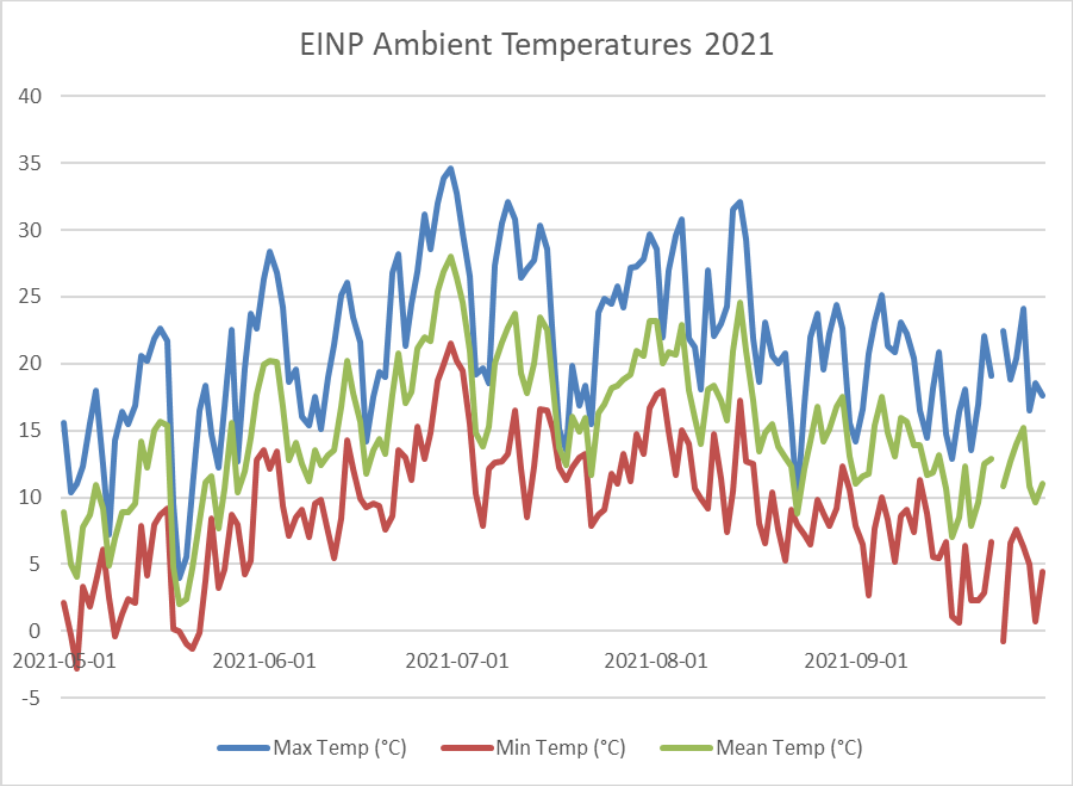


Live Bats: Checking for live bats was somewhat hit and miss over the summer. However, whenever assessed, there were bats present in one or both large houses, until mid September when bat activity declined, in conjunction with lower temperatures. The first time (June 27) and the last three times bats were detected (Sept 5, 6, 11), they were present in the right house. And overall, twice as many live bats were seen in the right (n=27) than the left (13) large bat house (Table 3). These observations are contrary to the occurrence of droppings being more numerous and more often on the left than the right.

Temperatures – Ambient

The absence of live bats and droppings in late May 2021 coincide with particularly low ambient temperatures at that time (Figure 4). Similarly bat activity dropped off in September in line with falling temperatures. As in previous years, mean ambient daily temperatures below 10C seem to coincide with reduced bat activity. Bat activity was greatest in the left house during periods of high ambient temperatures and more likely on the right in cold periods. Individual cold days (e.g., July 22) also had more activity on the right.

Figure 4. Daily ambient temperature and precipitation



May	June	July	August	Sept

In 2021 one remote motion-activated wildlife camera on loan from Alberta Parks was set up adjacent to the study site. The goal was to try to capture images of bats coming into or out of the bat houses. Unfortunately no definitive images of bats were seen on any images from the camera.

A specific bat interpretive program was not delivered in 2021 due to COVID19 restrictions both at the Heritage Centre and in the CLPRA in general. However, the bat houses were pointed out to the public occasionally when visitors were on-site and safe distancing practice could be achieved during FoB activities at the Heritage Centre. Bat info materials also are provided in the centre.

Discussion

Our ongoing project with the bat houses continues to provide useful data, an active citizen science project, and opportunities for public information and education. With the bat houses in place since 2018, and based on previous experience, routine observations began in early May 2021 and bats were present at the houses soon thereafter. This was considerably earlier than was detected in previous

years, but consistent with general evidence that bats often return to summer roosts in central Alberta in late April- early May. However, a late spring storm of 6' (16 cm) heavy wet snow, night temperatures below freezing, and daytime highs of 3-5C occurred May 18-21, inclusive. The bats disappeared from the houses as no guano or live bats were observed through late May. But, similar to previous years, once bats were present in early June, they were present continuously through to mid September. For the last three years, bats consistently leave the Waskehegan site around the 3rd week of September.

The spatial distribution of droppings, reflecting bat activity, across months in 2021 was similar to previous years. Through June and July, bats appeared to use the left (multi-chambered) house far more often and consistently than the right (single chambered). Yet in August and September, activity was consistently more likely in the single chambered house. Given the unusually high temperatures across central Alberta in summer 2021, and in the absence of more in-depth analyses, perhaps the multi-chambered house was less likely to overheat and/or provided more space for the bats to 'social distance' as a means of reducing ambient or body temperatures during the heat wave. However, this remains speculation. We still do not have sufficient data to see clear patterns under highly variable weather conditions as occurred during the study to date (2019-2021).

Counting live bats in the lower houses by using the flashlight tool provided additional direct evidence of bats at the site. It also was an added delight and incentive to volunteers and the public who had not seen live bats prior to this experience. However, as this is the first year of using this tool and despite considerable diligence in applying it, some discrepancies among observers and observations can be expected. Seeing bats in the houses can be difficult until a search image and experience is gained in recognizing and differentiating individual bats. This may be more of a concern when assessing the multi-chambered compartments of the LEFT house. Similarly, finding and seeing the bats may be more difficult in different light and weather conditions. But similar limitations are inherent in many citizen science projects and must be recognized in any analyses of the actual data.

Current observations of live bats in the lower houses do not warrant analysis relative to the total number of droppings below the houses. The number of bats is likely to change each night and it is unknown if the same bats return to the houses or whether they are transient bats that happen to choose the houses as day time roosts, depending on conditions during the evening and dawn flights. Even when droppings are counted on consecutive days, some of the droppings on day 2 are cumulative from late on day 1 plus those from day 2 prior to the count. As well, the number of bats in each house may have changed over night. Multiple counts on the same day invariably detect new droppings later in the day and present evidence that bats drop guano throughout their time spent in the day roost.

As in previous years, when assessed, there was no evidence of bats using either of the small bat houses, even when there was considerable active use of both large houses. As anticipated, it seems apparent there is little, if any, use of the two small houses and they can be largely ignored as unsuitable for bats.

SNAKES:

Since documentation in 2020 of the plains garter snake (*Thamnophis radix*) hibernaculum at the same site as the bat houses, written garter snake information is provided at the FoB Heritage Centre. In addition, some FoB volunteers include snake information in their ongoing public education conversations with PRA visitors. In general, the snake information is well received and appreciated.

This is yet another example of serendipity and added value when one citizen science project informs or supports another.

Specific to fall 2021, fewer snakes were seen. A remote motion sensing camera was set up facing one of the primary entrances to the hibernaculum under the Heritage Info Centre. Few pictures of snakes were recorded; however, a local cat was recorded regularly and often specifically checked the entrance. The cat also was recorded consuming a garter snake.

Recommendations:

- continue standardized observations in coming years

- begin observations in early May and continue at least each weekend into October, or until no evidence is found on three consecutive occasions

- consider daily counts for 7-10 days each month to help fine-tune patterns in live bats use and daily dropping counts

- assess effects of rain possible washing away droppings

- rethink the remote motion-activated trail camera for documenting bat activity at the houses

-- consider again installing temperature recorders in the large bat houses

- develop interpretative materials for the info centre, including a sort summary and this full report

- consider some acoustic sampling at the site at dusk to shed light on species using the houses

Acknowledgements

A project such as ours needs many forms of support. First, the members and Executive of the Friends of Blackfoot for suggesting, encouraging, and supporting the project. The Alberta Community Bat Program, particularly Cory Olson, made significant contributions to the project design, installation of the houses, and installation and data from the thermo buttons. The four bat houses were donated by FoB and ACBP. The installation backboard was prepared by Cam Mcgregor. Alberta Parks had a critical role in approving the project and arranging for installation of the houses.

Special recognition goes to the FoB members who voluntarily made diligent observations through the summer: Maria Basaraba, Cathy and Herb Gale, Mary Martens, Jim and Ruth Shewfelt, and Cliff Smith.

Prepared by Margo Pybus, on behalf of FoB

Associated Literature

Friends of Blackfoot (FoB). 2020. Friends of Blackfoot bat house project: 2019 year-end report. Prepared for Alberta Parks, April 2020. 16pp. Available from FoB.

Friends of Blackfoot (FoB). 2021. Friends of Blackfoot bat house project: 2020 year-end report. Prepared for Alberta Parks, April 2021. 15pp. Available from FoB.

Pybus, M.J. 1994. *Bats of Alberta – the real story*. Alberta Environmental Protection & Alberta Agriculture, Food, and Rural Development. Edmonton. 16 pp.

Vonhof, M.J. and D. Hobson. 2001. *Survey of the bats of central and northwestern Alberta*. Alberta Sustainable Resource Development, Fisheries & Wildlife Management Division, Resource Status and Assessment Branch.

Table 1. FoB Bat house project observations 2021.

2021		**Evidence**	**Evidence Type - if bats seen, provide # bats**			
Date checked	***Observer(s)***	**Y/N**	***Guano***	***# in roost L***	***R***	***Comments– include time of day, sky conditions, wind***
May 9	Margo	N	N			Clear, warm sunny 12C swept
May 10	Margo	Y	5			5 droppings since yesterday swept
May 11	Margo	Y	11			11 since yesterday swept no snakes
May 16	Margo	Y	7			21C sun/cloud
May 23	Margo	N	N			18C clear bright, snow melted [May 18:6" heavy wet snow. Temps: Night <0 to May 21. Day 3-5C
May 29	Maria	N	N			
May 30	Margo	N	N			Sunny light breeze 24C no bats
June 5	Ruth	Y	51			Lots! Cool mostly cloudy some rain last night swept
June 6	Margo	Y	23			Sun/cloud lgt breeze all day 20C swept
June 8	Ruth	Y	15			Cool cloudy some showers swept
June 12	Ruth	Y	25			Part sun breezy swept
June 13	Ruth	Y	36			Warm breezy day swept
June 19	Cliff	Y	116			Lots of droppings swept 15 on rails rest NO MAP
June 20	Maria	Y	35			swept
June 25	Ruth	Y	201			Over 200! swept
June 26	Maria	Y	55			2 counts 11 am (n=48) swept; 5 pm (7) swept
June 27	Ruth	Y	27	0	1	Washed & swept
June 28	Margo	Y	35	3	0	Flashlight/pole WORKS! HOT >30C v windy clear
July 1	Cathie	Y	177			Hot >30C, windy clear lots of droppings
July 3	Ruth	Y	65			Warm breezy swept
July 4	Ruth	Y	48	0	2	Cooler, sun/cloud swept

July 10	Maria	Y	277			
July 11	Ruth	Y	62			Sunny warm brisk wind gusts
July 17	Maria/Cathie	Y	415	2	2	Cloudy smoky
July 18	Ruth	Y	18			Still smoky, cool cloudy
July 22	Margo	Y	NA	1	5	Only checked live bats rt house grps: 3 + 2
July 24	Ruth & Jim	Y	69	1	1	Sunny warm WINDY—some blown away?
July 25	Mary/Cliff	Y	61	2	2	Partly sunny ~22C light winds
July 31	Ruth/Jim	Y	258	1	1	Sunny slight breeze warm/hot
Aug 1	Ruth	Y	57	-	-	Warm smoky no check live bats
Aug 2	Cathie/Herb	Y	114	1	2	Cool smoky cloudy calm
Aug 8	Ruth/Jim	Y	66	1	1	Cool sun cloud breezy some rain
Aug 14	Cliff	Y	205	0	2	Hot & hazy smoke
Aug 15	Maria	Y	40	0	1	2 counts 11 (n=33) & 4:30 (7) swept between
Aug 21	Cliff	Y	169	0	1	
Aug 22	Ruth	Y	No count	?	?	Heavy rain. Bat squeak from one house (?)
Aug 28	Maria	Y	229	1	2	
Aug 29	Ruth	Y	17	0	2	Warm sunny 20C
Sept 4	Ruth	Y	22	-	-	Sunny warm 20C live not checked
Sept 5	Cliff	Y	8	0	2	Sunny lt breeze 21C
Sept 6	Cathie/Herb	Y	6	0	1	All on struts sunny v windy 20C
Sept 11	Maria	Y	5	0	1	Rained o/night
Sept 12	Cliff	N	N	0	0	Cool light rain
Sept 18	Maria	N	N	0	0	
Sept 25	Margo	N	N	0	0	Sunny 18C no evidence of bats

Table 2. Location of droppings below the bat houses.

2021		Live Bats		Guano Left			Guano Right			Combined	%	
	Interval	Left	Right	Concrete	Rails	Total	Concrete	Rails	Total	total	Left	Right
09-May						-			-	0		
10-May	1 day			0	0	0	5	0	5	5		
11-May	1			7	1	8	3	0	3	11	72	28
16-May	5			7	0	7	0	0	0	7		
23-May	7			0	0	0	0	0	0	0	0	0
29-May	6			0	0	0	0	0	0	0	0	0
30-May	1			0	0	0	0	0	0	0	0	0
05-Jun	6			31	8	39	10	2	12	51	76	24
06-Jun	1			13	6	19	4	0	4	23	83	17
08-Jun	2			14	0	14	1	0	1	15	93	7
12-Jun	4			13	7	20	4	1	5	25	80	20
13-Jun	1			24	10	34	2	0	2	36	94	6
19-Jun	6					na			na	116		
20-Jun	1			13	7	20	4	2	6	26	77	23
25-Jun	5			109	64	173	24	4	28	201	86	14
26-Jun	1			33	9	42	13	0	13	55	76	24
27-Jun	1		1	21	0	21	5	0	5	26	81	19
28-Jun	1	3	0	32	3	35	0	1	1	36	97	3
01-Jul	3			112	49	161	12	4	16	177	91	9
03-Jul	2			51	5	56	8	1	9	65	86	14
04-Jul	1		2	32	2	34	12	2	14	48	71	29
10-Jul	6			211	37	248	18	11	29	277	90	10

11-Jul	1			36	12	48	11	3	14	62	77	23
17-Jul	6	2	2	172	35	207	74	9	83	290	71	29
18-Jul	1			5	0	5	12	1	13	18	28	72
22-Jul		1	5			na			na	0		
24-Jul	6	1	1	28	13	41	19	9	28	69	59	41
25-Jul	1	2	2	32	12	44	17	0	17	61	72	28
31-Jul	6	1	1	166	39	205	48	5	53	258	79	21
01-Aug	1			47	5	52	4	1	5	57	91	9
02-Aug	1	1	2	77	27	104	11	5	16	120	87	13
08-Aug	6	1	1	31	4	35	29	2	31	66	53	47
14-Aug	6	0	2	103	57	160	93	52	145	305	52	48
15-Aug	1	0	1	4	0	4	34	2	36	40	10	90
21-Aug	6	0	1	53	8	61	91	17	108	169	36	64
28-Aug	7	1	2	146	12	158	66	5	71	229	69	31
29-Aug	1			4	4	8	5	4	9	17	47	53
04-Sep	6			3	1	4	15	3	18	22	18	82
05-Sep	1	0	2	0	0	0	7	1	8	8		
06-Sep	1	0	1	0	3	3	0	3	3	6		
11-Sep	6	0	1	2	0	2	3	0	3	5		
12-Sep	1	0	0	0	0	0	0	0	0	0	0	0
18-Sep	6	0	0	0	0	0	0	0	0	0	0	0
25-Sep	7	0	0	0	0	0	0	0	0	0	0	0
						-			-		L/R	
TOTALS		13	27			2072			814	3002	total	2886

Table 3. Monthly total live bat observations

	LEFT	Right	# observations	TOTAL
June	**3**	**1**	**3**	**4**
July	**7**	**13**	**6**	**20**
August	**3**	**9**	**6**	**12**
September	**0**	**4**	**6**	**4**
Total	**13**	**27**		**40**

Appendix 1. Friends of Blackfoot BAT ROOST SURVEY FORM

Bat houses installed July 2018. Monitoring began May 2019.

2021		Evidence Type - if bats seen, provide # bats				
Date checked	*Observer(s)*	Y/N	*Guano*	*# in roost* L	R	*Comments– include time of day, sky conditions, wind*

Appendix 2. Guano location Record

Date	***Comments:*** ***Describe locations & approx. # of droppings*** ***Please pay particular attention to whether droppings occur on the left or right of centre line drawn on picture*** ***Draw ALL droppings on the tower image.***

Methods*:*

Please
1. ***Record your observations in the running survey form (see separate sheet)***
2. ***Show droppings on a copy of the tower picture. Please pay particular attention to whether droppings occur on the left or right of centre line.***

If guano present:

- *Record date and describe observation in comment section above*
- *Mark approx amount & location on the photo. Include any droppings on concrete pad AND on tower uprights or cross pieces.*
- ***Sweep away ALL droppings so the slate is clean for the next observation***