Friends of Blackfoot Bat House Project

2022 Year-end Report

June 2023

Friends of Blackfoot Society
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Friends of Blackfoot
COOKING LAKE – BLACKFOOT PROVINCIAL RECREATION AREA

Executive Summary

Ongoing observations at the bat house research site at Waskehegan Staging Area of the Cooking Lake Blackfoot Provincial Recreation Area (PRA) continue to prove useful, informative, and valuable for research, citizen science, and pubic education purposes. Friends of Blackfoot and public visitors continue to express interest and appreciation of the project and the results.

General Outline

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Methods

Results

- Weekly observations
    - Guano/droppings
    - Live bats
    - # bats/ # guano
- Daily consecutive observations
    - Guano/droppings
    - Live bats
    - # bats/ # guano
- Weather
- In-house temperatures
- Outreach

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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 Blackfoot Provincial Recreation Area, 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 PRA 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 2022.

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 interpretive centre. Generally FoB members are on site at the centre each weekend between the long weekends in May and September (weekend/weekly observations). Additional site visits specifically to check the bat houses for early bat activity are made through May. Similarly, late activity in September was monitored until three consecutive visits with no evidence of bat use of any house. From June to August 2022, inclusive, additional daily observations of live bats and associated guano were made for at least multiple consecutive days each month (daily/consecutive observations).

A survey form (Appendix 1) is used to track site assessments and record: date, observer(s), bat evidence (Yes/No), evidence type (guano, # bats 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 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.

As in 2021, a high intensity flashlight affixed to a slender 8’ pole was directed into the bottom of each large bat house to look for any occupants. All bats are counted and documented as to whether they are in the left or right large bat house. This monitoring tool was used extensively in 2022 and the number of bats present assessed in conjunction with the daily or weekend guano reports.

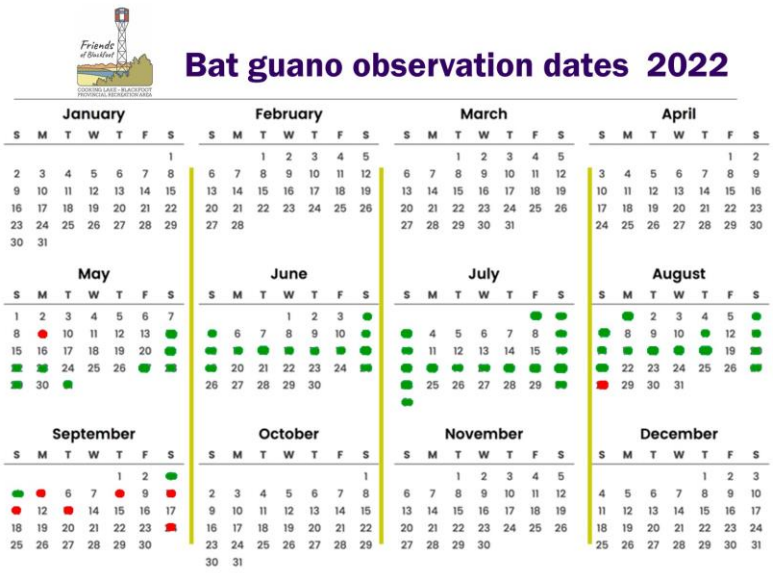
Observers also record general descriptions of weather conditions, such as temperature, wind speed, cloud cover, and precipitation. In 2022, in conjunction with the Community Bat Program (Cory Olson), a thermo-recorder took temperature recordings inside the large single-chambered bat house from June to August. 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 2022 were downloaded from the Environment Canada web pages in May 2023.

Results

Observations in 2022 began on May 9 and continued at least weekly through to September 24 (Figure 1). Evidence of bat presence (droppings) at the site was detected on May 14. Guano was consistently present for all observations between May 14 and August 27, inclusive; absent on Aug 28, but seen again on Sept 3 and 4. No droppings were present when checked multiple times after that. (Table 1, 2). Observations were discontinued after September 24.

Six FoB members were involved in the data collection. Volunteers were very diligent in recording and mapping their observations. All volunteers assessed the status of bat droppings but some did not assess live bat occupancy in the bat houses.

Figure 1. Guano observation days at Waskehegan bat house site, 2022. (Red: no guano. Green: guano present)



WEEKEND/WEEKLY OBSERVATIONS

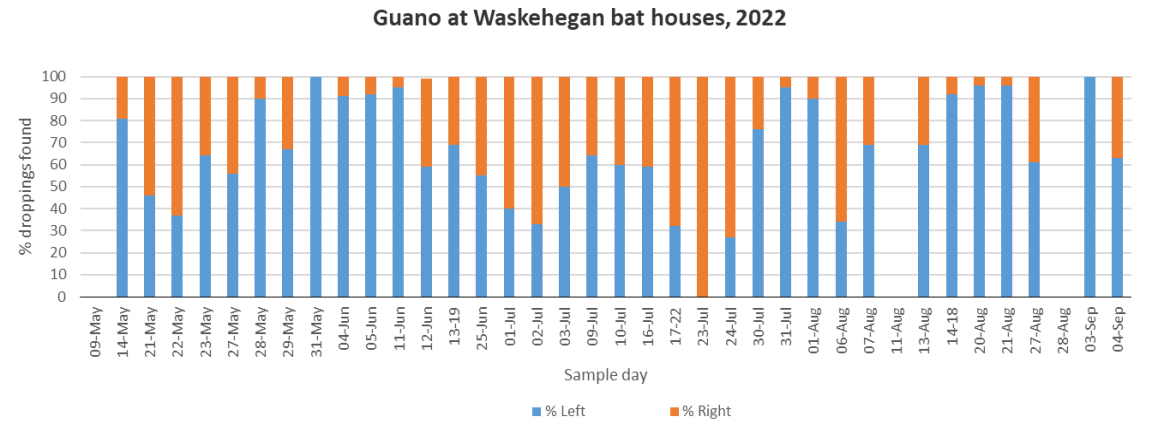
Guano

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).

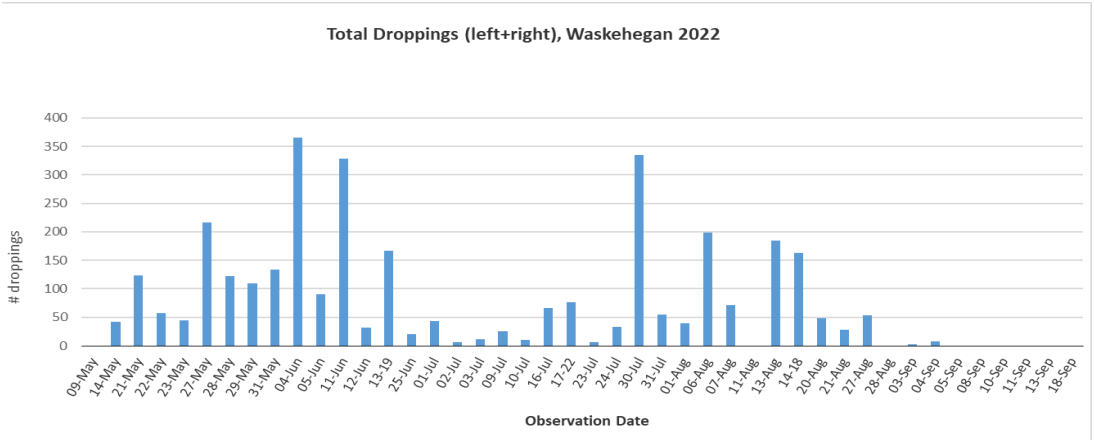
As in previous annual reports, the proportion of droppings found on the left (below the multi-chambered bat house) or the right (below the single-chambered bat house) was determined on each occasion as the percentage of total droppings that occurred to the left or right of the vertical median line (Figure 2). On Aug 11 observers recorded only the number of live bats, so spatial distribution (left or right) could not be determined on that day. On Aug 28 there were no droppings under either house and less than 10 droppings were present on July 2, July 23, and Sept 3 & 4 [sample size <10 can bias proportional data]. Consecutive daily observations were summarized for June 13-19, July 17-22, and Aug 14-18 (Table 2).

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



Throughout the summer, the great majority of droppings in 2022 were on the left side (74% of total left/right count; total n=3277), under the multi-chambered house (Table 2). Of 31 observations with valid proportion data, there were distinct differences in the proportion on left vs right, with droppings generally more likely to occur on the left (24 times of 31 observations, 77%), consistent with the larger total number of droppings. However, there was considerable variation in the total number of droppings each observation, ranging from over 300 in some observations in June and July but interspersed with days of less than 50, particularly through much of July (Figure 3). However, variable time intervals between observations may affect totals counts and obscure temporal patterns.

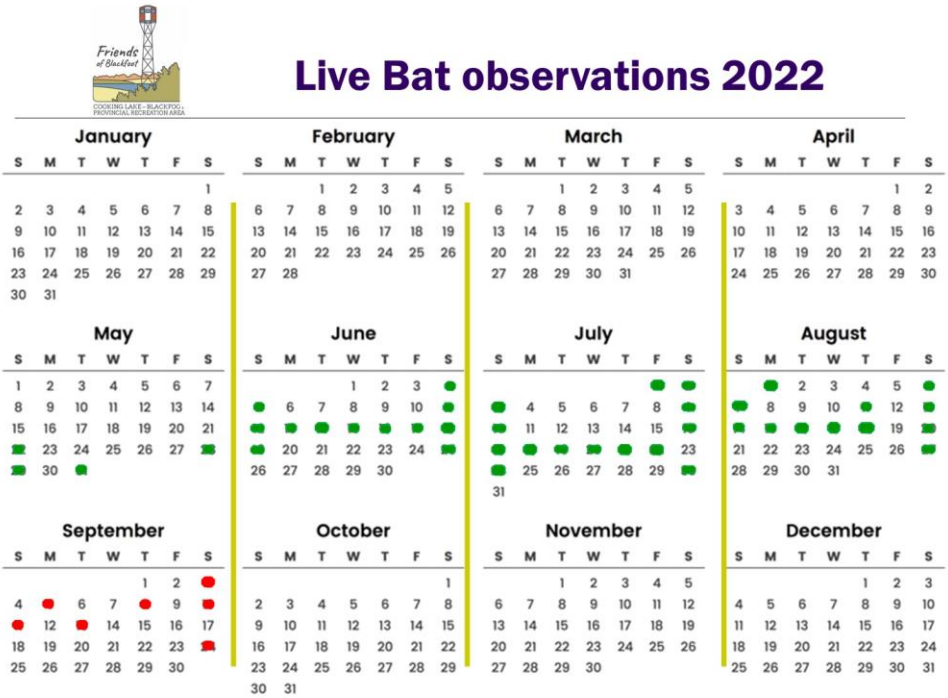
Figure 3. Total droppings on observation days throughout the summer, 2022



Live Bats

Following experience gained in 2021, checking for live bats with a pole light was consistent in 2022 throughout the summer. Live bat observations began on May 22 (following purchase of new flashlight batteries) and occurred consistently through the summer (Figure 2). Bats were present in all observations in May, June, July, and August but were absent in all observations in September.

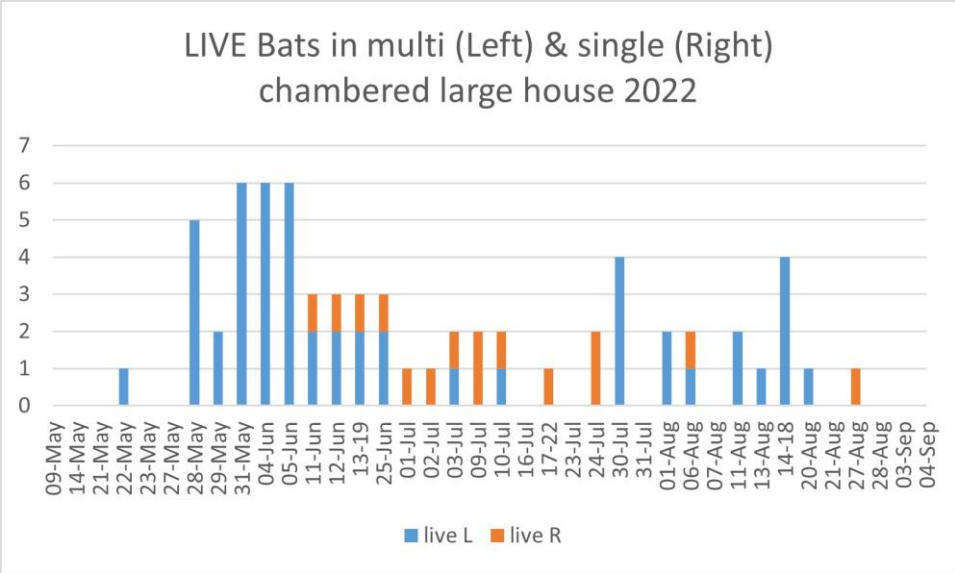
Figure 2. Live bat observation days at Waskehegan bat house site, 2022. [Red: no bats. Green: bats present.]



A total of 66 live bats was observed in the weekly analyses, with more bats on the left than the right (51 of 66 bats (77%) left; 15 of 66 (23%) right) (Table 2). Similarly, live bats were temporally more likely to occur in the left house (19 of 28 observation days, 68%) than in the right (13 of 28, 46%). When bats were present (Figure 3), the mean number of bats per observation was markedly higher in the left house (51 bats during 19 observations, mean # 2.7 bats/observation, range 1-6 bats) than the right (15 bats during 13 observations, mean 1.2 bats/observation, range 1-2 bats).

During May and early June, live bats were seen exclusively in the left house. From mid June to late July bats were seen in both houses. On occasion in early and late July bats were only seen in the right house. However, after July 24, very few bats were seen in the right house (2 bats in 14 observations), yet 25 bats were seen in the left house during the same 14 observations. Few live bats were seen in either house after mid August and none in September (even though fresh guano was present, Table 2).

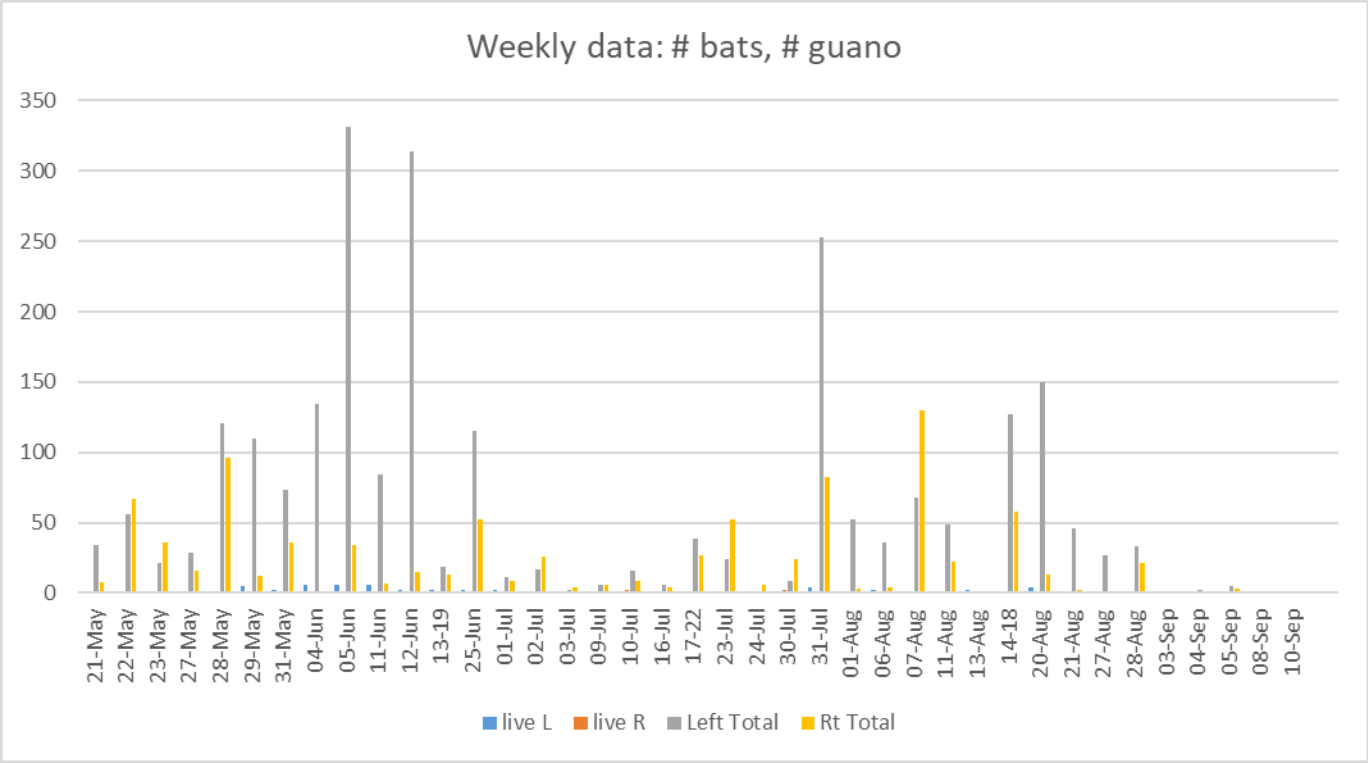
Figure 3. Live bats present in large bat houses in weekly observations, 2022



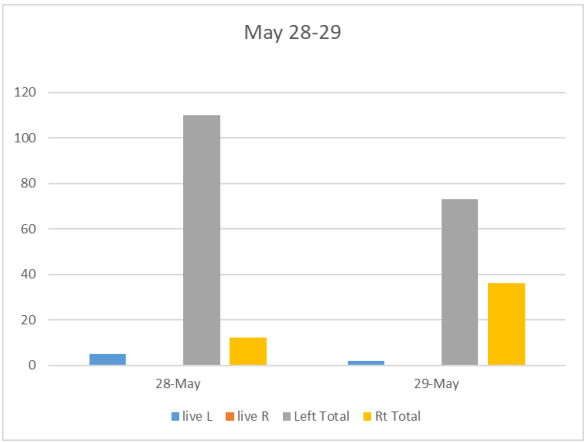
Number bats/ Number droppings

The number of bats vs number of droppings in weekly observations was highly variable and significantly affected by the number of days between observation periods (Figure 4). However, this was also the case within the groups of consecutive day observations (Figure 6) (see below).

Figure 4: Number of bats and number of droppings in weekly observations.



To minimize the effects of cumulative days prior to an observation, we looked at the second day of a weekend observation, that is, one day's worth of droppings and a known number of bats in each house. However, this too proved not to be fruitful. Using May 28-29 as example, there was no relationship between # bats and # droppings…. other than, more droppings under a house that has bats in (Figure 5). But the actual # of droppings seems unrelated to the number of bats. In particular, there were droppings under the right house but no bats were observed in that house during the day.



DAILY/CONSECUTIVE OBSERVATIONS

Daily/consecutive guano

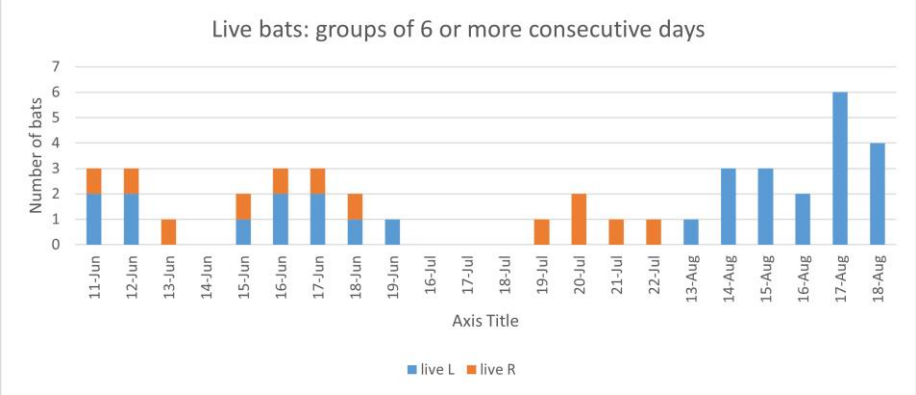
In 2022, bat activity was recorded for 5 or 6 consecutive days each month from June to August (Table 3). Each set of daily data was examined for any apparent patterns in changes in daily number of droppings, number of bats, number of droppings relative to number of bats, occupancy differences between houses relative to daily max temperature and precipitation, and monthly differences across June, July and August.

Distribution of droppings differed among the observation periods, primarily on the left in June (69%), the right in July (69%), and the left in August (92%). The higher proportion of droppings reflected greater live bat occurrence across months but not the actual number of bats observed (Table 3, 4). Further, the presence of droppings on the left in July but the absence of live bats seen on these days suggests that some bats use the house during the night as a temporary lay-over site rather than as a day roost.

Live bat consecutive days

The number and location of live bats in each large house was relatively stable from day to day within periods of consecutive observations (Figure 6). During June, bats were seen in both houses, whereas in July and August they were seen only in the right (single) and left (multi), respectively.

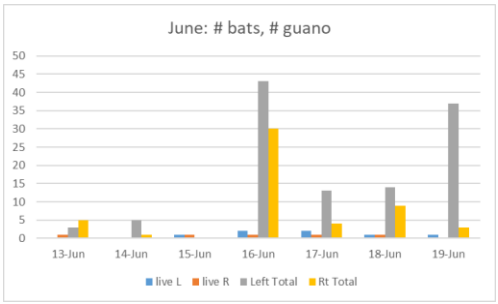
Figure 6. Proportion of live bats in left or right house during daily observations.

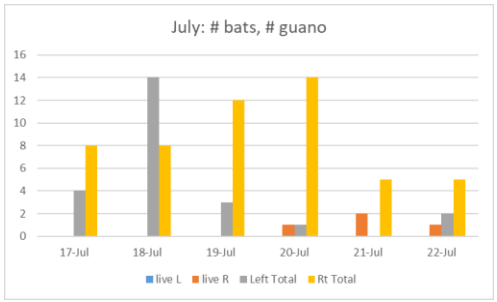


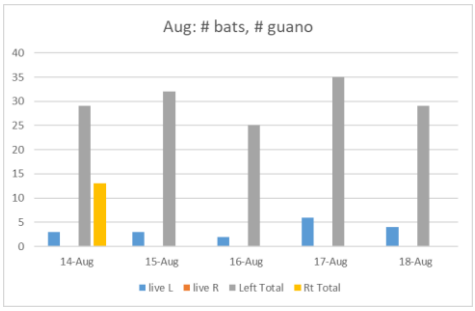
On an overall monthly basis, including the bats seen during the consecutive day assessments (Table 3), a similar pattern of use was apparent – both houses were used in June, right house more likely in July, and left house more likely in August. It should be noted that bats were not identified individually and recurrent observations of the same bat, whether or not it moved between observations, are quite likely. Superficially, in the consecutive observation periods, bats often appeared to be in the same spot within the house as on the previous day (though no way of knowing if it was the same bat, nor if the bat had moved overnight and returned to the same place in the house or had not moved since the previous observation).

Overall, there are no apparent patterns in the number of live bats seen in each house during the daytime observations and the number of droppings below the respective house for the previous 24 hrs Figure 7). For example, in June the occurrence of bats in either house had no reflection in the number of droppings that day, or the next day. From July 17-22, no live bats were seen in the left house, yet droppings were present under the left house in 5 of 6 daily observations. However, during August, bats and droppings were consistently present in or under the left house and droppings were somewhat proportional to the number of bats observed.

Figure 7. Number of bats and # droppings in periods of at least 6 consecutive days. By month.





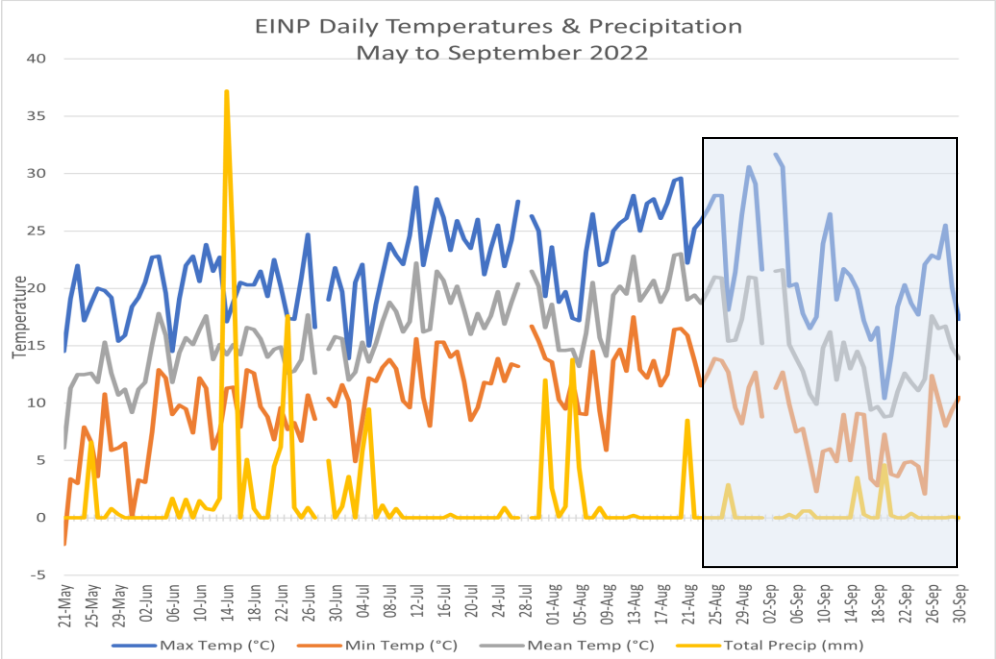


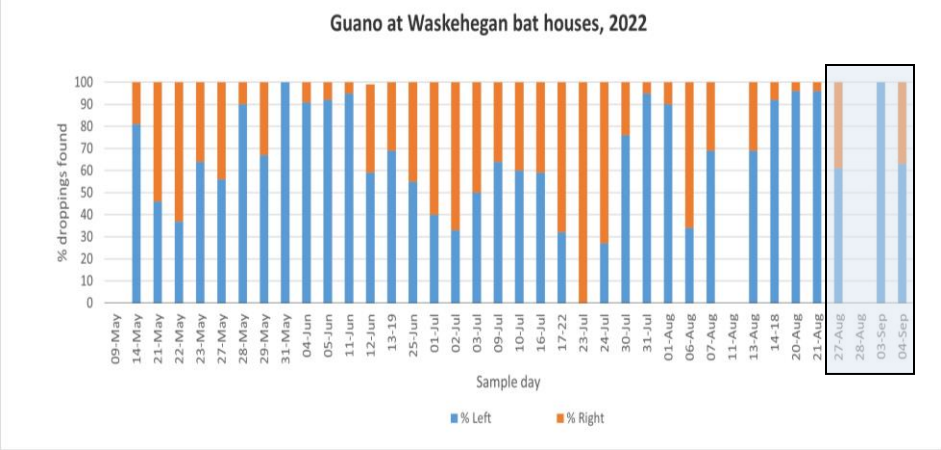
Temperatures – ambient and within the single-chamber house

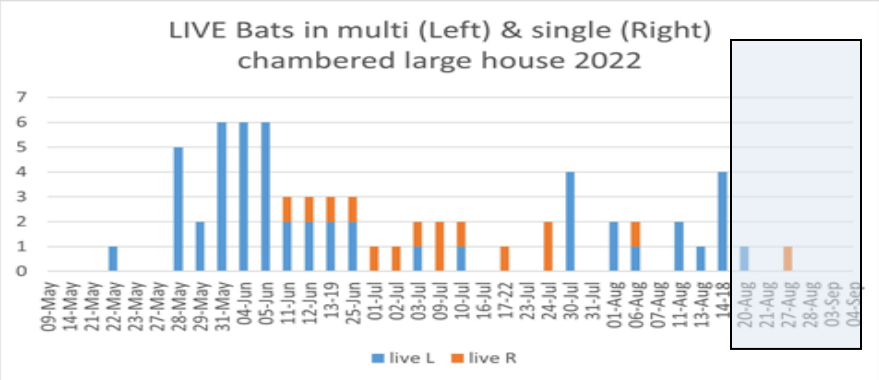
Ambient daily maximum, minimum, and mean temperatures from the Elk Island (EINP) weather station fluctuated daily but maximum daytime highs were consistently above 25C in mid July and through much of August (Figure 8). Conversely minimum night temperatures fell below 10C most days in May and June and after late August. Consistent low daily maximum and minimum temperatures in late August and September coincide with reduced bat activity and apparent departure from both houses.

Maximum daily temperature in the right (single) house was consistently higher in the August consecutive period and may have discouraged bat use in the single chambered house.

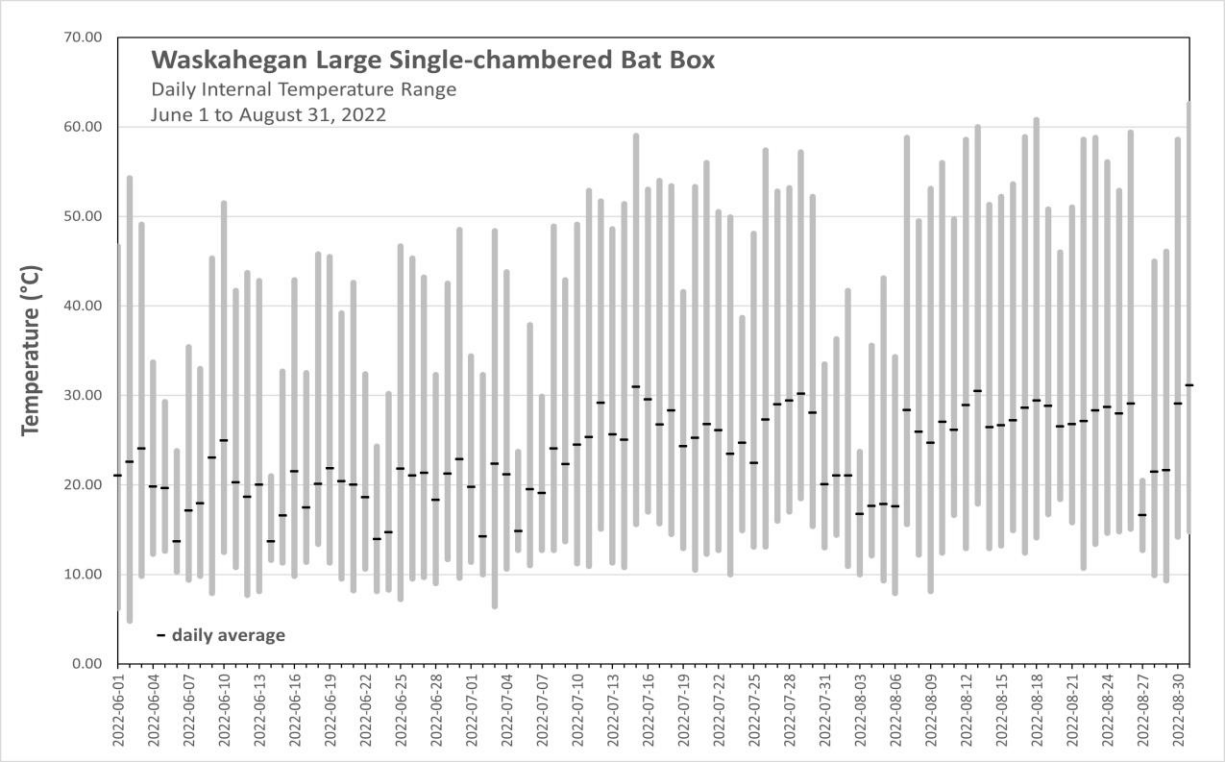
Figure 5. Daily ambient temperature and precipitation, Elk Island weather station, 2022



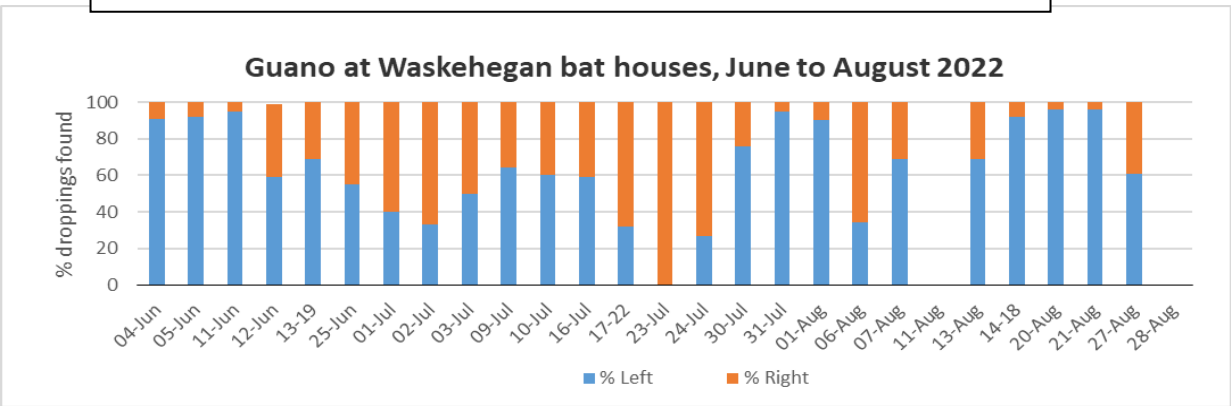




Thermo button in single chamber



June July August



In 2022 a motion-activated wildlife camera was set up to monitor the concrete pad below the bat houses. The goal was to assess whether some of the droppings on the concrete may perhaps come from nocturnal or diurnal small rodent activity on the pad. In a nutshell no small rodents were seen on any images captured by the camera. However, multiple times on many nights the local marauding cat crossed and often sat on the concrete pad, particularly at night. This could deter rodents from using this area. In addition, guano on the concrete pad is essentially the same as what sticks on the tower cross pieces, which only occur directly below the bat houses and no where else on the tower. Collectively, the evidence seems to reinforce that we are indeed counting bat droppings and not rodent droppings.

Outreach

A specific bat interpretive program in 2022 was delivered within current COVID19 restrictions for public interactions. Bat house tours as well as verbal and written outreach materials were provided to the public when visitors were on-site and safe distancing practice could be achieved during FoB activities at the Heritage Centre. In addition, a herpetologist from Australia came to visit the plains garter snake hibernaculum site at Waskehegan and was particularly interested in our bat project.

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.

Presence/absence: With the bat houses in place since 2018, and based on previous experience, routine observations began in May and bats were present consistently after mid May. This was a similar timeframe to previous years and is consistent with general evidence that bats often return to summer roosts in central Alberta in late April- early May. But, unlike pervious years bat activity dropped off in late August and the houses were abandoned in early September, much earlier than previous years. In 2019-2021, bats consistently left the Waskehegan site around the 3rd week of September.

Multi-chambered vs single house use: The spatial distribution of droppings, reflecting bat activity, across months differed slightly from previous years.

2021: Through June and July, bats used 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 right (single) house.

2022: Bats primarily used the left house in June, the right house in July, and the left house in August.

However, the observations both years seem to reflect ambient temperature patterns and suggest 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 internal body temperatures during warmer periods. However, this remains speculation. We do not have appropriate data to see clear patterns under highly variable weather conditions as occurred during the study to date (2019-2022), particularly in light of the confounding unknowns regarding bat activity patterns between observation days and without identifying individual bats.

Number of live bats: Counting live bats in the lower houses by using the flashlight tool provides useful direct evidence of bats at the site. It also is an added delight and incentive to volunteers and the public who have not seen live bats prior to this experience. Using experience gained in 2021, the record of live bats in the houses was more efficient and reliable in 2022, although search image and bright sunny days still provide challenges for some observers. Seeing bats in the houses can be difficult without a consistent search image and until 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. Such limitations are inherent in many citizen science projects and must be recognized in any analyses of the data reported herein.

During the daily consecutive observations, observer bias or variation was reduced by having one volunteer make all the observations.

It is readily apparent that the bat houses at Waskehegan are temporary day and night roosts rather than an ongoing established maternal colony. It is likely that most bats using the houses are individual male little brown bats, *Myotis lucifugus*, although individuals of other small myotic species are possible. On one or two occasions a larger paler bat was seen, most likely a big brown bat, *Eptesicus fuscus*.

Number of bats/ number of droppings: Current weekly observations of live bats in the two large houses do not present consistent patterns 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 consistently or whether there is high turnover among transient bats that just happen to use the site as a day time roost 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 afternoon and evening bat activity the previous day plus those from day 2 prior to the count. 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 well, the number of bats in each house may have changed through the night.

Assessing bat activity on a group of consecutive days each month, new to the 2022 program, was an attempt to further refine the data and observations. However, data associated with the number of bats and number of droppings in one-day intervals did not clarify any patterns, but further reinforced the lack of patterns. Confounding factors may include individual bat activity on the previous night – such as the extent of foraging activity, abundance of insects, individual hunger drive, all of which are confounded by environmental elements associated with activity of bats and/or insects. Similarly the presence of droppings on days without bats present on the previous day or the day of the observation indicate that transient use of the houses during the night likely occurs. Our daily consecutive data reinforces that the relationship between # bats and # droppings is highly variable and not productive in terms of analyses nor improving our understanding of bats or their relationships with night flying insects.

Temperatures: Lower ambient temperatures, as occurred early and late in the bat season, were associated with increased use of the multi-chambered house in 2022. This is contrary to patterns seen in 2021. In 2022, bat activity was greatest in the left (multi) house during periods of lower ambient temperatures and more likely on the right (single) in warmer periods. But these are relative observations within the annual data and cannot be applied to defining a more general temperature threshold associated with occupancy of either particular house. However, persistent colder temperatures in the fall, particularly night temperatures, are reflected in bat departure from the houses in all years of our study. As in previous years, minimum ambient daily temperatures below 10C seem to coincide with reduced bat activity. In 2022 this occurred in late August, earlier than in previous years.

Also 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 there is little, if any, use of the two small houses and they can be largely ignored as being unsuitable for bats. Monitoring or report of the two small houses is discontinued.

Recommendations *from 2021* ***(response in 2022)***:

- continue standardized observations in coming years (**delivered**)

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

- consider daily counts for 7-10 days each month to help fine-tune patterns in live bats use and daily dropping counts (**conducted each month, June to August)**

- assess effects of rain possible washing away droppings (**assessed, effects were minimal**)

- rethink the remote motion-activated trail camera for documenting bat activity at the houses (**discontinued, just not effective**)

-- consider again installing temperature recorders in the large bat houses (**monitored in single large house)**

- develop interpretative materials for the info centre, including a sort summary and this full report (**new outreach materials added)**

- consider some acoustic sampling at the site at dusk to shed light on species using the houses (**not done in 2022**)

Recommendations from 2022

- continue citizen science monitoring and education. This program is well received by volunteers and visitors alike.
- discontinue daily consecutive observations – there are too many impinging and uncontrollable variables and unknowns to be effective
- consider more in-depth multi-year analyses … ??? perhaps in conjunction with Community Bat Program

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). 2017. Friends of Blackfoot bat house project proposal: Summer 2017. 16pp. Available from FoB.

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

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Addendum: Spurious observations

On occasion, evidence of bat activity was seen at a small, very old, bat house hanging on the west wall of the Interpretive Centre. (July 10: 4 droppings, 1 bat inside. Aug 27: 11 droppings, 1 bat inside. Sept 3: 3 droppings, 1 bat inside). No evidence was seen on Sept 4, 5, 8, 13, or 18

Owl pellet. On Sept 3 one owl pellet was on the concrete pad within the tower legs. It contained feathers and bones of a medium-sized bird, perhaps a robin.

Table 1. FoB Bat house project observations 2022 (consecutive day observations highlighted).

2022		**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				Clear, warm sunny 15C swept
May 14	Margo	Y	42			Clear breezy 17C swept
May 21	Margo	Y	123			Lots of droppings both sides clear bright sunny 14c@18:00
May 22	Margo	Y	57	1	0	Clear sun/cloud 18C@1730 Cold nights this week
May 23	Margo	Y	45			Clear bright 20C@1715 no rain for days
May 27	Ruth	Y	217			Partly sunny 20C
May 28	Margo	Y	122	5	0	Sun/cloud 20C@1800 live bat grps 3 +2
May 29	Margo	Y	109	2	0	O'cast cool breezy 15C@1730 no rain but looks dark
May 31	Margo/Corey	Y	134	6	0	Clear sunny 17C Thermobutton RT live:2+2+2
June 4	Margo	Y	365	6	0	O'cast all day breezy 22C@1750 DRY live:4+2
June 5	Margo	Y	91	6	0	O'cast cool breeze all day 18C@1830 DRY live:4+2
June 11	Margo	Y	329	2	1	O'cast warm day 20C@1800 DRY live: 1+1, 1
June 12	Margo	Y	32	2	1	O'cast warm DRY 19C@1615 still dry live:1+1,1
June 13	Margo	Y	8	0	1	Sun/cloud 23C@1900 [new: wk of daily checks]
June 14	Margo	Y	6	0	0	Cold rain 24 hrs High wind gusts 14C NO Bats!
June 15	Margo	Y	0	1	1	Cold rain 48hrs guano washed away? Now sun/cl breeze 18C@1915
June 16	Margo	Y	73	2	1	Sun/cl lt breeze No rain 20C@1830 Live:2, 1
June 17	Margo	Y	17	2	1	O'cast. Rain on & off 24 hrs. 19C@2000
June 18	Margo	Y	23	1	1	Lt rain am sunny pm lt breeze 19C@1730
June 19	Margo	Y	40	1	0	Sun/cl 19C@1800
June 25	Margo	Y	20	2	1	O'cast 18C@1800. (Heavy rain Mon-Thur)

July 1	Margo	Y	43	0	1	Sun/cl lt breeze 14C@1930
July 2	Margo	Y	6	0	1	Heavy morn rain –washed away? 13C@1800
July 3	Cathie/Herb	Y	12	1	1	Sun/cloud breezy 19C@1530
July 9	Cliff	Y	25	0	2	Sunny 21C@1440
July 10	Maria	Y	10	1	1	Sun/cloud str wind. 1 bat in house on Interp Centre
July 16	Maria	Y	66	0	0	Grass clippings. Parks Day
July 17	Ruth	Y	12	-	-	Part cloud 20C@1200
July 18	Margo	Y	22	0	0	Clear sun hot 28C @1845
July 19	Margo	Y	15	0	1	Sun/cloud warm calm 21C@1825
July 20	Margo	Y	15	0	2	Sun all day 24C@1930
July 21	Margo	Y	5	0	1	Clear sunny lt breeze 24C@1715
July 22	Margo	Y	7	0	1	Sun/cloud lt breeze. Lt rain o'night. 21C@1915
July 23	Cliff	Y	6	-	-	Bright sun hard to see in boxes
July 24	Margo	Y	33	0	2	Overcast warm 24C@1620
July 30	Ruth	Y	335	4	0	Part sun lt breeze Hot wk. 22C@1230
July 31	Ruth	Y	55	-	-	Mostly cloud cool 16C@1300
Aug 1	Cathie/Herb	Y	40	2	0	Cloudy with breeze
Aug 6	Maria	Y	170	1	1	2 counts am/pm. 1 bat on rt moved to left in pm
Aug 7	Ruth	Y	71	-	-	Warm sunny breezy 13:30
Aug 11	Margo	Y	-	2	0	Bat count only, camera set up to watch slab
Aug 13	Cliff	Y	185	1	0	Hot sun all day hard to see in boxes 28C@1530
Aug 14	Maria	Y	42	3	0	Warm breezy
Aug 15	Margo	Y	32	3	0	Sunny hot all day 30C@1750
Aug 16	Margo	Y	25	2	0	Sun/cloud 25C@1630

Aug 17	Margo	Y	35	6 !!	0	Sunny hot 28C@1900
Aug 18	Margo	Y	29	4	0	Sunny hot 28C@1630
Aug 20	Cliff	Y	48	1	0	Sunny hot 30C@1520
Aug 21	Ruth	Y	28	-	-	Part cloud 21C@1300
Aug 27	Maria	Y	54	0	1	Cloudy dark. Rain last night
Aug 28	Ruth	N	0	-	-	Mostly sun. Windy
Sep 3	Margo	Y	2	0	0	Sun/cloud HOT 33C@1600.
Sep 4	Ruth	Y	8	-	-	Hot smoky
Sep 5	Cathie	N	0	0	0	Cool showers & rain 14C
Sep 8	Margo	N	0	0	0	Sun/cloud 15C@1730
Sep 10	Maria	N	0	0	0	Cloudy then sun 14C@1200
Sep 11	Cliff	N	0	0	0	Hot & hazy
Sep 13	Margo	N	0	0	0	Clear calm sunny 21C
Sep 18	Margo	N	0	0	0	Sun/cloud 17C
Sep 24	Cliff	N	0	0	0	

Table 2. Live bats and guano/droppings below the bat houses (weekly observations).

2022		Live Bats		Guano LEFT			Guano RIGHT			Combined	%	
	Interval	Left	Right	Concrete	Rails	Total	Concrete	Rails	Total	Total	Left	Right
09-May		-	-							0		
14-May	5 d	-	-	33	1	34	5	3	8	42	81	19
21-May	7	-	-	52	4	56	59	8	67	123	46	54
22-May	1	1	0	13	8	21	26	10	36	57	37	63
23-May	1	-	-	21	8	29	13	3	16	45	64	36
27-May	4	-	-	112		121	91	5	96	217	56	44
28-May	1	5	0	76	34	110	9	3	12	122	90	10
29-May	1	2	0	63	10	73	33	3	36	109	67	33
31-May	2	6	0	111	23	134	0	0	0	134	100	0
04-Jun	4	6	0	302	29	331	34	0	34	365	91	9
05-Jun	1	6	0	82	2	84	7	0	7	91	92	8
11-Jun	6	2	1	286	28	314	11	4	15	329	95	5
12-Jun	1	2	1	18	1	19	12	1	13	32	59	40
13-19	7	2	1	96	19	115	50	2	52	167	69	31
25-Jun	6	2	1	11	0	11	9	0	9	20	55	45
01-Jul	6	0	1	15	2	17	20	6	26	43	40	60
02-Jul	1	0	1	2	0	2	4	0	4	6	33	67
03-Jul	1	1	1	6	0	6	6	0	6	12	50	50
09-Jul	6	0	2	13	3	16	7	2	9	25	64	36
10-Jul	1	1	1	6	0	6	4	0	4	10	60	40
16-Jul	6	0	0	34	5	39	24	3	27	66	59	41
17-22	6	0	1	19	5	24	44	8	52	76	32	68
23-Jul	1	-	-	0	0	0	3	3	6	6	0	100
24-Jul	1	0	2	7	2	9	19	5	24	33	27	73
30-Jul	6	4	0	225	28	253	69	13	82	335	76	24
31-Jul	1	-	-	50	2	52	3	0	3	55	95	5
01-Aug	1	2	0	33	3	36	3	1	4	40	90	10
06-Aug	5	1	1	51	17	68	125	5	130	198	34	66
07-Aug	1	-	-	38	11	49	20	2	22	71	69	31
11-Aug		2	0									
13-Aug	5	1	0	119	8	127	48	10	58	185	69	31
14-18	5	4	0	128	22	150	11	2	13	163	92	8
20-Aug	2	1	0	40	6	46	2	0	2	48	96	4
21-Aug	1	-	-	25	2	27	1	0	1	28	96	4
27-Aug	6	0	1	31	2	33	21	0	21	54	61	39
28-Aug	1	0	0	0	0	0	0	0	0	0	NA	NA
03-Sep	5	0	0	2	0	2	0	0	0	2	100	0
04-Sep	1	-	-	4	1	5	0	3	3	8	63	37

05-Sep	1	0	0							
08-Sep	3	0	0							
10-Sep	2	0	0							
TOTALS		51	15		2419		858	3277	74	26

Table 3. Daily/consecutive guano and live bat observations in June, July, and August 2022.

2022		Live		Guano Left			Guano Right			Combined	%	
June	Interval	Left	Right	Concrete	Rails	Total	Concrete	Rails	Total	total	Left	Right
13-Jun	1	0	1	3	0	3	5	0	5	8		
14-Jun	1	0	0	4	1	5	1	0	1	6		
15-Jun	1	1	1	0	0	0	0	0	0	0		
16-Jun	1	2	1	36	7	43	28	2	30	73		
17-Jun	1	2	1	10	3	13	4	0	4	17		
18-Jun	1	1	1	11	3	14	9	0	9	23		
19-Jun	1	1	0	32	5	37	3	0	3	40		
TOTALS		7	5			115			52	167		
July												
17-Jul	1	-	-	3	1	4	7	1	8	12		
18-Jul	1	0	0	11	3	14	7	1	8	22		
19-Jul	1	0	1	3	0	3	11	1	12	15		
20-Jul	1	0	2	1	0	1	11	3	14	15		
21-Jul	1	0	1	0	0	0	5	0	5	5		
22-Jul	1	0	1	1	1	2	3	2	5	7		
TOTALS		0	5			24			52	76		
August												
14-Aug	1	3	0	25	4	29	11	2	13	42		
15-Aug	1	3	0	23	9	32	0	0	0	32		
16-Aug	1	2	0	23	2	25	0	0	0	25		
17-Aug	1	6	0	32	3	35	0	0	0	35		
18-Aug	1	4	0	25	4	29	0	0	0	29		
TOTALS		18	0			150			13	163		

Table 4. Overall monthly total live bat observations (includes daily consecutive data) 2022

	LEFT	Right	# observations	TOTAL
June	**25**	**8**	**12**	**33**
July	**6**	**13**	**13**	**19**
August	**25**	**2**	**12**	**27**
September	**0**	**0**	**9**	**0**
Total	**56**	**23**	**46**	**79**

Appendix 1. Friends of Blackfoot BAT ROOST SURVEY FORM

Bat houses installed July 2018. Monitoring began May 2019.

Friends of Blackfoot
COOKING LAKE – BLACKFOOT PROVINCIAL RECREATION AREA

2022		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***