Friends of Blackfoot Bat House Project

2023 Year-end Report

May 2024

Friends of Blackfoot Society
52365 Range Road 210
c/o Cooking Lake - Blackfoot Provincial Recreation Area
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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.

Background

Since December 2017 the Friends of Blackfoot (FoB) conducted research under permit from Alberta Parks to test bat house designs relative to bat occupancy (FoB 2020). In general, the approach involves monitoring bat houses at Waskehegan staging area of the Cooking Lake Blackfoot Provincial Recreation Area, east of Ardrossan Alberta. We document bat occupancy based on observstions of bat droppings and live bats, 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.

Four bat houses were installed on the communications tower adjacent to the FoB Heritage Interpretive Centre on July 31, 2018. Monitoring was limited in 2018 but extensive each year since. The report herein provides the data and experiences of this ongoing program in 2023.

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. Additional site visits specifically to check the bat houses for early bat activity are made through April. Similarly, bat occurrence in late September and early October was monitored.

A survey form (Appendix 1) is used to track site assessments and record: date, observer(s), bat evidence (Yes/No), evidence type (guano/droppings, # 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 at the base of the tower and the tower uprights and cross-pieces below the bat houses). Once droppings are counted and mapped, the entire site is swept clean each observation day.

As in previous years, depending on the observer and the weather conditions, a high intensity flashlight affixed to a slender 8' pole is 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 is used extensively and the number of bats present assessed in conjunction with the guano reports.

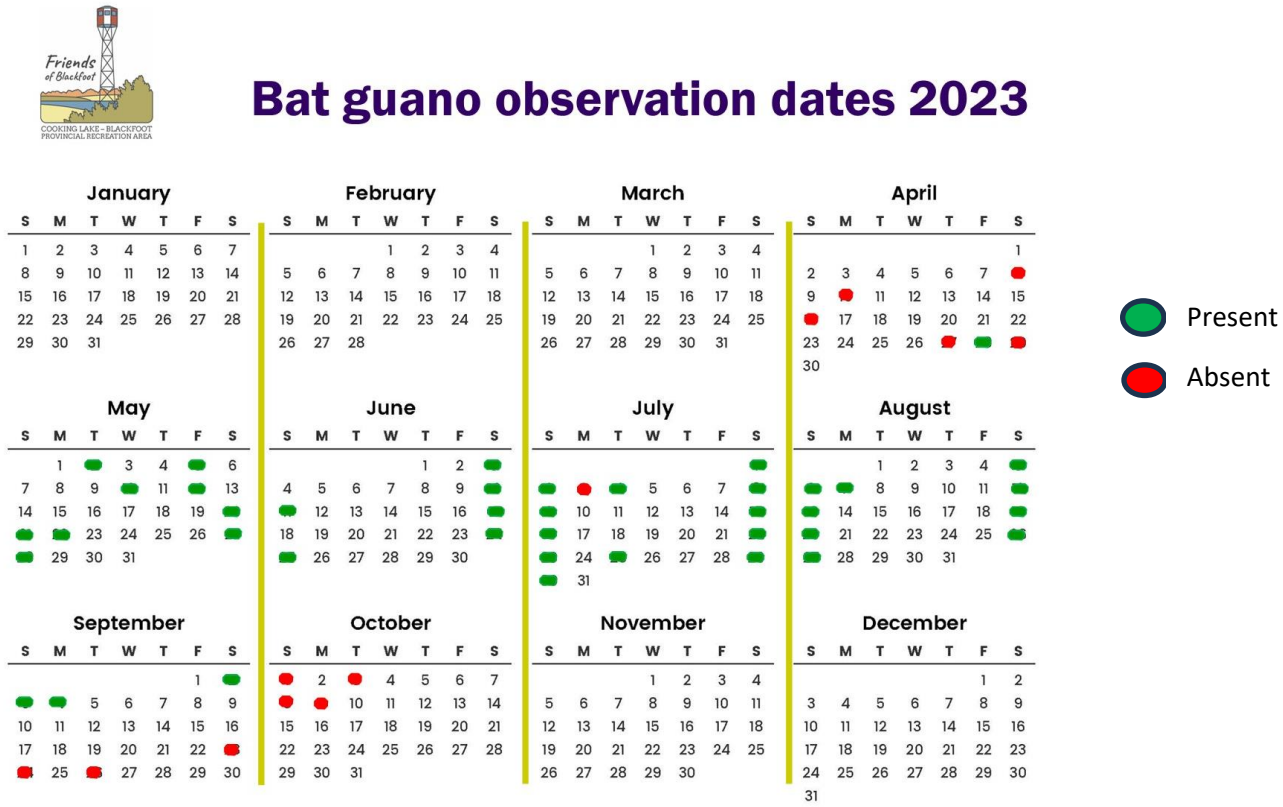
Observers also record general descriptions of weather conditions, such as temperature, wind speed, cloud cover, and precipitation. The closest weather station to the research site is Elk Island National Park (EINP). Standard daily measurements for temperature, precipitation, and wind at the EINP station for 2023 were downloaded from the Environment Canada web pages in May 2024.

Results

Observations in 2023 began on April 8 and continued at least weekly through to October 9, with a 2.5 wk gap in September (Figure 1). Evidence of bat presence (1 live bat, droppings) at the site was detected on April 28. Guano was consistently present for all observations between May 2 and September 4, inclusive; other than July 4. No droppings were present during repeated checks from September 23 to October 9. (Table 1, 2), after which observations were discontinued.

Seven 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, 2023.

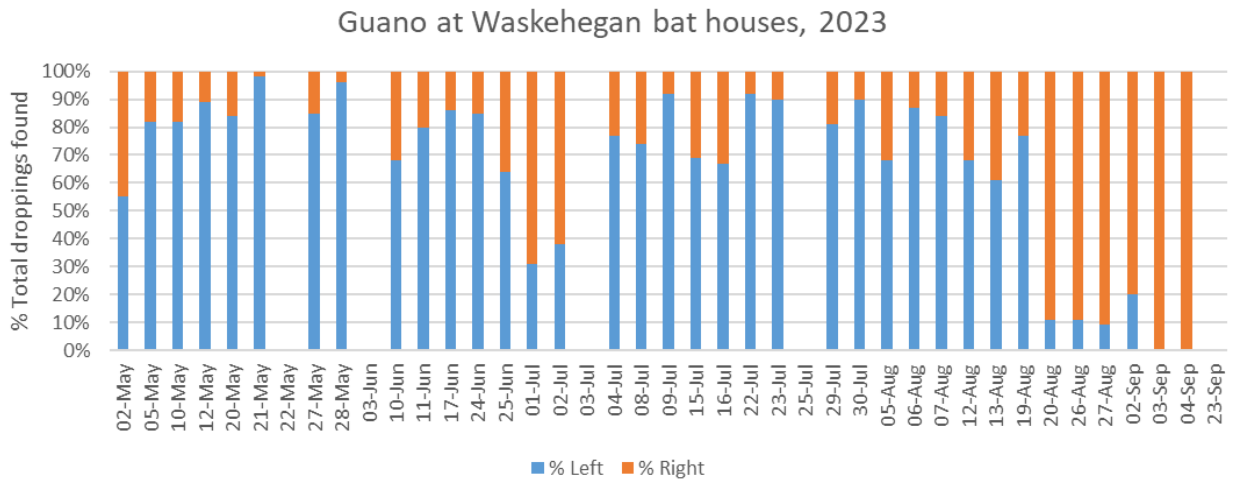


GUANO OBSERVATIONS

Presence or absence of bat guano below the houses was assessed at least one day each weekend, and generally both Saturday and Sunday, and Monday on long weekends. 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 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 examined on each occasion as the percentage of total droppings that occurred to the left or right of the vertical median line (Figure 2). On May 22 and June 3 observers recorded only the total number of droppings, so spatial distribution (left or right) could not be determined. On July 3 there were no droppings under either house and less than 10 droppings were present on Sept 2, 3, & 4 [sample size <10 can bias proportional data]. On (Tuesday) July 25, only live bats were counted, not guano.

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



Throughout the summer, 3280 droppings were documented, of which 3163 were classified as left or right. The great majority of droppings were on the left side (76% of total left/right count), under the multi-chambered house (Table 2). Of 36 observations, there were distinct differences in the proportion on left vs right, with droppings generally more likely to occur on the left (28 times of 36 observations, 78%), consistent with the larger total number of droppings. Higher proportions under the right house corresponded to relatively cold temperatures in early July and late August into September.

There was considerable variation in the total number of droppings at each observation, ranging from over 300 in some observations in May and August but interspersed with days of less than 50, particularly through much of June and July (Figure 3). Variable time intervals between observations may affect total counts and mask potential temporal patterns; however, the overall pattern in 2023 was similar to that seen in 2022.

Figure 3. Total droppings on observation days, 2023

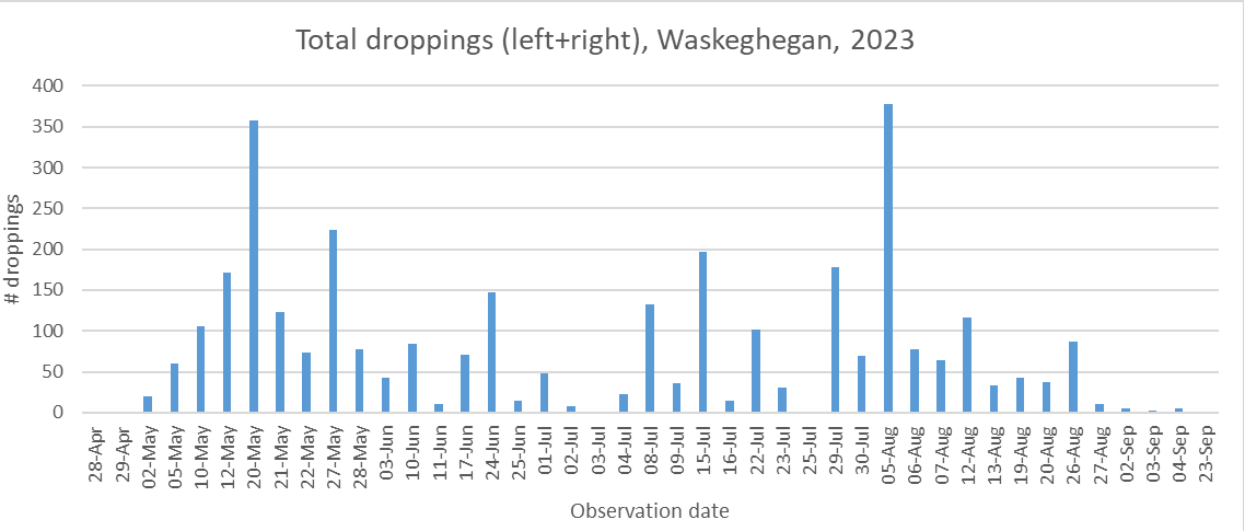
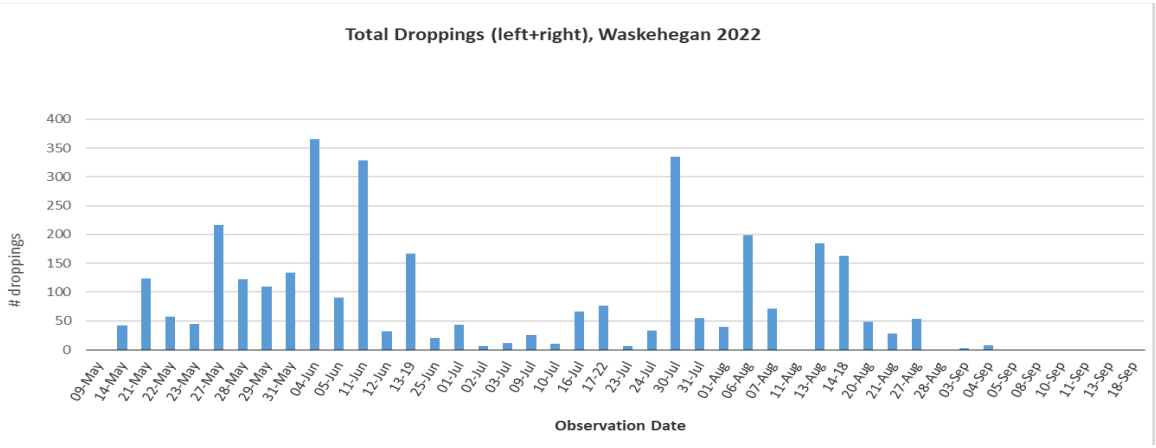
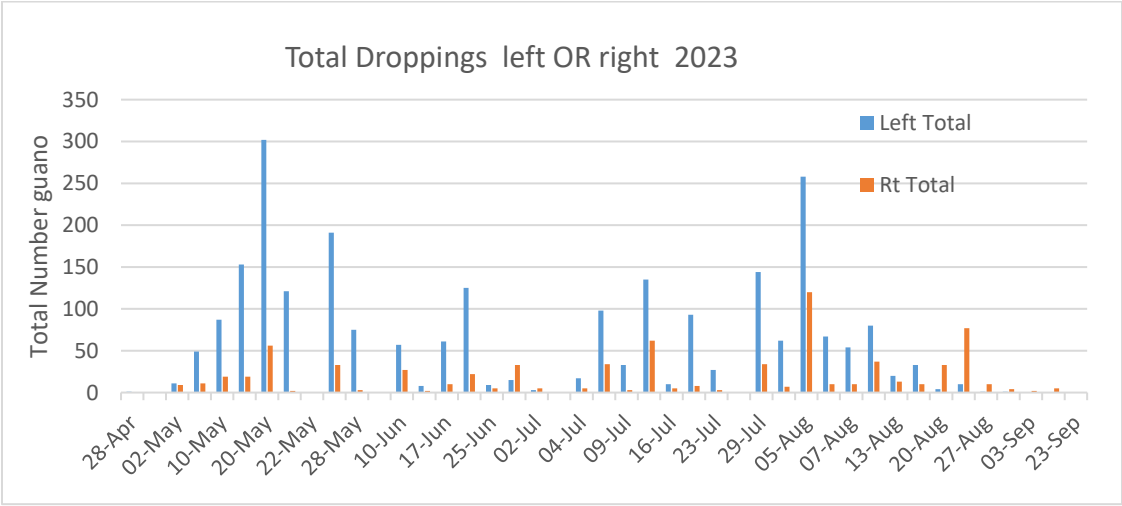


Figure 3b (for comparison). Total droppings on observation days, 2022



As seen in the proportional data (Figure 2), the total number of droppings was consistently higher under the left house than the right (Figure 4). Of the 3163 droppings classified as left or right, 2415 (76%) were under the left house and when present, the average number of droppings per observation was consistently higher on the left (2415 droppings on 33 occasions, mean 73 droppings/observation) than on the right (748 droppings on 36 occasions, mean 21 droppings/observation).

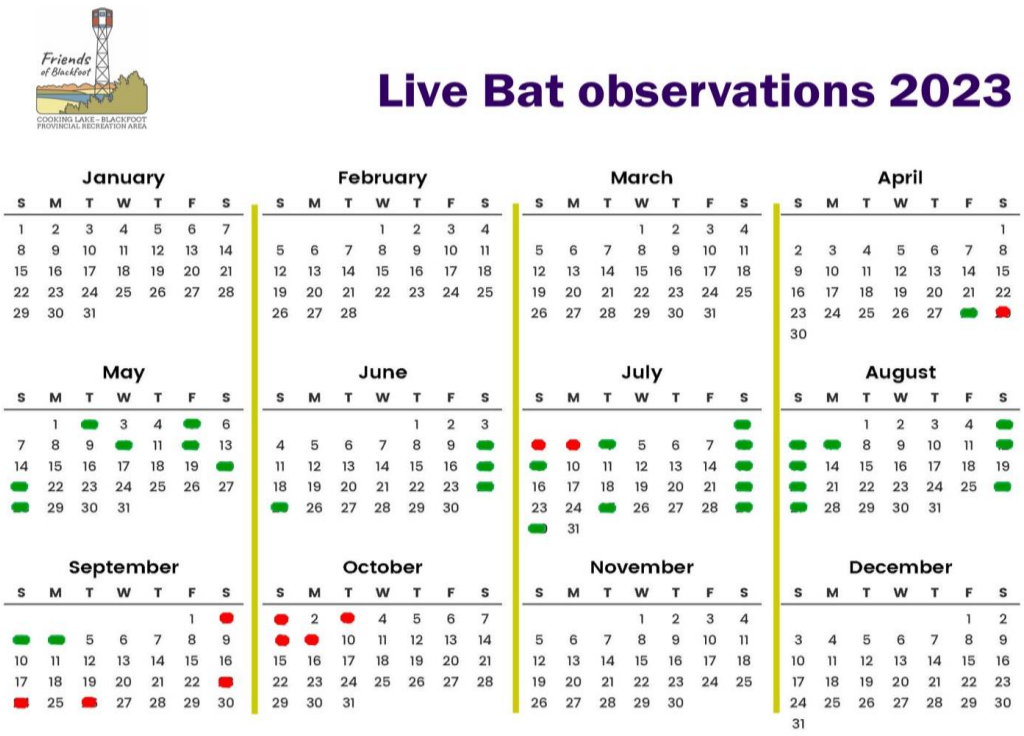
Figure 4. Total number of droppings under the left (multi) or right (single) bat house, 2023.



Live Bats

Following experience gained in previous years, checking for live bats with a pole light was consistent throughout the summer in 2023, although difficult for some observers to conduct. A single live bat was detected on April 28, but not April 29. Other than 2 occasions in early July and one in early September, live bats were present in one or both bat houses from early May to early September (Figure 5). No live bats were seen in any observation after September 4; however, no observations were made between Sep 4 and Sep 23.

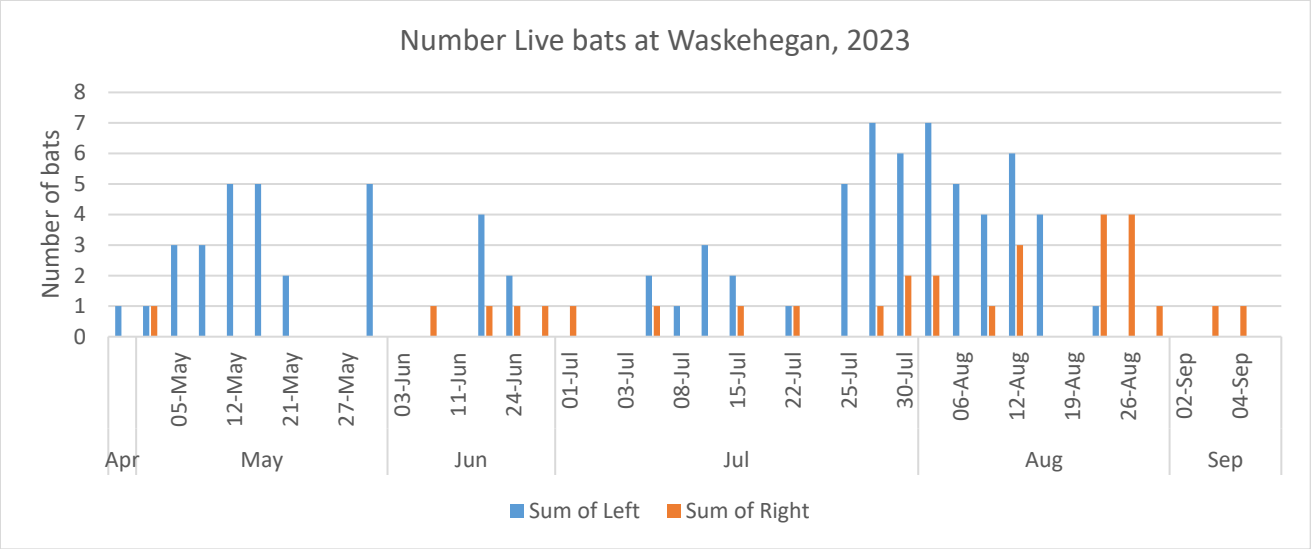
Figure 5. Live bat observation days at Waskehegan bat house site, 2023. [Red: no bats. Green: bats present.]



A total of 114 live bats was observed, with a higher proportion of bats on the left than the right (85 of 114, 75%) (Table 2). Similarly, live bats were temporally more likely to occur in the left house (24 of 31 observation days when bats were present, 77%). When bats were present (Figure 6), the mean number of bats per observation was markedly higher in the left house (85 bats during 24 observations, mean # 3.5 bats/observation, range 1-7 bats) than the right (29 bats during 19 observations, mean 1.7 bats/observation, range 1-4 bats).

Predominance of bats in the left house was particularly evident throughout the summer. On occasion in June and July bats were present only in the right house. And after August 20, most of the bats seen were in the right house. Few live bats were seen in either house after late August and none after early September.

Figure 6. Live bats present in large bat houses, 2023



On a monthly basis, ~25 bats were seen each month in the left house in May, July, and August, while the number of bats in the right house steadily increased each month (Figure 7). However, the cumulative number of bats seen is a direct reflection of the number of observations. On a per observation basis, the rate of occupancy was noticeably higher in August (4.7 bats/observation) than in other summer months (Table 3).

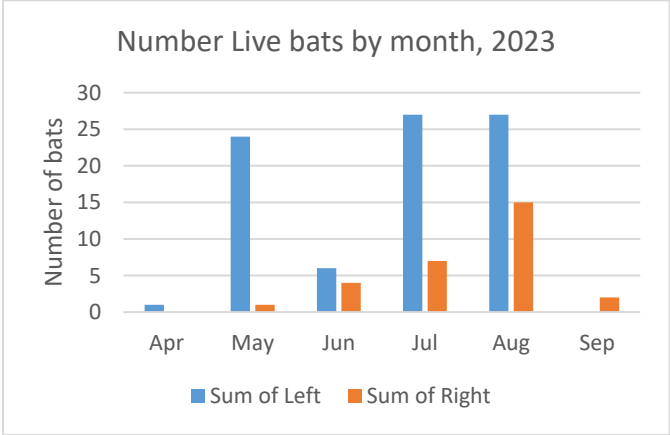
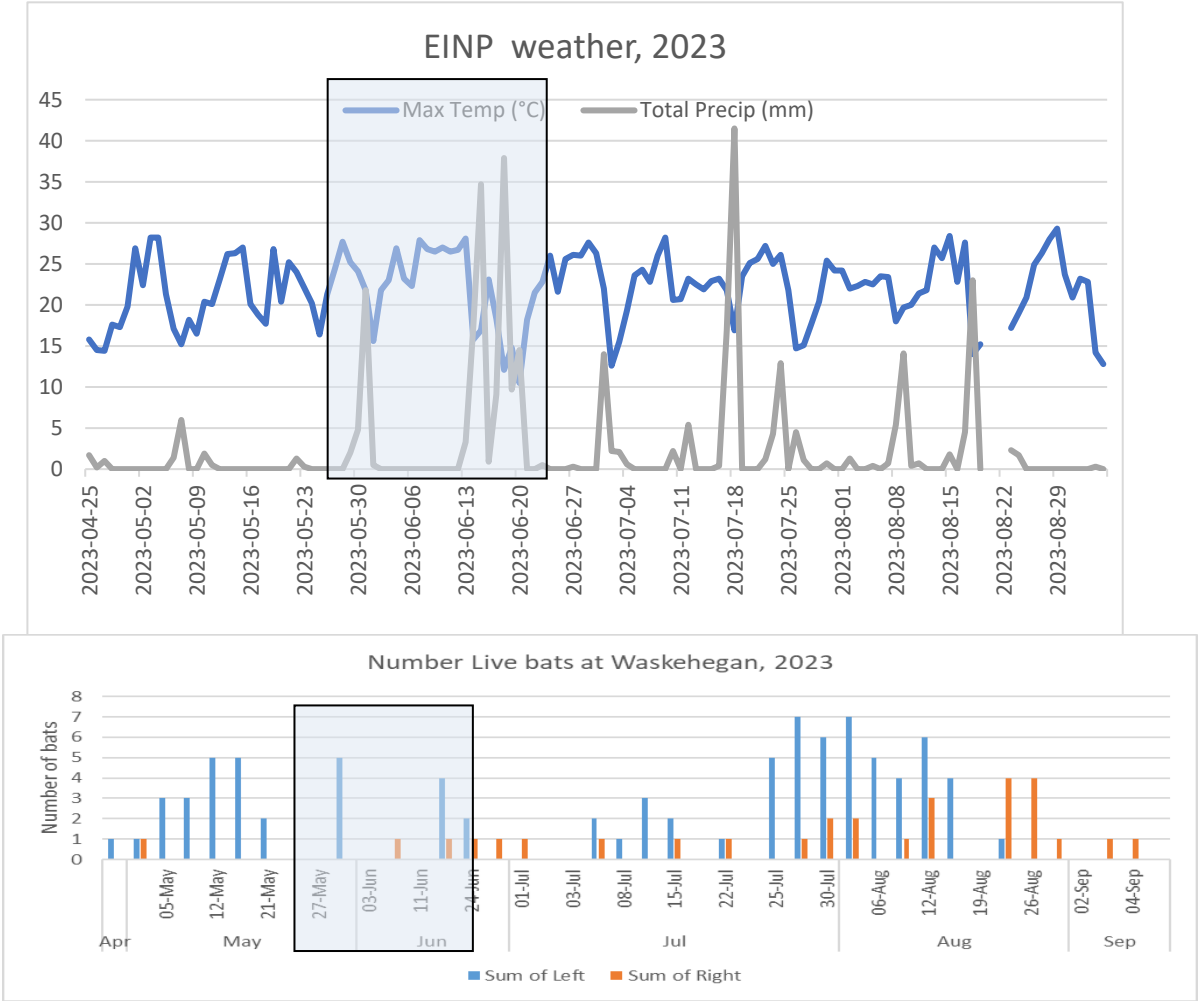


Figure 7. Monthly total live bats in left or right house, 2023

Temperatures – ambient

Ambient maximum daily temperatures from the Elk Island (EINP) weather station fluctuated generally between 15-28C but maximum daytime highs above 25C in early June were unusual [relative to previous years] (Figure 8). There was less bat activity at either bat house during this period. Conversely, both houses were used during a period of cold wet weather in mid June.

Figure 5. Daily ambient temperature and precipitation, Elk Island weather station, 2023



Outreach

Bat house tours as well as verbal and written outreach materials were provided to the public when visitors were on-site during FoB activities at the Heritage Centre. The ecological value of bats, promotion of bat houses, and discussions about white nose syndrome and its potential risk to bats, were highlighted. Interest and appreciation was expressed by many of the visitors. For additional information, visitors were directed to the Alberta Community Bat program https://www.albertabats.ca/.

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, all of which serve to increase the profile of bats and bat houses.

Presence/absence: With the bat houses in place since 2018, and based on previous experience, it is apparent that bats consistently use the lower large houses from May through August. Our data are consistent with general evidence that bats often return to summer roosts in central Alberta in late April-early May. However, the timing when bats discontinue using these houses is more variable year to year. And ranges from early September (2022) to late September (2019, 20, 21). Unfortunately, our data in 2023 missed the timing of bats leaving these summer roosts.

Multi-chambered vs single house use: The spatial distribution of droppings and live bats generally are consistent with previous patterns seen in bat activity throughout the summer. Activity peaks in mid May and late July, and holds throughout August. In most years activity is sporadic through June. Of particular note in 2023, relatively high temperatures in early June appeared to reduce bat activity at both houses. Reduced activity often coincides with periods of lower temperatures and higher precipitation, particularly in early June, et in mid June 2023, bats were present at both houses during a colds wet period. Extensive use of the multi-chambered house across 2019-2023 suggests this house may be less likely to overheat and/or it provides more space for the bats to 'social distance' as a means of reducing ambient or internal body temperatures during warmer periods. Data from 2023 are consistent with previous patterns indicating bats are more likely to use the single-chambered house in late season relatively cold periods after mid August. Further analyses at this time are confounded by highly variable weather conditions as occurred during the study to date (2019-2023), with an unusually wet summer (2020), near drought conditions (2021, 2022), and intense hot periods (2023). Unknown bat activity patterns between observation days and lack of individual bat identification also confound interpretation of activity patterns. Additional data may clarify broader patterns.

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. Seeing bats in the houses can be difficult without a consistent search image and experience in recognizing and differentiating individual bats. Observer bias or variation was reduced by having an experienced volunteer confirm many observations. 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.

It is readily apparent that the bat houses at Waskehegan are temporary day and night roosts rather than an ongoing established maternal colony. Although the number of bats seen on individual observations is increasing relative to previous years, with highs of 5 to 7 bats in May and again in July in 2023, there is no evidence of young of year pups. It is likely bats seen at these houses are wandering males. However, there is some consistency in location of bats within each house, suggesting that perhaps these may be the same males making repeated use of these day rooting sites. This could be better documented in coming years.

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*.

Recommendations *from 2023* ***:***

- continue standardized observations in coming years

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

- be more consistent in documenting location and spacing of bats within each house

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

- continue citizen science monitoring and education. This program is well received by volunteers and visitors alike.

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, on occasion, 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, Cathie and Herb Gale, Mary Martens, Chantal Pattenden, Ruth Shewfelt, Cliff Smith, Erla Stevenson.

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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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 2023

2023	Observer	Evidence	Guano	# bats in roost		Comments
		Y/N		L	R	
08-Apr	Margo	N				
10-Apr	Margo	N				
16-Apr	Margo	N				
27-Apr	Margo	N				
28-Apr	Margo	Y	1	1	0	Clear sunny breezy 17C @18:00
29-Apr	Margo	N				Clear sunny 18C@18:00
02-May	Margo	Y	20	1	1	Sun/cloud warm day 21C@1930
05-May	Margo	Y	60	3	0	Sun & strong breeze all day 21C@1930
10-May	Margo	Y	106	3	0	Rain showers Cool O'cast 16C@1930
12-May	Margo	Y	172	5	0	Clear sunny warm day 22c@1830
20-May	Margo/ Ruth	Y	358	5	0	Smoky calm 21C
21-May	Maria	Y	123	2	0	Not really smoky 18C@11 am
22-May	Erla	Y	74	-	-	Partly cloudy 20C@2pm
27-May	Ruth	Y	224	-	-	Part cloudy, calm 21C
28-May	Cliff/ Margo	Y	78	5	0	
03-Jun	Erla	Y	43	-	-	Partly cloudy 21C
10-Jun	Maria	Y	84	0	1	Sun on & off warm by end of day
11-Jun	Ruth	Y	10	-	-	Part sun Smoky 23C
17-Jun	Margo	Y	71	4	1	Sun/cloud Rain Wed-Thur 16C@1600
24-Jun	Ruth/ Margo	Y	147	2	1	Sunny 22C@1640
25-Jun	Margo	Y	14	0	1	Sun/cloud 21C@1640
01-Jul	Erla	Y	48	0	1	Sunny & 22C 'till 1pm. Thunder showers
02-Jul	Maria	Y	8	0	0	Cold V windy No sun smoke by 3pm 12C
03-Jul	Cathie	N				Cold wet windy Steady rain after noon 12C
04-Jul	Margo	Y	22	2	1	Sun'cloud 18C
08-Jul	Cliff	Y	132	1	0	Sunny & hot
09-Jul	Ruth/ Corey O	Y	36	3	0	Sunny & hot
15-Jul	Margo/ Maria	Y	197	2	1	Smoky sun/cloud
16-Jul	Ruth	Y	15	-	-	Smoky warm some breeze
22-Jul	Cliff	Y	101	1	1	
23-Jul	Erla	Y	30	-	-	Sunny 23C
25-Jul	Margo	Y	-	5	0	Cool breeze o'cast 18C @ 1830. Live only
29-Jul	Margo	Y	178	7	1	Sun/cloud 20C @ 1700
30-Jul	Ruth/ Margo	Y	69	6	2	Sunny 22C
05-Aug	Chantal	Y	378	7	2	Sunny lt breeze 21CAug 6
06-Aug	Maria	Y	77	5	0	Sun/cloud

07-Aug	Cathie	Y	64	4	1	Beautiful day mostly sunny occasional breeze
12-Aug	Ruth/ Margo	Y	117	6	3	Sun/cloud Brisk west wind
13-Aug	Cliff	Y	33	4	4	Hot sunny lt breeze
19-Aug	Ruth	Y	43	-	-	Cool mostly cloudy (24hr rain/wind yesterday)
20-Aug	Maria	Y	37	1	4	Sun/cloud not too hot
26-Aug	Ruth	Y	87	0	4	Clear warm lt breeze
27-Aug	Cliff/ Margo	Y	11	0	1	Sunny & hot 26C@1515
02-Sep	Cliff	Y	5	0	0	V brisk winds
03-Sep	Ruth	Y	2	0	1	Cool cloudy smoke lt rain 16C@1435
04-Sep	Cathie	Y	5	0	1	Breeze cloudy smoke 10C@1524
23-Sep	Maria	N	0	0	0	Sunny some cloud
24-Sep	Margo	N	0	0	0	Sunny 18C
26-Sep	Margo	N	0	0	0	Sunny 20C@1800
01-Oct	Margo	N	0	0	0	Sunny lt breeze 13C@1700 (cold damp all week)
03-Oct	Margo	N	0	0	0	Cool days & nights all week

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

2023			Live		Guano LEFT			Guano RIGHT					
date	primary L/R	Interval	Left	Right	Concrete	Rails	Left Total	Concrete	Rails	Rt Total	total	% Left	% Right
08-Apr*			0	0			0			0	0		
28-Apr	left	1	1	0	1	0	1	0	0	0	1		
29-Apr							-			-			
02-May	nr equal	3	1	1	11	0	11	9	0	9	20	55	45
05-May	left	3	3	0	48	1	49	10	1	11	60	82	18
10-May	left	5	3	0	80	7	87	19	0	19	106	82	18
12-May	left	2	5	0	132	21	153	18	1	19	172	89	11
20-May	left	8	5	0	232	70	302	51	5	56	358	84	16
21-May	left	1	2	0	116	5	121	1	1	2	123	98	2
22-May	-	1	-	-	-	-	-	-	-	-	74		
27-May	left	5	-	-	174	17	191	33	0	33	224	85	15
28-May	left	1	5	0	56	19	75	3	0	3	78	96	4
03-Jun	-	6	-	-	-	-	0	-	-	-	43		
10-Jun	left	7	0	1	47	10	57	22	5	27	84	68	32
11-Jun	left	1	-	-	6	2	8	2	0	2	10	80	20
17-Jun	left	6	4	1	50	11	61	9	1	10	71	86	14
24-Jun	left	7	2	1	92	33	125	15	7	22	147	85	15
25-Jun	nr equal	1	0	1	5	4	9	5	0	5	14	64	36
01-Jul	right	7	0	1	15	0	15	31	2	33	48	31	69
02-Jul	nr equal	1	0	0	2	1	3	2	3	5	8	38	62
03-Jul	none	1	0	0	0	0	0	0	0	0	0		
04-Jul	left	2	2	1	17	0	17	5	0	5	22	77	23
08-Jul	left	4	1	0	79	19	98	33	1	34	132	74	26
09-Jul	left	1	3	0	21	12	33	3	0	3	36	92	8
15-Jul	left	6	2	1	114	21	135	54	8	62	197	69	31
16-Jul	left	1	-	-	9	1	10	4	1	5	15	67	33
22-Jul	left	6	1	1	85	8	93	7	1	8	101	92	8
23-Jul	left	1	-	-	24	3	27	3	0	3	30	90	10
25-Jul	-	2	5	0	-	-	-	-	-	-			
29-Jul	left	6	7	1	135	9	144	33	1	34	178	81	19
30-Jul	left	1	6	2	58	4	62	6	1	7	69	90	10
05-Aug	left	6	7	2	208	50	258	117	3	120	378	68	32
06-Aug	left	1	5	0	48	19	67	9	1	10	77	87	13
07-Aug	left	1	4	1	51	3	54	10	0	10	64	84	16
12-Aug	left	5	6	3	67	13	80	33	4	37	117	68	32

13-Aug	nr equal	4	4		12	8	20	13	0	13	33	61	39
19-Aug	left	6	-	-	33	0	33	10	0	10	43	77	23
20-Aug	right	1	1	4	3	1	4	33	0	33	37	11	89
26-Aug	right	**5**	**0**	**4**	**8**	2	10	69	8	77	87	11	89
27-Aug	right	1	0	1	1	0	1	4	6	10	11	9	91
02-Sep	right	6	0	0	0	1	1	4	0	4	5	20	80
03-Sep	right	1	0	1	0	0	0	2	0	2	2	0	100
04-Sep	right	1	0	1	0	0	0	4	1	5	5	0	100
23-Sep	none	21	0	0	0	0	0	0	0	0	0		
TOTALS			85	29			2415			748	3163	L/R total	

* Also April 10, 16, 27

Table 3. Monthly total live bat observations, 2023

	Left	**Right**	**# observations**	**#/observation**	**TOTAL**
May	24	1	9	2.8	25
June	6	4	6	1.7	10
July	27	7	13	2.6	34
August	27	15	9	4.7	42
September	0	2	4	0.5	2
Total	85	29	41	2.8	114

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

2023		**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***