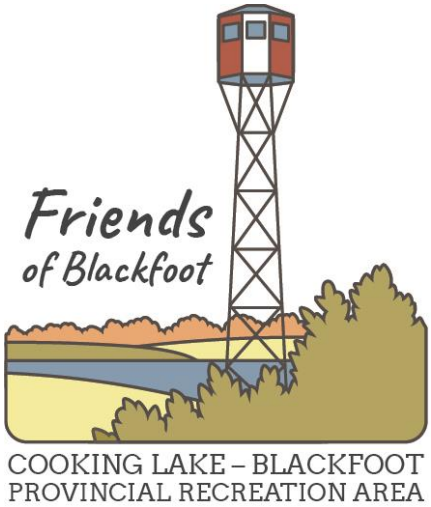
# Friends of Blackfoot Bat House Project

## *2020 Year-end Report*

***April 2021***

**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 is to install and monitor 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 in 2019 and 2020. The report herein provides the data and experiences of this ongoing program in 2020.

## *Methods*

Observations and data records were standardized. Records were created the same day observations were made. FoB volunteers assessed the research site whenever they were working at the information centre. Generally FoB members were on site at the centre each weekend between the long weekends in May and September. Additional site visits specifically to check the bat houses were made through May as well as September until there were three consecutive visits with no evidence of bat activity. In addition, Cory Olson (AB Community Bat Program) reported occasional site visits to look for bats roosting in any of the bat houses.

A survey form (Appendix 1) was used to track site assessments and record: date, observer(s), bat evidence (Yes/No), evidence type (guano, # flying, # in roost) and general comments. In addition, occurrence of guano was documented and mapped on a standardized image of the research site (Appendix 2). The image was partitioned by a vertical midline that delineated 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 were 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 were completed each observation day. On a few occasions dry bat droppings were collected in paper envelopes for DNA evaluation.

Observers were also asked to record general descriptions of weather conditions, such as temperature, wind speed, cloud cover, and precipitation . in addition, Ambient temperatures were recorded using

thermo-recorders inside each of the four houses. Large houses were monitored April to September. The multi-chamber house had one button inside on the north and one outside on the south. Small houses were monitored with one recorder inside each house from June to July. Each button recorded temperature every 30 minutes.

The closest weather station to the research site is Elk Island National Park (EINP). Standard daily measurements for temperature, precipitation, and wind at EINP for 2020 were downloaded from the Environment Canada web pages.

## *Results*

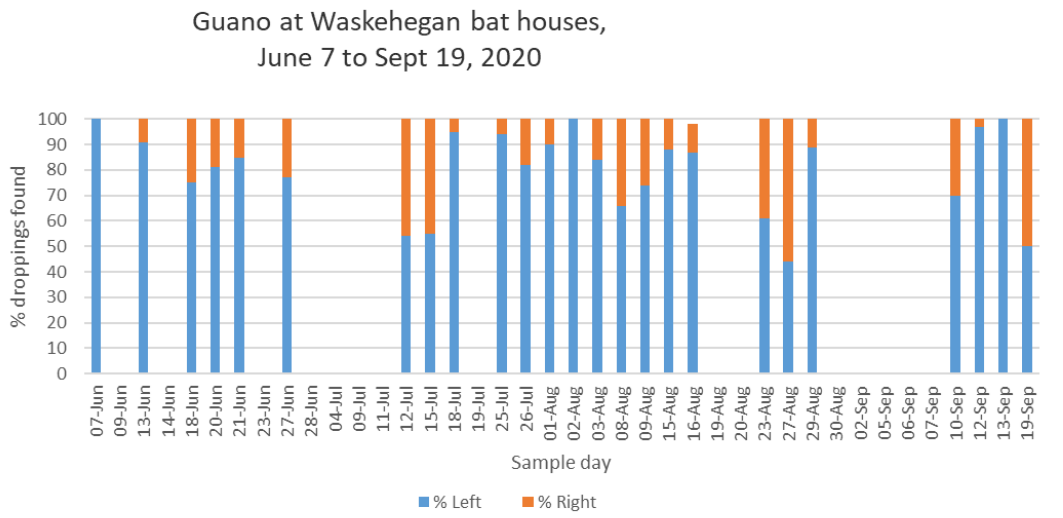
Observations began on April 26 2020 and continued through to October 4 (Figure 1). Evidence of bat presence at the site was detected in the first week of June – initially a single bat seen on June 5 in the large multi-chambered house (LEFT) and droppings observed on June 7 under the left house (Table 1). Bat activity was detected on every observation date through to September 19, except two days in early September (Table 2). There was no evidence of activity in late September. Observations were discontinued after October 4. Nine 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. Bat observations at Waskehegan bat house site, 2020.

The interval between observations generally was a week, but involved consecutive one or two days on multiple occasions, and in six 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 for a day that had more than one 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 on the lower tower uprights and crosspieces below the houses. All were included in the total for that observation. 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).

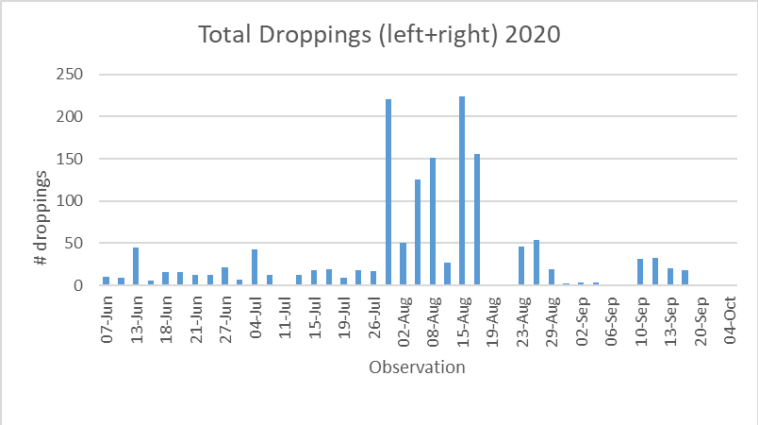
In 2020 the proportion of droppings found on the left (below the multi-chambered bat house) or the right (below the single-chambered bat house) was determined as the percentage of total droppings on each occasion found to the left or right of the vertical median line (Figure 2). Daily counts of less than 10 droppings were not included in the proportional data. However, they too tended to occur more on the left, except in early Sepetmber. In a few cases, observers did not map the droppings so spatial distribution (left or right) could not be determined.

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




Throughout the summer, most droppings in 2020 were on the left side, under the multi-chambered house. Of 25 observations with proportion data, only four (16%) approached even distribution on the left and right. At no time did the proportional data show higher percentage on the right, under the single-chambered house in 2020. The great majority of the droppings were present during late July through to late August. At this time, we do not have sufficient information to know whether the observations relate to single or multiple bats in the houses at any one time. Direct observations made intermittently indicate single bats present other than on Aug 16 when a total of 11 bats (10 on left, 1 on right) were present in the large houses. This observation, combined with the relatively high number of droppings, suggest multiple bats used the bat houses in August but perhaps not in June, July, or September.

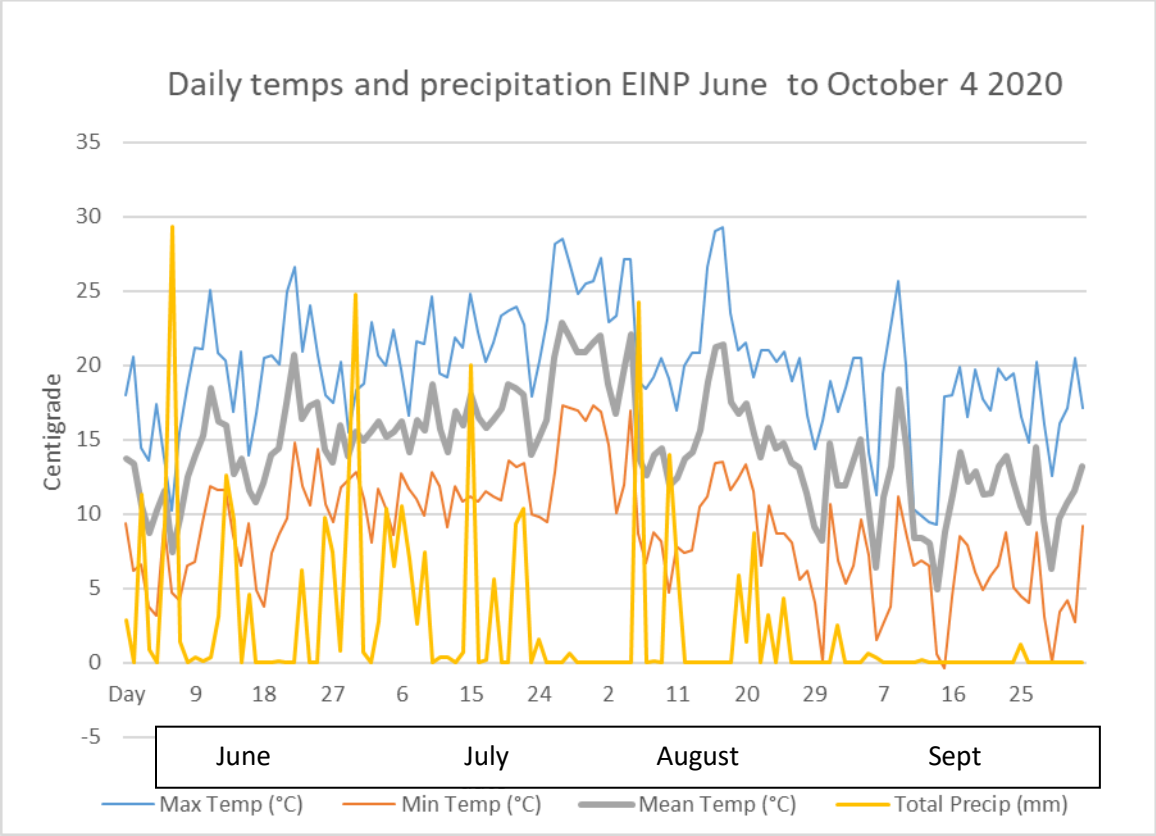
Figure 3. Total droppings throughout the summer, 2020




Temperatures – Ambient

In 2020 fewer bat droppins in late Aug and again in early and mid September coincided with days of mean ambient daily temperatures below 10C (Figure 4). Total precipitation June 1 to October 4 in 2020 was 316.6 mm.

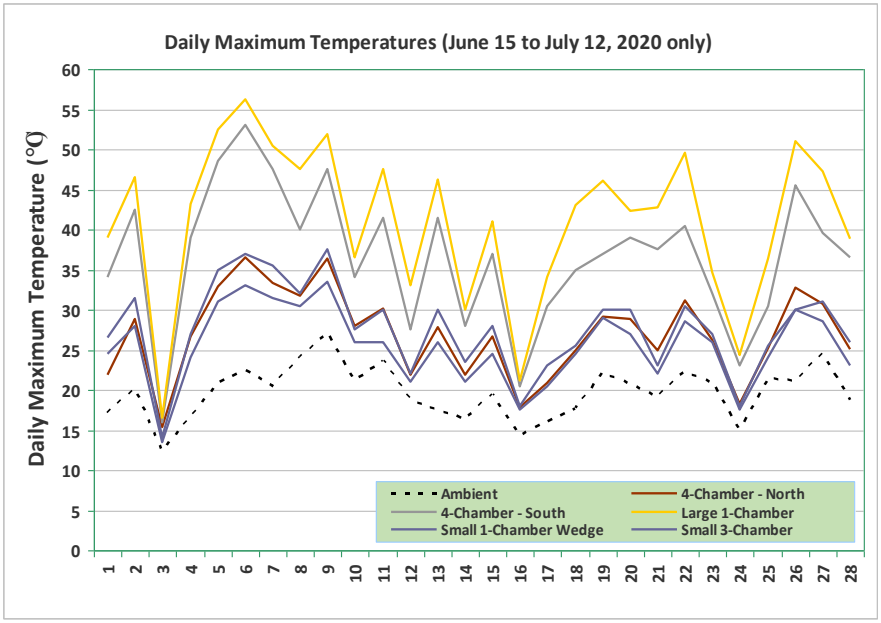
Figure 4. Daily ambient temperature and precipitation



Temperatures – within bat houses

Temperatures within the two large bat houses were considerably higher than ambient air temperature, as expected. Actual readings exceed potential lethal temperatures for bats in some situations, assuming that the bats stay deep within the bat house. More information is needed before conclusions can be drawn.

Figure 5. Bat box temps at Waskehegan from mid June to mid July 2020




These data, and those in the future, will be expanded to assess changes in maximum and minimum temperatures within the large vs small houses and in multi vs single chamber large houses. We can also assess these temperatures relative to ambient temperatures in multiple years. Additional years will also support more detailed assessment of bat house use, expressed as total number of droppings, relative to ambient temperatures and house temperatures.

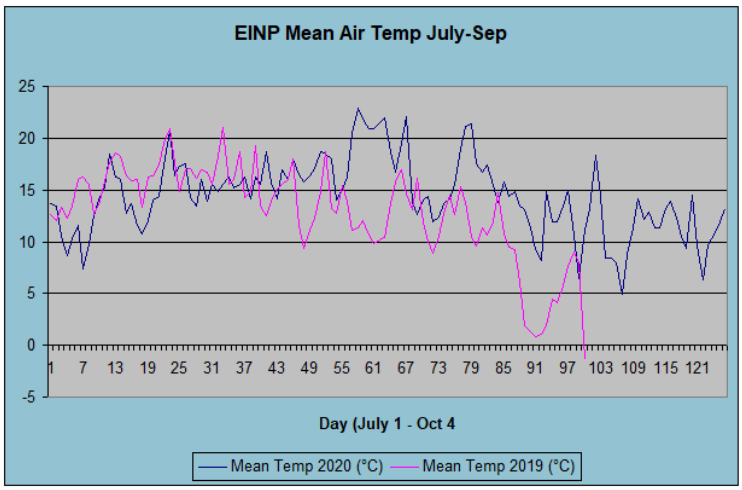
In 2020 two remote activated wildlife cameras on loan from Alberta Parks were set up on trees adjacent to the study site. The goal was to try to capture images of bats coming into or out of the bat houses. Unfortunately logistical problems resulted in no images of bats on the cameras. We will rethink the approach and try something different in 2021.

A specific bat interpretive program was not delivered in 2020 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 2019, and based on previous experience, routine observations began earlier in 2020 than in 2019. No evidence of bat activity was seen in May, despite general knowledge that migrating bats return to central Alberta in late April and May. However, once bats were present in early June, they are consistently present at the site through to mid September. This is similar to the late summer departure/absence recorded in 2019 (last bat occurrence in 2019 was Sep 21).

The spatial distribution of droppings in 2020 differed considerably from that in 2019. While we need more data over multiple years, it is tempting to suggest that the multi-chambered house gets higher use during colder periods (July and September in 2019, throughout the relatively cool wet summer in 2020) and the single-chambered house may get more use in warmer periods. However, this remains speculative until we have future data.




While it is tempting to make more in-depth comparison between years, we only have one and a half summers worth of data and additional or detailed comparisons still seem premature.

In contrast we can make some conclusions regarding the effects of the size of the houses. When assessed, there was no evidence of bats using either of the small bat houses, use even when large houses were in considerable active use. As anticipated, it seems apparent that there is little, if any, use of the two small houses and they can be largely ignored as unsuitable for bats.

This project continues to provide unexpected value. As a direct result of the monitoring activity at the bat house study site in September 2020, a significant plains garter snake (*Thamnophis radix*) hibernaculum was identified, documented, and reported to Alberta Parks and Fish & Wildlife for inclusion in their respective wildlife databases. This is yet another example of serendipity and added value when one citizen science project informs or initiates yet another. Activity at the snake hibernaculum will be monitored in spring and fall 2021 to try to document garter snakes leaving and returning to the dens at the Waskehegan staging area. In addition, garter snake information will be provided at the FoB Heritage Centre.

## *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 two consecutive occasions

- set up a remote motion-activated trail camera to try to document actual bat activity at the houses

- collect guano [this is put on hold for now. We are still awaiting results from samples collected in 2019]

- 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, Cliff Smith, Erla Stevenson, and Gerry Thorpe. And Greg Elzinga with AB Parks.

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.

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 2020.

| **2020** | | **Evidence ?** | **Evidence Type - if bats seen, provide # bats** | | | |
|---|---|---|---|---|---|---|
| ***Date checked*** | ***Observer(s)*** | **Y/N** | ***Guano*** | ***# flying*** | ***# in roost*** | ***Comments– include time of day, sky conditions, wind*** |
| April 26 | Margo | N | | | | Warm & dry 8 pm |
| May 3 | Margo | N | | | | Warm & dry mid-afternoon |
| May 10 | Margo | N | | | | Swept debris |
| May 13 | Greg Elzinga | N | | | | swept |
| May 14 | Ruth & Jim | N | | | | swept |
| May 16 | Margo | N | | | | swept |
| May 19 | Margo | N | | | | swept |
| May 24 | Margo | N | | | | swept |
| May 25 | Cory Olson | N | | | N | |
| May 27 | Margo | N | | | | swept |
| May 29 | Cory | N | | | N | |
| May 31 | Margo | N | | | | swept |
| June 3 | Greg | N | | | | swept |
| June 5 | Cory | Y | | | 1 | 1 bat on left (lge multi-house) |
| June 7 | Margo | Y | Y | | | n=10 Swept cold rain |
| June 9 | Greg | Y | Y | | | 7-10 swept |
| June 13 | Ruth | Y | Y | | | 45+ swept |
| June 14 | Ruth | Y | Y | | | None @ noon, 6 at 5pm |
| June 18 | Margo & Ruth | Y | Y | | | 16 swept lots of grass clippings |
| June 20 | Maria | Y | Y | | | 11 + 5 = 16 |
| June 21 | Ruth | Y | Y | | | 13 swept |
| June 23 | Greg | Y | Y | | | 11-14 swept |
| June 27 | Cory | Y | | | 1 | 1 bat on left (lge multi). All others empty |
| June 27 | Ruth | Y | Y | | | 22 swept wet day |
| June 28 | Maria | Y | Y | | | 7 swept away. Few rain drops |
| July 4 | Cliff | Y | Y | | | 43 swept |
| July 9 | Greg | Y | Y | | | 12-14 swept |

| | | | | | | |
|---|---|---|---|---|---|---|
| July 11 | Erla | 10 | Y | | | Present but not counted swept |
| July 12 | Ruth | Y | Y | | | 13 on both sides swept |
| July 15 | Ruth | Y | Y | | | 18—on both sides swept |
| July 18 | Margo | Y | Y | | | Rain & storms during week. Not today. Fresh droppings under left house. SWEPT |
| July 19 | Maria | Y | Y | | | Some droppings, counted, swept |
| July 24 | Cory | Y | | | 1 | 1 bat on left (lge multi) All others empty |
| July 25 | Ruth | Y | Y | | | Rain & storms during wk. most on left side. swept |
| July 26 | Margo | Y | Y | | | Clear sunny day. Most on left. Swept |
| July 27 | Cory | N | | | | All houses checked, no bats present |
| Aug 1 | Ruth | Y | Y | | | LOTS of droppings. Warm windy sunny Swept |
| Aug 2 | Cliff | Y | Y | | | Many droppings (+40) All on left. swept |
| Aug 3 | Cathie & Herb | Y | Y | | | Many on left. Swept at noon, Fresh droppings @ 3:30 |
| Aug 8 | Maria | Y | Y | | | Lots of guano. 2 checks. All swept |
| Aug 9 | Margo | Y | Y | | | Most on left, some high on struts. Strong wind, sunny. swept |
| Aug 10 | Ruth | Y | Y | | | 224 ! (90 on struts). Most on left. swept |
| Aug 16 | Margo | Y | Y | | | Left 135, rt 21. washed and swept slab & struts |
| Aug 16 | Cory | Y | | | 11 | 10 lge left, 1 lge rt. Sm houses empty |
| Aug 19 | Greg | Y | Y | | | 64-67 swept |
| Aug 20 | Ruth | Y | Y | | | Swept. Nocount—slab covered in grass clippings |
| Aug 23 | Ruth | Y | Y | | | 18 rt, 28 left. swept |
| Aug 27 | Ruth | Y | Y | | | 30 rt, 24 left. swept |
| Aug 29 | Maria | Y | Y | | | 2x. All left a.m. 17. swept. All rt p.m. 2. Swept |
| Aug 30 | Maria | Y | Y | | | 2x. 11:30– 2. swept. 4:30—0. swept |
| Sept 2 | Ruth | Y | Y | | | 4 all on rt swept |
| Sept 2 | Cory | Y | | | 1 | 1 lge rt. All others empty |
| Sept 5 | Maria | Y | Y | | | 3 all on rt, swept |
| Sept 6 | Ruth | N | N | | | None seen |

| | | | | | | |
|---|---|---|---|---|---|---|
| Sept 7 | Cathie | N | N | | | None seen |
| Sept 10 | Greg | Y | Y | | | 30-33 Swept |
| Sept 12 | Ruth | Y | Y | | | 33 most on lft. Cool weather. swept |
| Sept 13 | Erla | Y | Y | | | (4 did NOT sweep) |
| Sept 13 | Margo | Y | Y | | | 18 All on left. Swept |
| Sept 19 | Maria | Y | Y | | | 11:45-18. swept 4:45—none |
| Sept 20 | Margo | N | N | | | Clear warm day. No guano |
| Sept 27 | Margo | N | N | | | Sun/cloud. ~10C. Strong breeze. No guano |
| Oct 4 | Margo Maddie Brody | N | N | | | Overcast 14C No guano |

Table 2. Location of droppings below the bat houses.

| 2020 | | | | LEFT | | | RIGHT | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Interval | Swept? | Concrete | Rails | Left Total | Concrete | Rails | Right Total | Combined total | % Left (multi) | % Right (single) |
| 7-Jun | all on left | neg on June3 | Y | 10 | | 10 | | | 0 | 10 | 100 | 0 |
| 9-Jun | no map | 2 days | Y | | | | | | | 9 | | |
| 13-Jun | lots, mainly on left, some on struts | 6 days | Y | 34 | 7 | 41 | 3 | 1 | 4 | 45 | 91 | 9 |
| 14-Jun | most on left | 1 day | Y | 5 | 0 | 5 | 1 | 0 | 1 | 6 | | |
| 18-Jun | most on left | 4 days | Y | 10 | 2 | 12 | 3 | 1 | 4 | 16 | 75 | 25 |
| 20-Jun | most on left | 2 days | Y | 10 | 3 | 13 | 3 | 0 | 3 | 16 | 81 | 19 |
| 21-Jun | most on left | 1 day | Y | 11 | 0 | 11 | 2 | 0 | 2 | 13 | 85 | 15 |
| 23-Jun | no map | 2 days | Y | | | | | | | 12 | | |
| 27-Jun | most on left | 6 days | Y | 15 | 2 | 17 | 5 | 0 | 5 | 22 | 77 | 23 |
| 28-Jun | more on left | 1 day | Y | 4 | 1 | 5 | 1 | 1 | 2 | 7 | | |
| 4-Jul | no map | 6 days | Y | | | | | | | 43 | | |
| 9-Jul | no map | 5 days | Y | | | | | | | 13 | | |
| 11-Jul | swept, no count | | Y | | | | | | | | | |
| 12-Jul | even sides | 1 day | Y | 4 | 3 | 7 | 6 | 0 | 6 | 13 | 54 | 46 |
| 15-Jul | even sides | 6 days | Y | 7 | 3 | 10 | 7 | 1 | 8 | 18 | 55 | 45 |
| 18-Jul | all left | 3 days | Y | 15 | 3 | 18 | 0 | 1 | 1 | 19 | 95 | 5 |
| 19-Jul | most on left | 1 day | Y | 3 | 4 | 7 | 1 | 0 | 2 | 9 | | |
| 25-Jul | left | 6 days | Y | 17 | 0 | 17 | 1 | 0 | 1 | 18 | 94 | 6 |
| 26-Jul | left | 1 day | Y | 7 | 7 | 14 | 3 | 0 | 3 | 17 | 82 | 18 |
| 1-Aug | most on left | 6 days | Y | 157 | 42 | 199 | 18 | 4 | 22 | 221 | 90 | 10 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2-Aug | left | 1 day | Y | 40 | 10 | 50 | | | 0 | 50 | 100 | |
| 3-Aug | most on left | 1 day | Y | 83 | 22 | 105 | 16 | 4 | 20 | 125 | 84 | 16 |
| 8-Aug | most on left | 5 days | Y | 84 | 15 | 99 | 51 | 1 | 52 | 151 | 66 | 34 |
| 9-Aug | most left | 1 day | Y | 11 | 9 | 20 | 4 | 3 | 7 | 27 | 74 | 26 |
| 15-Aug | most left | 6 days | Y | 111 | 87 | 198 | 17 | 9 | 26 | 224 | 88 | 12 |
| 16-Aug | most left | 1 day | Y | 114 | 21 | 135 | 20 | 1 | 21 | 156 | 87 | 11 |
| 19-Aug | no map | 3 days | Y | | | | | | | 0 | | |
| 20-Aug | no count | 1 day | Y | | | | | | | 0 | | |
| 23-Aug | most left | 3 days | Y | 17 | 11 | 28 | 10 | 8 | 18 | 46 | 61 | 39 |
| 27-Aug | most right | 4 days | Y | 19 | 5 | 24 | 25 | 5 | 30 | 54 | 44 | 56 |
| 29-Aug | most left | 2 days | Y | 5 | 12 | 17 | 2 | 0 | 2 | 19 | 89 | 11 |
| 30-Aug | even sides | 1 day | Y | 0 | 1 | 1 | 1 | 0 | 1 | 2 | | |
| 2-Sep | all right | 3 days | Y | 0 | 0 | 0 | 4 | 0 | 4 | 4 | | |
| 5-Sep | all right | 3 days | Y | 0 | 0 | 0 | 3 | 0 | 3 | 3 | | |
| 6-Sep | none | 1 day | N | | | | | | | 0 | | |
| 7-Sep | none | 1 day | N | | | | | | | 0 | | |
| 10-Sep | most left | 3 days | Y | 24 | 0 | 24 | 8 | 0 | 8 | 32 | 70 | 30 |
| 12-Sep | left | 2 days | Y | 24 | 8 | 32 | 1 | 0 | 1 | 33 | 97 | 3 |
| 13-Sep | all left | 1 day | Y | 18 | 2 | 20 | 0 | 0 | 0 | 20 | 100 | 0 |
| 19-Sep | even sides | 6 days | Y | 8 | 1 | 9 | 8 | 1 | 9 | 18 | 50 | 50 |
| 20-Sep | none | 1 day | N | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 27-Sep | none | 7 days | N | | | | | | | | | |
| 4-Oct | none | 7 days | N | | | | | | | | | |

## Appendix 1. Friends of Blackfoot BAT ROOST SURVEY FORM

*Bat houses installed July 2018. Monitoring began May 2019.*

| | | Evidence ? | Evidence Type - if bats seen, provide # bats | | |
|---|---|---|---|---|---|
| ***Date checked*** | ***Observer(s)*** | **Y/N** | ***Guano*** | ***# flying*** | ***Comments– describe observation*** |
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**Appendix 2. Guano location Record**

| Date | ***Comments:***<br><br>***Describe locations & approx. # of droppings***<br><br>***Please pay particular attention to whether droppings occur on the left or right of centre line drawn on picture***<br><br>***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***