

Maternity Roost Selection by Northern Long-eared Bat (*Myotis septentrionalis*) On the Black Hills National Forest, Wyoming

Final Report

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Introduction

Bats are an important component of biodiversity and ecosystems worldwide. Many ecosystem processes are facilitated by bats including pollination and seed-dispersal (Adams 2003, Kunz and Parsons 2009). Bats consume a considerable biomass of invertebrates, some of which are agricultural pests and vectors of disease that affect human health (Kunz and Parsons 2009). In North America alone, bats prevent billions of dollars in damage to crops on an annual basis (Boyles et al. 2011). Globally, many bat species have experienced large declines and are faced with increasing risks of extinction. In the United States alone, six bat species are currently listed as “Endangered” and one is listed as “Threatened” under the Endangered Species Act (ESA), while two others are under consideration for ESA protections (Harvey et al. 2011, Kunz and Reichard 2011, United States Fish and Wildlife Service 2011, 2013, Center for Biological Diversity and Defenders of Wildlife 2016). Bat population declines across the globe have many causes including habitat loss and alteration, disease, and renewable energy development.

A number of ecoregions intersect in the vicinity of the Black Hills and Bearlodge Mountains of northeastern Wyoming and western South Dakota, resulting in an area of high biological diversity. Plant and animal species typical of the Rocky Mountains, Great Basin, eastern deciduous forest, boreal forest, and southern Great Plains bioregions are found across this region (Knight et al. 2014). The landscape is heterogeneous in topography, geology, and vegetation structure and composition. Much of the region is dominated by ponderosa pine (*Pinus ponderosa*) forest and mixed grass prairie (Knight et al. 2014). Bur oak (*Quercus macrocarpa*) are interspersed with ponderosa pine in forested areas and dominate low-lying areas and portions of some flood plains (Knight et al. 2014). Large plains cottonwood (*Populus deltoides*) are found along ephemeral and permanent streams. This biological diversity coupled with diverse habitat types and landscape features allows for uniquely diverse bat species assemblages.

While at least 11 bat species are known to occur in the region, we focused specifically on Northern Long-eared Bat (*Myotis septentionalis*; hereafter NLEB). The species is a small vespertilionid bat, medium in size among bats in the genus *Myotis*. Dorsally, the pelage is dull yellow-brown and ventral pelage is pale gray. Wing and tail membranes are translucent and light brown (Bogan et al. 2005). The calcar often, but not always, has a slight keel. The ears are relatively long (16-19 mm; generally ~16mm in Wyoming) and have a distinct long, pointed tragus (Caceres and Barclay 2000). NLEB is widely distributed across central and eastern Canada and the Midwestern and eastern United States. It is generally considered an eastern species and is thought to be quite rare in the western portions of its distribution. Wyoming marks the extreme western edge of the species range and the species has only been documented in the northeastern corner of the state in the vicinity of the Bear Lodge Mountains and Black Hills.

NLEB was petitioned for listing under the Endangered Species Act in 2010. The primary factor threatening the species listed in the petition was the impact of White-Nose Syndrome (WNS) to the species throughout a large portion of its range in eastern North America. In 2011, the United States Fish and Wildlife Service (USFWS) issued a positive 90-day finding indicating substantial evidence was presented within the 2010 petition. A 12-month status review was initiated in 2011 (United States Fish and Wildlife Service 2011). In 2013, USFWS published the results of this status review and proposed the species be listed as endangered under the ESA (United States Fish and Wildlife Service 2013). In April of 2015, USFWS determined the species warranted

threatened species status. The threatened status indicates that the species is in imminent danger of becoming endangered to the threat of extinction throughout a significant portion or its entire range. The USFWS also implemented a 4(d) rule for areas where WNS does not currently affect the species, this included all areas where the species occurs in Wyoming prior to the spring of 2018. The 4(d) rule exempts lawful incidental take of the species in these areas and is intended to provide flexibility for activities that may affect the species in the area covered under this rule (United States Fish and Wildlife Service 2015b). As specified in the original petition, WNS is the primary threat to the persistence of NLEB in North America. The disease is caused by the fungal pathogen *Pseudogymnoascus destructans* (formerly *Geomyces destructans*) and affects hibernating bats (O'Keefe and Loeb 2017). The disease was first noted in New York in 2006. Since that time, several million bats have died from WNS (Froschauer and Coleman 2012). In affected areas, mortality rates of up to 100% have been documented (Frick et al. 2010). The disease continues to spread west from the eastern and southeastern US. In 2018, WNS was documented in a male Long-legged Myotis near Jewel Cave National Monument and Pd was detected in a female Little Brown Myotis at Fort Laramie National Historic Site (Abernethy 2018). While Pd or WNS have yet been documented in our study area, the detection of WNS at Jewel Cave is only approximately 50 miles to the southeast. As the range of the disease continues to expand across the region, it will likely impact bats in our study area in the near future.

Basic knowledge of habitat use and associations of NLEB in Wyoming is limited. Across its range, NLEB is strongly associated with forested habitats. In Wyoming, the species is only known from areas dominated by ponderosa pine forest. The species frequents a wide variety of day roosts during the summer with trees are most frequently used as roosts. Specifically, tall, large diameter trees are preferred across the species range though maternity colonies may also include roosts such as human-made structures and buildings (Caceres and Barclay 2000). Prior to this study, maternity roost preference had not been evaluated in Wyoming but in the Black Hills of South Dakota, pregnant and lactating female NLEB typically roosted in large, highly decayed snags (Cryan et al. 2001). NLEB hibernates in caves and abandoned mines during the winter (Caceres and Barclay 2000). To date, there are no known hibernacula used by the species in Wyoming but they are known to hibernate in South Dakota. Within the hibernacula, NLEB often cluster in deep crevices. Evidence suggests that summer habit is generally fairly close to winter hibernacula (less than 56 km) (Caceres and Barclay 2000).

This report summarizes activities conducted from 2017 to 2019 to enhance our understanding of maternity roost use and selection of NLEB in Wyoming. In 2019, additional funds were secured from the State of Wyoming to continue this work through 2020. As described below, changes to roost and roost habitat data collection protocols did not allow for analyses across all three years and analyses presented here are limited to data collected in 2017 and 2018. The current lack of knowledge challenges land managers attempting to identify important areas and management techniques that can influence the persistence of NLEB in the region. Ultimately, enhanced understanding of distribution and habitat associations of NLEB will help land management agencies in planning current management actions leading to preservation of this and other bat species, management actions that are aligned with Endangered Species Act protections and upcoming Recovery Plans, and management actions in the more distant future under possible influence of (WNS).

Methods

Bat Capture and Handling

We captured bats using mist nets deployed in combinations of single-high, double-high, and triple-high arrays over water sources. We focused capture efforts in areas that were known to be frequented by pregnant or lactating female NLEB based on previous survey efforts (Wyoming Natural Diversity Database 2017). All captured bats were measured (forearm length, ear length), weighed, sexed, aged, and identified to species. We fit pregnant or lactating female NLEB with either 0.25 Blackburn VHF radio transmitters (Philip Blackburn 819 Logansport Street, Nacogdoches, TX 75961), 0.22-gram Holohil LB2x, or a 0.27-gram Holohil LB2xT VHF radio transmitters (Holohil Systems Ltd. 112 John Cavanaugh Drive, Carp, Ontario, Canada K0A 1L0) that comprised less than 5% of the bat's body mass (Aldridge and Brigham 1988). Male NLEB and all other bat species were released at the site of capture following processing. To attach the transmitter, we carefully timed a small patch of hair between the scapula approximately the size of the transmitter (8 mm X 2.8 mm) using small sterilized scissors and cleaned the area using a disposable alcohol pad. A small amount of surgical adhesive (Perma-Type Surgical Cement; <http://www.perma-type.com/accesil.html>) was applied to the trimmed area and allowed to set for 5 - 10 minutes, after which the flat side of the transmitter was placed on the adhesive with the antenna facing the posterior end of the bat. Once the adhesive was set, the bat was released at the capture location. As specified by the terms of our permit, all survey protocols followed the appropriate years "Range-wide Indiana Bat Survey Guidelines" (United States Fish and Wildlife Service 2015a, 2018a, 2019). Equipment was decontaminated following the most current versions of the "National White-Nose Syndrome Decontamination Protocol" (United States Fish and Wildlife Service 2016, 2018b). Survey methods also conformed to recommended guidelines (e.g., Kunz and Parsons 2009, Sikes et al. 2011) and followed recommendations in Wyoming's bat conservation plan (Hester and Grenier 2005) for documentation and followed WNS protocols presented in Wyoming's WNS strategic plan (Abel and Grenier 2011).

Roost Use and Selection

Radio tagged bats were tracked to day roosts every day until the signal was lost. Day roosts were located using standard VHF telemetry methods. We recorded features of roosts including: location, height of bat location within the structure, diameter at breast height (DBH) of trees, total height of trees, and life stage of trees (Table 2). In 2017 and 2018 we assessed forest features associated with occupancy by NLEB using data collected from tree density plots centered on roost trees and compared these data to data collected at plots located at random locations within ~2 miles of the roost tree. Random plots were selected from a spatially balanced random sample generated using the Equi-probable Design option and Balanced Acceptance Sampling (BAS) algorithm (Robertson et al. 2013) within the SDraw Package (McDonald 2016) in Program R (<https://www.r-project.org/>). Plots were 25 m in radius and within each plot, we collected data on vegetative structure and topography within three 25-m by 2-m belt transects radiating from the plot center. The orientation of first transect was determined using a table of randomly generated compass bearings and the remaining transects were oriented 120° and 240° from the first. We counted all trees with centers within the belt and recorded their species, DBH, and total height. We divided the number of trees by the transect area to estimate tree density. We also counted, recorded species, DBH, and total height of each dead standing tree that fell within the plot. Topographic position variables of slope and aspect were calculated using a Digital Elevation Model and the Aspect and Slope

tools in ArcMap 10.5. We used a Digital Elevation Model and the Geomorphometry and Gradient Metrics Toolbox in a GIS to generate a Heat Load Index (HLI) model for the Bearlodge Ranger District (Evans et al. 2014).

Because we had a small number of radio tagged NLEB and a small sample size of roosts, we assumed roosts were independent. We pooled data between years and did not evaluate year effects due to the small sample size and large number of predictors considered. Also, we inadvertently fit a small number of non-reproductive female NLEB with transmitters. To ensure only maternity roosts were included in our analysis, we removed roosts with emergence counts less than three. Finally, slightly different roost and habitat measurement protocols were utilized in 2019. As a result, roost use and selection findings presented here are limited to data collected in 2017 and 2018. Basic summary statistics for roosts located in 2019 are presented and discussed briefly here.

We assessed roost site selection at two scales: roost structures and habitat surrounding roosts. At both scales, we used logistic regression to compare used sites with random sites. Specifically, we compared trees that were used by NLEB with random trees and habitat surrounding NLEB roost structures with habitat surrounding random locations. We used the general linear model (glm) function with a logit link in Program R to conduct logistic regression analyses. For the roost structure-level analysis, we evaluated all possible subsets of additive models containing up to three variables measured at used roost trees and random trees (Table 1). Because we measured a larger number of covariates at the plot level, we used a two-stage process to develop models: first, we evaluated univariate models to select the best predictor within the categories of canopy cover, Diameter at Breast Height (DBH), height, decay class, stem density, and topographic position (Table 2). Categories with a statistically significant predictor were advanced to the second stage. We then evaluated all possible subsets of additive models comprising up to three covariates retained from the first stage. We used an information theoretic approach (Burnham and Anderson 2002) with the Akaike Information Criterion for small sample sizes (AICc) to select the highest ranking model with $<2 \Delta AICc$ and without uninformative parameters (Arnold 2010). We evaluated covariate point estimates and their 95% confidence intervals (CI) as indicators of the strength and direction of relationships in the best-approximating models, and interpreted lack of overlap between coefficient CI and zero as evidence of statistically significant relationships.

Results and Discussion

Mist-Netting

In all years combined, a total of 465 bats of 12 species were captured over 35 nights of mist-netting (Tables 3 – 5). We captured a total of 53 bats representing 9 species over 3 nights of mist-netting in 2017 (Table 3). In 2018, we captured 96 representing 10 species across 4 nights of mist-netting (Table 4). In 2019, a total of 324 bats of 10 species were captured over 28 nights of mist-netting (Table 5). In all years, we observed a male sex bias, with 301 males and 157 females captured across three years. We captured females of seven species with evidence of reproduction including pregnant and lactating individuals. These included Big Brown Bat, Fringed Myotis, Hoary Bat, Long-legged Myotis, NLEB, Silver-haired Bat, and Western Small-footed Myotis. All but 27 captured individuals were determined to be adults based on evaluation of the phalangeal epiphyseal plates (Kunz and Anthony 1982). These included juvenile Big Brown Bat, Fringed Myotis, Hoary Bat, Little Brown Myotis, Long-legged Myotis, NLEB, and Silver-haired Bat. The capture of female bats with evidence of reproduction in combination with the capture of juvenile individuals suggests the Bearlodge Mountains and Black Hills of

Wyoming likely support maternity colonies of these species. Both male and female NLEB were captured in all years. The capture of reproductive female NLEB and presence of maternity roosts across much of the study area runs contrary to patterns of sexual segregation driven by altitude reported for this species (Cryan et al. 2000). Specifically, Cryan et al. (2000) documented presence of males and non-reproductive females at higher elevations and the presence of pregnant and lactating females at lower elevations. Within the region, our study area is at a relatively high elevation and it is unknown why we observed this pattern.

No bats were incidentally or intentionally killed and all captures were released at the site of capture in good condition. Evaluation of the tail and wing membranes revealed no evidence of WNS infection (Reichard and Kunz 2009, Reichard 2010).

Roost Structures

Across all three years, a total of 33 female NLEB were fitted with radio transmitters resulting in the identification of 44 unique roosts (Figure 3; Table 6). In 2017, we placed radio tags on 7 female NLEB resulting in the identification of 16 unique roost sites. In 2018, we placed radio tags on 2 female NLEB and identified 2 unique roosts. In 2019, a total of 24 female NLEB were fitted with radio transmitters and were tracked to 26 unique roosts. In 2017, roosts were used an average of 2.0 days and tagged bats were tracked an average of 5.6 days and were tracked until the battery failed. In 2018, one tagged NLEB roosted exclusively on private surface east of the forest boundary while the other roosted on private surface 2 days and on USFS surface 2 days. In 2019, roosts were used an average of 1.9 days and tagged bats were tracked an average of 4.4 days. Mean distance from capture locations to roosts was 818.4m (SD 478.2m).

We attempted at least one emergence count at each roost and successfully completed 44 emergence counts (Table 7). Between 0 and 65 bats were counted emerging from roosts. Bats began to emerge between approximately 20 and 40 minutes after civil sunset. It is unknown if NLEB display fidelity to day roosts across years in Wyoming. To address this, we returned to six roosts located and used in 2017 and 2018 and conducted emergence counts in 2019. Only one bat was observed emerging from one of these roosts. It should be noted that only one visit on one night occurred. It is possible that these roosts were still in use but not during the dates these counts were conducted. Alternatively, NLEB may not have fidelity to day roosts across years or roosts may become unusable through time.

Landscape variables (e.g. aspect, slope, Heat Load Index) were not useful predictors of roost use. There were no consistent patterns in terms of aspect, with NLEB roosts located on all aspects. In general, roosts were on relatively moderate slopes (mean slope = 11.7°; SD = 7.7°).

NLEB roosts were typically located on the upper portions of slopes (i.e. near the summit, shoulder, or upper portions of the backslope). We observed potential differences in maternity roosts used by NLEB of different reproductive statuses and across years. In 2017 and 2018, maternity roosts were generally located in large live or dead ponderosa pine trees. Other roost structures were used but were likely not maternity roosts. Specifically, a large river birch (*Betula nigra*) was used by a single bat during two nights during an extended period of thunderstorm events. Additionally, in 2017 we inadvertently tagged a non-reproductive female NLEB which roosted singly in a number of quaking aspen trees (*Populus tremuloides*). However, in 2019, the majority of roosts located were in quaking aspen (n = 16) followed by ponderosa pine (n = 8) and Burr oak (n = 2).

Weather conditions in 2019 were wetter and colder than long-term averages. It is possible that female NLEB are selecting roost structures based on existing weather patterns. For example, it is possible that aspen trees may provide more suitable roosting conditions during cool, wet weather.

In some years, it appears that summer day roost selection varies with reproductive status. Specifically, in 2017 and 2018, pregnant NLEB used large, live ponderosa pines, lactating NLEB used large ponderosa pine snags, while non-reproductive NLEB used a variety of quaking aspen. While these initial results are based on a limited sample size, these findings suggest that a variety of day roost structures should be considered for any management planning.

NLEB Day Roost Structure Selection

Our best approximating model for NLEB day roost structure selection for 2017 and 2018 included variables for the DBH and tree height. Specifically, NLEB selected roost trees that had larger diameters and heights than random trees on the landscape ($\hat{\beta} = 0.28$, SE: 0.06, 95% CI: 0.17 to 0.42; $\hat{\beta} = 0.15$, SE: 0.06, 95% CI: 0.05 to 0.27; Tables 7 and 9). Because of limited sample size, we did not evaluate model fit (e.g. Hosmer and Lemeshow goodness of fit test). Our model generally aligns with observations of roost selection across the range of NLEB (Cryan et al. 2001, Garroway and Broders 2008). Throughout their range, NLEB have been documented using a wide range of tree species based on the site-specific forest community, suggesting characteristics of the tree used as a roost may be more important than the tree species (Lacki et al. 2009, O'Keefe and Loeb 2017). It is well known that within a species, individuals of different sex and reproductive status differentially select roosts to meet energy demands and water balance needs. Specifically, males and non-reproductive females tend to select roosts with lower solar insolation that reduce energy expenditure and water loss while pregnant and lactating females select roosts with higher solar insolation that allow them to meet increased energy demands associated with fetus development and lactation (Garroway and Broders 2008, Lacki et al. 2009, O'Keefe and Loeb 2017). Our results are generally consistent with these patterns, however, it should be noted that we observed apparent differences in roost selection between pregnant and lactating NLEB. Specifically, we only observed pregnant NLEB using large, live Ponderosa Pine trees (Figure 4) while lactating NLEB used large Ponderosa Pine snags (Figure 5). This suggests that a variety of dead and live trees should be accounted for when considering management actions that may alter forest structure. Because we had a relatively small sample size, we choose to evaluate only additive models with a limited number of variables (Burnham and Anderson 2002). Our results, therefore, likely reflect only the strongest patterns in roost selection and may not capture more subtle relationships, like the importance of less frequently used types of roost structures and potential interactions between roost types and their location in the landscape.

NLEB Day Roost Habitat Selection

The best approximating model for NLEB day roosting habitat in 2017 and 2018 included variables for the DBH of dead ponderosa pine trees in the overstory, the decay class of snags less than 3m tall, and the density of snags. Specifically, NLEB selected roosts in areas with larger diameter ponderosa pine snags, more less decayed snags less than 3m tall, and areas with higher densities of snags ($\hat{\beta} = 1.09$, SE: 0.61, 95% CI: 0.22 to 2.70; $\hat{\beta} = -4.25$, SE: 2.33, 95% CI: -10.72 to -0.99; $\hat{\beta} = 55.88$, SE: 30.14, 95% CI: 12.11 to 135.87; Tables 8 and 10). We hypothesize that forest stands with larger DBH ponderosa pine snags and higher densities of snags are older-aged stands that likely have a forest structure that provide more potentially suitable roost structures. Similar results have been noted in studies of NLEB and other tree-roosting bats (Lacki et al. 2009). It has been hypothesized that tree-

roosting bats roost in areas with numerous potential roost structures, allowing frequent roost switching to reduce predation and ectoparasite loads (O'Keefe and Loeb 2017). As noted above, we observed roost switching by NLEB, with individuals using different roost structures within relatively close proximity. Considering the variables included in our best approximating model together suggests that forest stands comprised of large diameter trees and higher densities of dead trees are more likely to be used as roosts by NLEB.

Conclusions

The availability of suitable day roost structures is a limiting factor for local bat populations (O'Keefe and Loeb 2017). Many studies of day roost use and selection have focused on pregnant and lactating female bats because of the importance of this demographic segment to persistence of local populations. However, relatively few studies have evaluated day roost selection between these different reproductive stages. Overall, our results suggest that female NLEB in the Bearlodge Mountains of northeast Wyoming roost in taller trees with larger diameters and that they roost in areas of older aged forests with larger diameter live trees and higher densities of snags. Anecdotally, we observed apparent differences in roost selection between pregnant and lactating NLEB with pregnant NLEB using large, live Ponderosa Pine trees and lactating NLEB using large Ponderosa Pine snags. We also observed use of different roost structures across years, with female NLEB using dead and live ponderosa pine in 2017 and 2018 and ponderosa pine, quaking aspen, and burr oak in 2019. These findings suggest that forest managers should consider a variety of potential roost structures to accommodate variation between reproductive status and climatic conditions. These observations are based on a small sample size and some caution should be applied when applying these results. Additional funding to continue this work with the assistance of a graduate student in 2019 and 2020 will increase the sample size nearly fourfold and allow for more prescriptive management use.

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Figures

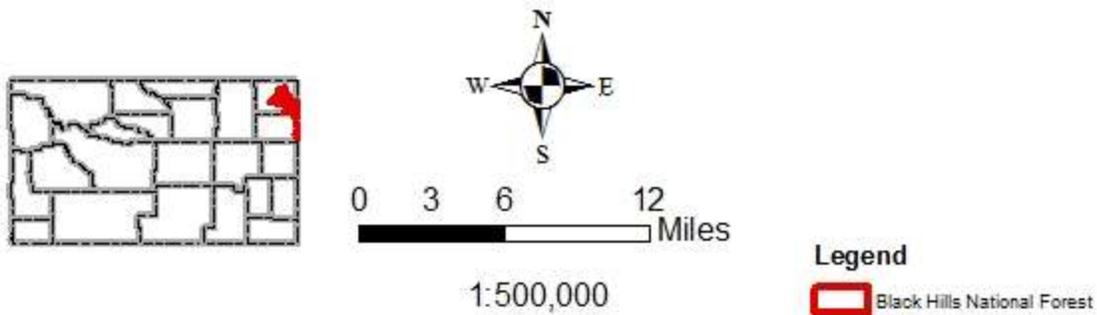
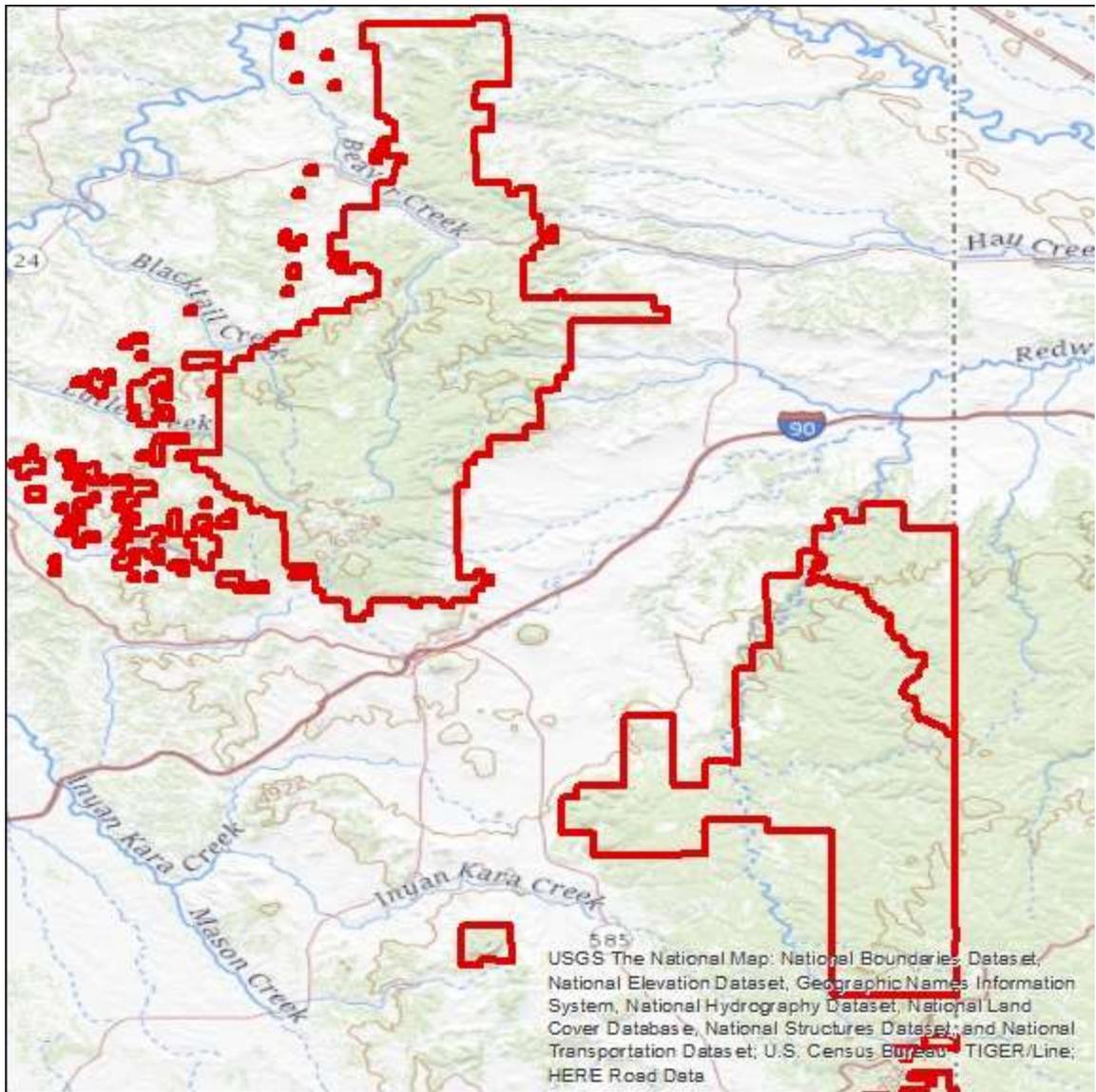


Figure 1. Study area on the Black Hills National Forest, Bearlodge Ranger District from 2017 to 2019.

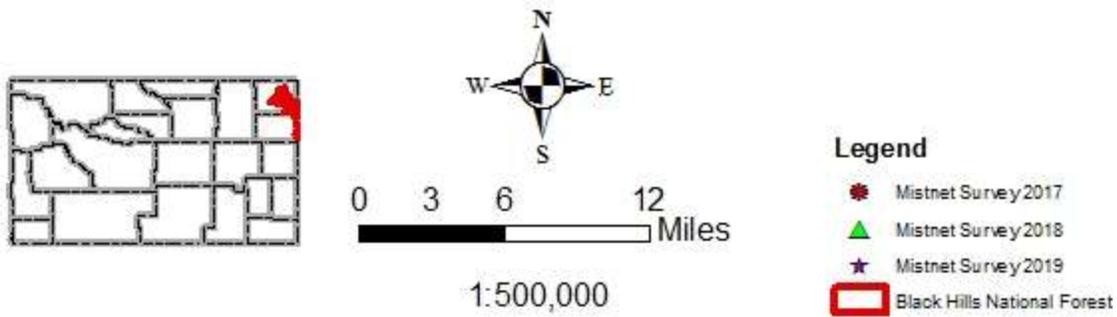
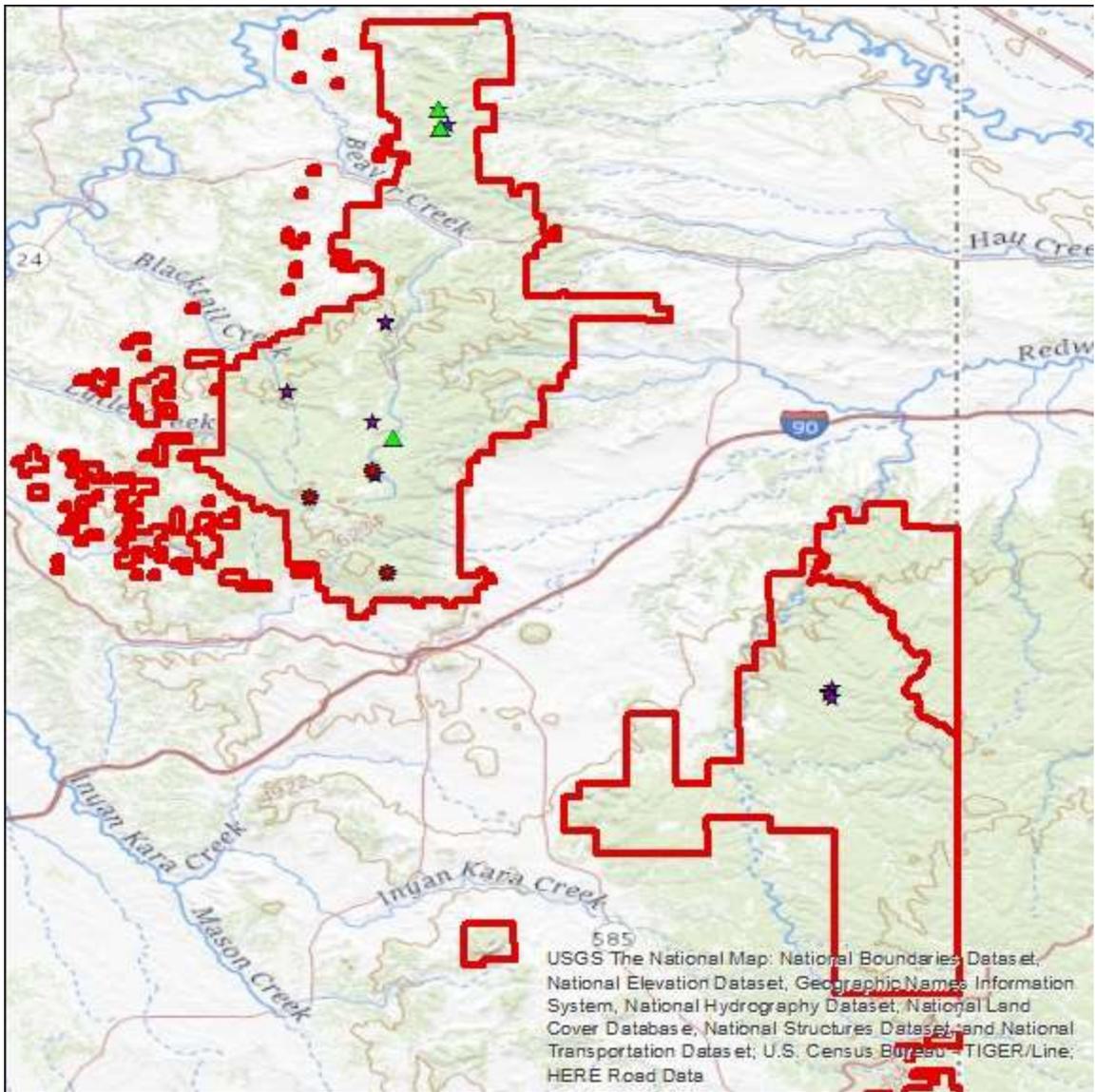


Figure 2. Mist-netting locations sampled on the Black Hills National Forest, Bearlodge Ranger District in 2017, 2018, and 2019.

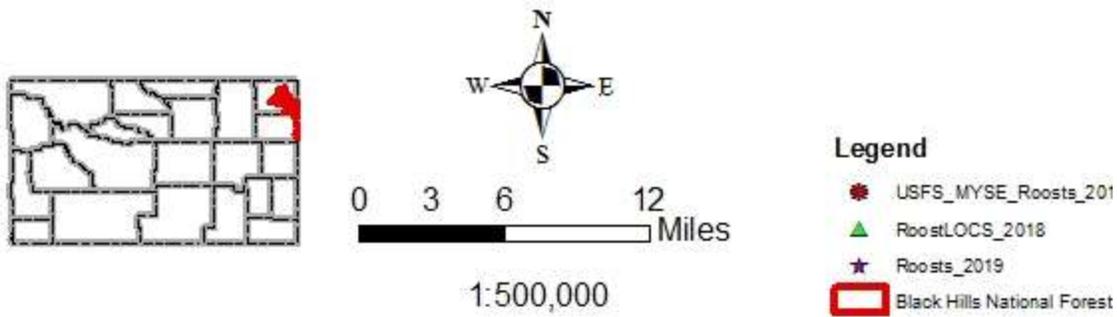
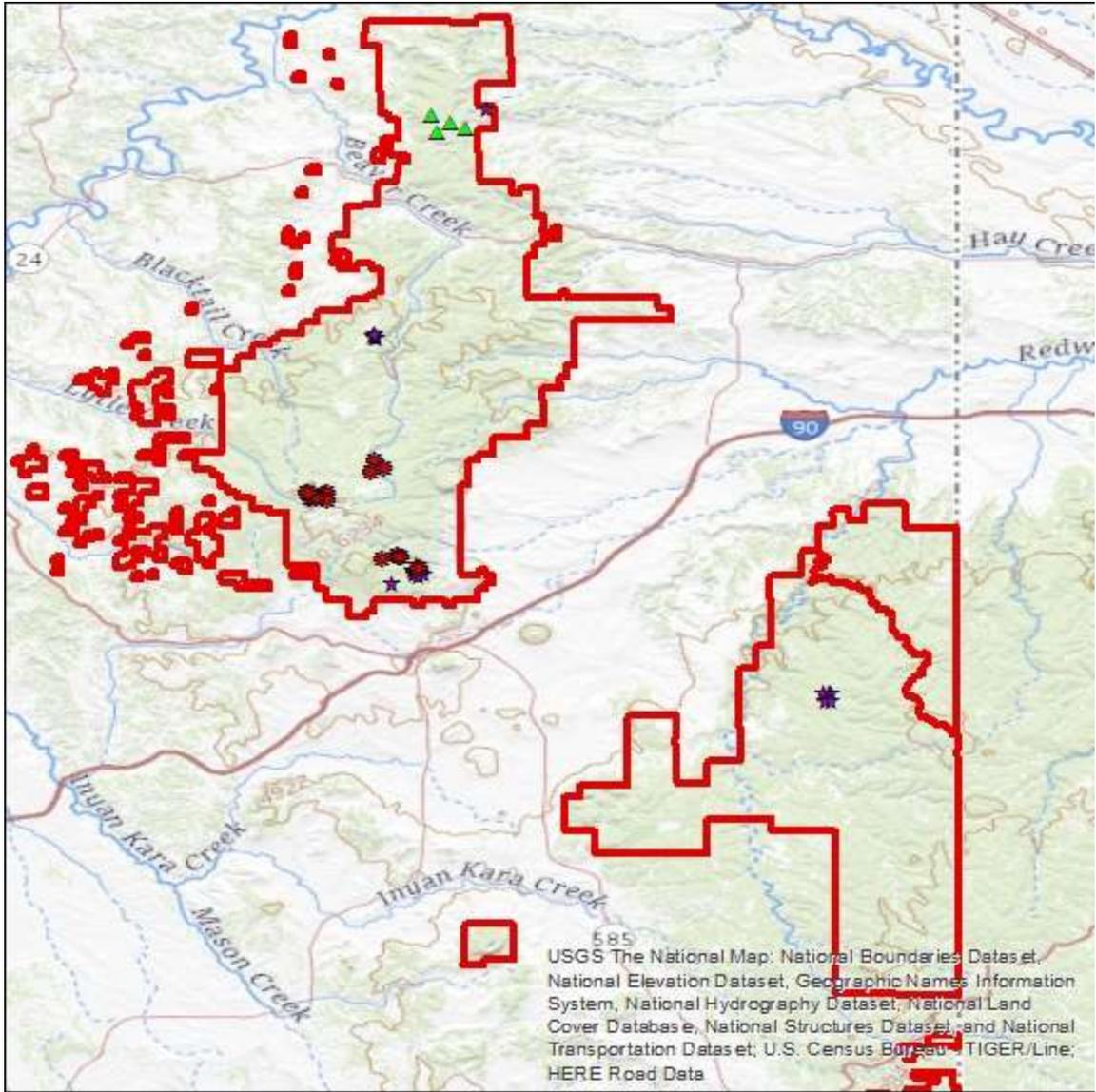


Figure 3. Northern Long-eared Bat day roosts located on the Black Hills National Forest, Bearlodge Ranger District in 2017, 2018, and 2019.

Tables

Table 1. Variables measured at NLEB roosts and random trees in the Bearlodge Mountains in 2017 and 2018.

Code	Definition
Used	1=bat roost 0=random plot
DecayClass	Decay class of random or roost tree
DBH_inches	Diameter at Breast Height of random or roost tree
ThreeHeight	Height of random or roost tree

Table 2. Variables measured at plots centered on NLEB roosts and at random plots in the Bearlodge Mountains in 2017 and 2018. Category represents habitat variable groupings used to identify the best predictor and categories with a significant predictor are denoted with an asterisk. The best significant predictors of NLEB roost use are denoted by an asterisk in the Code column and were included in our all-subsets modeling process.

Category	Code	Definition
	Used	1=bat roost 0=random plot
Canopy Cover	PCR	Percent canopy cover at the roost or random plot center
	PCP	Percent canopy cover for the entire plot
DBH*	LSO_DBH*	DBH of live trees over 3m
	DSO_DBH	DBH of dead trees over 3m
	DSU_DBH	DBH of dead trees less than 3m
	Snag_DBH	DBH of dead trees over 2m
Tree Heights	LSO_Rheight	Average height of live trees over 3m proximate to roost
	LSO_Pheight	Average Height of live trees over 3m for entire plot
	DSO_Height	Average height of dead trees over 3m for entire plot
	DSU_Height	Average height of dead trees under 3m for entire plot
	SnagHeight	Average height of dead trees over 3m for entire plot
Decay Classes*	DSO_Decay	Average decay class of dead trees over 3m for entire plot
	DSU_Decay*	Average decay class of dead trees under 3m for entire plot
	SnagDecay	Average decay class of all dead trees for entire plot
Stem Density*	D_LSO	Density of live trees greater than 3m in height
	D_DSO	Density of dead trees greater than 3m in height
	D_DSU	Density of dead trees less than 3m in height
	D_Snags*	Density of dead trees of any height
Topographic	Slope	Slope in degrees
	Aspect	Aspect of slope in degrees
	HLI	Heat Load Index

Table 3. Bats captured on the Black Hills National Forest, Bearlodge Ranger District in 2017.

Locality	Date	Common Name	Sex	Age	Reproductive Status
Box Spring	6/27/2017	Western Small-footed Myotis	Male	Adult	Non-reproductive
Box Spring	6/27/2017	Long-legged Myotis	Male	Adult	Non-reproductive
Box Spring	6/27/2017	Western Small-footed Myotis	Male	Adult	Non-reproductive
Box Spring	6/27/2017	Northern Myotis*	Female	Adult	Pregnant
Box Spring	6/27/2017	Big Brown Bat	Male	Adult	Non-reproductive
Box Spring	6/27/2017	Long-legged Myotis	Male	Adult	Non-reproductive
Box Spring	6/27/2017	Silver-haired Bat	Male	Adult	Descended Testis
Box Spring	6/27/2017	Hoary Bat	Male	Adult	Non-reproductive
Box Spring	6/27/2017	Silver-haired Bat	Male	Adult	Non-reproductive
Box Spring	6/27/2017	Northern Myotis	Male	Adult	Non-reproductive
Box Spring	6/27/2017	Hoary Bat	Male	Adult	Non-reproductive
Box Spring	6/27/2017	Long-legged Myotis	Male	Adult	Non-reproductive
Box Spring	6/27/2017	Hoary Bat	Female	Adult	Lactating
Box Spring	6/27/2017	Big Brown Bat	Male	Adult	Non-reproductive
Box Spring	6/27/2017	Silver-haired Bat	Male	Adult	Non-reproductive
Box Spring	6/27/2017	Northern Myotis*	Female	Adult	Pregnant
Box Spring	6/27/2017	Northern Myotis	Male	Adult	Non-reproductive
Box Spring	6/27/2017	Northern Myotis*	Female	Adult	Pregnant
Box Spring	6/27/2017	Northern Myotis	Male	Adult	Non-reproductive
Box Spring	6/27/2017	Little Brown Myotis	Male	Adult	Non-reproductive
Box Spring	6/27/2017	Big Brown Bat	Female	Adult	Pregnant
Box Spring	6/27/2017	Northern Myotis	Male	Adult	Non-reproductive
Box Spring	6/27/2017	Little Brown Myotis	Male	Adult	Non-reproductive
Box Spring	6/27/2017	Long-eared Myotis	Male	Adult	Non-reproductive
Beaver Creek	7/22/2017	Long-legged Myotis	Male	Adult	Non-reproductive
Beaver Creek	7/22/2017	Northern Myotis*	Female	Adult	Lactating
Beaver Creek	7/22/2017	Hoary Bat	Female	Adult	Lactating
Beaver Creek	7/22/2017	Silver-haired Bat	Male	Adult	Descended Testis
Beaver Creek	7/22/2017	Silver-haired Bat	Male	Adult	Non-reproductive
Beaver Creek	7/22/2017	Long-legged Myotis	Female	Juvenile	Non-reproductive
Beaver Creek	7/22/2017	Silver-haired Bat	Male	Adult	Descended Testis
Beaver Creek	7/22/2017	Silver-haired Bat	Male	Adult	Non-reproductive
Beaver Creek	7/22/2017	Silver-haired Bat	Male	Adult	Descended Testis
Beaver Creek	7/22/2017	Silver-haired Bat	Male	Adult	Descended Testis
Beaver Creek	7/22/2017	Silver-haired Bat	Female	Adult	Lactating
Beaver Creek	7/22/2017	Hoary Bat	Female	Adult	Lactating
Beaver Creek	7/22/2017	Silver-haired Bat	Male	Adult	Non-reproductive
Beaver Creek	7/22/2017	Silver-haired Bat	Female	Adult	Non-reproductive
Beaver Creek	7/22/2017	Silver-haired Bat	Male	Adult	Descended Testis

Locality	Date	Common Name	Sex	Age	Reproductive Status
Beaver Creek	7/22/2017	Silver-haired Bat	Male	Juvenile	Non-reproductive
Beaver Creek	7/22/2017	Long-legged Myotis	Female	Adult	Non-reproductive
Beaver Creek	7/22/2017	Silver-haired Bat	Female	Adult	Non-reproductive
Beaver Creek	7/22/2017	Red Bat	Male	Adult	Non-reproductive
Beaver Creek	7/22/2017	Silver-haired Bat	Female	Adult	Lactating
Beaver Creek	7/22/2017	Silver-haired Bat	Female	Adult	Lactating
Beaver Creek	7/22/2017	Silver-haired Bat	Male	Adult	Non-reproductive
Beaver Creek	7/22/2017	Big Brown Bat	Male	Adult	Non-reproductive
Beaver Creek	7/22/2017	Hoary Bat	Female	Adult	Lactating
Beaver Creek	7/22/2017	Silver-haired Bat	Female	Adult	Lactating
USFS 100	7/23/2017	Northern Myotis*	Female	Adult	Pregnant
USFS 100	7/23/2017	Long-legged Myotis	Male	Adult	Non-reproductive
USFS 100	7/23/2017	Northern Myotis*	Female	Adult	Lactating
USFS 100	7/23/2017	Northern Myotis*	Female	Adult	Pregnant

*Capture fitted with radio transmitter

Table 4. Bats captured on the Black Hills National Forest, Bearlodge Ranger District in 2018.

Locality	Date	Common Name	Sex	Age	Reproductive Status
Beaver Dam Spring	7/14/2018	Fringed Myotis	Unknown	Juvenile	Non-reproductive
Beaver Dam Spring	7/14/2018	Fringed Myotis	Unknown	#N/A	Unknown
Beaver Dam Spring	7/14/2018	Big Brown Bat	Male	#N/A	Descended Testis
Beaver Dam Spring	7/14/2018	Northern Myotis	Male	Adult	Non-reproductive
Beaver Dam Spring	7/14/2018	Fringed Myotis	Male	Adult	Non-reproductive
Beaver Dam Spring	7/14/2018	Western Long-eared Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/14/2018	Fringed Myotis	Male	Adult	Non-reproductive
Beaver Dam Spring	7/14/2018	Little Brown Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/14/2018	Fringed Myotis	Male	Adult	Non-reproductive
Beaver Dam Spring	7/14/2018	Northern Myotis	Male	Adult	Non-reproductive
Beaver Dam Spring	7/14/2018	Northern Myotis	Male	Juvenile	Non-reproductive
Beaver Dam Spring	7/14/2018	Hoary Bat	Female	Adult	Lactating
Beaver Dam Spring	7/14/2018	Northern Myotis	Male	Adult	Non-reproductive
Beaver Dam Spring	7/14/2018	Fringed Myotis	Male	Adult	Non-reproductive
Beaver Dam Spring	7/14/2018	Fringed Myotis	Male	Adult	Non-reproductive
Beaver Dam Spring	7/14/2018	Western Small-footed Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/14/2018	Fringed Myotis	Female	Adult	Lactating
Beaver Dam Spring	7/14/2018	Fringed Myotis	Male	Juvenile	Non-reproductive
Beaver Dam Spring	7/14/2018	Fringed Myotis	Male	Adult	Non-reproductive
Beaver Dam Spring	7/14/2018	Big Brown Bat	Unknown	#N/A	#N/A
Beaver Dam Spring	7/15/2018	Little Brown Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/15/2018	Long-legged Myotis	Female	Adult	Pregnant
Beaver Dam Spring	7/15/2018	Little Brown Bat	Male	Adult	Non-reproductive

Locality	Date	Common Name	Sex	Age	Reproductive Status
Beaver Dam Spring	7/15/2018	Big Brown Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/15/2018	Northern Long-eared Bat	Female	Adult	Lactating
Beaver Dam Spring	7/15/2018	Long-legged Myotis	Female	Adult	Lactating
Beaver Dam Spring	7/16/2018	Little Brown Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/16/2018	Northern Long-eared Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/16/2018	Silver-haired Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/16/2018	Northern Long-eared Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/16/2018	Long-legged Myotis	Female	Adult	Pregnant
Beaver Dam Spring	7/16/2018	Silver-haired Bat	Female	Adult	Non-reproductive
Beaver Dam Spring	7/16/2018	Big Brown Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/16/2018	Western Long-eared Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/16/2018	Silver-haired Bat	Female	Adult	Lactating
Beaver Dam Spring	7/16/2018	Silver-haired Bat	Female	Adult	Non-reproductive
Beaver Dam Spring	7/16/2018	Northern Long-eared Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/16/2018	Big Brown Bat	Male	Adult	Descended Testis
Beaver Dam Spring	7/16/2018	Silver-haired Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/16/2018	Northern Long-eared Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/16/2018	Big Brown Bat	Male	Adult	Descended Testis
Beaver Dam Spring	7/17/2018	Western Long-eared Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/17/2018	Big Brown Bat	Male	Adult	Descended Testis
Beaver Dam Spring	7/17/2018	Silver-haired Bat	Female	Adult	Lactating
Beaver Dam Spring	7/17/2018	Big Brown Bat	Male	Adult	Descended Testis
Beaver Dam Spring	7/17/2018	Northern Long-eared Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/17/2018	Little Brown Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/17/2018	Western Long-eared Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/17/2018	Little Brown Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/17/2018	Big Brown Bat	Male	Adult	Descended Testis
Beaver Dam Spring	7/17/2018	Big Brown Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/17/2018	Silver-haired Bat	Female	Adult	Lactating
Beaver Dam Spring	7/17/2018	Big Brown Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/17/2018	Big Brown Bat	Male	Juvenile	Non-reproductive
Beaver Dam Spring	7/16/2018	Western Long-eared Bat	Female	Adult	Lactating
Beaver Dam Spring	7/16/2018	Western Long-eared Bat	#N/A	#N/A	#N/A
Beaver Dam Spring	7/16/2018	Long-legged Myotis	Female	Adult	Non-reproductive
Beaver Dam Spring	7/16/2018	Northern Long-eared Bat	Male	Adult	Non-reproductive
Beaver Dam Spring	7/16/2018	Little Brown Bat	Male	Juvenile	Non-reproductive
Beaver Dam Spring	7/16/2018	Big Brown Bat	Male	Adult	Descended Testis
Beaver Dam Spring	7/14/2018	Northern Long-eared Bat	Female	Adult	Non-reproductive
Beaver Dam Spring	7/15/2018	Western Long-eared Bat	Female	Adult	Lactating
Beaver Dam Spring	7/14/2018	Little Brown Bat	Male	#N/A	#N/A

Locality	Date	Common Name	Sex	Age	Reproductive Status
Beaver Dam Spring	7/14/2018	Little Brown Bat	Male	#N/A	#N/A
Beaver Dam Spring	7/14/2018	Northern Long-eared Bat	Female	#N/A	Non-reproductive
Beaver Dam Spring	7/14/2018	Little Brown Bat	Male	#N/A	#N/A
Beaver Dam Spring	7/14/2018	Long-legged Myotis	Male	#N/A	#N/A
Beaver Dam Spring	7/14/2018	Western Long-eared Bat	Male	#N/A	#N/A
Beaver Dam Spring	7/14/2018	Western Long-eared Bat	Male	#N/A	#N/A
Beaver Dam Spring	7/14/2018	Myotis Species	Unknown	#N/A	#N/A
Beaver Dam Spring	7/14/2018	Northern Long-eared Bat	Female	Adult	Lactating
830 Pond	8/22/2018	Little Brown Bat	Male	Adult	Non-reproductive
830 Pond	8/22/2018	Little Brown Bat	Male	Juvenile	Non-reproductive
830 Pond	8/22/2018	Northern Long-eared Bat	Male	Juvenile	Non-reproductive
830 Pond	8/22/2018	Big Brown Bat	Female	Adult	Non-reproductive
830 Pond	8/22/2018	Big Brown Bat	Male	Adult	Non-reproductive
830 Pond	8/22/2018	Northern Long-eared Bat	Male	Adult	Non-reproductive
830 Pond	8/22/2018	Eastern Red Bat	Female	Adult	Non-reproductive
830 Pond	8/22/2018	Long-legged Myotis	Male	Juvenile	Non-reproductive
830 Pond	8/22/2018	Little Brown Bat	Male	Adult	Non-reproductive
830 Pond	8/22/2018	Little Brown Bat	Male	Adult	Non-reproductive
830 Pond	8/22/2018	Northern Long-eared Bat	Female	Adult	Lactating
830 Pond	8/22/2018	Long-legged Myotis	Female	Juvenile	Non-reproductive
830 Pond	8/22/2018	Long-legged Myotis	Female	Juvenile	Non-reproductive
830 Pond	8/22/2018	Little Brown Bat	Male	Juvenile	Non-reproductive
830 Pond	8/22/2018	Long-legged Myotis	Female	Juvenile	Non-reproductive
830 Pond	8/22/2018	Little Brown Bat	Male	#N/A	Non-reproductive
Beaver Creek	8/19/2018	Northern Long-eared Bat	Female	Adult	Post-lactating
Beaver Creek	8/19/2018	Northern Long-eared Bat	Female	Adult	Post-lactating

Table 5. Bats captured on the Black Hills National Forest, Bearlodge Ranger District in 2019.

Locality	Date	Common Name	Sex	Age	Reproductive Status
Beaver Creek Upper	6/24/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Scott Spring	6/27/2019	Silver-haired Bat	Female	Adult	Pregnant
Blacktail Creek	6/22/2019	Big Brown Bat	Male	Adult	Non-reproductive
Box Springs	8/4/2019	Little Brown Bat	Male	Adult	Non-reproductive
Box Springs	7/29/2019	Long-legged Myotis	Male	Adult	Non-reproductive
Box Springs	7/29/2019	Northern Long-eared Bat	Female	Adult	Lactating
Box Springs	8/4/2019	Big Brown Bat	Male	Adult	Non-reproductive
Box Springs	8/11/2019	Northern Long-eared Bat	Female	#N/A	Lactating
Box Springs	8/26/2019	Northern Long-eared Bat	Female	Adult	Lactating
MYSE Pond	7/22/2019	Little Brown Bat	Male	Adult	Non-reproductive
MYSE Pond	7/24/2019	Little Brown Bat	Male	Adult	Non-reproductive
Box Springs	7/29/2019	Long-legged Myotis	Male	Adult	Non-reproductive
Box Springs	7/29/2019	Northern Long-eared Bat	Female	Adult	Lactating
Box Springs	8/4/2019	Fringed Myotis	Male	Adult	Non-reproductive
Box Springs	8/4/2019	Western Long-eared Bat	Male	Adult	Non-reproductive
2017 Pond	7/18/2019	Long-legged Myotis	Male	Adult	Non-reproductive
2017 Pond	7/18/2019	Long-legged Myotis	Female	Adult	Pregnant
Box Springs	8/4/2019	Northern Long-eared Bat	Female	Adult	Non-reproductive
2017 Pond	7/17/2019	Little Brown Bat	Male	Adult	Non-reproductive
Box Springs	8/4/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
2017 Pond	7/17/2019	Little Brown Bat	Male	Adult	Non-reproductive
2017 Pond	7/17/2019	Little Brown Bat	Male	Adult	Non-reproductive
2017 Pond	7/18/2019	Silver-haired Bat	Female	Adult	Lactating
2017 Pond	7/18/2019	Long-legged Myotis	Female	Adult	Pregnant
Beaver dam pond	7/20/2019	Little Brown Bat	Male	Adult	Non-reproductive
Surprise Gulch	7/6/2019	Silver-haired Bat	Female	Adult	Lactating
Bear Lake Pond	7/7/2019	Little Brown Bat	Male	Adult	Non-reproductive
Bear Lake Pond	7/7/2019	Little Brown Bat	Male	Adult	Non-reproductive
2017 Pond	7/17/2019	Little Brown Bat	Male	Adult	Non-reproductive
2017 Pond	7/17/2019	Little Brown Bat	Male	Adult	Non-reproductive
2017 Pond	7/17/2019	Little Brown Bat	Male	Adult	Non-reproductive
2017 Pond	7/18/2019	Fringed Myotis	#N/A	#N/A	#N/A
Box Springs	7/29/2019	Northern Long-eared Bat	Female	Adult	Lactating
Beaver dam pond	7/20/2019	Little Brown Bat	Male	Adult	Non-reproductive
2017 Pond	7/18/2019	Silver-haired Bat	Female	Adult	Lactating
Beaver dam pond	7/20/2019	Little Brown Bat	Male	Adult	Non-reproductive
Beaver dam pond	7/20/2019	Little Brown Bat	Male	#N/A	Non-reproductive
Box Springs	7/29/2019	Little Brown Bat	Male	Adult	Non-reproductive
Box Springs	7/29/2019	Northern Long-eared Bat	Female	Adult	Lactating

Locality	Date	Common Name	Sex	Age	Reproductive Status
Bear Lake Pond	7/7/2019	Little Brown Bat	Male	Adult	Non-reproductive
Beaver dam pond	7/20/2019	Little Brown Bat	Male	Adult	Non-reproductive
Box Springs	7/29/2019	Northern Long-eared Bat	Female	Adult	Lactating
Bear Lake Pond	7/8/2019	Long-legged Myotis	Female	Adult	Lactating
Beaver Creek	8/2/2019	Little Brown Bat	Male	Adult	Non-reproductive
2017 Pond	7/18/2019	Little Brown Bat	Male	Adult	#N/A
2017 Pond	7/18/2019	Hoary Bat	Female	Adult	Lactating
Beaver dam pond	7/20/2019	Western Long-eared Bat	Female	Adult	Pregnant
Box Springs	7/29/2019	Northern Long-eared Bat	Female	Adult	Lactating
Box Springs	8/4/2019	Little Brown Bat	Male	Adult	Non-reproductive
Scott Spring	6/28/2019	Little Brown Bat	Male	Adult	Non-reproductive
Bear Lake Pond	7/8/2019	Long-legged Myotis	Female	Adult	Lactating
Scott Spring	6/27/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Box Springs	8/4/2019	Big Brown Bat	Female	Adult	Lactating
2017 Pond	7/17/2019	Little Brown Bat	Male	Adult	Non-reproductive
2017 Pond	7/17/2019	Little Brown Bat	Male	Adult	Non-reproductive
2017 Pond	7/17/2019	Little Brown Bat	Male	Adult	Non-reproductive
2017 Pond	7/17/2019	Little Brown Bat	Male	Adult	Non-reproductive
2017 Pond	7/18/2019	Silver-haired Bat	Female	Adult	Lactating
Scott Spring	6/28/2019	Little Brown Bat	Male	Adult	Non-reproductive
Surprise Gulch	7/6/2019	Long-legged Myotis	Male	Adult	Non-reproductive
Surprise Gulch	7/6/2019	Long-legged Myotis	Male	Adult	Non-reproductive
Beaver dam pond	7/20/2019	Little Brown Bat	Male	Adult	Non-reproductive
MYSE Pond	7/24/2019	Long-legged Myotis	Male	Adult	Non-reproductive
Surprise Gulch	7/5/2019	Long-legged Myotis	Male	Adult	Non-reproductive
2017 Pond	7/17/2019	Little Brown Bat	Male	Adult	Non-reproductive
Beaver dam pond	7/27/2019	Little Brown Bat	Male	Adult	Non-reproductive
Scott Spring	6/27/2019	Northern Long-eared Bat	Male	#N/A	Non-reproductive
Surprise Gulch	7/5/2019	Northern Long-eared Bat	Female	Adult	Pregnant
2017 Pond	7/17/2019	Little Brown Bat	Male	Adult	Non-reproductive
Scott Spring	6/27/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Bear Lake Pond	7/7/2019	Western Small Footed Myotis	Male	Adult	Non-reproductive
Bear Lake Pond	7/7/2019	Silver-haired Bat	Female	Adult	Lactating
Bear Lake Pond	7/8/2019	Long-legged Myotis	Male	Adult	Non-reproductive
2017 Pond	7/17/2019	Long-legged Myotis	Male	Juvenile	Non-reproductive
2017 Pond	7/17/2019	Little Brown Bat	Male	Adult	Non-reproductive
2017 Pond	7/18/2019	Silver-haired Bat	Female	Adult	Lactating
Beaver dam pond	7/20/2019	Silver-haired Bat	Female	Adult	Lactating
MYSE Pond	7/24/2019	Little Brown Bat	Male	Adult	Non-reproductive
Box Springs	7/29/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive

Locality	Date	Common Name	Sex	Age	Reproductive Status
Beaver Creek	8/2/2019	Eastern Red Bat	Female	Adult	#N/A
MYSE Pond	7/24/2019	Little Brown Bat	Male	Adult	Non-reproductive
MYSE Pond	6/12/2019	Northern Long-eared Bat	Female	Adult	#N/A
Scott Spring	6/27/2019	Long-legged Myotis	Male	Adult	Non-reproductive
MYSE Pond	6/12/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Bear Lake Pond	7/7/2019	Little Brown Bat	Male	Adult	Non-reproductive
2017 Pond	7/18/2019	Big Brown Bat	Male	Adult	Non-reproductive
Box Springs	7/29/2019	Fringed Myotis	Male	Adult	Non-reproductive
Beaver Creek	8/2/2019	Silver-haired Bat	Female	Juvenile	Non-reproductive
2017 Pond	7/25/2019	Little Brown Bat	Male	Adult	Non-reproductive
Box Springs	6/10/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Beaver Creek	6/23/2019	Western Long-eared Bat	Male	Adult	Non-reproductive
Box Springs	7/29/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Box Springs	8/4/2019	Big Brown Bat	Male	Adult	Non-reproductive
Box Springs	7/29/2019	Little Brown Bat	Male	Adult	Non-reproductive
Box Springs	6/10/2019	Little Brown Bat	Male	Adult	Non-reproductive
Beaver Creek Upper	6/24/2019	Hoary Bat	Male	#N/A	#N/A
Scott Spring	6/28/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Scott Spring	6/28/2019	Big Brown Bat	Male	Adult	Non-reproductive
Box Springs	8/4/2019	Little Brown Bat	Male	Adult	Non-reproductive
Box Springs	8/4/2019	Big Brown Bat	Female	Adult	Lactating
Box Springs	8/4/2019	Northern Long-eared Bat	Female	Adult	Non-reproductive
Bear Lake Pond	7/7/2019	Hoary Bat	Male	Adult	Non-reproductive
2017 Pond	7/18/2019	Silver-haired Bat	Female	Adult	Lactating
Scott Spring	6/27/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Scott Spring	6/28/2019	Little Brown Bat	Male	Adult	Non-reproductive
Scott Spring	6/28/2019	Northern Long-eared Bat	Female	Adult	Lactating
Beaver dam pond	7/20/2019	Little Brown Bat	Male	Adult	Non-reproductive
MYSE Pond	7/24/2019	Northern Long-eared Bat	Female	Adult	Pregnant
2017 Pond	7/17/2019	Long-legged Myotis	Female	Adult	Pregnant
Scott Spring	6/27/2019	Little Brown Bat	Male	Adult	Non-reproductive
Beaver dam pond	7/20/2019	Long-legged Myotis	Female	Adult	Non-reproductive
MYSE Pond	7/22/2019	Northern Long-eared Bat	Female	Adult	Lactating
Box Springs	6/10/2019	Silver-haired Bat	Female	Adult	Pregnant
MYSE Pond	6/12/2019	Northern Long-eared Bat	Female	Adult	Unknown
Beaver Creek	6/23/2019	Little Brown Bat	Male	Adult	Non-reproductive
Beaver Creek Upper	6/24/2019	Hoary Bat	Male	#N/A	Non-reproductive
Scott Spring	6/27/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Surprise Gulch	7/6/2019	Northern Long-eared Bat	Female	Adult	Non-reproductive

Locality	Date	Common Name	Sex	Age	Reproductive Status
Surprise Gulch	7/6/2019	Northern Long-eared Bat	Female	Adult	Pregnant
Bear Lake Pond	7/7/2019	Long-legged Myotis	#N/A	#N/A	#N/A
2017 Pond	7/18/2019	Silver-haired Bat	Female	Adult	Lactating
Beaver Creek	8/2/2019	Silver-haired Bat	Female	Adult	Non-reproductive
Box Springs	8/4/2019	Long-legged Myotis	Male	Adult	Non-reproductive
Scott Spring	6/27/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Beaver Creek	6/23/2019	Big Brown Bat	Male	Adult	Non-reproductive
Beaver Creek	8/2/2019	Silver-haired Bat	Female	Adult	Post Lactating
MYSE Pond	6/12/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
MYSE Pond	6/12/2019	Northern Long-eared Bat	Female	Adult	#N/A
MYSE Pond	7/24/2019	Little Brown Bat	Male	Adult	Non-reproductive
Surprise Gulch	7/5/2019	Silver-haired Bat	Female	Adult	Lactating
Box Springs	6/10/2019	Northern Long-eared Bat	Female	Adult	Pregnant
Box Springs	6/10/2019	Little Brown Bat	Male	Adult	Non-reproductive
Scott Spring	6/28/2019	Big Brown Bat	Male	Adult	Non-reproductive
Bear Lake Pond	7/7/2019	Hoary Bat	Male	Adult	Non-reproductive
Bear Lake Pond	7/7/2019	Northern Long-eared Bat	Female	Juvenile	Non-reproductive
2017 Pond	7/17/2019	Fringed Myotis	Male	Adult	Non-reproductive
Beaver Creek	8/2/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Box Springs	8/4/2019	Long-legged Myotis	Male	Adult	Non-reproductive
Box Springs	8/4/2019	Little Brown Bat	Male	Adult	Non-reproductive
Box Springs	8/4/2019	Little Brown Bat	Female	Juvenile	Non-reproductive
MYSE Pond	7/22/2019	Northern Long-eared Bat	Female	Adult	Non-reproductive
Beaver Creek	6/24/2019	Little Brown Bat	Male	Adult	Non-reproductive
Upper					
Beaver Creek	6/24/2019	Silver-haired Bat	Female	Adult	Pregnant
Upper					
Scott Spring	6/27/2019	Northern Long-eared Bat	Female	Adult	#N/A
Beaver Creek	8/2/2019	Big Brown Bat	Female	Adult	Post Lactating
Beaver Creek	8/2/2019	Little Brown Bat	Male	Adult	Non-reproductive
2017 Pond	7/17/2019	Northern Long-eared Bat	Male	Juvenile	Non-reproductive
2017 Pond	7/18/2019	Silver-haired Bat	Female	Adult	Lactating
MYSE Pond	7/24/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Box Springs	6/10/2019	Silver-haired Bat	Female	Adult	Pregnant
Blacktail Creek	6/22/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Box Springs	8/4/2019	Big Brown Bat	Male	Adult	Non-reproductive
MYSE Pond	6/12/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Surprise Gulch	7/5/2019	Silver-haired Bat	Male	Adult	Non-reproductive
MYSE Pond	7/24/2019	Big Brown Bat	Male	Adult	Non-reproductive
Scott Spring	6/27/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Scott Spring	6/28/2019	Northern Long-eared Bat	Female	Adult	Lactating

Locality	Date	Common Name	Sex	Age	Reproductive Status
Beaver Creek	8/2/2019	Silver-haired Bat	Male	Juvenile	Non-reproductive
Beaver Creek	8/2/2019	Hoary Bat	Male	Adult	Non-reproductive
2017 Pond	7/17/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
MYSE Pond	7/24/2019	Long-legged Myotis	Female	Adult	Non-reproductive
Blacktail Creek	6/22/2019	Big Brown Bat	Male	Adult	Non-reproductive
Box Springs	8/4/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Scott Spring	6/28/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Bear Lake Pond	7/7/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Beaver dam pond	7/20/2019	Silver-haired Bat	Female	Juvenile	Non-reproductive
Surprise Gulch	7/5/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Beaver dam pond	7/20/2019	Little Brown Bat	Female	Adult	Non-reproductive
Scott Spring	6/27/2019	Northern Long-eared Bat	Male	#N/A	Non-reproductive
Surprise Gulch	7/6/2019	Northern Long-eared Bat	Female	Adult	Non-reproductive
Bear Lake Pond	7/7/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Bear Lake Pond	7/7/2019	Silver-haired Bat	Female	#N/A	#N/A
2017 Pond	7/18/2019	Silver-haired Bat	Female	Adult	Lactating
2017 Pond	7/18/2019	Silver-haired Bat	Female	Adult	Lactating
Beaver dam pond	7/20/2019	Silver-haired Bat	Female	Adult	Post Lactating
MYSE Pond	7/24/2019	Hoary Bat	Male	Adult	Non-reproductive
Box Springs	6/10/2019	Big Brown Bat	Female	Adult	Pregnant
2017 Pond	7/18/2019	Hoary Bat	Female	Adult	Non-reproductive
Box Springs	8/4/2019	Big Brown Bat	Male	Adult	Non-reproductive
MYSE Pond	6/12/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
MYSE Pond	7/22/2019	Long-legged Myotis	Female	Adult	Lactating
MYSE Pond	6/11/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
MYSE Pond	7/24/2019	Big Brown Bat	Male	Adult	Non-reproductive
Box Springs	8/4/2019	Northern Long-eared Bat	Female	Adult	Lactating
Box Springs	6/10/2019	Big Brown Bat	Female	Adult	Pregnant
Blacktail Creek	6/22/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Beaver Creek	8/2/2019	Hoary Bat	Male	Adult	Non-reproductive
Beaver Creek	8/2/2019	Silver-haired Bat	Female	Adult	Post Lactating
Box Springs	8/4/2019	Big Brown Bat	Female	Adult	Lactating
Box Springs	8/4/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Surprise Gulch Pond	7/5/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Box Springs	6/10/2019	Big Brown Bat	Female	Adult	Pregnant
MYSE Pond	6/12/2019	Big Brown Bat	Male	Adult	Non-reproductive
Blacktail Creek	6/22/2019	Long-legged Myotis	Male	Adult	Non-reproductive
Beaver Creek Upper	6/24/2019	Little Brown Bat	Male	Adult	Non-reproductive

Locality	Date	Common Name	Sex	Age	Reproductive Status
Beaver Creek Upper	6/24/2019	Silver-haired Bat	Female	Adult	Pregnant
Surprise Gulch	7/6/2019	Little Brown Bat	Male	Adult	Non-reproductive
Bear Lake Pond	7/7/2019	Hoary Bat	Female	Adult	Lactating
Beaver Creek	8/2/2019	Long-legged Myotis	Female	Adult	Lactating
MYSE Pond	7/22/2019	Long-legged Myotis	Female	Adult	Pregnant
Beaver Creek	8/2/2019	Silver-haired Bat	Male	Juvenile	Non-reproductive
Box Springs	6/10/2019	Silver-haired Bat	Female	Adult	Pregnant
Box Springs	6/10/2019	Silver-haired Bat	Female	Adult	Pregnant
Beaver Creek Upper	6/24/2019	Silver-haired Bat	Female	Adult	Pregnant
Bear Lake Pond	7/7/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Bear Lake Pond	7/7/2019	Fringed Myotis	Male	Adult	Non-reproductive
MYSE Pond	7/24/2019	Hoary Bat	Male	Adult	Non-reproductive
Box Springs	6/10/2019	Western Long-eared Bat	Male	#N/A	Non-reproductive
Scott Spring	6/27/2019	Hoary Bat	Female	Adult	Lactating
MYSE Pond	6/12/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
MYSE Pond	7/31/2019	Big Brown Bat	Female	Adult	Non-reproductive
Box Springs	6/10/2019	Silver-haired Bat	Female	Adult	Pregnant
Beaver Creek	8/2/2019	Silver-haired Bat	Female	Adult	Post Lactating
Beaver Creek	8/2/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Beaver Creek	8/2/2019	Big Brown Bat	Male	Adult	Non-reproductive
Beaver Creek	8/2/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Box Springs	6/10/2019	Big Brown Bat	Male	Adult	Non-reproductive
Beaver Creek Upper	6/24/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Beaver Creek Upper	6/24/2019	Silver-haired Bat	Female	Adult	Pregnant
Surprise Gulch	7/5/2019	Northern Long-eared Bat	Female	Adult	Pregnant
2017 Pond	7/18/2019	Little Brown Bat	Male	Adult	Non-reproductive
Beaver Creek	6/23/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Beaver Creek Upper	6/24/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Beaver Creek Upper	6/24/2019	Silver-haired Bat	Female	Adult	Pregnant
Surprise Gulch	7/6/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Box Springs	6/10/2019	Little Brown Bat	Male	Adult	Non-reproductive
MYSE Pond	7/24/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Box Springs	6/10/2019	Silver-haired Bat	Female	Adult	Pregnant
MYSE Pond	6/12/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Scott Spring	6/28/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Bear Lake Pond	7/7/2019	Little Brown Bat	Male	Adult	Non-reproductive

Locality	Date	Common Name	Sex	Age	Reproductive Status
Box Springs	8/4/2019	Long-legged Myotis	Male	Adult	Non-reproductive
Box Springs	8/4/2019	Fringed Myotis	Male	Adult	Non-reproductive
MYSE Pond	6/12/2019	Northern Long-eared Bat	Female	Adult	#N/A
Blacktail Creek	6/21/2019	Hoary Bat	Male	Adult	Non-reproductive
Box Springs	6/10/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Scott Spring	6/29/2019	Fringed Myotis	Male	Adult	Non-reproductive
Box Springs	8/4/2019	Big Brown Bat	Male	Adult	Non-reproductive
Box Springs	8/4/2019	Hoary Bat	Female	Juvenile	Non-reproductive
Scott Spring	6/27/2019	Western Long-eared Bat	Male	Adult	Non-reproductive
Box Springs	6/10/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Beaver Creek	8/2/2019	Big Brown Bat	Male	Adult	Non-reproductive
Box Springs	8/4/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Box Springs	8/4/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Beaver Creek	6/23/2019	Hoary Bat	Male	Adult	Non-reproductive
MYSE Pond	7/24/2019	Little Brown Bat	Male	Adult	Non-reproductive
Beaver Creek	8/2/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Beaver Creek	8/2/2019	Big Brown Bat	Male	Adult	Non-reproductive
MYSE Pond	6/12/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Bear Lake Pond	7/8/2019	Silver-haired Bat	Female	Adult	Lactating
MYSE Pond	6/12/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
2017 Pond	7/17/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Surprise Gulch	7/5/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Bear Lake Pond	7/7/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Bear Lake Pond	7/8/2019	Western Long-eared Bat	Female	Adult	Lactating
Beaver Creek	8/2/2019	Hoary Bat	Female	Adult	Post Lactating
Beaver Creek	8/3/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Box Springs	8/4/2019	Western Long-eared Bat	Male	Adult	Non-reproductive
Blacktail Creek	6/21/2019	Little Brown Bat	Male	Adult	Non-reproductive
MYSE Pond	7/24/2019	Fringed Myotis	Male	Adult	Non-reproductive
Box Springs	8/5/2019	Little Brown Bat	Male	Adult	Non-reproductive
Surprise Gulch	7/6/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Bear Lake Pond	7/7/2019	Little Brown Bat	Male	Adult	Non-reproductive
Bear Lake Pond	7/7/2019	Northern Long-eared Bat	Female	Adult	Pregnant
Bear Lake Pond	7/7/2019	Western Long-eared Bat	Male	Adult	Non-reproductive
2017 Pond	7/18/2019	Silver-haired Bat	Female	Adult	Lactating
2017 Pond	7/17/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Scott Spring	6/29/2019	Western Long-eared Bat	Male	Adult	Non-reproductive
Box Springs	6/10/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Beaver dam pond	7/21/2019	Hoary Bat	Female	#N/A	Lactating
2017 Pond	7/18/2019	Western Long-eared Bat	Male	Adult	Non-reproductive

Locality	Date	Common Name	Sex	Age	Reproductive Status
2017 Pond	7/19/2019	Northern Long-eared Bat	Female	Adult	Lactating
MYSE Pond	7/23/2019	Fringed Myotis	Male	Adult	Non-reproductive
MYSE Pond	7/23/2019	Little Brown Bat	Male	Adult	#N/A
Box Springs	8/5/2019	Hoary Bat	Male	Juvenile	Non-reproductive
Box Springs	8/5/2019	Western Long-eared Bat	Male	Adult	Non-reproductive
Beaver dam pond	7/21/2019	Silver-haired Bat	Female	Adult	Lactating
Box Springs	8/5/2019	Hoary Bat	Male	Adult	Non-reproductive
Beaver dam pond	7/21/2019	Little Brown Bat	Male	Adult	Non-reproductive
MYSE Pond	7/23/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Box Springs	8/5/2019	Hoary Bat	Female	Adult	Non-reproductive
Box Springs	8/5/2019	Hoary Bat	Male	Juvenile	Non-reproductive
Box Springs	8/5/2019	Hoary Bat	Female	Adult	Post Lactating
Box Springs	8/5/2019	Hoary Bat	Female	Juvenile	Non-reproductive
MYSE Pond	7/25/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
MYSE Pond	7/23/2019	Fringed Myotis	Male	Adult	Non-reproductive
Box Springs	6/10/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Beaver Creek	8/2/2019	Eastern Red Bat	Female	Adult	Non-reproductive
2017 Pond	7/19/2019	Long-legged Myotis	Female	Adult	Lactating
2017 Pond	7/19/2019	Big Brown Bat	Female	Adult	Non-reproductive
2017 Pond	7/19/2019	Big Brown Bat	Female	Adult	Non-reproductive
2017 pond	7/19/2019	Long-legged Myotis	Female	Adult	Pregnant
Box Springs	6/10/2019	Little Brown Bat	Male	Adult	Non-reproductive
Scott Spring	6/27/2019	Big Brown Bat	Male	Adult	Non-reproductive
2017 Pond	7/19/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Box Springs	6/10/2019	Silver-haired Bat	Male	Adult	Non-reproductive
2017 Pond	7/19/2019	Silver-haired Bat	Female	Adult	Lactating
2017 Pond	7/19/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
Box Springs	6/10/2019	Little Brown Bat	Male	Adult	Non-reproductive
2017 Pond	7/19/2019	Little Brown Bat	Male	Adult	Non-reproductive
MYSE Pond	7/23/2019	Big Brown Bat	Male	Adult	Non-reproductive
Box Springs	8/5/2019	Silver-haired Bat	Female	Adult	Non-reproductive
Box Springs	6/10/2019	Silver-haired Bat	Female	Adult	Pregnant
Box Springs	6/10/2019	Northern Long-eared Bat	Female	Adult	Pregnant
Box Springs	8/5/2019	Long-legged Myotis	Male	Adult	Non-reproductive
MYSE Pond	7/25/2019	Northern Long-eared Bat	Female	Adult	Lactating
Box Springs	8/5/2019	Hoary Bat	Male	Juvenile	Non-reproductive
MYSE Pond	7/23/2019	Northern Long-eared Bat	Male	Adult	Non-reproductive
2017 Pond	7/19/2019	Silver-haired Bat	Female	Adult	Lactating
2017 Pond	7/19/2019	Northern Long-eared Bat	Female	Adult	Non-reproductive
Box Springs	8/5/2019	Silver-haired Bat	Male	Adult	Non-reproductive

Locality	Date	Common Name	Sex	Age	Reproductive Status
Box Springs	8/5/2019	Northern Long-eared Bat	Female	Adult	Lactating
Box Springs	8/5/2019	Little Brown Bat	Male	Adult	Non-reproductive
Box Springs	6/10/2019	Little Brown Bat	Male	Adult	Non-reproductive
Box Springs	6/10/2019	Long-legged Myotis	Male	Adult	Non-reproductive
Box Springs	6/10/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Box Springs	6/10/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Beaver Creek Upper	6/24/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Bear Lake Pond	7/7/2019	Long-legged Myotis	Male	Adult	Non-reproductive
Bear Lake Pond	7/7/2019	Long-legged Myotis	Male	Adult	Non-reproductive
Surprise Gulch	7/5/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Surprise Gulch	7/5/2019	Silver-haired Bat	Male	Adult	Non-reproductive
Bear Lake Pond	7/7/2019	Long-legged Myotis	Male	Adult	Non-reproductive

Table 6. Northern Long-eared Bat day roost sites and roost characteristics observed on the Black Hills National Forest, Bearlodge Ranger District in 2017 and 2018.

Roost ID	Date	Tree Species	Tree Status	Decay Class	DBH Inches	Tree Height	Sloughing Bark	Evident Cavities
BR01	6/27/2017	Ponderosa Pine	Live	0	29	18.8	None	Yes
BR01	6/28/2017	Ponderosa Pine	Live	0	29	18.8	None	Yes
BR02	6/27/2017	Ponderosa Pine	Live	0	24	18.2	None	Yes
BR02	6/28/2017	Ponderosa Pine	Live	0	24	18.2	None	Yes
BR02	6/29/2017	Ponderosa Pine	Live	0	24	18.2	None	Yes
BR03	6/29/2017	Ponderosa Pine	Live	0	21	24.4	None	Yes
BR03	6/30/2017	Ponderosa Pine	Live	0	21	24.4	None	Yes
BR04	6/29/2017	River Birch	Live	0	10	18.9	None	No
BR04	7/1/2017	River Birch	Live	0	10	18.9	None	No
BR05	6/30/2017	Ponderosa Pine	Live	0	20	25.4	None	Yes
BR06	7/1/2017	Ponderosa Pine	Live	0	18	21	None	Yes
BR07	7/22/2017	Ponderosa Pine	Dead	2	29	21.6	0-25%	Yes
BR07	7/23/2017	Ponderosa Pine	Dead	2	29	21.6	0-25%	Yes
BR07	7/24/2017	Ponderosa Pine	Dead	2	29	0	0-25%	Yes
BR08	7/23/2017	Aspen	Live	0	13	11	None	Yes
BR08	7/24/2017	Aspen	Live	0	12	13	None	Yes
BR08	7/25/2017	Aspen	Live	0	12	0	None	Yes
BR09	7/23/2017	Ponderosa Pine	Dead	5	12	11.2	None	Yes
BR10	7/23/2017	Ponderosa Pine	Dead	3	14	20	26-50%	Yes
BR10	7/24/2017	Ponderosa Pine	Dead	3	14	0	26-50%	Yes
BR10	7/25/2017	Ponderosa Pine	Dead	3	14	0	26-50%	Yes
BR11	7/24/2017	Aspen	Live	0	11	10.2	None	Yes
BR12	7/25/2017	Ponderosa Pine	Dead	5	23	5	0-25%	Yes
BR13	7/25/2017	Aspen	Live	0	12	12.6	None	Yes
BR14	7/26/2017	Ponderosa Pine	Dead	4	16	10	26-50%	Yes
BR14	7/26/2017	Ponderosa Pine	Dead	4	16	10	26-50%	Yes
BR14	7/27/2017	Ponderosa Pine	Dead	4	16	0	26-50%	Yes
BR15	7/26/2017	Aspen	Dead	2	3	6.6	76-100%	Yes
BR15	7/27/2017	Aspen	Dead	2	3	6.6	76-100%	Yes
BR16	7/26/2017	Ponderosa Pine	Dead	2	17	17.4	76-100%	Yes
BR16	7/27/2017	Ponderosa Pine	Dead	2	17	17.4	76-100%	Yes
BR17	7/16/2018	Ponderosa Pine	Dead	4	23	20.2	76-100%	Yes
BR18	7/18/2018	Ponderosa Pine	Live	0	18	19	None	Yes
BR20190804_690	8/4/2019	Ponderosa Pine	Dead	6	15.5	4.8		Yes
BR20190803_690	8/3/2019	Ponderosa Pine	Dead	5	22	20.2		Yes
BR20190802_690	8/2/2019	Ponderosa Pine	Live	1	17.6	20.6		Yes

Roost ID	Date	Tree Species	Tree Status	Decay Class	DBH Inches	Tree Height	Sloughing Bark	Evident Cavities
BR20190801_690	8/1/2019	Aspen	Live	1	9.5	14.8		Yes
BR20190731_193	7/31/2019	Ponderosa Pine	Live	1	21	21.2		Yes
BR20190730_690	7/30/2019	Ponderosa Pine	Live	1	21	19		Yes
BR20190727_958	7/27/2019	Aspen	Live	2	7.1	7.2		Yes
BR20190724_571	7/24/2019	Ponderosa Pine		6	20	13		Yes
BR20190723_571	7/23/2019	Aspen	Live	2	8	12.6		Yes
BR20190719_452	7/19/2019	Burr Oak	Live	2	9	8.2		Yes
BR20180708_331	7/8/2019	Aspen	Live	2	8	11.6		Unknown
BR20190708_533	7/8/2019	Aspen	Dead	3	12	8.6		Unknown
BR20190707_533	7/7/2019	Aspen	Live	2	13.5	15.2		Yes
BR20190707_812	7/7/2019	Aspen	Dead	3	8.05	11.6		Yes
BR20190706_331	7/6/2019	Ponderosa Pine	Dead	4	20.9	10.4		Yes
BR20190706_812	7/6/2019	Ponderosa Pine	Dead	4	19.9	25.6		n
BR20190701_090	7/1/2019	Aspen	Live	1	8.5	13.2		Yes
BR20190630_211	6/30/2019	Aspen	Dead	5	9.7			Yes
BR20190629_211	6/29/2019	Burr Oak	Live	1	13.6	11.8		Unknown
BR20190629_090	6/29/2019	Aspen	Dead	6	12.5	5.6		Yes
BR20190613_449	6/13/2019	Aspen	Live	1	21.2	13.3		Yes
BR20190613_818	6/13/2019	Aspen	Dead	4	11.2	13		Yes
BR20190618_449	6/18/2019	Aspen	Dead	4	10	12.63		No
BR20190613_643	6/13/2019	Aspen	Live	2	6.5	8		Unknown
BR20190615_818	6/15/2019	Aspen	Dead	3	12	2		Yes
BR20190611_978	6/11/2019	Aspen	Live	1	10.5	13.9		Yes

Table 7. Date, emergence time, and count of individual bats emerging from Northern Long-eared Bat day roost sites on the Black Hills National Forest, Bearlodge Ranger District in 2017, 2018, and 2019.

Roost ID	Date	Emergence Time	Bat Count
BR01	6/29/2017	2109	39
BR02	6/28/2017	2111	21
BR03	7/2/2017	2105	18
BR05	7/1/2017	2106	1
BR06	7/2/2017	2106	26
BR07	7/23/2017	2051	51
BR08	7/24/2017	2100	1
BR09	7/24/2017	2052	37
BR10	7/24/2017	2051	1
BR11	7/25/2017	2057	25
BR13	7/26/2017	2039	17
BR15	7/27/2017	2052	1
BR16	7/27/2017	2054	2
BR17	7/16/2018	-	34
BR18	7/18/2018	2114	4
BR20190613_449	6/13/2019	21:08	1
BR20190613_643	6/13/2019	21:19	2
BR20190613_818	6/13/2019	21:00	57
BR20190611_978	6/12/2019	21:14	1
BR20190611_978	6/11/2019	-	0
BR20190613_818	6/17/2019	21:06	65
BR20190618_449	6/18/2019	21:08	1
BR07	6/24/2019	-	0
20190630_211	6/30/2019	21:04	31
BR20190701_090	7/1/2019	-	1
BR20190708_533	7/9/2019	20:52	45
BR20190708_331	7/8/2019	20:58	33
BR20190707_812	7/7/2019	21:05	1
BR20190706_812	7/6/2019	21:09	2
BR20190707_533	7/7/2019	20:58	21
BR20190706_331	7/6/2019	21:29	1
BR17	7/17/2019	21:20	1
BR20190719_452	7/21/2019	20:53	38
BR20190723_571	7/23/2019	20:59	39
BR13	7/25/2019	20:58	1
BR11	7/25/2019	-	0
BR09	7/25/2019	-	0
20190724_571	7/24/2019	20:59	26

Roost ID	Date	Emergence Time	Bat Count
BR20190731_193	8/1/2019	-	0
BR02	8/1/2019	-	0
BR20190730_690	7/30/2019	20:39	51
BR20190801_690	8/1/2019	20:40	48
BR20190802_690	8/3/2019	-	0
BR20190803_690	8/3/2019	20:38	43

Table 8. Candidate models and associated AICc statistics investigating the selection of day roost structures by NLEB on the Black Hills National Forest, Bearlodge Ranger District in 2017 and 2018. The model in bold font indicates the best approximating model.

Model Form	K	AICc	Δ AICc	AICc Weight	Cumulative Weight
DecayClass + DBH_inches + Tree Height	4	73.88	0	0.56	0.56
DBH_inches + Tree Height	3	74.44	0.56	0.42	0.98
DBH_inches	2	81.51	7.63	0.01	0.99
DecayClass + DBH_inches	3	82.62	8.74	0.01	1
DecayClass + Tree Height	3	92.08	18.20	0	1
Tree Height	2	98.02	24.14	0	1
null	1	134.97	61.09	0	1
DecayClass	2	135.13	61.25	0	1

Table 9. Candidate models and associated AICc statistics investigating the selection of habitat surrounding day roost sites used by NLEB on the Black Hills National Forest, Bearlodge Ranger District in 2017 and 2018. The model in bold font indicates the best approximating model.

Model Form	K	AICc	Δ AICc	AICc Weight	Cumulative Weight
PP_DSO_DBH + DSU_Decay + D_Snags	4	22.06	0	0.87	0.87
PP_DSO_DBH + DSU_Decay	3	27.57	5.51	0.06	0.92
PP_DSO_DBH + D_Snags	3	28.21	6.15	0.04	0.96
DSU_Decay + D_Snags	3	29.59	7.53	0.02	0.98
PP_DSO_DBH	2	31.06	9.00	0.01	0.99
DSU_Decay	2	31.90	9.84	0.01	1
D_Snags	2	36.56	14.51	0	1

Table 10. Model coefficients from the best approximating model for selection of day roost structures by NELB on the Black Hills National Forest, Bearlodge Ranger District in 2017 and 2018.

Variable	Estimate	SE	z-value	Pr(> z)	LCL	UCL
(Intercept)	-9.84	1.50	-6.56	>0.001	-13.40	-7.40
DBH_inches	0.28	0.06	4.64	>0.001	0.17	0.42
TreeHeight	0.15	0.06	2.81	>0.01	0.05	0.27

Table 11. Model coefficients from the best approximating model for habitat surrounding day roosts by NELB on the Black Hills National Forest, Bearlodge Ranger District in 2017 and 2018.

Variable	Estimate	SE	z-value	Pr(> z)	LCL	UCL
(Intercept)	-3.75	5.24	-0.72	0.474	-17.01	6.22
PP_DSO_DBH	1.09	0.61	1.79	0.073	0.22	2.70
DSU_Decay	-4.25	2.33	-1.83	0.068	-10.72	-0.99
D_Snags	55.88	30.14	1.85	0.064	12.11	135.87