

**Bat Biodiversity Survey
Marsh-Billings-Rockefeller National
Historic Park**

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EXECUTIVE SUMMARY

The bat biodiversity survey was completed during the middle of the active season of temperate northeastern bats in the Marsh-Billings-Rockefeller National Historic Park (MBRNHP). The objectives of the monitoring were to; (1) survey MBRNHP for the presence of endangered bats and (2) obtain some basic biological data on bat biodiversity throughout MBRNHP. After 5 nights of sampling (309 net-meter-nights), a total of 113 bats were captured. Neither the federally-endangered Indiana bat (*Myotis sodalis*) or the state-threatened eastern small-footed bat (*M. leibii*), were captured during the survey. The only two species captured with mist nets were the little brown bat (*M. lucifugus*: 75% of captures) and the northern long-eared bat (*M. septentrionalis*: 25% of captures).

Trapping data suggest that trails are the primary travel corridor and water sources (The Pogue) are the primary foraging areas for the smaller woodland bats in the MBRNHP; these trails and water bodies should be adequately sampled to maximize the capture success of *Myotis* spp. However, MBRNHP lacks small ponds, which are known to be an important habitat feature for trapping more elusive species.

Acoustic monitoring resulted in 1,336 calls from at least seven species. The forty (40) non-*Myotis* calls belonged to *Eptesicus fuscus* (n=16), *Pipistrellus subflavus* (n=15), *Lasiurus cinereus*, (n=5), *Lasionycteris noctivigans* (n=3), and *Lasiurus borealis* (n=1). Most of the acoustic activity for the non-*Myotis* spp was concentrated in fields, although several calls from *P. subflavus* were recorded along a roadway within the MBRNHP.

The Pogue is the critical habitat for bats in the park. The pine plantations appear to be devoid of bat life and should be managed to be a more diverse and mature forest community. Most of the bats captured are communal species that rely on human habitat for roosting. Examinations of some of the estate buildings showed historic evidence for bat roosting. Due to the renovations of the estate buildings, alternative roosting sites may need to be provided to maintain the local population, including bat houses and bat sheds. In addition, further renovations or cleanings that may impact bat roosting spaces should be done during the dormant period (from Sept through March) when bats are not present.

SCOPE OF RESEARCH

Limitations of Capture Technique

Most bats were captured using 38 mm mesh, 2-ply-50 denier black nylon (Avinet) mist nets of 6m, 9m, 12m, and 18m lengths. The mist nets were oriented horizontally or vertically ('canopy') depending on the habitat into which they were deployed.

Capturing bats in flight using ground-based nets continues to be one of the most difficult and time-consuming aspects of surveys. Because bats vary in habitat preference, height of flight, and flight speeds, mist nets are often biased in their sampling. Specifically, hoary bats (*Lasiurus cinereus*) and silver-haired bats (*Lasionycteris noctivagans*), and to a lesser degree, red bats (*Lasiurus borealis*), are larger and have a relatively high aspect ratio that restricts their flight to open habitat that can not be easily sampled by mist nets. When possible, attempts were made to compensate for this bias by sampling over water, where most bats either forage or drink.

Limitations of Acoustic Monitoring

The acoustic surveys were conducted using frequency-division (Anabat II) detectors housed in remote monitoring stations running for a minimum of five hours (usually from at sunset until 02:00). The two goals of the acoustic survey were to; (1) evaluate general bat activity and (2) compare species detected with the acoustic survey with species captured in the field.

Acoustic monitoring offers biologists the opportunity to observe foraging and commuting bats without impacting their behavior or risk of injury. This technique provides a lot of 'broad-brush' information about habitat usage patterns with a relatively small amount of effort and cost. However, the advantages of acoustic monitoring must be weighed against its detractors. Specifically, this type of research does not measure species abundance, population density, or other population biology characteristics that impact conservation biology decisions. Further, distribution patterns drawn from these data do not necessarily reflect causative agents since no attempts were made to create a balanced experimental design. Lastly, limitations of this equipment prevent us from detecting species within the genus *Myotis*. This genus contains the state-threatened small-footed myotis (*Myotis leibii*) and the federally-endangered Indiana bat (*Myotis sodalis*).

SPECIES DESCRIPTION

Vermont has nine species of bats that occupy the state during either the summer or winter months. All of these species belong to the family Vespertilionidae within the Order Chiroptera. The following is a list of these bat species with abbreviations used throughout the report:

Common Name	Scientific Name	Abbreviation
1. Little brown myotis	<i>Myotis lucifugus</i>	Mlu
2. Eastern small-footed myotis	<i>Myotis leibii</i>	Mle
3. Northern long-eared myotis	<i>Myotis septentrionalis</i>	Msp
4. Indiana bat	<i>Myotis sodalis</i>	Msd
5. Big brown bat	<i>Eptesicus fuscus</i>	Ef
6. Eastern pipistrelle bat	<i>Pipistrellus subflavus</i>	Ps
7. Eastern red bat	<i>Lasiurus borealis</i>	Lb
8. Hoary bat	<i>Lasiurus cinereus</i>	Lc
9. Silver-haired bat	<i>Lasionycteris noctivagans</i>	Ln

The first six species are temperate hibernating bats that spend the active months (summer) foraging and reproducing in Vermont and spend the remainder of the year hibernating in abandoned mines throughout New England and New York. The remaining three species (7-9) spend the summer months in Vermont and migrate south during the colder seasons to hibernate (9) or remain active in more southern climates (7-8).

1. Little Brown Bat

Myotis lucifugus

The Little Brown bat is a medium-sized bat with glossy fur that varies from dark sooty brown to pale golden brown, with light ventral fur. It is one of the most abundant bats in North America, distributed throughout the entire continent; as far north as central Alaska and south down to the Valley of Mexico. They roost in a variety of sites including attics, trees, under bridges and rocks and occasionally in caves. The bats typically remain torpid during the day, but can stay active during warm days. Little brown bats eat aquatic insects, moths, wasps, gnats and beetles. They typically forage at a height of about 3-6 meters above the ground, foraging along vegetation borders and above water. In the northeast, Little Brown bats leave their summer roosts to hibernate in abandoned mines that are often 100 miles or more from their nursery colonies.

2. Eastern Small-footed Myotis

Myotis leibii

The Small-Footed myotis is a small bat with thick glossy fur that is dark brown in color with golden highlights due to longer hairs that are lighter colored at the tip. Both the ears and wings of the bat are blackish in color. The Small-Footed bat is most commonly found in deciduous forests of the northeastern United States and Canada. It is a relatively rare bat and is not believed to be abundant in any part of this range. The Small-Footed bat is generally found roosting in buildings and beneath rock slabs, and forms small maternity colonies. It is a slow and erratic flyer, but little is known about its feeding habits. The Small-Footed bat can be distinguished from the Little Brown bat by features of the face and feet; in the Small-Footed bat, the rostrum and ears are black, forming a distinct mask. The feet of the small-footed bats also contains a strongly-keeled calcar.

3. Northern Long-Eared Bat

Myotis septentrionalis

The Northern long-eared bat is a small bat with dull gray/brown fur and long ears (13 mm). They inhabit eastern and northern North America, extending from eastern Canada to the Florida panhandle. They roost in small groups (less than 100), but are also commonly found as solitary individuals, utilizing both natural and man-made roost structures but preferring tight crevices and holes. Northern Long-Eared bats hibernate in relatively humid caves at cooler temperatures than most other bats. It is thought to forage along forest edges, clearings and sometimes over ponds. We relied on several morphological measures to separate *M. septentrionalis* from *M. lucifugus*. Specifically, we classified all bats as *M. septentrionalis* if we found 1) a longer, more pointed tragus, 2) longer ears with more prominent antitragal ridges, 3) the absence of toe hairs that extend beyond the toes, and 4) and uropatigial striations that were fewer ($n < 15$) and more evenly distributed. In practice, many individuals of *M. septentrionalis* shown morphological overlap with *M. lucifugus* in one or more of these characters.

4. Indiana Myotis

Myotis sodalis

The Indiana bat is a medium-sized bat with dull gray/black fur and a pale gray-brown nose. It is found in the eastern United States from Vermont to Florida. They often migrate large distances (up to 500 km) from their summer colonies to hibernation caves each autumn, foraging nightly in early September and October to replenish fat reserves consumed during migration. During

summer, Indiana bats use natural roosts, typically beneath the bark of trees, hollows, or under bridges. Females give birth to single pups in late June. Indiana bats forage near rivers but feed more often among trees rather than over water, flying slow and erratic beneath the forest canopy. The primary prey of the Indiana bat are moths, but they also consume several types of flies and beetles. The Indiana bat is federally endangered due to cave exploration and destruction.

5. Big Brown Bat *Eptesicus fuscus*

The Big Brown bat is a large, heavy-bodied bat with relatively large eyes, a wide nose and small, black ears. The fur is long, soft and somewhat oily with the color ranging from pale tan to a rich dark brown. They are usually darker dorsally than ventrally. The Big Brown is one of the most common bats in North America, ranging from Alaska and Canada through most of Central America and even into South America. It is one of the most common 'house bats', commonly found roosting in attics and barns, but also using hollow trees, rock crevices and other natural roosts when man-made buildings are unavailable. They generally roost in small groups in New England (less than 50 females) but can reach colony sizes of up to 700 individuals. They are very strong fliers and can forage in a variety of habitats including forested areas, fields and over streams, often travelling the same course each evening. Big Brown bats eat a large variety of medium-sized insects, but are especially partial to beetles. Big Brown bats often hibernate in places that are close to their summer colonies, sometimes using the same site for both maternity roost and hibernaculum. Big Brown bats in New England typically have twin pups that are born in late June.

6. Eastern Pipistrelle *Pipistrellus subflavus*

The Pipistrelle bat is a small bat with distinctive tri-colored hairs (dark at the base and tip and light yellow-brown in the middle). Found throughout eastern North and Central America and the Midwestern United States, the Pipistrelle is generally found solitary or forming small groups of up to 30 females during the summer. Virtually nothing is known about the summer distribution of this species in New Hampshire. Research from Massachusetts suggests that pipistrelles begin foraging earlier than most species in the evening, often foraging over waterways, open pasture and at the forest edges but never in deep woods. Pipistrelles are commonly found hibernating near other species in New Hampshire hibernacula.

7. Red Bat *Lasiurus borealis*

The Red bat is a medium-sized bat with reddish fur with hairs that are dark at the base and red at the ends. The females' fur is white-tipped, giving them a yellowish or frosted appearance whereas the males is brick red in color. The Red bat is a forest-dwelling species that roosts exclusively in among leaf clusters. They roost alone or in small groups, emerging early in the evening near dusk and foraging at treetop level or higher in forest edges and clearings. They eat a large variety of insects, following the same flight pattern each night. Red bats are one of the migratory species that migrate south each autumn and return to New England each spring to reproduce. The females give birth to a litter from one to four young, very much like the Hoary Bat.

8. Hoary Bat *Lasiurus cinereus*

The Hoary bat is a large bat with very distinctive grayish mahogany fur on the body and yellowish patches on the face and throat. The Hoary bat has the widest range of all American bats, although it is relatively rare in New England. The Hoary bat roosts primarily in trees during the day, but have also been reported to use buildings and squirrel nests. They roost

alone or in small groups of two to seven bats. They tend to emerge later in the evening than most other bats species, becoming most active about 4 hours after sunset. The Hoary bat is a swift and powerful flyer that eats predominantly moths but also will eat beetles, flies, dragonflies and wasps. Hoary bats are also one of the migratory species of bat, travelling south in the autumn and returning to the north and east during the spring to reproduce. The Hoary bat has one to four offspring each summer, the highest litter size of any New England bat.

9. Silver-Haired Bat

Lasionycteris noctivigans

The Silver-Haired Bat is a medium sized bat whose white-tipped hairs create a frosted appearance. The wings, ears and interfemoral membrane are black. The bat is found in most parts of the United States, as well as southern Canada and northern Mexico. The Silver-Haired bat is one of three New England bat species that is migratory, moving north in the spring and returning south in the fall. Not a lot is known about this species because they are not very abundant, but it is generally believed that they roost in hollow trees in coniferous or mixed deciduous forests in family groups consisting of a female and her two pups. They are generally slow and erratic flyers that forage at low altitude near ponds and streams eating a wide variety of insects.

SITE SELECTION AND SURVEY TECHNIQUES

Site Selection

Review of the habitat and topographic maps suggested we focus on two primary areas for sampling MBRNHP lands over the 5 day period; the Pogue Lake and fields associated with the MBRNHP estate. Consequently, these two areas were sampled during the project (Fig. 1). Once these areas were chosen, specific net and acoustic monitoring sites were chosen based on walking surveys to evaluate the presence of travel corridors (trails and roads), linear landscape elements (forest edges), and access to water; three habitat factors known to be important for bats.

Mist Nets

Walking surveys of each site were conducted to determine the number, type, and orientation (ground or canopy) of mist nets to be deployed. Horizontal mist nets were set across trails, roads, or edge habitat to capture bats on route to foraging locations. When available, horizontal mist nets were also set over water to capture bats foraging on emerging insects or drinking. Canopy nets were set primarily in trails that were 3-4 m in width and had overhanging structure that allowed a rope to be used for hoisting the net.

Based on the U.S. Fish and Wildlife Mist Netting Guidelines (Appendix 1), at least three nets were used at each site, and each site was sampled for at least two nights to obtain a minimum six (6) net-night effort. Because the number and length of mist nets deployed varied nightly, each site summary includes net details and total net-meter-nights to standardize capture success (Appendix 2). Also according to the above guidelines, mist nets were left open for a minimum of five hours, with nets set up from sunset to at least 01:30.

Ambient temperature was measured concurrently using a Kestrel 3000™ portable temperature, relative humidity, and wind speed computer.

Anabat Detectors

Each detection system consisted of an ANABAT ultrasonic detector attached to a zero-crossing analysis interface module (ZCAIM). ‘Real-time’ monitoring of the echolocation calls

was achieved by attaching the ZCAIM to an IBM-compatible laptop. All calls were saved to the laptop computer in site-specific directories for analysis.

The system was operated on remote mode (automatic data collection) using a weatherproof enclosure. In order to sample continuously throughout the evening, the detector, ZCAIM, and computer were connected to a DC-AC transformer and powered by a 12V battery.

RESULTS

Capture Results

The bat survey of the MBRNHP was based on a total of 309 net-meter-nights. In total, 113 bats were captured, with more little brown bats (*M. lucifugus*; 75% total captures) than northern long-eared bats (*M. septentrionalis*; 25% of total captures) (Table 1, Appendix). No eastern small-footed bats (*M. leibii*) or Indiana bats (*M. sodalis*) were captured during this survey. Although not many bats were captured in total, at least two species were captured at each site. More bats were caught over water (35%) and trailheads (35%) than trails (28%), hillsides (2%), roads (0%) or fields (0%). Based on relatively sampling effort, sampling over the water clearly had the highest capture efficiency, representing 35% of the total captures, but only 9% of the nets and 16% of the total net-m-nights.

Table 1. Summary of mist net hours and captures.

	Pogue West 07/24	Pogue East 07/25	Estate 07/26	Estate 07/31	Pogue West 08/01
Total net-meter-nights	54	51	84	66	54
Total net-nights	6	7	9	7	6
Bat Species Captured					
<i>M. lucifugus</i>	22	23	1	0	39
<i>M. septentrionalis</i>	2	11	0	1	14
Total Bats:	24	34	1	1	53

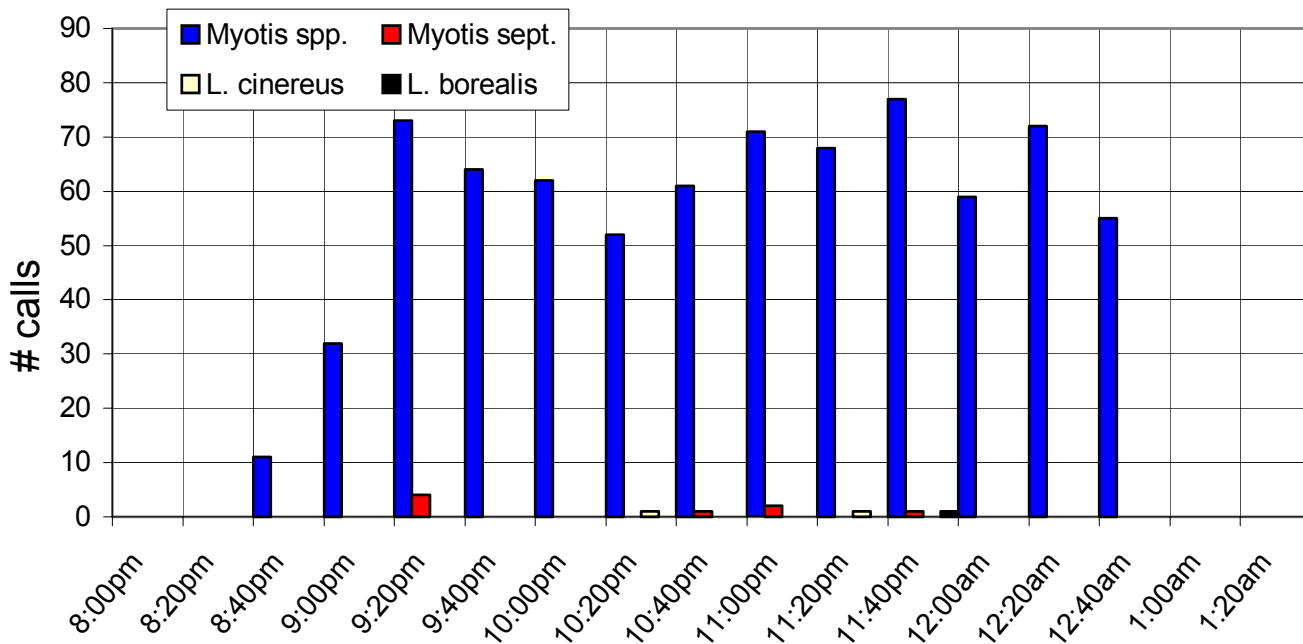
Acoustic Monitoring Results

A total of 1,336 'usable' echolocation calls were collected during the five nights (Table 2). The site with the highest level of activity (calls/hour) was Pogue East; particularly the detector set out over the water near the northern edge of the pond (Fig. 1). Although all the detectors that surveyed the water showed high levels of activity, the field sites (Estate and Pogue West 08/01) showed the highest level of biodiversity. The data collected from acoustic monitors left on the trails showed a high level of concordance with the mist net captures in both activity levels and biodiversity. Most feeding 'buzzes' were detected over water, confirming that water sources are primarily attracting feeding and drinking bats whereas trails are being used as travel corridors.

Table 2. Summary of acoustic monitoring results.

	Pogue West 07/24	Pogue East 07/25	Estate 07/26	Estate 07/31	Pogue West 08/01
First Activity:	20:55	20:32	20:29	20:19	20:14
Last Activity:	22:54	01:02	23:14	01:14	01:30
Total Hours Sampled:	2.5	9.0	8.0	8.0	8.0
<i>Myotis spp.</i>	190	859	31	25	122
<i>M. septentrionalis</i>	9	44	0	2	14
<i>Pipistrellus subflavus</i>	0	0	12	2	1
<i>Eptesicus fuscus</i>	0	0	0	14	2
<i>Lasiurus cinereus</i>	0	2	0	0	3
<i>Lasiurus borealis</i>	0	1	0	0	0
<i>Lasionycteris noctivigans</i>	0	0	3	0	0
Total Anabat Calls:	199	906	46	43	142

Figure 2. Number and timing of calls on 25 July 2001 detected by ANABAT system on the northeastern edge of the Pogue.



Species Overview and Life History Summary

The life history data on the bats caught in the mist nets suggest several patterns (Table 3). First, the first bats captured on a given night were generally juveniles, suggesting they begin foraging earlier than the adults. Second, the sex ratios were highly skewed towards females. In all sampling nights where more than one bat was caught, the overall sex ratio was 27% male for *M. septentrionalis* and 21% male for *M. lucifugus*. Reasons for this pattern are not clear, it is

possible that many of the adult males of both species have begun their migration to winter hibernacula, and are no longer foraging in the MBRNHP area. Additional sampling earlier in the summer may help answer some of these questions.

Table 3. Summary of life history status of bats caught in mist nets.

	Pogue West 07/24	Pogue East 07/25	Estate 07/26	Estate 07/31	Pogue West 08/01
<i>M. septentrionalis</i>					
Sex Ratio (% male)	100%	18%	--	100%	33%
male					
juvenile	1	2	0	1	5
adult	1	0	0	0	0
female					
juvenile	0	3	0	0	6
lactating	0	4	0	0	0
post-lactating	0	2	0	0	4
non-reproductive	0	0	0	0	0
<i>M. lucifugus</i>					
Sex Ratio (% male)	23%	26%	100%	--	16%
male					
juvenile	2	4	1	0	4
adult	3	2	0	0	2
female					
juvenile	9	6	0	0	17
lactating	4	7	0	0	1
post-lactating	4	4	0	0	14
non-reproductive	0	0	0	0	0

DISCUSSION

The MBRNHP bat survey was highly successful in that bats were captured at all of the sampling sites. Although only 2 species of bats were captured, the acoustic data suggest that at least seven species of bats are using the park to some extent. It is possible that additional mist netting in the areas of high biodiversity may yield more documented species. The use of complementary techniques, such as net captures and acoustic monitoring, is the most accurate method of sampling the woodland bat community. Consistent with most summer surveys of woodland bats in the northeast, the two most commonly-captured species were the little brown bat (*M. lucifugus*) and the northern long-eared bat (*M. septentrionalis*). The habitat types sampled during this survey are not consistent with habitat used by *M. sodalis* and *M. leibii* in other parts of their range, so it is unlikely that either of these species is present to any extent within the MBRNHP. In particular, the absence of mixed-age hardwood stands with exposed snags makes it unlikely that a maternity colony of *M. sodalis* exists within the MBRNHP boundaries. Similarly, the lack of exposed rocky outcrops that characterize *M. leibii* roosts appears to be missing within MBRNHP. However, this survey was not adequate in scope to

support the conclusion that *M. sodalis* and *M. leibii* do not use the MBRNHP land during the summer active season.

These data provide further support for the use of water sources and trails as key habitat features for capturing woodland bats in the northeast. The use of water sources as foraging areas for *Myotis* bats was confirmed by the high level of feeding ‘buzzes’ captured over water by the acoustic monitoring. The absence of such buzzes in the trails supports the conclusion that they are primary travel corridors.

The Pogue is the critical habitat for bats in the park. The pine plantations appear to be devoid of bat life and should be managed to be a more diverse and mature forest community. Most of the bats captured are communal species that rely on human habitat for roosting. Examinations of some of the estate buildings showed historic evidence for bat roosting. Due to the renovations of the estate buildings, alternative roosting sites may need to be provided to maintain the local population, including bat houses and bat sheds. In addition, further renovations or cleanings that may impact bat roosting spaces should be done during the dormant period (from Sept through March) when bats are not present.

APPENDIX 1. Data for bats captured in mist nets.

Band ID	Date	Species	Sex	Life History Stage	Mass (g)	Forearm Length (mm)	Town, State (County)	Contact Information	Comments:
VT05501	24-Jul-01	M. lucifugus	1	5	7.50	38.5	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05502	24-Jul-01	M. lucifugus	1	2	7.78	36.6	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05503	24-Jul-01	M. lucifugus	2	5	6.57	37.0	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05504	24-Jul-01	M. lucifugus	1	5	6.38	37.5	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05505	24-Jul-01	M. lucifugus	2	5	6.60	37.0	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05506	24-Jul-01	M. lucifugus	1	5	-	38.2	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05507	24-Jul-01	M. lucifugus	1	2	7.18	39.3	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05508	24-Jul-01	M. lucifugus	1	2	7.18	39.3	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05509	24-Jul-01	M. lucifugus	2	3	7.32	38.0	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05510	24-Jul-01	M. lucifugus	1	4	7.17	38.7	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05511	24-Jul-01	M. lucifugus	1	5	7.66	38.1	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05512	24-Jul-01	M. lucifugus	1	5	6.97	37.0	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05513	24-Jul-01	M. lucifugus	1	4	6.98	37.9	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05514	24-Jul-01	M. lucifugus	1	5	8.37	39.1	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05515	24-Jul-01	M. septentrionalis	2	5	6.58	38.5	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05516	24-Jul-01	M. lucifugus	1	5	6.50	38.8	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05517	24-Jul-01	M. lucifugus	1	2	7.46	37.2	Woodstock, VT	Kent McFarland	Poque West, MBRNHP

Band ID	Date	Species	Sex	Life History Stage	Mass (g)	Forearm Length (mm)	Town, State (County)	Contact Information	Comments:
VT05518	24-Jul-01	M. lucifugus	1	5	9.10	38.5	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05519	24-Jul-01	M. lucifugus	2	3	7.40	36.7	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05520	24-Jul-01	M. septentrionalis	2	3	8.62	36.6	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05521	24-Jul-01	M. lucifugus	2	3	7.33	39.9	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05522	24-Jul-01	M. lucifugus	1	5	6.78	38.3	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05523	24-Jul-01	M. lucifugus	1	4	7.91	38.3	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05524	24-Jul-01	M. lucifugus	1	4	8.80	38.1	Woodstock, VT	Kent McFarland	Poque West, MBRNHP
VT05525	25-Jul-01	M. lucifugus	1	2	7.55	40.6	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05526	25-Jul-01	M. lucifugus	1	5	7.55	38.2	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05527	25-Jul-01	M. lucifugus	2	3	7.49	37.0	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05528	25-Jul-01	M. septentrionalis	1	5	7.15	39.0	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05529	25-Jul-01	M. lucifugus	1	5	7.39	38.7	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05530	25-Jul-01	M. lucifugus	1	5	7.87	38.7	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05531	25-Jul-01	M. lucifugus	2	3	7.70	39.2	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05532	25-Jul-01	M. lucifugus	1	4	8.25	37.4	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05533	25-Jul-01	M. lucifugus	1	5	6.30	36.7	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05534	25-Jul-01	M. lucifugus	1	2	7.59	38.0	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05536	25-Jul-01	M. lucifugus	1	2	7.84	39.0	Woodstock, VT	Kent McFarland	Poque East, MBRNHP

Band ID	Date	Species	Sex	Life History Stage	Mass (g)	Forearm Length (mm)	Town, State (County)	Contact Information	Comments:
VT05535	25-Jul-01	M. septentrionalis	1	4	6.82	37.9	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05538	25-Jul-01	M. septentrionalis	1	2	8.37	37.7	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05537	25-Jul-01	M. lucifugus	1	2	7.05	37.2	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05539	25-Jul-01	M. septentrionalis	1	2	7.90	37.5	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05540	25-Jul-01	M. lucifugus	1	4	8.03	38.1	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05541	25-Jul-01	M. septentrionalis	1	2	8.46	36.5	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05542	25-Jul-01	M. lucifugus	1	2	7.66	38.3	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05543	25-Jul-01	M. lucifugus	1	5	5.81	36.4	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05544	25-Jul-01	M. lucifugus	1	2	7.95	36.7	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05545	25-Jul-01	M. septentrionalis	2	5	6.13	38.3	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05546	25-Jul-01	M. septentrionalis	1	4	7.66	38.2	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05547	25-Jul-01	M. septentrionalis	2	5	6.48	38.8	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05548	25-Jul-01	M. lucifugus	1	5	7.29	39.4	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05549	25-Jul-01	M. lucifugus	2	5	7.27	38.7	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05550	25-Jul-01	M. lucifugus	2	5	7.05	37.0	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05551	25-Jul-01	M. septentrionalis	1	5	7.13	38.2	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05552	25-Jul-01	M. lucifugus	2	5	6.74	37.6	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05553	25-Jul-01	M. lucifugus	1	2	8.75	38.5	Woodstock, VT	Kent McFarland	Poque East, MBRNHP

Band ID	Date	Species	Sex	Life History Stage	Mass (g)	Forearm Length (mm)	Town, State (County)	Contact Information	Comments:
VT05554	25-Jul-01	M. lucifugus	1	4	7.64	38.0	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05555	25-Jul-01	M. lucifugus	2	5	6.49	35.8	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05556	25-Jul-01	M. lucifugus	1	4	8.30	37.9	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05557	25-Jul-01	M. septentrionalis	1	2	7.74	37.9	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05558	25-Jul-01	M. septentrionalis	1	5	6.47	37.2	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05559	26-Jul-01	M. lucifugus	2	5	6.63	39.3	Woodstock, VT	Kent McFarland	MBRNHP Estate, MBRNHP
VT05560	01-Aug-01	M. lucifugus	1	5	6.29	36.4	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05561	31-Jul-01	M. septentrionalis	2	5	6.53	37.8	Woodstock, VT	Kent McFarland	MBRNHP Estate, MBRNHP
VT05562	01-Aug-01	M. septentrionalis	2	5	5.96	37.6	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05563	01-Aug-01	M. septentrionalis	2	5	6.12	37.0	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05564	01-Aug-01	M. septentrionalis	1	5	6.76	40.6	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05565	01-Aug-01	M. septentrionalis	2	5	5.50	37.4	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05566	01-Aug-01	M. lucifugus	1	5	6.44	38.8	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05567	01-Aug-01	M. septentrionalis	1	4	7.09	37.3	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05568	01-Aug-01	M. septentrionalis	1	5	6.65	39.0	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05569	01-Aug-01	M. lucifugus	1	2	-	39.1	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05570	01-Aug-01	M. septentrionalis	1	5	7.15	37.3	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05571	01-Aug-01	M. lucifugus	1	4	5.85	38.5	Woodstock, VT	Kent McFarland	Poque East, MBRNHP

Band ID	Date	Species	Sex	Life History Stage	Mass (g)	Forearm Length (mm)	Town, State (County)	Contact Information	Comments:
VT05572	01-Aug-01	M. lucifugus	2	5	5.90	36.2	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05573	01-Aug-01	M. lucifugus	2	3	6.00	36.5	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05574	01-Aug-01	M. lucifugus	1	4	7.23	39.0	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05575	01-Aug-01	M. septentrionalis	1	5	6.50	36.4	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05576	01-Aug-01	M. septentrionalis	2	5	6.40	37.3	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05577	01-Aug-01	M. lucifugus	1	4	5.95	37.3	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05578	01-Aug-01	M. lucifugus	1	5	6.71	38.4	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05579	01-Aug-01	M. lucifugus	1	4	8.40	39.1	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05580	01-Aug-01	M. lucifugus	1	4	7.51	38.5	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05581	01-Aug-01	M. lucifugus	2	5	5.25	37.4	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05582	01-Aug-01	M. lucifugus	1	5	7.13	36.9	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05583	01-Aug-01	M. lucifugus	1	2	8.31	37.1	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05584	01-Aug-01	M. lucifugus	1	5	6.96	39.3	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05585	01-Aug-01	M. lucifugus	1	5	5.78	37.8	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05586	01-Aug-01	M. lucifugus	1	4	6.88	36.0	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05587	01-Aug-01	M. lucifugus	1	5	5.64	37.6	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05588	01-Aug-01	M. septentrionalis	1	5	5.86	39.0	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05589	01-Aug-01	M. lucifugus	1	4	6.88	37.8	Woodstock, VT	Kent McFarland	Poque East, MBRNHP

Band ID	Date	Species	Sex	Life History Stage	Mass (g)	Forearm Length (mm)	Town, State (County)	Contact Information	Comments:
VT05590	01-Aug-01	M. lucifugus	1	5	5.05	35.9	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05591	01-Aug-01	M. lucifugus	1	4	7.20	37.7	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05592	01-Aug-01	M. lucifugus	1	5	5.21	38.1	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05593	01-Aug-01	M. lucifugus	1	4	6.27	-	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05594	01-Aug-01	M. lucifugus	1	5	7.66	39.1	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05595	01-Aug-01	M. lucifugus	1	5	6.84	35.7	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05596	01-Aug-01	M. septentrionalis	1	4	7.17	36.9	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05597	01-Aug-01	M. septentrionalis	1	4	7.34	39.8	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05598	01-Aug-01	M. septentrionalis	1	5	5.94	38.5	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05599	01-Aug-01	M. lucifugus	1	5	7.72	38.5	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
VT05600	01-Aug-01	M. lucifugus	1	5	7.38	38.0	Woodstock, VT	Kent McFarland	Poque East, MBRNHP
NH10101	01-Aug-01	M. lucifugus	1	4	7.40	37.7	Woodstock, VT	Scott Reynolds	Poque East, MBRNHP
NH10102	01-Aug-01	M. lucifugus	1	4	8.19	39.1	Woodstock, VT	Scott Reynolds	Poque East, MBRNHP
NH10103	01-Aug-01	M. lucifugus	2	5	5.67	38.3	Woodstock, VT	Scott Reynolds	Poque East, MBRNHP
NH10104	01-Aug-01	M. lucifugus	1	5	5.80	38.3	Woodstock, VT	Scott Reynolds	Poque East, MBRNHP
NH10105	01-Aug-01	M. lucifugus	1	4	8.64	38.2	Woodstock, VT	Scott Reynolds	Poque East, MBRNHP
NH10106	01-Aug-01	M. lucifugus	1	5	7.40	36.5	Woodstock, VT	Scott Reynolds	Poque East, MBRNHP
NH10107	01-Aug-01	M. septentrionalis	1	4	8.10	36.7	Woodstock, VT	Scott Reynolds	Poque East, MBRNHP

Band ID	Date	Species	Sex	Life History Stage	Mass (g)	Forearm Length (mm)	Town, State (County)	Contact Information	Comments:
NH10108	01-Aug-01	M. lucifugus	2	5	5.34	38.5	Woodstock, VT	Scott Reynolds	Poque East, MBRNHP
NH10109	01-Aug-01	M. lucifugus	1	5	5.83	36.4	Woodstock, VT	Scott Reynolds	Poque East, MBRNHP
NH10110	01-Aug-01	M. lucifugus	2	5	5.93	36.9	Woodstock, VT	Scott Reynolds	Poque East, MBRNHP
NH10111	01-Aug-01	M. lucifugus	1	5	7.12	36.5	Woodstock, VT	Scott Reynolds	Poque East, MBRNHP
NH10112	01-Aug-01	M. lucifugus	2	3	7.42	37.5	Woodstock, VT	Scott Reynolds	Poque East, MBRNHP