

Small Mammals of the Guthrie-Bancroft Farm - Year 15  
Colby Hill Ecological Project, Lincoln and Bristol, Vermont  
2019 Report - N. W. Tepper

## Summary

Small mammals were sampled from ecosystems 1, 6, 14 and 20 on the Guthrie-Bancroft Farm in Lincoln, VT between July 30, 2019– August 12, 2019. A total of 43 captures from 911 trap nights were recorded with overall trap success at 4.7%. At least 10 different species of small mammals were captured considering the two *Peromyscus* and two *Sorex* species (*S. cinereus* and *S. hoyi*) could not be morphologically separated. No new species were detected this year, but rare and uncommon captures included two *Synaptomys cooperi*, one *Sorex fumeus*, and three *Zapus hudsonius*. *Peromyscus spp.* and *Myodes gapperi* were the most abundant small mammals making up 60% of the all the captures.

## Introduction

2019 represents the 15th year of small mammal sampling at Colby Hill since 2000 with regular annual censusing since 2011. Ecosystems (ES) 14 and 20 have been monitored for 15 years while ES 1 and 6 have been monitored for 14 years. Long-term studies of ecological systems are paramount in providing insights into processes that show annual variability, processes that are slow to manifest, proper natural resource management, and the conservation of biodiversity (Lindmayer et. al, 2012; Franklin, 1989). Cycles within a population of small mammals can only be observed through monitoring a site for multiple years (Krebs and Myers, 1974; Korpimäki and Krebs, 1996; Hörnfeldt, 2004). Vermont Family Forest's minimal-management policy of its Colby Hill lands offers unique insight into small mammal population trends within wild areas subject to natural succession. Over the last 18 years, the small mammal surveys for the Colby Hill Ecological Project have yielded valuable data that will contribute to the state-wide small mammal project (Kilpatrick and Benoit 2011).

## Materials and Methods

From July 29 to August 12, the daytime temperature fluctuated between 61°F and 83°F, and wind was predominantly out of the northwest with speeds varying from 0-11 mph. Rain showers occurred on five of the twelve nights that traps were set. Seventy-nine traps (70 Sherman and 9 pitfalls along a drift fence) were set in all four sites. The Sherman live traps were set in two 350ft trap lines (A and B) of 35 traps each. The traps were set for three consecutive nights in each ecosystem, adding up to a pending total of 948 trap nights. Thirty-seven false closes were documented amounting a final total of 911 trap nights. As with last year, a majority of the false closes were attributed to the fascination of an American Black Bear. The Sherman traps were baited with “Old Fashioned” oatmeal, and each trap was marked with flagging.

Field work was carried out under the guidelines from the American Society of Mammalogists (Sikes et al. 2011, Wilson et al. 1996). Each captured individual was sexed, aged (placed in categories: juvenile, subadult, or adult), assessed for reproductive status and inspected for presence of ectoparasites. Fourteen individuals of *Peromyscus spp.* (n=1), *Myodes gapperi* (n=3), *Microtus pennsylvanicus* (n=1), *Synaptomys cooperi* (n=1), *Napaeozapus insignis* (n=1), *Zapus hudsonius* (n=1), *Blarina brevicauda* (n=1), *Sorex cinereus* (n=4), and *Sorex fumeus* (n=1) were kept as voucher specimens. These specimens are permanently preserved in the Zadock Thompson Natural History Collection (ZTNHC) of the University of Vermont.

Habitat data was taken at the site of each capture. Distance to the nearest tree (any live woody plant with a height > 2m), and its DBH were recorded. Distance to the nearest log (any woody debris with a greatest diameter of 1 cm or more), and its diameter at its widest point were recorded. Canopy cover, herbaceous cover, and leaf cover were estimated in increments of 25% within a 1m radius of each trap.

All *Sorex cinereus* specimens taken to the ZTNHC were assumed to be *Sorex cinereus*, but are being processed in order to examine dentition, the only reliable method to rule out *Sorex hoyi*. This report is subject to change pending further investigation of these specimens.

## Results and Discussion

### Population Trends

This year's overall trap success was 4.7%, which is a new record low for trap success at this site, and well below last year's trap success of 31.1%. Per usual, the highest species diversity was found in ES20 with six species, while the lowest species diversity was found in ES1 with just three species. Rare species captures included two Southern Bog Lemmings (*S. cooperi*). Both captures were made in the same area (a seepy forest clearing in ES 6) in which one *S. cooperi* was trapped last year. This is the first year multiple individuals of *S. cooperi* have been captured in one survey.

This year represented record low captures of *Peromyscus spp.* (n=15) and *M. gapperi* (n=11). A record high year of *B. brevicauda* in 2018 with 37 captures was followed in 2019 with just 1 capture (tying the previous record low). A good mast year for nut-bearing trees in 2018 saw population surges in sciurids with 23 captures last season. A crash in sciurid populations was shown in the 2019 season with only one capture of *T. striatus*.

The 2013 survey season is the only previous year in this study with a comparatively low trap success (5%) to 2019. Both the 2019 and 2013 seasons were preceded by a shortage in fall cone crops. Along with reduced resources from small mammal population spikes in previous seasons, the lack of cone crop likely contributed to the 2013 and 2019 small mammal population declines at Guthrie Bancroft. The bumper crop of spruce cones observed in the 2019 field season should make for a more eventful 2020 survey.

Though not detected on the property since 2014, three *Z. hudsonius* were captured this year. Uncommon at this site, a *S. fumeus* was captured this season after not being detected in 2018. As in 2018, the 2019 trapping year lacked any captures of *Mustela erminea*, but an individual was observed on the property on the morning of August 7.

Several rodent botflies (*Cuterebra sp.*) were observed on *Peromyscus spp.*, *N. insignis*, and *M. gapperi* this year. One botfly will be extracted from a *N. insignis* and kept as a specimen for further analysis. Two ticks were found behind the ear of a *Sorex cinereus*. Identification of the genus and species has not yet been researched, but the ticks are included with the specimen in the ZTNHC. Substantial colonies of orange mites were found feeding on the pinna tissue of three

*M. gapperi*. These mites are suspected to be a *Leptotrombidium sp.*, but more analysis of the two specimens sent to the ZTNHC is warranted to confirm (Bobbie et al. 2017).

### Habitat Data

With only 43 captures this year, habitat data was insignificant for nearly all species. In general, all small mammals surveyed had associations with one or several forms of cover. The 2018 report more eloquently describes specific species interactions with specific cover, which all held true this year. One addition to these interactions is an association of *S. fumeus* with mossy rocks. The one individual captured this year held true to this pattern, which has been documented in previous years on Colby Hill.

Two Southern Bog Lemmings were captured in ES6 this year, notably in the same seepy forest clearing as the species was captured in last year. This clearing measures roughly 30m x 20m, and is quite mesic with clay soil components. The canopy is dominated by sugar maple, red oak, and white ash. The mid-story is sparsely populated with beaked-hazel. Windthrow of several sugar maples and ash in this area has created a clearing that allows a quite bit of sun in some places (~25% canopy cover). More windthrow seems likely as several large maples and oaks have split crowns here. The forest floor is dominated by *Osmunda spp.*, *Rubus spp.*, and sensitive fern.

The 2018 season marked the first time *S. cooperi* had been captured at Guthrie-Bancroft since a 2012 capture in ES14, a mesic spruce-fir bog. A capture of *M. pennsylvanicus* in ES14 this year suggests that *S. cooperi* was likely outcompeted in that spruce-fir bog. Though speculation, substantial windthrow along the stream drainage that connects ES14 to ES20, and subsequently ES20 to ES6 could have provided ample habitat for a dispersal of *S. cooperi* from ES14 to ES6 between the years of 2012 and 2018. The trapping of ES6 in 2020 and 2021 will hopefully provide more information into the *S. cooperi* population currently residing there.

### **Other Observations**

Large mammals observed by track or trail cam included two American Black Bear, many White-tailed Deer, Bobcat, and Coyote. Only one trap was subject to bear damage in 2019, as opposed to twelve traps in 2018.

Reptiles and amphibians observed included Green Frog (*Lithobates clamitans*), Wood Frog (*Lithobates sylvestris*), Pickerel Frog (*Lithobates palustris*), Spring Peeper (*Pseudacris crucifer*), American Toad (*Anaxyrus americanus*), Eastern Red-backed Salamander (*Plethodon cinereus*), Spotted Salamander (*Ambystoma maculatum*), Eastern Newt (*Notophthalmus viridescens*), Eastern Milksnake (*Lampropeltis triangulum*), a first record of a gravid female DeKay's Brownsnake for the property (*Storeria dekayi*), and Common Gartersnake (*Thamnophis sirtalis*).

Seventy-eight bird species were observed on the property this field season, and a species list can be viewed on the eBird "Vermont Family Forest's Guthrie Bancroft Property (Restricted Access)" hotspot. Notably a Ruffed Grouse was heard drumming in ES6, a territorial pair of Broad-winged Hawks were viewed in ES20, and a dispersing juvenile Yellow-bellied Flycatcher was observed at the Wells Farm.

Notable insects observed included Chalk-fronted Corporal (*Ladona julia*), Green-striped Darner (*Aeshna verticalis*), Canada Darner (*Aeshna canadensis*), Black-tipped Darner (*Aeshna tuberculifera*), Lance-tipped Darner (*Aeshna constricta*), Variable Darner (*Aeshna interrupta*), Clamp-tipped Emerald (*Somatochlora tenebrosa*), four species of *Chrysops* deer-flies, a Yellow-banded Bumblebee (*Bombus terricola*), and many larval and adult Monarchs.

## Literature Cited

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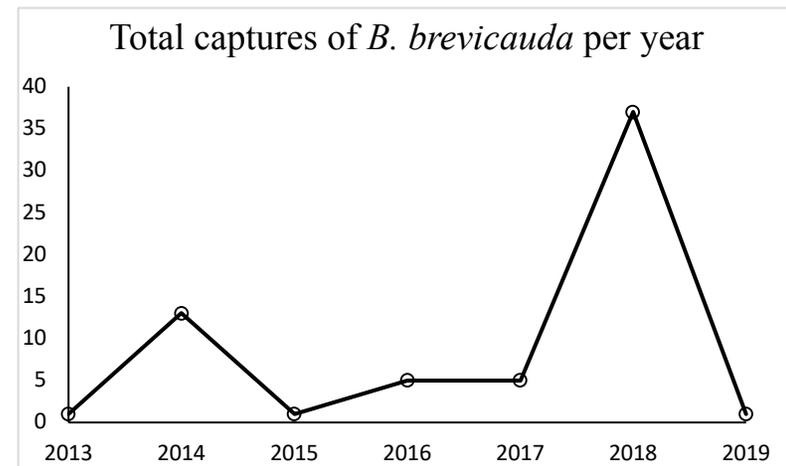
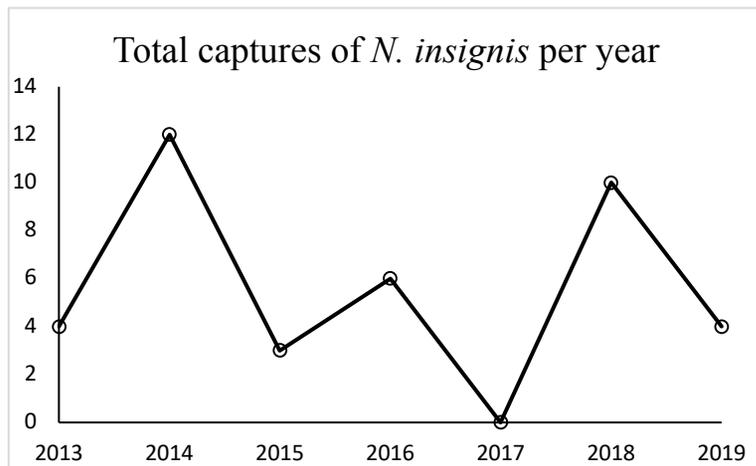
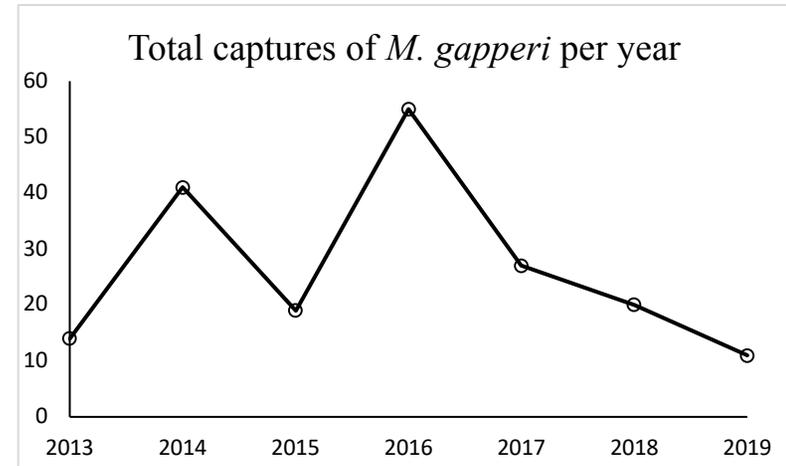
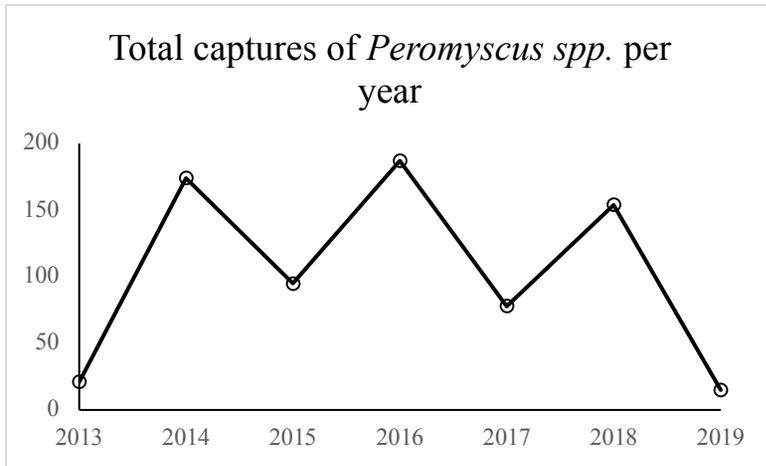
Table 1. Captures and success for 15 years of summer small mammal surveys from 2000-2019 at Guthrie Bancroft Farm, Lincoln, VT.

Species with asterisk refer to rare or difficult to trap (i.e. *Glaucomys volans*) small mammals.

Year	2000	2001	2002	2005	2006	2007	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
No. of nights trapped	9	11	12	12	12	12	12	12	12	12	12	12	12	12	12	176
Trapnights	372	332	591	744	765	744	855	948	948	948	948	948	948	853	911	11855
<b>Shrews &amp; Moles</b>																
<i>Blarina brevicauda</i>	8	23	18	22	14	24	28	20	1	13	1	5	5	37	1	220
<i>Sorex fumeus</i>	2	0	0	1	1	3	0	8	6	2	0	0	1	0	1	25
<i>Sorex cinereus</i>	1	1	10	9	10	10	4	1	0	1	0	1	2	5	4	59
<i>Sorex palustris</i> *	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
<i>Parascalops breweri</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
<b>Rodents</b>																
<i>Peromyscus spp.</i>	45	76	63	70	84	119	69	122	21	174	95	187	78	154	15	1372
<i>Napaeozapus insignis</i>	1	3	4	19	3	47	6	18	4	12	3	6	0	10	4	140
<i>Zapus hudsonius</i>	3	0	0	4	3	3	0	0	0	4	0	0	0	0	3	20
<i>Microtus pennsylvanicus</i>	3	4	3	23	1	3	3	18	1	9	5	6	0	13	1	93
<i>Microtus pinetorum</i> *	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	3
<i>Myodes gapperi</i>	17	20	18	95	81	68	52	39	14	41	19	55	27	20	11	577
<i>Synaptomys cooperi</i> *	0	0	0	1	0	0	0	1	0	0	0	0	0	1	2	5
<i>Tamias striatus</i>	0	1	2	1	4	8	8	6	0	11	2	4	1	18	1	67
<i>Tamiasciurus hudsonicus</i>	0	1	0	0	0	2	1	0	0	0	1	1	0	0	0	6
<i>Glaucomys volans</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	5	0	6
<b>Carnivores</b>																
<i>Mustela erminea</i>	0	0	1	1	4	2	2	3	0	0	0	1	0	0	0	14
Total captures	80	129	120	246	206	290	174	236	47	268	126	266	114	265	43	2610
Species	8	8	9	11	11	12	10	10	6	10	7	9	6	10	10	16
Cumulative species	8	10	12	13	14	15	16	16	16	16	16	16	16	16	16	16
Trap success (%)	21.5	38.9	20.3	33.1	26.9	39.0	20.4	24.9	5.0	28.3	13.3	28.1	12.0	31.1	4.7	22.0

Table 2. Captures of small mammals by ecosystem (ES) at Guthrie-Bancroft Farm Lincoln, VT in July-August 2019.

Ecosystem (ES) No.	1	6	14	20	Totals
ES definition	well-drained mesic red oak hardwood forest	seepy terrain rich northern hardwood forest	poorly drained spruce-fir northern hardwood forest	alder swamp/sedge meadow edge of former beaver pond	
Nights trapped	3	3	3	3	12
Total traps	237	237	237	237	948
False closes	21	1	6	9	37
Trapnights	216	236	231	228	911
Shrews & Moles					
<i>Blarina brevicauda</i>	0	1	0	0	1
<i>Sorex fumeus</i>	0	0	0	1	1
<i>Sorex cinereus</i>	2	0	1	1	4
<i>Sorex palustris</i> *	0	0	0	0	0
<i>Parascalops breweri</i>	0	0	0	0	0
Rodents					
<i>Peromyscus spp.</i>	4	6	4	1	15
<i>Napaeozapus insignis</i>	0	0	1	3	4
<i>Zapus hudsonius</i>	0	0	1	2	3
<i>Microtus pennsylvanicus</i>	0	0	1	0	1
<i>Microtus pinetorum</i> *	0	0	0	0	0
<i>Myodes gapperi</i>	8	1	0	2	11
<i>Synaptomys cooperi</i> *	0	2	0	0	2
<i>Tamias striatus</i>	0	1	0	0	1
<i>Tamiasciurus hudsonicus</i>	0	0	0	0	0
<i>Glaucomys volans</i>	0	0	0	0	0
Carnivores					
<i>Mustela erminea</i>	0	0	0	0	0
Species	3	5	5	6	10
Total captures	14	11	8	10	43
Trap success (%)	6.5	4.7	3.5	4.4	4.7



Figures 1-4. Fluctuations from 2013-2019 of total captures of *Peromyscus spp.*, *Myodes gapperi*, *Napaeozapus insignis*, and *Blarina brevicauda* trapped during summer surveys at Guthrie-Bancroft Farm Lincoln, VT.