Curatorial Report Number 6

The Small Mammal Survey | 1971

By Fred Scott and Barry Wright
March 1972

Nova Scotia Museum
1747 Summer Street
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ABSTRACT

In 1971 the authors collected small mammals throughout Nova Scotia in order to improve the museum collections and acquire specimens and information for an exhibit and publications on the mice and shrews of this province. Altogether, 238 animals were collected and 1839 records of Nova Scotian mammals were obtained from other institutions throughout North America. Ectoparsites collected in this survey for study in Ottawa will contribute significantly to knowledge of fleas and other parasites in the Maritimes.

INTRODUCTION

At the beginning of 1971 the mouse and shrew collections of the Nova Scotia Museum consisted of 31 study skins, associated skulls, and 109 whole animals preserved in alcohol. The majority of the study skins were poorly prepared or badly damaged and the data accompanying them was incomplete with few localities being represented. Nearly all of the specimens in alcohol were faded to some degree, many having become entirely white. Altogether, nine of the thirteen species of mice and shrews known to occur in this province were represented, but only six of them by study skins. The collection was thus far from representative and, due to the condition of the specimens, almost useless for reference purposes.

The survey was undertaken for three reasons: 1) to expand the study skin collection so that future identifications could be made by comparison of specimens: 2) to expand our knowledge of the distribution and habitat requirements of these animals and 3) to obtain material for an exhibit and publications on the mice and shrews of this province.

The project was divided into two phases. Phase I was the collecting of mice and shrews in the spring and summer. Phase II involved the accurate determination of species, collecting records from other institutions in North America, and preparing the results for publication.

PHASE I

The trapping program was conducted from April to October and included a four or five day visit to each of five widely separated localities in Nova Scotia and nineteen overnight visits to localities closer to Halifax. These localities are shown in Figure 1. The authors were assisted at times by John Gilhen of the museum staff and by Gary Hardy and Paul Doleman on a volunteer basis. The Nova Scotia Department of Lands and Forests provided working space in their depots at Oxford and Baddeck.

Methods

Two kinds of traps were used in this program: Number 0 Havahart traps, and household snap traps (mouse traps). Various baits were tried but the one generally used was a mixture of rolled oats, peanut butter and raisins. This seemed to work as well as any other, including mixtures with raw bacon or other kinds of meat. In some batches, raisins were omitted without noticeably affecting trapping results.

Since the object of the survey was to obtain as many species as possible from each locality an effort was made to trap in a variety of habitats with an emphasis on areas which promised to be most productive. No attempt was made to use grid or index lines since quantitative results were not an objective of this survey. Every effort was made to find signs of the presence of mice and shrews, such as holes, runways,

droppings and evidence of feeding such as nibbled fungi, berries, or seed husks. Traps were then set in what appeared to be the most likely spots within each trapping area. In areas of tall grass or ericaceous shrubbery it was sometimes found necessary to set traps in well marked lines so that they could be found without undue searching. In these situations, Havahart traps were seldom used since grass stems or twigs often blocked the trigger mechanism.

With experience, a procedure evolved for trapping new areas. On the first night, a dozen traps were set in each of three or four hastily selected habitats. On the second day traps were removed from unproductive areas and, after throughly exploring the region, additional traps were set in selected sites. By the third night it was evident which sites were giving the best results and trapping was concentrated in these with up to 200 traps being set. On the fourth night trapping was limited to a few traps in potentially interesting areas in order that skinning and cataloguing could be finished by noon on the following day prior to returning to Halifax. Traps were usually set between 5:00 pm and dusk and were checked between 7:30 and 9:00 am the following morning. Those that had been left set throughout the day were checked in the evening while setting new traps. A field note book was kept and photographs were taken of each trapping site whenever possible.

A routine was adopted for processing the catch which resulted in a fairly equitable division of labor. One person

prepared the skins while the other catalogued, weighed, measured and sexed the animals, collected ectoparasites and wrote tags and labels. In this way, on returning from a collecting trip, there was no additional preparation required; specimens could be incorporated directly into the collection and cards could be placed in the catalog.

The specimens were weighed on a wooden bar scale, which had been calibrated with precision brass weights and checked against an electric balance. It was found to be accurate to within 0.1 grams. Measurements were made in accordance with the methods outlined in Hall & Kelson. Animals captured alive were either catalogued and released or killed with carbon dioxide before skinning. In addition to skins, skulls and ectoparasites, full stomachs were preserved for future examination of their contents and all embryos were counted, measured and preserved.

PHASE II

This, the second part of the program, was an effort to obtain all available records of Nova Scotian small mammals in other collections and also to ensure that specimens in our collection were correctly named. A particular problem existed in the determination of the two species of Peromyscus (deermice) since efforts to satisfactorily segregate them on the basis of characters given in principal references were unsuccessful.

At Carleton University discussions were held with Dr. Donald Smith who is familiar with the two species in Ontario and was able to give valuable assistance in outlining characters used to separate them in that province. The Royal Ontario Museum, National Museum, Redpath Museum, New Brunswick Museum and Acadia University Museum were visited by the authors and records made of Nova Scotian specimens in their collections. Particular attention was paid to measurements and characters of deermice from Quebec, New Brunswick and Nova Scotia. As a result of these visits, and letters sent to Museums and Universities throughout North America, 1839 records of mice and shrews caught in Nova Scotia have been added to our catalog.

Trapping and preparation techniques were discussed with staff members at the National Museum, the Royal Ontario Museum and the New Brunswick Museum. Slight modifications to techniques used in this survey were suggested, the principal change being the use of corn-meal instead of borax as an absorbent during skinning. No attempt had been made to clean skulls and methods for doing this were discussed. These institutions use dermestid beetle cultures exclusively, and on a very large scale.

Several visits were made to Acadia University Museum and records were made of all Nova Scotian mammals in their collections. Mice and shrews were examined and redetermined wherever necessary. A large collection of fleas, mites and lice, made by R. Yescott in 1965 during tick studies in the

Tobeatic Game Sanctuary, required considerable curatorial work including labelling before being sent to Ottawa for study. The fleas in this collection, together with those collected by the authors, are being studied by G. P. Holland and the data incorporated in a revised edition of "The Siphonaptera of Canada".

DEERMICE

An important aspect of Phase II was the clarification of criteria for separating Nova Scotian specimens of Peromyscus leucopus and P. maniculatus. Standard reference works (Hall and Kelson, 1959, and Peterson, 1966) emphasize characters distinguishing the two species in other parts of their range. In Nova Scotia most of these characters are either ill-defined or do not apply because of the subspecies involved. The authors discussed this problem with a number of workers, including Philip Youngman of the National Museum, Dr. D. Smith of Carleton University, Dr. Randolph Peterson of the Royal Ontario Museum, Stanley Gorham of the New Brunswick Museum and Dr. Donald Dodds of Acadia University. As a result of these discussions the authors have established criteria for separating the two species in Nova Scotia with reasonable certainty, including juvenile and subadult stages.

The characters used in principal references to distinguish between the two species do not generally apply in this province. There is no significant difference in the length of the hind foot or the tail and differences in the color of the fur on the

ventral surface of the forearms are not constant.

The following characters may be used to distinguish between the two species of Peromyscus in Nova Scotia. Peromyscus maniculatus abietorum has a sharply bicolored tail, blackish brown above and white beneath, moderately hairy and with a hair pencil 3 to 5 mm long at the tip. The pelage presents a grizzled or brindled, fluffy appearance and is slightly darker in the mid dorsal region. The ears are large, usually more than 16 mm long. Peromyscus leucopus caudatus has an indistinctly bicolored tail, dark grey-brown above and parchment colored beneath, only slightly hairy, visibly scaly beneath, and with a 1 to 3 mm hair pencil at the tip. The pelage is smooth and glossy with a fairly well defined dark dorsal stripe, the white fur on the underside of the throat is more extensive than in P. maniculatus, and the ears are shorter, usually less than 16 mm. Subadults are distinguised by differences in the progress of the change from grey to adult pelage. In maniculatus the change appears to occur uniformly whereas in leucopus the change is progressive, extending from the lower sides towards the back in more or less semicircular patches. Juveniles are difficult to determine with any degree of certainty; the most reliable character is the color and hairiness of the tail.

The skulls collected in this survey have not yet been cleaned and the characters are not readily observed, but it has been suggested that the species may be separated on the basis of the width of the interparietal bone and the shape of the

palatine slits.

ECTOPARASITES

Fleas, mites and lice were collected as part of the routine of processing animals caught in this program. Fleas were seldom found on animals which had been killed in snap traps. On freshly killed animals fleas would remain hidden until the animal had been dead for ten to fifteen minutes, then they would suddenly appear and in the space of five minutes or so all of them would have abandoned the host. Some mites and lice would also abandon the host but most were found by carefully searching the fur. Although several samples of fleas and other ectoparasites were collected from shrews, mice were generally far more productive. Mice usually carried five or six fleas and were often infested with orange mites at the bases of the ears and the tail. The ectoparasites were collected with forceps and preserved in 70% isopropyl alcohol.

"The Siphonaptera of Canada" by G. P. Holland (1949), the most recent comprehensive treatment of fleas in this region, lists but a single record from Nova Scotia. Holland is currently revising this work and is anxious to include our records. Altogether, 101 samples of fleas from this program have been submitted to Dr. Holland for study and determination, and 132 samples from the Acadia University collections have been labelled and forwarded by the Nova Scotia Museum for the same

purpose. These samples are being mounted on microscope slides by technicians at the Entomology Research Institute in Ottawa. The staff of this institute are also very interested in our mite and louse collections but require them to be mounted on microscope slides prior to submission for determination.

TRAPPING RESULTS

Microsorex hoyi, Sorex palustris and Synaptomys cooperi, although known to occur in this province, were not captured during this survey. Microsorex hoyi requires a more sophisticated trapping program using either pitfall or Sherman traps. Sorex palustris is a riverbank and wetland species and very few traps were set in suitable habitats. Synaptomys cooperi has seldom been taken in Nova Scotia and would require a program specifically directed toward its capture. The effort in the present survey was directed toward woodland situations with comparatively light trapping in wetlands. Apart from the above species, the small mammals of this province are now well represented in our collection by properly prepared skins and associated skulls.

Many factors influenced the effectiveness of the traps. Heavy rain either curtailed the activity of small mammals or rendered the bait less attractive. On cool nights it was noted that the proportion of shrews was greater than usual. Raccoons, squirrels and chipmunks were frequently a problem and it was not an uncommon experience to find all the Havahart

traps overturned and the snap traps set off and scattered.

In the course of this survey the relative merits of the two types of trap became apparent. Snap traps were easier to carry and set in large numbers, but problems were encountered with slugs and rain triggering the traps and, under outdoor conditions, trap mechanisms had a very short life. Snap traps did not significantly damage skins but sometimes crushed skulls. Cinerous and Short-tailed shrews occasionally ate portions of mice caught in snap traps. Havahart traps are bulky and were sometimes difficult to set due to vegetation interfering with the tripping mechanism, but skins prepared from live-caught animals were invariably of better quality and ectoparasites which quickly abandon dead hosts could be collected. However, if stomach contents were to be studied, snap-trapped animals were preferable since live-caught animals could complete digestion while in the trap.

Table 1 shows that Havahart traps were more than twice as productive as snap traps on the basis of trap-nights per capture. In spite of this more snap traps than Havaharts were used because larger areas and a wider variety of habitats could be covered in the limited time available.

Table 1.

Species taken	Havahart traps	Snap traps	Total	Skins prepared
Blarina brevicauda	39	22	61	13
Sorex cinereus	0	12	12	11
Sorex fumeus	2	5	7	7
Sorex arcticus	0	2	2	2
Tamias striatus	5	2	7	2
Peromyscus maniculatus	3	8	11	8
Peromyscus leucopus	6	8	14	10
Clethrionomys gapperi	33	14	47	21
Microtus pennsylvanicus	8	10	18	13
Mus musculus	0	1	1	1
Zapus hudsonius	4	9	13	12
Napaeozapus insignis	39	6	45	29
Totals	139	99	238	129
Total-trap nights	1198	2074	3272	
Trap-nights per capture	8.62	20.95	13.7	

Additional publications arising from this project.

In press

Shrews, moles and myomorph rodents in the Nova Scotia Museum collection. (Curatorial report).

In preparation

Mice and shrews in Nova Scotia. (Occasional paper).

Collecting and preserving mice and shrews. (Manual).

The genus Peromyscus in Nova Scotia. (Scientific paper).

Range extension for Peromyscus leucopus caudatus in Nova Scotia. (Scientific paper).

Projected

Fleas and other parasites of mice and shrews in Nova Scotia. (Occasional or Scientific paper).

Exhibit arising from this project

The mice and shrews of Nova Scotia.

Suggested future projects.

1. Collect topotypical specimens of mice and shrews.
   Many of our subspecies are endemic to this province and we do not have representatives from type localities in our collections.

2. A trapping program directed toward obtaining the three species not collected in this survey.

3. A trapping program in the Barrington Passage area to collect and study Red-backed mice.
   An unusual population of Red-backed mice with a high incidence of melanism has been found in this area. There are no melanic specimens in our collection.

4. Further trapping to establish the range limits of Peromyscus leucopus.

References cited

Hall, E. Raymond and Keith R. Kelson, 1959. The Mammals of North America. 2 Volumes, pp xxx + 1083 + 79 pp. Ronald Press, New York.

Peterson, Randolph L., 1966. The Mammals of Eastern Canada. pp xxxii + 465. Oxford University Press, Toronto.

APPENDIX I

Trapping Localities

A brief description of each locality and site is given, followed by a tabular presentation of captures. In the tables, figures in each column refer to the number of animals caught and, in parentheses, the number of skins prepared.

Page	Locality
i	Petpeswick Inlet, Halifax County
ii	Quarry Trail, Halifax County
iii	Bicentennial Highway, Halifax County
iii	McCabe Lake, Halifax County
iv	Sackville River, Halifax County
v	Kempt, Queens County
v	Prospect, Halifax County
vi	Tomahawk Lake, Halifax County
viii	Bridgewater, Lunenburg County
x	Sandy Cove, Digby County
xii	Sherbrooke, Guysborough County
xv	Baddeck, Victoria County
xvii	Point Pleasant Park, Halifax
xviii	New Ross, Lunenburg County
xx	Cameron Lake, Queens County
xxi	Oxford, Cumberland County
xxiv	Aylesford, Kings County

PETPESWICK INLET, Halifax Co., N. S.

Site 1. Rocky barren about 200 yards southeast of West Petpeswick on the west side of the inlet. A dry, ericaceous barren with regenerating grey birch and spruce. Much of the granite bedrock was exposed and lichen covered, as were numerous granite boulders. Area sloped to the southeast toward a moderately large bog.

Site 2. About 400 feet south of the government wharf at Petpeswick Harbour. Traps were set between the road and the beach in an area of tall, thick grass adjacent to the Spartina zone. Numerous runways were present.

Site 3. In front of an abandoned shack at the south end of the beach at Petpeswick Harbour. Traps set in a lush growth of grass and weeds in poorly drained, very damp soil. Numerous runways were present.

F. Scott, 3-4 June 1971

Site 1 No captures.

6 choker traps.

F. Scott, G. Hardy, 16-17 June 1971 Accession 971-Z-311

Species	Site 2	Site 3
M. pennsylvanicus	3(1)	1

18 Havahart traps.

QUARRY TRAIL, Halifax Co., N. S.

Trail between MacDonald Avenue, Rockingham and Quarry Lake,

Site 1. About 150 feet east of the Bicentennial Highway 443900N 633730W. Traps set in front of holes under and between rocks and logs on a steep slope (facing south) covered with open second growth mixed woods. Substrate leaf litter and mossy stumps and logs. Light snow overnight.

F. Scott, J. Gilhen, J. Callahan, 15-16 April. Accession 971-Z-305

Species	Site 1
Sorex fumeus	1(1)

1 choker trap, 2 tin-can traps.

BICENTENNIAL HIGHWAY, north of Halifax, N. S.

Site 1. Two miles south of Rockingham interchange, on west side. Young-growth mixed woods, maple and birch predominant, slope toward northeast. Some signs of mouse activity in cracks and crevices in protruding weathered bedrock.

Site 2. 100 yards south of site 1. Ravine with stream. Mostly red maple with stands of spruce.

F. Scott, P. Doleman, 14-15 June 1971.

12 Havahart traps, no captures, site 1.

F. Scott, J. Gilhen, 15-16 June 1971.

16 Havahart traps, no captures, site 2.

McCABE LAKE, Halifax Co., N. S.

Eastern end of McCabe Lake about $1\frac{1}{4}$ miles east of Highway 101 at the end of a logging road. Recently logged, predominantly spruce forest with much slash and dead trees. Ground cover lichens, ericaceous shrubs and bracken.

G. Hardy, 22-23 June 1971. Accession 971-Z-313

Species	Site 1
C. gapperi	1
N. insignis	1 (1)

4 Havahart traps

SACKVILLE RIVER, 10 miles north of Halifax, N. S.

Site 1. Balsam fir, birch and red maple woods 70 feet west of the Sackville River about 1/3 miles west of Lower Sackville.

Site 2. Vicinity of the confluence of the stream from Marshy Lake and the Sackville River near Lower Sackville. Open sandy area between the streams where crossed by power transmission lines. Area partially overgrown with Solidago and grasses, except at the tip of the promontary where there is an Alder thicket.

Site 3. Alder grove in a wet swale about 50 feet northeast of the Sackville River and about 100 feet south of site 2.

F. Scott, J. Gilhen, 10-11 June 1971, Accession 971-Z-308

Species	Site 1
P. leucopus	1(1)

24 snap traps, 5 choker traps.

J. Gilhen, 18-20 June 1971, not accessioned

Species	Site 1
P. leucopus	1
C. gapperi	1

42 Havahart traps

F. Scott, J. Gilhen, P. Doleman, 21-22 June 1971, Accession 971-Z-312

Species	Site 2	Site 3
Z. hudsonius	1 (1)	-

30 Havahart traps

KEMPT

Vicinity of Kempt, Queens Co., N. S.

Site 1. North bank of Minards Brook, about 300 feet north of the road from Highway 8 to New Grafton. Open mixed woods, mostly maple, ash, spruce and fir. Ground cover ferns and tall grass with ericaceous growth along the stream bank.

Site 2. Old bog on the north side of Highway 8 about half way between Kempt and the New Grafton road. Vegetation black spruce, ericaceous shrubbery, sphagnum and pitcher plants.

F. Scott, J. Gilhen, 24-25 June 1971.
24 Havahart traps, 24 snap traps. No captures.

F. Scott, J. Gilhen, 25-26 June 1971. (Heavy rain overnight).
24 Havahart traps, 20 snap traps. No captures.

PROSPECT

Prospect Village, Halifax Co., N. S.

Site 1. Meadow $\frac{1}{4}$ mile north of village on the west side of the highway. Grassy meadow thickly overgrown in many places with young wild rose, Vaccinium and cinnamon fern, alders along the margin.

F. Scott, J. Gilhen and P. Doleman, 29-30 June 1971. Accession 971-Z-315

Species	Site 1
B. brevicauda	1 (1)

23 Havahart traps, 17 snap traps

TOMAHAWK LAKE

East end of Tomahawk Lake, Halifax Co., N. S. 444555N 634610W

Site 1. Small dry meadow on west side of road, about 120 feet south of the outlet stream. Sparse grass and weeds, including Solidago and conifer seedlings. Surrounded by young spruce woods.

Site 2. About 40 feet north of site 1, on the same side of the road. Thick alder and red maple growth at the edge of a spruce stand. Deep leaf litter and slash.

Site 3. Area of tall weeds (Solidago and Aster, etc.) surrounding an abandoned shack across the road from site 1. (photographed)

Site 4. 30 to 75 feet east of site 3. Open mature woods behind the shack, birch and maple overstory with fir understory. Ground cover of hardwood seedlings, herbaceous plants and ferns. Deep leaf litter, mossy logs and rocks. (photographed)

Site 5. Banks of outlet stream about 75 yards from the lake. In mature mixed forest with conifers predominating. Stream banks mossy, with sparse vegetation and alders. Some ericaceous shrubbery.

Site 6. Along lakeshore about 50 yards north of the outlet stream. A small sphagnum bog surrounded by alders on lake side, and ericaceous shrubbery, sedges and grasses on the other sides.

Three trips were made to various sites at this locality.

TOMAHAWK LAKE (continued)

J. Gilhen, G. Hardy, 13-14 July 1971. Accession 971-Z-319

Species	Site 1	Site 2	Site 3	Site 4
B. brevicauda	1	-	-	-
N. insignis	-	1 (1)	3 (3)	7 (7)

36 Havahart traps

F. Scott, B. Wright and J. Gilhen, 26-27 July 1971. Accession 971-Z 321

Species	Site 3	Site 4	Site 5	Site 6
S. fumeus	-	1 (1)	-	-
B. brevicauda	-	-	-	1
Peromyscus sp.	-	1 seen	-	-
C. gapperi	2 (1)	6 (1)	2 (1)	-
M. pennsylvanicus	-	-	-	1 (1)
N. insignis	1	4 (1)	1	1 (1)

36 Havahart traps

F. Scott, B. Wright, 30-31 August 1971. Accession 971-Z-326

Species	Site 3	Site 4
C. gapperi	-	1
N. insignis	-	2

24 Havahart traps

BRIDGEWATER, Lunenburg Co., N. S.

Vicinity of the Johnson farm, $\frac{1}{4}$ mile east of Bridgewater on the north side of Highway 3.All sites photographed.

Site 1. Ravine with stream, on the southeast side of the farm. Mature hardwoods with deep leaf litter and sparse herbaceous ground cover.

Site 2. Mature woodlot at the northeast end of the ravine, mostly maple, ash and white pine. Deep leaf litter with sparse herbaceous vegetation. Woodlot bounded on the north by a shallow stream.

Site 3. Large meadow on the eastern side of the farm between the woodlot and an oak ridge (site 4). Bounded on the southwest by a railway cutting. Traps set in three locations at the edge of the meadow.

Site 4. Ridge at the east end of the meadow (site 3). Young red oak forest with moderately deep leaf litter, sparse ground cover. No captures.

Site 5. Boggy swale in spruce forest, about 100 yards north of site 4. Standing water and sphagnum hummocks.

Site 6. White pine grove in mixed forest, about 200 yards northwest of site 5 and 200 yards northeast of woodlot. Sparse ericaceous ground cover, piles of slash and deep needle litter.

BRIDGEWATER (continued)

Site 7. A grassy shaded pathway between Highway 3 and the LaHave River, opposite the Johnson farm. Lush grass, annual growth and tall shrubbery.

Site 8. Extensive area of tall grass, etc. between the railway and the LaHave River near site 7. Traps set under the edge of bayberry and other shrubbery bordering the grass zone, also along the base of the railway embankment.

F. Scott, B. Wright, 19-23 July 1971. Accession 971-Z-320

Species \ Site	1	2	3	5	6	7	8
B. brevicauda	9(1)	3	1	7(1)	-	3	1
P. leucopus	-	1(1)	-	1(1)	-	-	-
C. gapperi	-	-	-	3(2)	2(2)	-	-
M. pennsylvanicus	-	-	-	-	-	1(1)	-
T. striatus	-	2	-	2(1)	-	-	-

572 trap-nights (327 Havahart, 245 snap)

SANDY COVE and WHALE COVE, Digby Co., N. S.

Site 1. Coastal meadow above the rocky shore east of the beach on the Fundy shore at Sandy Cove. Vegetation mainly grasses with wild rose, Rubus, Fragraria and Habernaria.

Site 2. Wooded slope on the west side of the road $\frac{1}{4}$ mile south of Whale Cove. The steep slope faces east, overstory of striped maple and yellow birch, understory of ash and spruce seedlings, ground cover of low herbaceous plants, Clintonia, ferns and deep leaf litter. Several old sawn stumps. (Photographed)

Site 3. A broad marshy ditch between the road and site 2. Tall grass, sedges, rushes and alders. (Photographed)

Site 4. Wet meadow across the road from sites 2 and 3. Tall grass, knapweed, wild rose, iris, Rubus and Habenaria. (Photographed)

Site 5. Dry upland meadow on higher ground at the southern edge of the wet meadow. Short grass, wild rose, alder patches, rock piles, grey birch, Solidago and other weeds. Rocks hidden in long grass in sites 4 and 5, particularly where the two sites joined, were evidently used as feeding stations by mice. (Photographed)

Site 6. Lower part of the road from Whale Cove to the dam (pond) at the top of the hill. Overgrown with annual weeds and long grass. Alders 5 - 8 feet high growing in from the sides. (Photographed)

SANDY COVE and WHALE COVE (continued)

Site 7. Upper part of the road to the dam. White spruce woods, pure and sometimes mixed with hardwoods. Alder thickets, grasses and annual weeds along the road. (Photographed)

Site 8. Extensive boggy marsh on the south side of Highway 17 at the junction with the road to Whale Cove. Traps set in the long grass zone, the ericaceous sphagnum zone and into the edge of the very wet Juncus zone.

F. Scott, B. Wright, 2-6 August 1971. Accession 971-Z-322

Species	Site 1	2	3	4	5	6	7	8
S. cinereus	-	-	1(1)	-	2(2)	-	-	1(1)
B. brevicauda	1(1)	2(2)	2	2	1	-	1	-
P. leucopus	-	1(1)	-	-	-	-	2(2)	-
Z. hudsonius	-	-	-	2(2)	-	1(1)	-	-

326 trap-nights (183 Havahart, 143 snap)

SHERBROOKE, Guysborough Co., N. S.

Site 1. Wooded hillside on the west bank of St. Mary's River, 2 miles north of Sherbrooke and 100 yards north of the bridge on the road to Waternish. Lower slope with red maple, beech and yellow birch overstory, no understory and deep leaf litter. Upper slope with red maple and fir overstory, fir and spruce understory, needle litter and abundant mushrooms. Mossy logs and rocks occurred all the way up the slope.

Site 2. Ditch between the road and the lower part of the slope, about 15 feet wide with tall grass, Spiraea and Solidago. The margin of the ditch at the foot of the slope was lined with a dense growth of balsam fir (2 - 6 ft high). (Photographed)

Site 3. Bank of St. Mary's River, across the road from sites 1 and 2. Outcrops of rock between small sand and gravel beaches overhung with alders.

Site 4. Extensive wet meadow between Highway 7 and the east bank of St. Mary's River, about 3 miles north of Sherbrooke. Thick mixed grasses with Solidago and Aster species in the drier parts, sphagnum and heath plants in the wetter parts. Crossed by an elevated grassy road with shallow Sphagnum filled ditches on each side. Scattered alder clumps and one large alder thicket. (Photographed)

Site 5. Woodlot opposite Site 4. Spruce stand with larch at the western end and some fir mixed throughout. Ground entirely

SHERBROOKE (continued)

mossy with patches of ferns. Part of the area clear-cut with heavy slash on top of the mossy ground cover. (Photographed)

Site 6. Area at the beginning of the grassy roadway into the woodlot. Pathway with tall grasses, Spiraea, Solidago, Prunus and other small trees on the north side, a small stream through young mixed woods with mossy stream banks on the south side. (Photographed)

Site 7. Wooded area behind the Marine Motel on Highway 7, $\frac{1}{4}$ mile west of Sherbrooke. Balsam fir with some red maple and birch, no understory. Ground cover moss, ferns and Cornus canadensis. No captures.

Site 8. Scrubby clearing behind the Marine Motel, overgrown with regenerating maple, alder, larch, spruce and fir and with Vaccinium and ferns. A zone of Rubus, Solidago and Spiraea bordering on the parking area, and extending about 20 feet into the clearing.

SHERBROOKE (continued)

F. Scott, B. Wright, 9-13 August 1971. Accession 971-Z-323

Species \ Site	1	2	3	4	5	6	8
S. cinereus	-	-	1(1)	-	-	-	-
S. fumeus	1(1)	-	1(1)	-	-	1(1)	1(1)
S. arcticus	-	-	-	2(2)	-	-	-
B. brevicauda	1(1)	3(1)	-	-	-	-	-
P. maniculatus	-	-	1(1)	-	1(1)	-	-
P. leucopus	-	-	1(1)	-	-	-	-
C. gapperi	2(2)	-	-	-	-	-	-
M. pennsylvanicus	-	-	-	4(3)	-	-	-
Z. hudsonius	-	1(1)	-	5(4)	-	1(1)	-
N. insignis	2(2)	3(2)	-	-	-	-	2(2)
T. striatus	1(1)	-	-	-	-	-	-

691 trap-nights (191 Havahart, 500 snap)

BADDECK and vicinity, Victoria Co., N. S.

Site 1. $\frac{1}{4}$ mile south of the top of Kelly's Mountain near Englishtown. A section of abandoned old highway on the south-west side of Highway 5. Traps were set on both sides of the old highway in regenerating mixed woods and weedy shrubbery. Traps were also set on the heavily wooded, steep west-facing bank of a ravine beside this road and also beside the fast flowing stream in the ravine. Vegetation mature fir, yellow birch, mountain maple woods with fallen logs, herbaceous ground cover and deep leaf litter.

Site 2. St. Anne's Lookoff, on Kelly's Mountain. Traps were set on the wide gravel verge on the north side of Highway 5. Vegetation sparse weeds, spruce and birch seedlings.

Site 3. Boggy clearing in black spruce woods beside the gravel road to the Baddeck town dump, about 3 miles northwest of Baddeck. Traps set beside fallen dead spruce in spongy sphagnum with some ericaceous shrubs and clumps of spruce seedlings.

Site 4. Kidston Island near Baddeck. Traps set in coarse grass in marshy area between the public beach and the lighthouse on the west point. There were many runways but no captures.

Site 5. Middle River. Traps were set in and around an abandoned barn, and in a balsam poplar grove beside the river behind the barn. One jumping mouse was seen, no captures.

BADDECK and vicinity (continued)

Site 6. Baddeck Bridge. Traps were set in shallow drainage ditches in an old field beside fallen-down farm buildings. Vegetation short grass, Juncus and spruce seedlings.

Site 7. Baddeck Bridge. Traps were set in a wet meadow beside the river near site 6. Vegetation: Long grass, Juncus and alders.

Site 8. Baddeck Bridge. An extensive stand of old white spruce. Ground covered entirely with thick mossy carpet. Traps were set in the vicinity of a small stream near the edge of the stand.

B. Wright, F. Scott, 17-20 August 1971. Accession 971-Z-324

Species	Site 1	2	3	6	7	8
S. cinereus	3(2)	-	2(2)	-	-	-
B. brevicauda	2(1)	-	-	2	-	-
S. fumeus	1(1)	-	-	-	-	-
P. maniculatus	2(1)	2(2)	-	-	-	1(1)
C. gapperi	1(1)	-	-	-	-	-
M. pennsylvanicus	-	-	-	-	1(1)	-
N. insignis	10(3)	1	-	-	-	-

282 trap-nights (24 Havahart, 258 snap)

POINT PLEASANT PARK, Halifax, N. S.

Traps were set in the vicinity of the Nature Trail near the end of South Park Street.

Site 1. Sphagnum bog at beginning of Nature Trail. Traps were set in ericaceous shrubbery beside the boardwalk over the bog.

Site 2. The western edge of the bog, among ferns and alders and on drier ground. Overstory of spruce, maple, birch and white pine, substrate of mossy stumps and needle litter.

Site 3. Rocky, softwood ridge west of the bog. White pine and spruce overstory. Spruce, birch, oak and maple understory. Ground cover of tree seedlings and needle litter. No captures.

F. Scott, B. Wright, 25-26 August 1971. Accession 971-Z-325

Species	Site 1	Site 2
B. brevicauda	-	2(1)
P. leucopus	1(1)	2(1)

36 snap traps

NEW ROSS, Lunenburg Co., N. S.

Site 1. Wet meadow beside stream at the end of the nature trail north of Ross Farm. Traps set in tall grass, spongy and wet underfoot.

Site 2. Edge of woods bordering on the wet meadow. Traps set in the alder zone between the meadow and the woods. No captures.

Site 3. Beneath a large white pine on the nature trail, about 100 yards south of site 1. No captures.

Site 4. The southern end of the nature trail. Traps set at the edges of the path in weedy shrubbery and regenerating hardwoods. No captures.

Site 5. Mature Red maple/black ash forest with understory of alders, Prunus and balsam fir, beside Lake Lawson, east of Ross Farm. Traps set near the rocky shore and on higher ground 50 yards from the shore. No captures.

Site 6. Edge of woods bordering on the hayfield east of Ross Farm. Traps set in shrubbery with wild rose predominating. No captures.

Site 7. Patch of unmown grass near the centre of the hayfield east of Ross Farm. Numerous runways, no captures.

NEW ROSS (continued)

F. Scott, B. Wright, 1-2 September 1971. Accession 971-Z-327

Species	Site 1
S. cinereus	1(1)

82 snap traps

CAMERON LAKE, near South Brookfield, Queens Co., N. S.

Site 1. Bushes and long grass along eastern shore of stream entering Cameron Lake near bridge on Highway 8.

Site 2. Mature oak/maple/beech woods on east side of stream entering Cameron Lake near bridge on Highway 8.

Site 3. Mature maple/ash/hemlock/pine woods on west side of stream entering Cameron Lake, across the stream from site 3. Sparse herbaceous ground cover, deep leaf and needle litter.

Site 4. Mature beech woods near summer cottages, on hillside above eastern shore of Cameron Lake.

Site 5. Old hemlock, white pine, ash, red maple and balsam fir forest on both sides of Highway 8 south of the church near the junction with Highway 208. Sparse ground cover, mostly ash and maple seedling, with deep leaf and needle litter. Many large mossy bogs and stumps.

F. Scott, J. Gilhen and B. Wright, 8-9 September 1971.

Accession 971-Z-328

Species Site	1	2	3	4	5
B. brevicauda	1	2	7	2(1)	1
P. leucopus	-	-	2	-	-
C. gapperi	1(1)	-	4(3)	-	1
N. insignis	3(3)	-	-	-	-
T. striatus	-	-	2	-	-

46 Havahart traps, 98 snap traps

OXFORD, Cumberland Co., N. S.

Site 1. A boggy roadside ditch on the north side of Highway 104, about 11 miles east of Oxford. Traps set in grass and moss beside a stream in the ditch.

Site 2. Extensive marshy area on the south side of Highway 104, about 11 miles east of Oxford, across the road from site 1. Traps were set on dry ground bordering a stream through the marsh. Meadow voles were caught in an area of short grass bordered with weedy shrubbery near the Highway.

Site 3. Young birch/poplar/white ash forest on the north side of Highway 104, about 7 miles east of Oxford. Sparse understory of Salix sp. and red maple; ground cover tall grass, ferns Solidago, Aster, Cornus, Fragaria, Rubus, or Sphagnum moss and leaf litter.

Site 4. Young mixed hardwood forest on the north side of Highway 104, about $5\frac{1}{2}$ miles east of Oxford. Predominantly birch, maple, poplar and beech, with ground cover of Viburnum and ericaceous shrubbery, ferns and thin leaf litter.

Site 5. Wet meadow across the road from Park Lake on the southern outskirts of Oxford. The house mouse was caught at the edge of a cornfield bordering on this meadow.

Site 6. Mature mixed wood $\frac{1}{2}$ mile south of Simpson Lake, about 21 miles south of Oxford. Sugar maple with red maple, yellow

OXFORD (continued)

birch, occasional spruce and beech. Ground cover maple seedlings, ferns, Rubus sp., violets, deep leaf litter. Many mossy logs and stumps, fungi varied and abundant.

Site 7. 1 mile north of Simpson Lake, about 20 miles south of Oxford. Old red maple forest with occasional yellow birch and balsam fir, deep leaf litter and scanty ground cover of ferns, violet, false Solomon's seal.

Site 8. Mature spruce - fir woods with ground carpeted with moss, at the confluence of Simpson Brook and the West Economy River, about 22 miles south of Oxford.

Site 9. Edge of mixed woods on both sides of Highway 104, about 2 miles east of Oxford. Traps set in the edge of the woods and along the stream bed, under overhanging alders.

Site 10. Millsite near site 8. A large grassy clearing with sawdust piles and streams along two sides. Traps set in shrubbery at the edge of this clearing and along the stream bed. No captures.

OXFORD (continued)

F. Scott, B. Wright and J. Gilhen, 20-24 September 1971

Accession 971-Z-331

Species Site	1	2	3	4	5	6	7	8	9
S. cinereus	-	1(1)	-	-	-	-	-	-	-
B. brevicauda	-	-	-	-	1(1)	-	-	-	-
P. maniculatus	1	-	-	2(1)	-	-	-	-	1(1)
C. gapperi	-	-	2(2)	1	-	6(3)	5(1)	6(1)	-
M. pennsylvanicus	-	3(3)	-	-	2(1)	1(1)	-	-	1(1)
M. musculus	-	-	-	-	1(1)	-	-	-	-
Z. hudsonius	-	-	1(1)	-	-	-	-	-	1(1)
N. insignis	-	-	-	-	-	2(2)	-	-	1(1)

651 trap-nights (136 Havahart, 515 snap)

AYLESFORD, Kings Co., N. S.

Site 1. Young hardwoods in wet, poorly drained area at the western tip of the Caribou Bog about 1½ miles east of Aylesford. Traps were set in the shrubby edges of these woods at the sides of grassy, overgrown paths. Floor of woods, bare blackish mud and debris with scattered mossy logs and sparse weedy vegetation.

Site 2. Sandy barrens between Kingston and Auburn. Traps were set in openings in extensive patches of Broom crowberry, and under stands of young poplar in leaf litter and Broom crowberry. Traps were set after dusk. No captures.

B. Wright, 25-26 September 1971. Accession 971-Z-332

Species	Site 1
B. brevicauda	1(1)
P. leucopus	1(1)

100 snap traps

Figure 1.

LOCALITIES TRAPPED DURING THE SMALL MAMMAL SURVEY.