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Status and Ecology of Nova Scotia Bat Species

Progress Report: May 2004

Introduction

There are significant populations of at least 3 species of bat in Nova Scotia including little brown bat, northern long-eared bat, and eastern pipistrelle. Four species that probably occur irregularly in the province include hoary bat, red bat, silver-haired bat and big brown bat. Still much remains to be learned about the summer and winter distribution and behavior of local species and there is a need to further investigate the possibility of there being geographically restricted populations of a species not yet detected (e.g., big brown bat). In 2001 I recorded a significant number of eastern pipistrelles in Kejimkujik National Park and evidence gathered since then suggest that this population may be distinct and disjunct from populations of the same species in other parts of its range. Given the paucity of information on this species, especially in Canada (where there were no other known populations of this species) there was a need to gather more information on the status and behavior of this population which might be nationally significant.

The objectives of the current research are to:

- Gather additional data on species distribution in the province so that we have greater confidence in, or be able to refute the status of species as presented by Broders et al (2003), which was based on data that was geographically limited .
- Examine the summer roosting and foraging behaviour of eastern pipistrelle.
- Gather some preliminary information on the distribution and behavior of various species among known hibernacula.

Results from 2003

The approach taken in this study was to undertake intensive ecological research in Kejimkujik National Park where, at the time, the only known local population of eastern pipistrelles existed and to do brief surveys over a wider geographic area to determine the diversity and distribution of the various species.

Provincial Species Distribution

As part of the province-wide sampling we conducted 59 detector nights of sampling which resulted in 9,630 identifiable echolocation sequence files. Of these, 9,502 were identified as being representative of either the little brown bat and northern long-eared bat, 84 from eastern pipistrelles, 36 from hoary bat, 7 from red bat, and 1 from either big brown bat or silver-haired bat. Except for the *Myotis* spp. sequences, species were disproportionately recorded in different areas throughout the province. No eastern pipistrelle calls were recorded from Yarmouth, Cumberland, Guysborough, Shelburne, Annapolis, Halifax, or Colchester Counties. The majority of eastern pipistrelle sequences (60) were recorded in the New Germany Area, along the Lahave River and its tributaries, in northwestern Lunenburg County. Eighteen sequences were recorded along the Gaspereau River, Kings County, 4 along the Kennetcook River, Hants County, and 2 from Queens County. Hoary bats were more widely distributed across the province with 1 or 2 sequences from each of Halifax, Cumberland, Kings and Queens Counties. In Colchester County, 6 sequences were recorded along the Waughs River, Tatamagouche, and another 6 from the Truro area. Seventeen sequences were recorded from one site in Yarmouth on a section of the Tusket River System. Two sequences identified as red bats calls were recorded from Northern Lunenburg County, 2 from the Truro area, and 1 from Yarmouth. The only individual captured during this portion of our study was a little brown bat (juvenile female) from Lunenburg County.

Roosting and Foraging Behavior - Results from Kejimkujik National Park.

The little brown bat and northern long-eared bat. appear to be abundant in Kejimkujik, while the eastern pipistrelle occurs in lower numbers. Although trapping efforts were focused on the higher-flying eastern pipistrelles, greater numbers of little brown bat and northern long-eared bat were captured (see Table 1). All eastern pipistrelles captured within the park were taken at the one river site despite at least 150 of a total of over 500 trap hours being conducted elsewhere. A total of seven female adult eastern pipistrelle were captured; five of the seven were in June. Our trapping efforts yielded one eastern pipistrelle per 63 trap hrs (one trap hour is equal to the use of one six-meter mist net or one harp trap for one hour).

Table 1. Bat captures within KNP by site-type for each species with number of trap hours.

Site Type	Species	Adult		Juvenile		Total Bats	Trap Hours
		Female	Male	Female	Male		
River	Little brown bats	2		1	3	6	
	Eastern pipistrelles	7				7	361.5
Road	Little brown bats				1	1	
	Northern long-eared bats	3		2	2	7	17.5
Trail	Little brown bats	10	6	1	3	20	
	Northern long-eared bats	10			1	11	115
House	Little brown bats	2	1			3	3
Total		**34**	**7**	**4**	**10**	**55**	**497**

**Trap hour = One hour of trapping effort with 6m of mist net or one harp trap.*

Highlights from our ultrasonic monitoring in Kejimkujik National Park include:

- The magnitude of activity of eastern pipistrelles, as determined by ultrasonic surveys, was about 10% of the magnitude of activity of *Myotis* spp. activity.
- 70% of eastern pipistrelle activity was recorded over rivers, 94% over rivers and lakes combined.
- 60% of total eastern pipistrelle activity was recorded at one site. At this same site we captured 38% of the total insect biomass.
- A further 21% of eastern pipistrelle activity was recorded at two lake sites.
- 64% of *Myotis* activity was recorded over rivers and lakes, nearly all of which can be designated as little brown bat activity (Broders *et al.* 2003).
- Little brown bat activity was higher over lakes than rivers despite lower prey availability.
- On 01 July 2003, 10 m above the river at Eel Weir we recorded 7 echolocation sequences that were attributable to either big brown bat or silver-haired bat.

All 7 eastern pipistrelles were equipped with radio-transmitters, in addition to one little brown bat, and three northern long-eared bats. Of the 7 eastern pipistrelles, a total of 14 roost trees were found for 5 individuals. Despite extensive searches no signal was found for the other two after the night of release. We documented the first breeding record of eastern pipistrelle in Nova Scotia, and to our knowledge, the first in Canada. On 26 July 2003 we located a colony of 15 individuals that was likely comprised of 5 females and 10 newly volant juveniles. By observing the colony at dusk we were able to observe young make what we assume is some of their first attempts at flight.

In general, eastern pipistrelles showed roost area fidelity but switched trees regularly. They were colonial roosters (3-15 individuals per colony) and roosted in both hardwoods and softwoods in pendulous clumps of *Usnea* spp. on small diameter branches pointing in a northward direction (Table 5). Eastern pipistrelles were found to roost from 0.5 to 5.5 km from the capture location at the eel weir river site.

A female little brown bat that was captured at Eel Weir river roosted in a hollow red oak snag (roost entrance = 14m AGL) for at least a week. Emergence observations made at the site indicated that 105-226 individuals were using the site. Two northern long-eared bats which were captured at a different site on the Mersey River were found roosting together in a hollow hemlock tree (*Tsuga canadensis*) on two consecutive days, and in separate hollow red maples (*Acer rubrum*) on the next. One of the pair was tracked for six days and used three

roost trees. The other used two different trees over three days. One female northern long-eared bat was captured at Eel Weir and located at three roost trees in five days. Three consecutive days were spent in one hollow red oak snag (*Quercus rubra*), another red oak was used on another, and a live trembling aspen (*Populus tremuloides*) with a cavity was used on one day.

Occurrences at hibernacula

For this component of the study we captured 435 individuals and recorded 4,186 echolocation sequences at Hayes and Frenchmen's Caves. Captures consisted of 163 northern long-eared bats (FMC=47 and HC=116), 270 little brown bats (FMC=17 and HC=253) and 2 eastern pipistrelle (both at FMC). Except for 76 echolocation sequences attributable to eastern pipistrelle (FMC=17 and HC=59), and a single sequence attributable to hoary bats (from HC on 8 October 2003 at 21:27) all other sequences were attributable to *Myotis* spp. (FMC=758 and HC=3352).

Future Work - 2004

In 2004, myself and students will continue to pursue a greater understanding of the diversity and ecology of bats in Nova Scotia. We will be concentrating our efforts on the eastern pipistrelle in SW Nova Scotia as this is the species that seems to be of the greatest significance from a conservation perspective. Additionally, we will be further pursuing work at hibernacula and determining the distribution and abundance of each of the species.

Communications

Garroway, Colin (2003) Species diversity of bats at Nova Scotia hibernacula. APICS Undergraduate Student Environmental Conference.

Quinn GM, Broders HG (2003) Roosting and Foraging Ecology of the Eastern Pipistrelle (*Pipistrellus subflavus*). Atlantic Society of Fish and Wildlife Biologists, Dartmouth, N.S.

Quinn GM, Broders HG (2003) Roosting and Foraging Ecology of the Eastern Pipistrelle (*Pipistrellus subflavus*). North American Symposium on Bat Research, Lincoln, Nebraska, U.S.A.

Garroway, Colin (2004) Inter- and intra-specific temporal variation in the activity of bats at two Nova Scotia hibernacula. Atlantic University Undergraduate Biology Conference.

Garroway, Colin (2004) Inter- and intra-specific temporal variation in the activity of bats at two Nova Scotia hibernacula. Honors Thesis, Saint Mary's University, Department of Biology (Supervisor: Hugh G. Broders)

Lewis, Chris (2004) Spatial segregation of foraging space by three Nova Scotia bat species. Honors Thesis, Saint Mary's University, Department of Biology (Supervisor: Hugh G. Broders)

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