

## Note

### Late-autumn record of Little Brown Myotis (*Myotis lucifugus*) in north-central British Columbia

ROY V. REA<sup>1,\*</sup> and CANDYCE E. HUXTER<sup>1</sup>

<sup>1</sup>Ecosystem Science and Management Program, University of Northern BC, 3333 University Way, Prince George, British Columbia V2N 4Z9 Canada

\*Corresponding author: reav@unbc.ca

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#### Abstract

Little Brown Myotis (*Myotis lucifugus*) inhabits north-central British Columbia (BC), but its flight activity at the onset of hibernation is not well known. On 31 October 2019, we saw three bats flying in patterns that suggested feeding, near the north shore of the Fraser River near Prince George, BC. Observations of Little Brown Myotis flying this late in the autumn have not previously been documented this far north in interior BC. We photographed the bats, and here we describe the encounter and discuss the scientific value of our observation.

Key words: Seasonal activity; autumn; hibernation; Little Brown Bat; *Myotis lucifugus*; temperature

Few studies have documented the autumn biology of bats in northwestern Canada and no studies appear to have been conducted on the seasonal activity patterns of Little Brown Myotis (*Myotis lucifugus*) in north-central British Columbia (BC). Of the approximately 15 bat species known to occur regularly in BC (Government of British Columbia 2020), most—including *M. lucifugus*—hibernate during the winter months (defined as 1 November to 31 March by Nagorsen *et al.* 1993) and emerge sometime in the spring when they begin to return to their summer grounds (BC Community Bat Program 2018). However, much remains to be learned concerning various aspects of winter activity for North American temperate zone bats (Boyles *et al.* 2006).

In summer, Little Brown Myotis has been observed roosting in bat boxes, tree snags, rock crevices, mines, and caves, often selecting the latter three locations for hibernacula (Fenton and Barclay 1980), but it will also select and preferentially use buildings when available, particularly in northern climates (Randall 2014; Willie 2018). These bats are described as nocturnal obligate insectivores (Fenton and Barclay 1980). They have been observed throughout BC, mainly in summer, but a few records exist for use of a building (C. Lausen pers. comm. 31 May 2020), cave (Davis *et al.* 1997), and mine (Jobin 1952) at

other times of the year. Caves are suspected to provide hibernacula for Little Brown Myotis; however, none have been confirmed (C. Lausen pers. comm. 31 May 2020; B. Paterson pers. comm. 10 July 2020). Late fall and early spring acoustic data strongly suggest that Little Brown and other *Myotis* spp. also use crevice habitat as hibernacula (B. Paterson pers. comm. 10 July 2020).

Information on the winter distribution and roosting habits of bats in north-central BC is anecdotal at best, with one hibernaculum documented to the southwest of our observation (Jobin 1952). Nagorsen *et al.* (1993) report that winter records exist for only seven species of bats in BC.

According to some studies, bats may intermittently emerge from hibernacula in fall and winter because of dehydration, hunger, fungal infections, or the need to relocate (Lausen and Barclay 2006; BC Ministry of Environment 2017), to exercise flight muscles (Klüg-Baerwald *et al.* 2017), to spur immune function, or to copulate (Boyles *et al.* 2006). Bat activity patterns and behaviours associated with torpor, hibernation, and emergence linked to foraging bouts are complex and poorly understood (Czenze and Willis 2015; Meyer *et al.* 2016).

On 31 October 2019, we observed three bats in flight near the 17-km marker board on the North Fraser

Resource Road on the north bank of the Fraser River adjacent to a south aspect rock face at 54.260343°N, 122.372495°W, ~60 km northeast of Prince George. The three bats, seemingly of the same species, appeared to be foraging back and forth over the river and between the rock face and the river channel. We also noticed small flying insects in the air, which the bats, based on their erratic flight paths, appeared to be pursuing. Most of the flying occurred in a 25-m radius around our car, 2–6 m above the road surface with heights of 10–12 m occasionally reached. The bats moved up and down the road where we were stopped and over the river; they did not fly farther than 300–400 m in either direction from where we were parked.

The observation occurred between 1530 and 1615 on a sunny afternoon (temperature ~4°C; little to no wind; sunset 1739). The surrounding habitat was riparian with an upland forest of mixed mature Trembling Aspen (*Populus tremuloides* Michaux), hybrid White Spruce (*Picea engelmannii* Engelmann var. *engelmannii* × *Picea glauca* (Moench) Voss.), and Douglas Fir (*Pseudotsuga menziesii* var. *glauca* (Beissner) Franco), with some large diameter (>100 cm at breast height) Black Cottonwood (*Populus balsamifera* subsp. *trichocarpa* Torrey & A. Gray) along the north shore of the Fraser River. Although the area in which we observed the bats was relatively pristine, much of the surrounding forest had been impacted by logging over the last 50 years. Average temperature for the Prince George area for October (1981–2010) is 4.5°C, with average precipitation 63.3 mm; average temperature and precipitation for November are –2.5°C and 55.3 mm, respectively (Environment and Climate Change Canada 2019).

The bats had light brown bodies, dark brown wings, and were relatively small (Figure 1). We were able to take dozens of high-resolution photographs of the bats at different angles (5D Mark 3 with a 300 f/2.8 lens and 2× extender, Canon, Ota City, Tokyo, Japan). We sent some to three bat experts: one confirmed the genus as *Myotis* sp. (B. Fenton pers. comm. 12 November 2019), and two others confirmed the species as Little Brown Myotis (C. Lausen and I.-J. Hansen pers. comm. 7 and 8 January 2020, respectively). As described by C. Lausen, “The high resolution images enabled close examination of head and tail details of the bats in flight, concluding there was no sign of a keel, the tragus was blunt, and the ear pinnae were somewhat pointed”. The absence of the keel narrowed the identification to either Little Brown or Yuma Myotis (*Myotis yumanensis*), both with somewhat pointed ear pinnae and a blunt tragus, but the latter species is not known northeast of the Williams Lake–Quesnel area (BC Ministry of Environment 2008).



**FIGURE 1.** Little Brown Myotis (*Myotis lucifugus*) in the afternoon sun near Prince George, British Columbia, 31 October 2019. High-resolution photographs, such as this one, helped experts identify the bats. Photo: R.V. Rea.

Except for a single specimen of Little Brown Myotis that was found hibernating in a mine shaft near Williams Lake, ~300 km south of our sighting (Jobin 1952), winter occurrences of this species in BC are extremely limited (Nagorsen *et al.* 1993), especially as far north as our observation and west of the Rocky Mountains. To the best of our knowledge, this is the most northern sighting of a Little Brown Myotis this late in the autumn in north-central BC. Schowalter (1980) reported sampling Little Brown Myotis near Edmonton, Alberta (approximately same latitude as our encounter), in the late 1970s, but nearly all bats caught after the second week of September were found in a torpid condition, rather than active and foraging. Unpublished acoustic recordings of Little Brown Myotis exist from north of our encounter, at Muncho Lake (59.043°N, 125.794°W) on 23 October 2015, but the only recording of which we are aware for this species after 31 October in northern BC is coastal, at Tow Hill, Haida Gwaii, on 4 November 2014 (C. Lausen pers. comm. 31 May 2020).

Our observation has scientific value for several reasons. First, we observed bats flying during daylight hours. The BC Ministry of the Environment asks the public to report bats that are flying during the day and/or during winter months, because this may indicate early signs of infection with white-nose syndrome (BC Ministry of Environment 2017).

Second, although we did not confirm the presence of a hibernaculum, we assumed that bats flying in the late afternoon in late October would remain close to their hibernaculum (Whitaker and Rissler 1992) and that one was nearby. As such, the local area should be scrutinized for the presence of a hibernaculum.

The northernmost confirmed hibernaculum in BC (west of the Rocky Mountains) appears to be ~200 km southwest of where we made our observation (Jobin 1952). Several other overwintering hibernacula are suspected in the Williston Reservoir area (caves and rock crevices; I.-J. Hansen pers. comm. 22 September 2020) and Evanoff Provincial Park (C. Lausen pers. comm. 31 May 2020); however, none has been confirmed. Locating hibernacula, which are critical habitat (Environment and Climate Change Canada 2018), is crucial for conservation of this federally Endangered species (SARA Registry 2019). Acoustic detectors are typically set to begin recording at sunset, but researchers should consider beginning their recordings much earlier in the day in the north during the fall, winter, and spring to avoid missing opportunities to document potential hibernacula. Once hibernacula are located, they can be used to monitor bat population trends and the susceptibility of the bats to and the spread of white-nose syndrome or other, potentially emerging diseases (Misra *et al.* 2009).

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