

## Note

### A male Little Brown Myotis (*Myotis lucifugus*) recaptured after 28 years at the same site in southwest Saskatchewan, Canada

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Christiansen, J.J.A., D.M. Green, D.J. Bender, D.L. Gummer, M.C. Kalcounis-Rueppell, and R.M. Brigham. 2022. A male Little Brown Myotis (*Myotis lucifugus*) recaptured after 28 years at the same site in southwest Saskatchewan, Canada. Canadian Field-Naturalist 136(1): 13–16. <https://doi.org/10.22621/cfn.v136i1.2871>

#### Abstract

Little Brown Myotis (*Myotis lucifugus*) is one of the most common and widely distributed mammals in Canada and has been recorded to live over 30 years in the wild. As part of a long-term bat research project in Cypress Hills Interprovincial Park, Saskatchewan, we recaptured a male Little Brown Bat in a mist net over Battle Creek on 12 June 2021. The bat was recaptured within 100 m of where it was first captured and banded as an adult in 1993, indicating that this bat was at least 29 years old and exhibited repeated use of the same summer flying, foraging, and drinking site. The bat was not caught in the intervening years; therefore, its frequency of use of this site is unknown. In eastern North America, this species has declined because of high mortality rates associated with White-nose Syndrome (WNS). WNS has been moving westward and has now been detected in eastern and western Saskatchewan. Understanding aspects of the natural history of Little Brown Bat, including longevity, is important before WNS is detected in a region and leads us to advocate continued marking of individuals (e.g., banding, PIT tagging) to continue learning about bat longevity and survival before and after WNS infection.

Key words: Chiroptera; Cypress Hills; Little Brown Myotis; longevity; site fidelity; *Myotis lucifugus*; southwest Saskatchewan

Longevity among the nearly 6500 recognized mammalian species (Burgin *et al.* 2018) is highly variable, but on average, larger species have greater longevity (Austad and Fischer 1991; de Magalhães *et al.* 2007). For example, 1000 kg Bowhead Whale (*Balaena mysticetus*) regularly live over 100 years and can surpass 200 years (Rosa *et al.* 2013), while 4–6 g Least Shrew (*Cryptotis parva*) rarely exceed two years (Mock 1982; Hutchinson *et al.* 2015). After accounting for body size, bats (order Chiroptera) are the longest-lived mammals, with maximum longevity three times that of size-equivalent, non-flying mammals (Austad and Fischer 1991; Brunet-Rossinni and Austad 2004; de Magalhães *et al.* 2007). Longevity of wild bats is likely underestimated because bats are relatively difficult to capture (nocturnal and flying) and recaptures are rare.

The oldest recaptured Little Brown Myotis (*Myotis lucifugus*) was 34 years old (New York, USA; Davis and Hitchcock 1995), and the oldest resighted one was a 38-year-old male (Cadomin Cave, Alberta, Canada; Lausen *et al.* 2022). In the United States, male *M. lucifugus* aged 18, 24, 25, and 32 years were recaptured in two hibernacula near Warrentown, Wisconsin (White *et al.* 2019). In Canada, one female, aged 16 years, and two males, aged 29 and 30 years, were recaptured in an abandoned mine tunnel near Craigmont, Ontario (Keen and Hitchcock 1980). Most recaptures of long-lived *M. lucifugus* tend to be males. This difference is postulated to be the case because males hibernate longer compared with females and/or males do not incur the additional energetic demands females endure during pregnancy and lactation (Podlutsky *et al.* 2005).

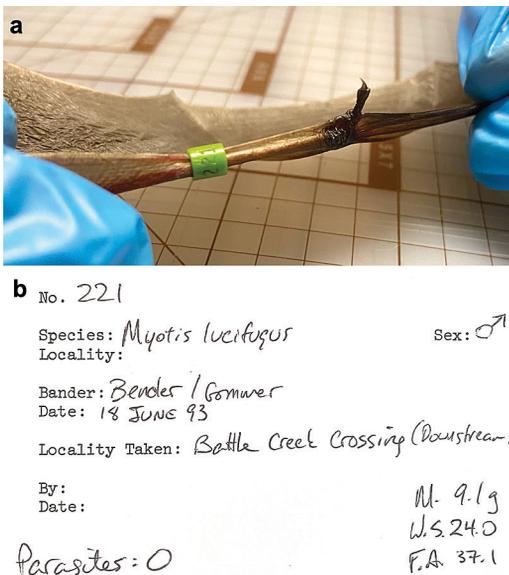
R.M.B. and coworkers have studied bats in Cypress Hills Interprovincial Park, Saskatchewan (49° 34'N, 109°53'W), since 1991. Methods for capturing and marking bats have not changed substantially over this time. We deploy mist nets across familiar locations along a prominent stream, Battle Creek, and capture bats while they are flying, foraging, and/or drinking. Our work follows accepted ethical methods for the study of bats in the field with appropriate permissions (Sikes 2016). In 2015, a female *M. lucifugus* was recaptured in Cypress Hills 23 years after it was originally captured in 1993 (Florko *et al.* 2017). On 12 June 2021, we captured a male *M. lucifugus* that had been banded as an adult on 18 June 1993 (Figure 1). This bat was, therefore, at least 29 years of age, representing the oldest *M. lucifugus* recorded for Saskatchewan. The individual had first been captured in a mist net across Battle Creek and had been banded with the prospect of future recaptures contributing to demographic information. After 28 years, the bat appeared to be in excellent condition and had glossy fur and sharp teeth (Figure 2).

The bat was recaptured less than 100 m from its original capture site along the same section of Battle Creek near Fort Walsh National Historic Site. Site fidelity has been noted in *M. lucifugus* but most of what we know comes from records of bats in hibernacula that are visited over multiple years or adult female bats recaptured or resighted at maternity

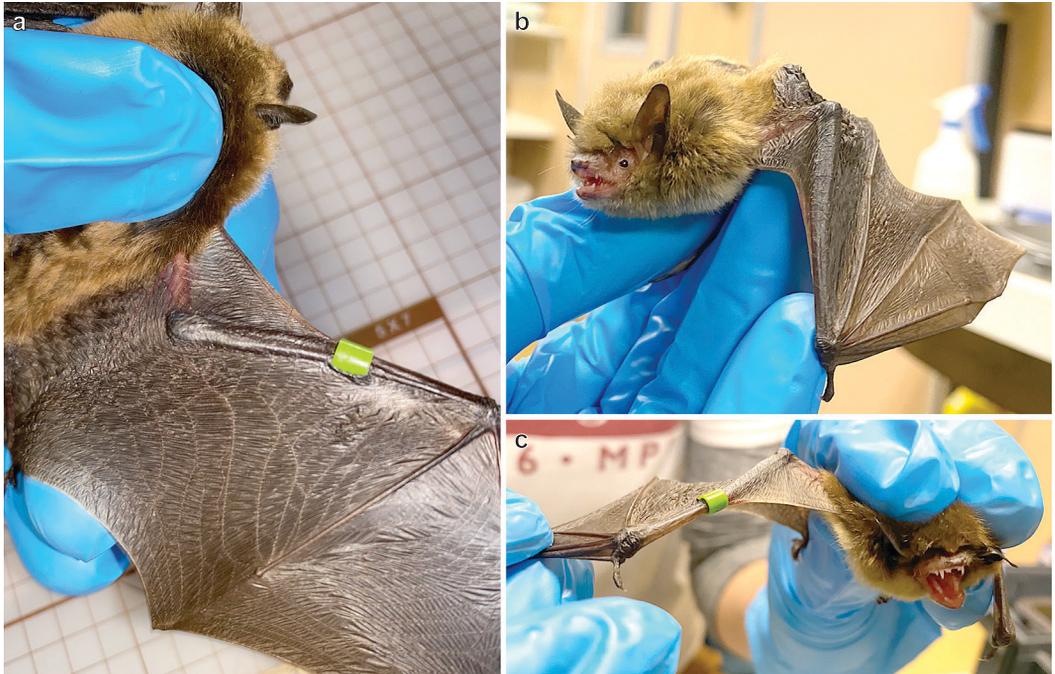
colonies (as reviewed in Lewis 1995). Return observations at a hibernaculum reveal that, across four consecutive years, an individual *M. lucifugus* was found within 4 m of its original recovery location (White *et al.* 2019), and maternity roost fidelity in *M. lucifugus* is known to be as long as 18 years from Yukon, Canada (Slough and Jung 2020).

For forest dwelling bats, records of site fidelity at locations other than roost sites or hibernacula are rare (as summarized in Perry 2011), especially for males that are not constrained to forage near a maternity colony. Recapturing females over foraging, flying, and drinking sites near maternity colonies may be expected, even over many years, because of philopatry (Burland *et al.* 2001; Flanders *et al.* 2016). The previous report from the Cypress Hills of a 23-year-old adult female *M. lucifugus* (Florko *et al.* 2017) is notable, but perhaps not unprecedented given that the bat was initially captured at a nearby maternity colony. However, recapturing the male *M. lucifugus* less than 100 m from its original capture site after 28 years is noteworthy and indicates some level of site fidelity. This bat was not recaptured between 1993 and 2021 despite similar netting effort in most years. Although the frequency that this bat returned to the same area is not known, the recapture is especially noteworthy, and to our knowledge represents a record for a male bat returning to a foraging, flying, and drinking site. We are aware of a previous estimate that 6–8% of female *M. lucifugus* have fidelity to foraging sites for at least 10 years in Yukon, Canada (Slough and Jung 2020). However, our observation from the Cypress Hills is important, not only because it demonstrates longevity, but it also suggests limited male dispersal in the summering grounds of a *M. lucifugus*.

Although *M. lucifugus* was until recently one of the most common and widely distributed bat species in North America, eastern North American populations have drastically declined since the emergence of the fungal disease White-nose Syndrome (WNS) in New York in 2006 (Frick *et al.* 2010, 2015). WNS was first detected in western North America near Seattle, Washington, in 2016 (Lorch *et al.* 2016) and has been recorded in two states (North Dakota 2018–2020; Montana 2019–2021) and one province (Manitoba 2017–2021) adjacent to Saskatchewan (White-nose Syndrome Response Team 2021). WNS is the primary reason (COSEWIC 2013) *M. lucifugus* is now listed as Endangered in Canada (SARA Registry 2021). Because WNS has now been detected in eastern and western Saskatchewan (White-nose Syndrome Response Team 2021), preinfection data on the natural history of *M. lucifugus* may be increasingly valuable and difficult to obtain, leading us to advocate



**FIGURE 1.** a. Green plastic split-ring numeric band on the right forearm of a 29-year-old recaptured Little Brown *Myotis lucifugus*. b. Original capture data card from 18 June 1993. Photos: J. Christiansen.



**FIGURE 2.** Banded male Little Brown Myotis (*Myotis lucifugus*) at least 29 years of age, recaptured in Cypress Hills Interprovincial Park, Saskatchewan on 12 June 2021. Photos: J. Christiansen.

continued marking of individuals (e.g., banding, PIT tagging). Even single observations of longevity and movement or return of an individual, such as that presented here for *M. lucifugus*, may have implications for understanding summer behaviour and ecology, as well as disease dynamics and conservation of *M. lucifugus*.

### Author Contributions

Writing – Original Draft Preparation: J.J.A.C.; Writing – Review & Editing: D.M.G., D.J.B., D.L.G., M.C.K.-R., and R.M.B.; Investigation: J.J.A.C., D.M.G., D.J.B., D.L.G., and M.C.K.-R.; Supervision: M.C.K.-R. and R.M.B.; Funding Acquisition: R.M.B.

### Acknowledgements

The fieldwork described here was conducted on Treaty 4 lands with a presence in Treaty 6. These are the territories of the nēhiyawak, Anihšīnāpēk, Dakota, Lakota, and Nakoda, and the homeland of the Métis/Michif Nation. Funding was provided by grants from the Natural Science and Engineering Research Council of Canada to R.M.B. Bat research on Fort Walsh National Historic Site was conducted under Parks Canada research permit FWA-2021-39420. An earlier version of this manuscript was improved by the helpful comments of Dwayne Lepitzki, Graham Forbes, and two anonymous reviewers.

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Received 29 August 2021

Accepted 16 March 2022

Associate Editor: G.J. Forbes