

## NOTES

### AN UNUSUAL ROOSTING LOCATION OF A HOARY BAT (*LASIURUS CINEREUS*) IN BRITISH COLUMBIA

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A Hoary Bat (*Lasiurus cinereus*) was photographed roosting in a red-stemmed ceanothus (*Ceanothus sanguineus*) shrub at 1630 hrs on 6 October 2008 in Okanagan Mountain Provincial Park, BC. The roost site was unusually low (less than 1 m off the ground; Figure 1) and the bat was very visible in the sparse foliage of the shrub (Figure 2). The ceanothus was growing at the side of a recreational trail on a cool aspect, open, sparsely vegetated rocky slope above Okanagan Lake, at an elevation of 413 m, just south of Lakeshore Road. The site itself is in the Ponderosa Pine very dry hot Okanagan biogeoclimatic subzone variant (PPxh1). Wildfires burned much of Okanagan Mountain Provincial Park in 2003, but large live conifers were present within a few hundred metres. The roosting bat was not disturbed, so its age and sex are not known.

On the day, between 0100 and 0700 hrs, wind speeds ranged from 0-4 km/h, and temperature ranged from -2.7 to 0°C as measured at the Kelowna AWOS weather station (Environment Canada 2008). The day reached a maximum of 13.2°C between 1300 and 1400 hrs. The morning was sunny but the sky became overcast in the afternoon. Rain began just as the bat was discovered.

Hoary Bats are foliage roosters, most commonly reported roosting alone in trees 4-5 m off the ground, in microsites that provide overhead cover and a clear flight path (Wunder and Carey 1996, Gannon 2003). Little is known about characteristics of roosts in British Columbia, although the species is known to roost in fruit trees in the Okanagan (Nagorsen and Brigham 1993). Both deciduous and coniferous trees are used as roosts in other areas (Constantine 1959, Sparks et al. 2005, Carter and Menzel 2007).



**Figure 1.** Hoary Bat roosting in a ceanothus shrub. Okanagan Mountain Park, BC. 6 October 2008 (Lorraine Andrusiak). BC Photo 3665a.



**Figure 2.** The roost site offered little concealment or protection from the elements. Okanagan Mountain Park, BC. 6 October 2008 (Lorraine Andrusiak). BC Photo 3665b.

Coniferous trees may be preferred as roost sites in western North America (Pybus 1986, Perkins and Cross 1988, R. Barclay *in* Heinrich et al. 1999).

Tree species that are found in British Columbia that have been documented being used by roosting Hoary Bats include Douglas-fir (*Pseudotsuga menziesii*) (M. Sarell, pers. comm.), white spruce (*Picea glauca*) (Kalcounis-Rüeggell 2005, Willis and Brigham 2005), lodgepole pine (*Pinus contorta*) (Kalcounis-Rüeggell 2005, Gruver 2002) and mountain alder (*Alnus tenuifolia* syn. *Alnus incana tenuifolia*) (Gruver 2002). No previous observations of Hoary Bats roosting in low shrubs in Canada could be located, although Constantine (1966) reported use of a wild plum (*Prunus* sp.) as a roost site in Iowa and Gruver (2002) reported two individuals roosting in ‘medium-sized’ mountain alder < 5 m in height in Wyoming, although the heights at which

the bats were roosting were not provided. Both of those observations were of individuals to which transmitters had been attached the previous day. Gruver (2002) considered those two roost sites to be anomalies and did not include them in his analysis. Other non-typical Hoary Bat roost sites reported in the literature include beneath a wooden bridge in Montana (Hendricks et al. 2004), inside a hollow western redcedar (*Thuja plicata*) (Nagorsen and Brigham 1993), and within a woodpecker hole (Cowan and Guiguet 1978).

Willis and Brigham (2005) documented reproductive female Hoary Bats in Saskatchewan roosting on average  $12.7 \pm 3.4$  m above the ground at sites with dense overhead cover. Roosts were located on the southeast sides of mature white spruce trees, and wind speeds measured at roost sites were significantly lower than those at the opposite side

of the tree. Gruver (2002) found Hoary Bats in Wyoming roosted primarily in lodgepole pine trees that were taller and had greater canopy cover than randomly selected trees. Hoary bats in Arkansas roosted at heights averaging 16.2 m in dominant or co-dominant coniferous and deciduous trees > 21 cm dbh (Perry and Thill 2007). Constantine (1966) reported characteristics of nine roost sites used by eight different adult Hoary Bats in Iowa. All roosts were in deciduous trees, and the lowest roost was 6.5 feet (2 m) above the ground. Roosts were open below, with dense cover overhead and to the sides, and were situated within trees on edges.

Use of relatively large trees by foliage-roosting bats has been documented in a number of studies (e.g., Kalcounis-Rüeggell et al. 2005). Some authors have suggested that bat preference for higher roosts reflects the need for a vertical drop of some distance to assist the bat in take off (Constantine 1966, Pybus 1986, Wunder and Carey 1996). Taller roosts may also offer increased protection from terrestrial predators and increased opportunities for solar insolation (Vonhof and Barclay 1996). Some authors have also suggested that Hoary Bats may be attracted to tall trees or other tall structures for mating displays during the fall (Cryan 2008). Hoary Bats are relatively large and fast-flying (Barclay 1989), characteristics that might affect choice of open roosts that are easy to access, with little clutter. The bat roost described here provided neither concealment nor protection from predators, and little clear flight space was available below or around the roost. The open roost did provide high exposure to the morning sunlight, but also exposed the bat to the afternoon's rain.

Hoary Bats are widely distributed across North America (Shump and Shump 1982, Patterson et al. 2003). The species is thought to be migratory (Nagorsen and Brigham 1993). Few data are available regarding migration routes, but stable isotope analysis of hoary bat hair suggests that Hoary Bats summering in Canada may winter as far south as Mexico (Cryan et al. 2004). Cryan (2003) reviewed 3,217 museum records of Hoary Bat specimens from North America. Canadian records peaked in August, and only two October records were shown for British Columbia. Those records correspond to

two specimens in the Cowan Vertebrate Museum at the University of British Columbia; a female collected on 14 October 1932 at Okanagan Landing (UBC5390) and a male collected 15 October 1958 at Kelowna (UBC9020) (R. Kenner, pers. comm.). A third October record was found in the collection of the Royal British Columbia Museum of a female with an infected wing fracture, collected on 2 October 1986 in Delta, British Columbia (RBCM016731; L. Kennes pers. comm.). The injury would have halted or prevented the migration of that individual.

The autumn migration of Hoary Bats in British Columbia is believed to occur between August and October (Nagorsen and Brigham 1993).

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### *Literature Cited*

- Barclay, R.M.R.** 1989. The effect of reproductive condition on the foraging behaviour of female Hoary Bats, *Lasiurus cinereus*. Behavioral Ecology and Sociobiology 24:31-37.
- Carter, T.C., and J.M. Menzel.** 2007. Behavior and day-roosting ecology of North American foliage-roosting bats. Chapter 3 in M.J. Lacki, J.P. Hayes, and A. Kurta (eds.). Bats in Forests: Conservation and Management. Johns Hopkins University Press, Baltimore, MD.
- Constantine, D. G.** 1959. Ecological observations on lasiurine bats in the North Bay Area of California. Journal of Mammal. 40:13-15.
- \_\_\_\_\_. 1966. Ecological observations of lasiurine bats in Iowa. Journal of Mammalogy 47:34-31.
- Cryan, P. M.** 2008. Mating behavior as a possible cause of bat fatalities at wind turbines. Journal of Wildlife Management 72: 845-849.
- \_\_\_\_\_. 2003. Seasonal distribution of migratory tree bats (*Lasiurus* and *Lasionycteris*) in North America. Journal of Mammalogy 84:579-580.
- Cryan, P.M., M.A. Bogan, R.O. Rye, G.P.**

**Landis, and C.L. Kester.** 2004. Stable hydrogen isotope analysis of bat hair as evidence for seasonal molt and long-distance migration. *Journal of Mammalogy* 85: 995-1001.

**Environment Canada.** 2008. Kelowna AWOS hourly data report for October 6 2008. Climate Data Online. [http://www.climate.weatheroffice.ec.gc.ca/climateData/canada\\_e.html](http://www.climate.weatheroffice.ec.gc.ca/climateData/canada_e.html).

**Gannon, W.A.** 2003. Bats – Vespertilionidae, Molossidae, Phyllostomidae. Chapter 3 in G.A. Feldhamer, B.C. Thompson, and J.A. Chapman (eds.). *Wild mammals of North America: biology, management and conservation*. Second Edition. Johns Hopkins University Press, Baltimore, MD.

**Gruver, J.C.** 2002. Assessment of bat community structure and roosting habitat preferences for the hoary bat (*Lasiurus cinereus*) near Foote Creek Rim, Wyoming (M.Sc. thesis). University of Wyoming, Laramie, WY.

**Heinrich, R., M. Todd, B. Beck, R. Bonar, J. Beck, and R. Quinlan.** 1999. Hoary bat summer roosting habitat. Habitat suitability index model (Version 5). Foothills Model Forest, Hinton, AB.

**Hendricks, P., J. Johnson, S. Lenard, and C. Currier.** 2004. Use of a bridge for day roosting by the hoary bat, *Lasiurus cinereus*. *Canadian Field-Naturalist* 119:132-133.

**Kalcounis-Rüeggell, M.C., J. Psyllakis and R.M. Brigham.** 2005. Tree roost selection by bats: an empirical synthesis using meta-analysis. *Wildlife Society Bulletin* 33:1123-1132.

**Kurta, A.** 2005. Roosting ecology and behavior of Indiana bats (*Myotis sodalis*) in summer. Pages 29-42 in K.C. Vories and A. Harrington (eds.) *The Indiana bat and coal mining*. Office of Surface Mining, United States Department of the Interior, Alton, IL.

**McTaggart-Cowan, I., and C.J. Guiguet.** 1978. The mammals of British Columbia. *British Columbia Provincial Museum Handbook* No. 11, Victoria, BC. 414 pp.

**Nagorsen, D., and M. Brigham.** 1993. The mammals of British Columbia Volume 1. *Royal British Columbia Museum Handbook*. University of British Columbia Press, Vancouver, BC. 164 pp.

**Patterson, B.D., G. Ceballos, W. Sechrest, M.F. Tognelli, T. Brooks, L. Luna, P. Ortega, I. Salazar,**

**and B.E. Young.** 2003. Digital distribution maps of the mammals of the western hemisphere (version 1.0). NatureServe, Arlington, VA.

**Perkins, J. M., and S. P. Cross.** 1988. Differential use of some coniferous forest habitats by Hoary and Silver-haired bats in Oregon. *Murrelet* 69:21-24.

**Perry, R.W., and R.E. Thill.** 2007. Roost characteristics of Hoary Bats in Arkansas. *American Midland Naturalist* 158:132-138.

**Pybus, M.** 1986. Bats of Alberta - the real story. Alberta Energy and Natural Resources and Alberta Agricultural AGDEX. Pages 684-688 *In* American Vocational Association, Washington, DC.

**Shump, K.A., and A.U. Shump.** 1982. *Lasiurus cinereus*. Mammalian Species Report No. 185. American Society of Mammalogists, Lawrence, KS.

**Sparks, D.W., C.M. Ritz, and B.L. Everson.** 2005. Nocturnal behavior and roosting ecology of a juvenile *Lasiurus cinereus* near Indianapolis, Indiana. *Proceedings of the Indiana Academy of Science* 114:70-72.

**Vonhof, M., and R.M.R. Barclay.** 1996. Roost-site selection and roosting ecology of forest-dwelling bats in southern British Columbia. *Canadian Journal of Zoology* 74:1797-1805.

**Willis, C., and M. Brigham.** 2005. Physiological and ecological aspects of roost selection by reproductive female hoary bats (*Lasiurus cinereus*). *Journal of Mammalogy* 86:85-94.

**Wunder, L., and A.B. Carey.** 1996. Use of the forest canopy by bats. *Northwest Science* 70:79-85.

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Lorraine, a Registered Professional Biologist, graduated from Simon Fraser University and completed her M.Sc. at the University of British Columbia. Her thesis title was “Breeding biology and nesting and roosting habitat of the Barn Owl (*Tyto alba*) in the Lower Mainland of British Columbia”.

She has been employed by Keystone Wildlife Research Ltd., Surrey, BC since 1994 and has worked on a variety of assignments involving wildlife habitat assessment, strategic planning, and impact assessment for provincial government, First Nations, and private industry clients.