ACOUSTIC EVIDENCE FOR HOARY BAT MIGRATION IN THE COAST MOUNTAINS OF BRITISH COLUMBIA

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A migratory tree bat, the Hoary Bat (Lasiurus cinereus) is a summer resident in British Columbia that migrates to a winter range in the United States or Mexico (Nagorsen and Brigham 1993; Cryan 2003; Cryan and others 2004). Information on its summer range and migration in the province is limited to occurrence records derived from museum specimens or opportunistic live captures by bat researchers. Consequently, this species’ migratory routes and migration timing in British Columbia are largely unknown. For 5 mo in 2009, we monitored bat activity at a site proposed for a wind turbine on Grouse Mountain in the North Shore Mountains of the southern Coast Mountains in the District of North Vancouver. From acoustic recordings, we found evidence for a migratory passage of Hoary Bats. Herein, we review the seasonal activity patterns observed at the site and their implications for Hoary Bat migration.

We passively monitored bat activity on Grouse Mountain from 21 May–22 October 2009 with 2 ultrasonic acoustic detectors (AnaBat™, Model SD1, Titley Scientific, Columbia, Missouri) placed in trees. AnaBat™ High Mount cable microphones with waterproof coverings were attached above the units and positioned over plexi-glass reflectors set at a 45° angle. The acoustic detectors were protected in waterproof containers and powered by rechargeable 12-volt batteries with associated solar panel charging units. We programmed detectors to record from sunset to sunrise.

The detectors monitored 2 sampling stations below the summit of Grouse Mountain (Fig. 1). Both stations were in forest dominated by Mountain Hemlock (Tsuga mertensiana) with scattered Yellow Cedar (Chamaecyparis nootkatensis) and Amabilis Fir (Abies amabilis). Station 1 was on a Mountain Hemlock tree at 1200 m elevation (UTM: Zone 10, 494653E, 5470568N, NAD83) with the microphone positioned 12 m above ground. The microphone faced north and sampled airspace above the Thrasher Creek valley. Station 2 was located on top of a 6-m-high cliff face, 60 m southeast of the other station, in a Yellow Cedar snag at 1202 m elevation (UTM: Zone 10, 494577E, 5470503N, NAD83). The microphone was positioned 12 m above the ground facing east towards the Mosquito Creek valley and sampled airspace over a cleared ski run.

We downloaded data recorded on the digital storage cards of the detectors bimonthly and analyzed acoustic files with call analysis software (AnalookW™; http://users.lmi.net/corben/WinAnalook.htm#AnaLookW_Contents). A bat pass was defined as a file containing 2 or more echolocation calls. We identified files as those of a Hoary Bat if they had a sequence of calls with either fluctuating minimum frequencies or a sequence of calls uniform in frequency that had a maximum frequency ≤25 kHz, and a minimum or characteristic frequency below 20 kHz (O’Farrell and others 1999; 2000). We categorized passes as either commuting passes (calls with a regular pulse rate) or feeding passes (some calls with a rapid pulse rate, steep slope, and short duration).

We obtained weather data from the National Climate Data and Information Archive, Environment Canada (www.climate.weatheroffice.gc.ca). Nightly temperature (°C) and relative humidity (%) were calculated from data recorded at 15-min intervals from 20:00–06:00 h at the Cypress Bowl North weather station situated at 953 m elevation, 10 km west of Grouse