A Summary of Roosting Requirements of Northern Long-Eared Myotis in Northeastern British Columbia

Maarten J. Vonhof
Echo Biological Consulting Inc.
1610 - 2A Street NW, Calgary, AB, T2M 2X4, Canada
mvonhof@yorku.ca

Lisa C. Wilkinson
British Columbia Ministry of Environment, Lands and Parks
Suite 400, 10003 - 110 Avenue, Fort St. John, BC, V1J 6M7, Canada

Key words: bat, boreal mixedwood forest, *Myotis septentrionalis*, northern long-eared myotis, roosting, wildlife tree.

EXECUTIVE SUMMARY

(Refer to Vonhof and Wilkinson 1999 for further details). Bats spend over half their lives subject to the selective pressures of their roost environment (Kunz 1982). Roosts offer protection from the ambient environment and from predators, provide sites for mating and rearing young, and promote social interactions. Despite the need for accurate information to include in habitat management plans, the roosting habitat requirements of forest-dwelling bats have only recently begun to receive attention.

Up to 7 species of bats are found in the boreal mixedwood forest in northeastern British Columbia, and all of these are dependent on forest habitat for their roosting and foraging needs (Nagorsen and Brigham 1993). In this summary we report on a 2-year study to examine the roost-site preferences of the northern long-eared myotis (*Myotis septentrionalis*), a provincially Blue-listed species. The specific objectives were: to characterize roosting habitat used by bats, with emphasis on northern long-eared bat females; to compare attributes of confirmed roost sites with potential roosts at the patch and stand levels to determine the criteria used for roost selection; and to provide specific recommendations as to how bat roosting habitat requirements can be incorporated into forest development plans and wildlife tree patch design.

The study area was located in northeastern British Columbia near Fort Nelson, within the moist-wet subzone (mw2) of the Boreal White and Black Spruce (BWBS) biogeoclimatic zone, in the Fort Nelson Lowland ecosection. The area was surveyed in the summers of 1997 and 1998. Bats were captured in mistnets, and radiotelemetry was used to locate roost sites. Various measurements were taken of the roost tree and a randomly selected cavity tree. A 17.8-m-radius plot was established around the roost tree and several site characteristics were recorded. A similar plot was established around a randomly selected cavity tree in another area of the same stand (as in Vonhof and Barclay 1996). Analyses were conducted to compare: various tree measurements; characteristics of cavity trees and non-cavity trees; tree characteristics of roost trees and cavity trees from the 2 geographic scales (cavity trees within the roost tree plot versus cavity trees from other areas of the same stand); and site characteristics of roost trees and cavity trees from the 2 geographic scales.

Nine female and 4 male northern long-eared myotis were outfitted with radio-transmitters, yielding 21 and 17 roost trees respectively. Females roosted primarily in cracks (17), followed by primary cavity excavator hollows (3), and beneath loose bark (1), and males roosted primarily beneath loose bark. Females typically roosted in colonies, whereas all males roosted alone. Female roost trees were farther away from the nearest neighbouring tree than were cavity trees from the same forest patch. No tree or site characteristics significantly discriminated between roost trees and cavity trees in other areas of the same stand. Females roosted at random with respect to the availability of tree species and decay stages, although all roosts were decay stage 2 trembling aspen or balsam poplar trees, and were located in age class 6 (mature) stands. Almost all cavity trees measured were deciduous. Bats commonly switched roosts each day, even when they were caring for nonvolant young, and the distance between roost trees was small (approximately 200 m on average).

Our results concur with other studies, which found that northern long-eared myotis roost primarily in mature stands of deciduous trees, which contain a greater abundance of large snags in a variety of decay classes (Cline et al. 1980), reduced densities, and less clutter (Franklin et al. 1981). In terms of management recommendations, the presence of cavity trees should be considered when designating wildlife trees; all lactating females used cracks, which provide both security and thermal cover. In addition, harvesting plans should consider leaving veteran and dominant trees to help maintain some degree of canopy cover and associated microclimate; by leaving both live and dead trees, a range of decay classes as well as cavities and loose bark will be preserved. Selective cutting could also help to reduce the level

of clutter in dense second-growth stands. Lastly, because bats use a suite of roosts within a restricted area, roosting habitat could be provided by maintaining contiguous stands or large patches of mature deciduous or mixedwood forest.

The recent interest in mixedwood harvesting in northeastern British Columbia makes the results of this study and the accompanying management recommendations highly relevant to the conservation of habitat for northern long-eared bats, as well as for other bat species and cavity users.

ACKNOWLEDGEMENTS

This study was funded by Forest Renewal British Columbia. Several people provided valuable assistance in the field: S. Bradbury, S. McNally, J. Unger, and A. Yee. S. Morris provided information on netting sites, and G. Haines and T. Li provided GIS support. The British Columbia Ministry of Environment, Lands and Parks in Fort St. John provided telemetry equipment and a GPS unit.

LITERATURE CITED

Cline, S. P., A. B. Berg, and H. M. Wright. 1980. Snag characteristics and dynamics in Douglas-fir forests, western Oregon. J. Wildl. Manage. 44:773–786.

Franklin, J. F., K. Cromack Jr., W. Denison, A. McKee, C. Maser, J. Sedell, F. Swanson, and G. Juday. 1981. Ecological characteristics of old-growth Douglas-fir forests. U.S. Dep. Agric. For. Serv., PNW For. and Range Exp. Stn., Portland, OR. Gen. Tech. Rep. PNW-118.

Kunz, T. H. 1982. Roosting ecology of bats. Pp. 1–55 *in* T. H. Kunz, ed. Ecology of bats. Plenum Press, New York, NY.

Nagorsen, D. W., and R. M. Brigham. 1993. Bats of British Columbia. Roy. B.C. Mus., Victoria, BC and University of British Columbia Press, Vancouver, BC.

Vonhof, M. J., and R. M. Barclay. 1996. Roost-site selection and roosting ecology of forest-dwelling bats. Can. J. Zool. 74:1797–1805.

_____, and L. C. Wilkinson. 1999. Roosting habitat requirements of northern long-eared bats (*Myotis septentrionalis*) in the boreal forest of northeastern British Columbia. B.C. Minist. Environ., Lands and Parks, Fort St. John, BC. 88pp. Unpubl. rep.