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# UPDATES BY REGION

## YUKON

### **Bats and the Midnight Sun**

Jennifer Talerico, University of Calgary

Jennifer Talerico (University of Calgary) is starting her MSc. research this summer in Watson Lake, Yukon. She will be investigating how northern nocturnal mammals, specifically little brown bats (*Myotis lucifugus*), adjust their foraging behaviour and strategies where there is a short reproductive season, low temperatures and short nights. Jennifer will be examining: (1) bat emergence and return time, (2) foraging habitat, (3) diet, (4) insect abundance and distribution (5) light intensity and (6) weather. She will be working in cooperation with Thomas Jung, Yukon Department of Environment.

### **Bats of the Yukon**

Brian Slough, Whitehorse

I am continuing my bat studies initiated in 1997 to learn about Yukon's bats. These were the first studies directed at bats in the territory and have been funded primarily by the Northern Research Institute, Yukon College. Objectives have been to determine species present, their distribution, colony dynamics, foraging and roosting habitats, and daily and seasonal activity patterns. Most, if not all, Yukon bats are migratory, and the locations of their swarming/hibernating sites remain a mystery. I am still trying to establish collaboration with Alaskan researchers to help answer this question. Here is a brief update on what I have learned.

I recorded a big brown bat (*Eptesicus fuscus*), in the southern Yukon in 1999 and captured northern long-eared bats (*Myotis septentrionalis*) (along with collaborators from the Yukon Department of Environment and NatureServe Yukon) in the southeast. I have banded almost 400 little brown bats (*Myotis lucifugus*) and collected biopsy punches from 200 bats at several colonies across the southern Yukon. Tanya Dewey, University of Michigan, is analyzing *M. lucifugus* genetics, and has found two subspecies, *M. l. lucifugus* and *M. l. alascensis*, with both types found at a single colony near Whitehorse. The northern limit of bats at 64° appears to be constrained by migration abilities rather than summer light conditions or habitat factors. Bats forage in continuous daylight at the darkest part of the day, presumably to minimize predation risk.

Little brown bat colonies are highly dynamic, with rates of recapture low, and evidence of movement between colonies. Natural day roosts have been observed in rock crevices and in dead trees. Riparian habitats are preferred. Seasonal migration to the Yukon begins in mid-April, parturition is around July 1, and colonies begin to disintegrate in early August, although many bats remain until late September. There are records of bats hibernating in buildings in interior Alaska, but this has not been documented in the Yukon. There are natural hibernacula in Southeast Alaska, and I suspect that many Yukon bats belong to that population.



## NORTHWEST TERRITORIES

Submitted by Joanna Wilson, Environment and Natural Resources,  
Government of the Northwest Territories, Yellowknife

### Bats in the Northwest Territories

Very little work has been done to date on bats in the Northwest Territories (NWT). There are records of only three species in the NWT: *Myotis lucifugus*, *M. septentrionalis* and *Lasiurus cinereus*. Bats in the NWT are at the northern limit of their range. Records are very few. In 2005 a *M. septentrionalis* was found in the western NWT (in Fort Simpson) by Doug Tate of Parks Canada, thought to be only the second record of this species and lending support to the range distribution for this species in the territory. It is suspected that additional species, interesting habitats, and potentially hibernacula may be present in the NWT, particularly in the Nahanni National Park area. There are no ongoing bat research projects in the NWT at this time, but we are hopeful that a bat survey will be done in the Nahanni area in the near future (see summary by Cori Lausen in the Alberta section).

## BRITISH COLUMBIA

### Protecting Threatened Pallid bats (*Antrozous pallidus*) in the Okanagan Valley, British Columbia

Daniela A. Rambaldini and the Nk'Mip (Osoyoos) Indian Band  
Oliver, British Columbia

In 2005, our Pallid bat research was once again focused on the Nk'Mip (Osoyoos) Indian Reserve, however 2 sites in Washington State were also visited. The focus of our research was quantification of habitat use for foraging - specifically, we wanted to determine to what extent Pallid bats foraged in vineyards compared to native habitat. By understanding how this species is adapting to the changing landscape, effective land management policies can be implemented. Our field work also included some of the "usual" bat field work protocols - mist netting, banding, radio tracking, and taking lots of pictures!!

Over the summer, 5 adult males and 1 lactating female were captured and all but 2 males were radio tagged with temperature-sensitive transmitters. Emergence surveys conducted at known colony roosts yielded slightly lower occupancy rates compared to previous years. Effects of ambient temperature and precipitation on roost emergence were not statistically significant. Radio tagged bats showed fidelity to roosting areas (5 new roosts were found) and foraged within 1.5 km of their day roost, albeit not all roost and foraging areas were found. Compared to tagged males, the female maintained higher daytime skin temperatures during the tracking period. A maternity roost was located in a cliff rock crevice, and a single untagged Pallid bat was discovered night roosting under an open girder concrete highway bridge; these are the first such roosting records for Pallid bats in Canada. Night vision surveys indicated that foraging activity in native habitat exceeded (by up to 50%) that in vineyards. Foraging behaviour and habitat use were not significantly affected by environmental conditions. However, more bats were observed on warmer nights. Pitfall traps were constructed to assess



arthropod composition in native habitat and vineyards; specimens from native habitat were larger, more taxonomically diverse, and more likely to be taken as prey (based on published literature for Pallid bat diet composition) than specimens collected in adjacent vineyards. Faecal analysis indicated that BC Pallid bats ate mostly Scarab beetles (Coleoptera: Scarabaeidae), whereas WA bats ate mostly Jerusalem crickets (Orthoptera: *Stenopelmatus* spp.) and had a more diverse diet than BC bats.

One objective - identifying colonies outside the current range - was not attempted due to time and labour constraints. Despite efforts, a hibernaculum was not found. The research team also presented several bat talks for local school and conservation centre education programs, outreach initiatives, and community events.

It is extremely important to continue Pallid bat research and public education. Future work will involve: surveying outside the delineated BC distribution; maintaining an updated census by surveying roosts, capturing bats, monitoring health of recaptures, and collecting tissue (DNA) samples; locating more maternity roosts and a hibernaculum; continue characterizing habitat use to assess seasonal trends, and include alternate locations and additional colonies, including maternity colonies; and addressing potential threats to population persistence (e.g., pesticide contamination). If you're interested, you can visit [www.zooaction.ca](http://www.zooaction.ca) (click on "Species at Risk") for more information (and some photos!) or check out the Western Bat Working Group website to download a full, detailed report.

Best of luck to everyone for the upcoming bat field season!!

## ALBERTA

### Status of Migratory Bats in Alberta

Submitted by Robin Gutsell, Alberta Sustainable Resource Development  
Fish and Wildlife Division

At their November 2005 meeting, the Alberta Bat Action Team discussed the status of migratory bats in Alberta, with particular regard to 1) increased evidence that red bats are more common in the province than previously thought; and 2) the potential threat to all migratory bats from wind energy development. The group made a recommendation to the Alberta Fish and Wildlife Division that the eastern red bat should be added to the list of species in the province. Further, ABAT recommended that, along with silver-haired and hoary bats, red bats should be moved into the "sensitive" category in the upcoming *General Status of Alberta Wild Species: 2005* in view of the potential for high mortalities of migratory bats at wind energy sites. Previously, silver-haired and hoary bats were considered "Secure", and red bats were considered "Accidental/Vagrant."

This status change should enable government, land managers and industry to better highlight the issue of bat mortality around wind energy developments. The "Sensitive" category is considered a prevention category in Alberta, and is defined as *any species that is not at risk of extinction or extirpation but may require special attention or protection to prevent it from becoming at risk*. Sensitive species are given emphasis in environmental assessments, industrial guidelines, biological inventories and management planning. It is the hope of ABAT that this move will help focus attention on the potential conservation issues that have been raised by the high mortalities of migratory bats at wind energy developments in some parts of North America.



## Bats of Alberta Poster

The Alberta Conservation Association spearheaded the production of a "Bats of Alberta" poster. The poster committee consisted of representatives from Alberta Bat Action Team and Alberta Sustainable Resource Development. Most pictures were provided by Merlin Tuttle (Bat Conservation International), and local photographer Gord Court. The poster will be available free of charge from Alberta SRD Information Centre (Main Floor, 9920-108 Street, Edmonton, AB T5K 2M4 / Ph: (780) 422-2110 Fax: (780) 427-4407). The poster will be available to view and order online at <http://www3.gov.ab.ca/srd/info>.

## Winter Acoustics Results and Summer Bat Surveys

Cori Lausen, University of Calgary

This past winter I again monitored Dinosaur Provincial Park and East Coulee, Alberta, two locations in the Alberta prairies that had substantial bat activity throughout last winter. Bats were again active at both locations, with *Myotis spp.* (mainly *M. ciliolabrum* and *M. evotis*) and *Eptesicus fuscus* active throughout the winter. The coldest bat passes I detected this year were  $-7.3^{\circ}\text{C}$  for *Myotis* and  $-7.9^{\circ}\text{C}$  for *E. fuscus*. I monitored a third Red Deer River location this past winter: Dry Island Buffalo Jump Provincial Park. For those of you unfamiliar with this park, it is a spectacular badlands area with spruce trees located in the central part of the province. Both *Myotis* and *E. fuscus* were active in this park each month this past winter, providing evidence that this area is also important for hibernation of prairie bats in Alberta. I look forward to seeing the acoustic results from Dry Island Park this spring, because given the presence of evergreen trees in this north-south river corridor, it may be an important migratory route for hoaries, silver-haired and red bats as they "magically" make their way into northern Alberta from the U.S., seemingly by-passing the southern Alberta prairies. Results of my hibernation work from 2004-5 should be appearing in Canadian Journal of Zoology in the near future.

As a prerequisite to writing the Alberta status report for *M. ciliolabrum*, I hope to spend a few days netting and do some acoustic work in the Stettler/Donalda area along the Battle River in the Parkland Zone of Alberta. I started this work last summer but due to cold weather was unable to properly survey for the western small-footed bat. This summer I hope to establish the current northern limit for the western small-footed in Alberta.

If funding comes through my partner, Michael Proctor, and I will be surveying bats in the Nahanni National Park Reserve in the Northwest Territories this summer. This survey will be a combination of acoustics and mistnetting, and all sites will be accessed via canoe and possibly helicopter. To date little is known about the bats of NWT (see Joanna Wilson's NWT update above). We have received a great deal of support from CPAWS-NWT and Parks Canada, and anticipate that if funding does not materialize this summer, the survey will take place in 2007 instead.



## Evaporative Water Loss in Prairie Bats

Jeff Gruver, University of Calgary

This spring I will be heading back to Drumheller, Alberta to begin my third field season of work investigating the interplay between the roosting environments of bats (especially reproductive females) and their need to balance daily energy and water budgets. Following up on the previous two year's work, I will be measuring physiological responses of *Myotis evotis* and *M. ciliolabrum* in the lab and of *M. evotis* in the field to determine if evaporative water loss influences roost selection in dry southeastern Alberta.

Preliminary results indicate that at a given ambient temperature and humidity, females lose significantly more water than males, and provide support for my hypothesis regarding the importance of water balance. Work during summer 2006 will focus on refining models of water loss at various levels of ambient temperature and humidity, and investigating differences in roosting conditions that influence water conservation.

## The Effects of Urbanization on Prairie Bats

Joanna Coleman, University of Calgary

I will be studying the urban ecology of bats. Although few studies have looked at how bats are affected by urbanization, the general view is that they decline in diversity and abundance and that rarer species disappear. However, at least a few species, including *Eptesicus fuscus* and *Myotis lucifugus* are commonly found in many North American cities, where they may be very successful. My study system will be communities of bats inside and outside the city of Calgary, Alberta. Five species (*E. fuscus*, *Lasiurus cinereus*, *Lasionycteris noctivagans*, *M. evotis* and *M. lucifugus*) are known to occur in the same geographic area as Calgary, and my objectives include determining whether these are found in equal numbers in and outside the city. I will also assess some of the underlying factors, i.e., availability of roosts and prey that are likely to impact the diversity of bats in urban and rural areas.

## ALASKA

Submitted by Carrie Talus, University of Alaska Southeast

## Long-Term Remote Acoustic Bat Detector

Matt Heavner, Assistant Professor of Physics, University of Alaska Southeast, 11120 Glacier Highway, Juneau, AK 99801, (907) 796-6403 [matt.heavner@uas.alaska.edu](mailto:matt.heavner@uas.alaska.edu)

Dr. Matt Heavner of the University of Alaska Southeast is developing an acoustic bat sensor that is specifically designed for long-term acoustic monitoring of bats. This sensor system uses a lower power computer, and will be designed to continuously monitor bat activity from remote locations. The software is designed to recognize bat signals and automatically identify and eliminate background noise. During the 2005 summer season, the first prototype of the system was tested during three weeks of field work from 8 nights of recordings at 5 different locations on Prince of Wales (POW) Island in Southeast Alaska. The recordings collected during the 2005 field season were analyzed using Raven, a sound analysis software application developed by



the Cornell Bioacoustics Research Program, in order to validate the system software and identify needed improvements. During the 2005/2006 winter 35.5 hours of audio data have been analyzed in order to check and improve the software's ability to discriminate between bat signals and noise. Field research will again take place on Prince of Wales during the summer of 2006. The objectives of this second summer of data collection include 1.) Continuing to locate sites on POW where bats are located and to gather preliminary information on bat distribution, and 2.) Test the equipment by recording continuously for a week or longer if possible. If possible, one system will be left in the field to continue recording over the winter. The remaining development issues are reliability and use-friendly interface development. This project is funded by the Alaska Department of Fish and Game. More information can be found at <http://alaskabats.org/>.

## MONTANA

Submitted by Bryce Maxell, Senior Zoologist, Montana Natural Heritage Program

Montana Natural Heritage will be doing bat acoustic and mist net surveys on BLM lands in SW Montana in summer 2006 as part of a project to fill in gaps in distribution information for small mammals. MNH will also be doing acoustic and mist net surveys on USFS lands in SW Montana and central Montana for the Region 1 USFS inventory effort. Our recent report for the USFS summarizes all bat records for Montana through statewide dot distribution maps for individual species (see Recent Literature section below). The report can be downloaded as a pdf file off of our website at: [http://mntnhp.org/reports/USFS\\_Bats.pdf](http://mntnhp.org/reports/USFS_Bats.pdf).

## ABAT UPDATE

**Wind Energy and Bats.** The Alberta Bat Action team did not have a spring meeting this year. The group was asked at the last meeting in November to produce a "bats and wind turbines" protocol to be part of the "Wildlife Guidelines for Alberta Wind Energy Projects, Alberta Sustainable Resource Development – Fish and Wildlife Division". This document was completed by the University of Calgary Bat Lab and reviewed by a number of ABAT members. AB Sustainable Resource Development has expressed interest in having the group also draft a "post-construction protocol".

A copy of the updated Handbook of Inventory Methods and Standard Protocols for Surveying Bats in Alberta, and two associated appendices: 1. Tissue sampling protocol for genetic study of bats, and 2. Bats and Wind Turbines -- Pre-siting and pre-construction survey protocols are to appear on the ABAT website in the near future. The wind turbine protocol appendix is specific to Alberta, providing suggested survey protocol for the relatively small-scale wind energy developments that are currently proposed for the southern part of the province. This is a first draft, and provides Alberta Environment with some basic guidelines for assessing impact on bats of proposed wind energy developments in this province. This document is expected to change as new information is obtained; because Erin Baerwald, an MSc student at the University of Calgary is starting her first field season this summer looking at bats and wind turbines in the Pincher Creek area, it is expected that new data in the fall will warrant a revision of the protocol. Regular checking of the website is encouraged as updates will be posted there.



**Bats of Alberta Poster.** ABAT helped the Alberta Conservation Association design a “Bats of Alberta” poster. ABAT members Margo Pybus, Robin Gutsell, Lisa Wilkinson, and Cori Lausen worked with Kris Kendell from the Alberta Conservation Association and Heather Wheeliker (Coordinator, Waste and Wetlands Education Programs, Alberta Environment, Education & Outreach) on the production of the poster. Other ABAT members provided input and review. This initiative was spearheaded by the ACA. The poster will be available free of charge from SRD Information Centre Ph: (780) 422-2110 [www.srd.gov.ab.ca/info/index.cfm](http://www.srd.gov.ab.ca/info/index.cfm)

**Migratory Bat Status in AB.** The Alberta Government accepted a recommendation by ABAT to change the status of all 3 species of migratory bats (hoary, silver-haired and eastern red bats) to “sensitive”. See submission by Robin Gutsell in the Alberta section for details.

## WESTERN BAT WORKING GROUP UPDATE

**Biennial Conference Announcement.** The location for the next WBWG Conference has been decided: Tucson, AZ Spring 2007. Details will be posted at [www.wbwg.org](http://www.wbwg.org) as plans unfold.

**Canadian Representation.** Canada recently acquired new representation on the WBWG Board: Joanna Wilson, Protected Areas Strategy Biologist with Environment and Natural Resources, Government of the Northwest Territories joins Mike Fournier, Canadian Wildlife Service in representing the NWT. If you would like to know who your provincial/territorial representative is on the WBWG, visit [www.wbwg.org](http://www.wbwg.org) and click on Contacts.

**WBWG Newsletter.** The WBWG Newsletter, issue 2 (spring 2006) is soon to be released and can be viewed at [www.wbwg.org](http://www.wbwg.org). If you would like this newsletter to be sent to you as a .pdf, please contact your provincial/territorial representative. If you would like to be notified when the newsletter is available for download from the WBWG website, join the ListServ (instructions on the homepage).

**Wind Energy and Bats – Sub-Committee.** The WBWG is exploring ways of helping to facilitate the emerging research and management issues surrounding wind energy and bats. Dr. Robert Barclay, University of Calgary and Ed Arnett, Bat Conservation International, were invited to join the last WBWG conference call where they provided information about the latest bats and wind energy research developments; they acknowledged that the WBWG could be instrumental in a networking capacity and could facilitate the standardization of data collection. This stimulated the group to suggest a sub-committee to review and compile wind energy protocols. This sub-committee is currently being assembled. Individuals interested in participating on this committee are encouraged to contact Bronwyn Hogan of California ([bhogan@dfg.ca.gov](mailto:bhogan@dfg.ca.gov)).





# CLASSIFIEDS

## SCHOLARSHIP/GRANT OPPORTUNITIES

Bat Conservation International offers grants and scholarships; check out their website at [www.batcon.org](http://www.batcon.org). Applications for the 2007 Student Scholarship Program and 2007 NABCP Conservation Fund will be available in July, 2006. Their Global Grassroots Bat Conservation Fund has no deadline, and applications can be filled out online.

## BAT JOB/VOLUNTEER OPPORTUNITIES

**Job Postings.** Currently the following job postings are listed on the BCI website. For details, check out the "Bat Vine" at [www.batcon.org](http://www.batcon.org).

- Two Bat Field Technicians to work at Camp Atterbury, just south of Indianapolis, IN looking at the potential effects of military training operations on endangered bats from 15 May through September 2006.
- An upper-level undergraduate student is wanted as an assistant for research on how stream channel geomorphology influences bat foraging activity.
- Six volunteers are needed to assist in radio tracking of Townsend's big-eared bats from July 10-21, 2006 near Kanab, Utah. Radio telemetry experience preferred, but not absolutely necessary.

**Volunteer Opportunity in Egypt.** A Bat scientist is required as part of an extensive biodiversity survey programme that is being implemented in the St Katherine Protectorate (in the Sinai Desert), Egypt. The applicant will be required to work for a 6 week period from 25th June to 5th August Primary duties: \*To implement mist net and echo location surveys of the bat fauna of the St Katherine within the protectorate region. \* To organise volunteers to assist with the surveys and ensure that they are aware of the purpose and outcome of the survey work. \*To present the findings of the research to volunteers and other project staff. \* To coordinate the write up and publication of the data collected.

*Attributes, skills and experience required* \* Previous experience of mist net and echo location surveys for bat species (preferably within a desert environment) \*Leadership experience, and evidence of good organisational abilities. \*Ability to work in remote areas as part of a small friendly team \*Previous publications are desirable, but not essential.

This is a *voluntary post*, however there is a travel bursary to cover the cost of travel to Egypt, and all food and accommodation costs in country are covered by the project.

*Applications* to be made by email to [info@opwall.com](mailto:info@opwall.com). Applicants should enclose a CV and a covering letter identifying how they meet the attributes, skills and experience requirements listed above. Please put Bat Scientist in the email subject field.



## WHILE YOU ARE IN THE FIELD...

**Band Returns Wanted!** Thomas Jung, Yukon Department of Environment, Whitehorse, Yukon, and Brian Slough have been banding little brown bats in the Yukon for several years; hundreds have been banded thus far. Among other questions, they are interested in where bats summering in the Yukon hibernate (likely not in the Yukon). Bats we've banded have either red or gold alloy lipped-bands (Lambournes, UK) punched with UAF and 4 numbers (e.g. UAF 2953) or silver alloy bands (Geys, Pennsylvania, USA) punched with YTG and 3 numbers (e.g. YTG 078). Please contact Thomas Jung ([thomas.jung@gov.yk.ca](mailto:thomas.jung@gov.yk.ca)) should you encounter a bat banded in the Yukon.

**Water Trough Information Needed!** Bat Conservation International is seeking measurements and descriptions for livestock water tanks across North America to assess their potential for bat use and risk of mortality. *If you own or live near a stock water tank, could you please take a few minutes to measure it.* The information needed is listed on the online form available at: [www.batcon.org](http://www.batcon.org) (click on Conservation Programs, Water for Life, then "Participate"). For Canadians filling in the form online there is no place to enter Province or Territory, so simply leave that blank and include it into another entry such as Notes or Range/Management Unit. Alternative to online submission, you can print and fax the form to 619-280-0202 or mail to Dan Taylor, BCI, 4251-46<sup>th</sup> St, San Diego, CA 92115. Word document forms are available that can be filled in as an email attachment from Dan Taylor at [dtaylor@batcon.org](mailto:dtaylor@batcon.org) or Cori at [corilausen@netidea.com](mailto:corilausen@netidea.com). *Please spread the word to farmers in your area.* BCI is eager to get a widespread sampling of troughs; your help is greatly appreciated!

# ANNOUNCEMENTS

## MEETINGS/CONFERENCES/WORKSHOPS

**14<sup>th</sup> International Bat Research Conference**, Merida, Yucatan, Mexico, 19 – 23 August 2007. Details will be posted at <http://www.nasbr.org/> as plans unfold.

**Bat Conservation and Management Workshops:** Portal, Arizona June 12-17 and June 17-22, 2006; Harrisburg, Pennsylvania August 7-12, 2006; Nashville, Tennessee August 16-21, 2006. For information and applications, visit <http://www.batcon.org/> or contact Kari Gaukler, Bat Conservation International, PO Box 162603, Austin, TX 78716, 512-327-9721; [kgaukler@batcon.org](mailto:kgaukler@batcon.org)

**Bat Conservation Acoustic Monitoring Workshop.** Tucson, Arizona. June 22 – 27, 2006. For more information visit [www.batcon.org](http://www.batcon.org)

**WBWG 2007 Conference.** This biennial conference will be in Tucson, AZ Spring 2007. Details will be posted at <http://www.wbwg.org/> as plans unfold.

**36<sup>th</sup> Annual North American Symposium on Bat Research**, 18-21 October 2006. Wilmington, North Carolina. See <http://www.nasbr.org/> for full details.



**12th Australasian Bat Society Conference** is being held April 19-21, 2006, at the University of Auckland. <http://www.sbs.auckland.ac.nz/absc2006/>

**NJ Bat Study Techniques Workshop.** Great Swamp National Wildlife Refuge • June 2-4, 2006. Two concurrent sessions are available to choose from: Acoustic Monitoring or Capture Techniques. Details: [www.batmanagement.com/Programs/programcentral](http://www.batmanagement.com/Programs/programcentral)

**TWS Bat Workshop.** The Western Section of The Wildlife Society is sponsoring a four-day "Ecology and Management of Bats" Workshop in Monterey, CA, September 7-10. Recognized experts will be leading discussions, and field work with echolocation and mist-netting are among the many scheduled activities. Additional information is available at [www.tws-west.org](http://www.tws-west.org) (click Meetings and Workshops).

## RECENT LITERATURE

### "Gray" Literature

- Craig, J.A. and M. Sarell. 2006. The Kootenay Community Bat Project: 2005 Progress Report. Prepared for Columbia Basin Trust, Golden, BC and Columbia Basin Fish and Wildlife Compensation Program, Nelson, BC.
- Hendricks, P. and B.A. Maxell. 2005. Bat Surveys on USFS Northern Region Lands in Montana: 2005. Report to the USDA Forest Service, Northern Region. Montana Natural Heritage Program, Helena, MT.
- Lausen, C. L. 2006. 2005-2006 Bat Survey of the Middle Red Deer and Battle Rivers. Alberta Natural Heritage and Information Centre, Parks and Protected Areas Division, Edmonton, AB.
- Lausen, C., Baerwald, E., Gruver, J. and R. Barclay. 2006. APPENDIX 5. *Bats and Wind Turbines. Pre-siting and pre-construction survey protocols.* In: Vonhof, M. 2002. Handbook of Inventory Methods and Standard Protocols for Surveying Bats in Alberta (Alberta Sustainable Resource Development). Alberta Sustainable Resource Development, Fish and Wildlife Division, Edmonton, Alberta. Revised 2004.
- Rambaldini, D.A. 2006. Behavioural Ecology of Pallid bats (Chiroptera: *Antrozous pallidus*) in British Columbia Osoyoos (Nk'Mip) Indian Band, Oliver, B.C., British Columbia Ministry of Environment, Penticton, B.C., and Canadian Wildlife Service, Delta, B.C.

### Papers

- Psyllakis, J.M. and R.M. Brigham. 2006. Characteristics of diurnal roosts used by female *Myotis* bats in sub-boreal forests. *Forest. Ecol. Manag.* 223:93-102.
- Willis, C.K.R., R.M. Brigham, and F. Geiser. 2006. Deep, prolonged torpor by pregnant, free-ranging bats. *Naturewissenschaften* 93:90-83.



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