# Western Canada Bat Network Newsletter

Issue No. 33 Winter 2018

# Western Canada Bat Network Newsletter

Winter 2018 Issue No. 33

# Table of Contents

Cover – Hoary Bat in Castle Provincial Park, AB. Photo: J. Headley.

# Updates by region

## Alberta

### Provincial update

Lisa Wilkinson, Species at Risk Biologist,
Alberta Environment and Parks lisa.wilkinson@gov.ab.ca

Status: Currently, Little Brown Myotis (*Myotis lucifugus*) and Northern Myotis (*M. septentrionalis*) are going through the status review process to determine if they will be listed as a Species at Risk in Alberta. A status report for the Hoary Bat, *Lasiurus cinereus*, is under development.

Caves: Work continues at Alberta's largest hibernacula, with banding in the fall and continuing the metabolic study started last year. A new cave hibernacula was recently discovered by members of the caving community.

NABat: This year represented the third or fourth year of data collection for most sites, with a couple of new cells added this year.

Banded Myotis at Cadomin Cave. Photo: J. Burgar.

WNS: The “stow-away” bat campaign had a small scale launch this year, with some provincial parks putting up signage. This will be expanded next year.

Wind farms: The pre-construction protocol and bat mitigation framework are being updated.

---

## Alberta Community Bat Program Update

Cory Olson, AB Community Bat Program Coordinator and Susan Holroyd, Alberta Community Bat Regional Coordinator

The ACBP delivered over 50 programs/events from January to November 2018, with the largest events held in Edmonton and Calgary. Two new guidebooks were released in 2018 “Building Bat-Friendly Communities” (downloaded over 2000 times) and “Alberta Bat House Guidelines” (downloaded over 5700 times).

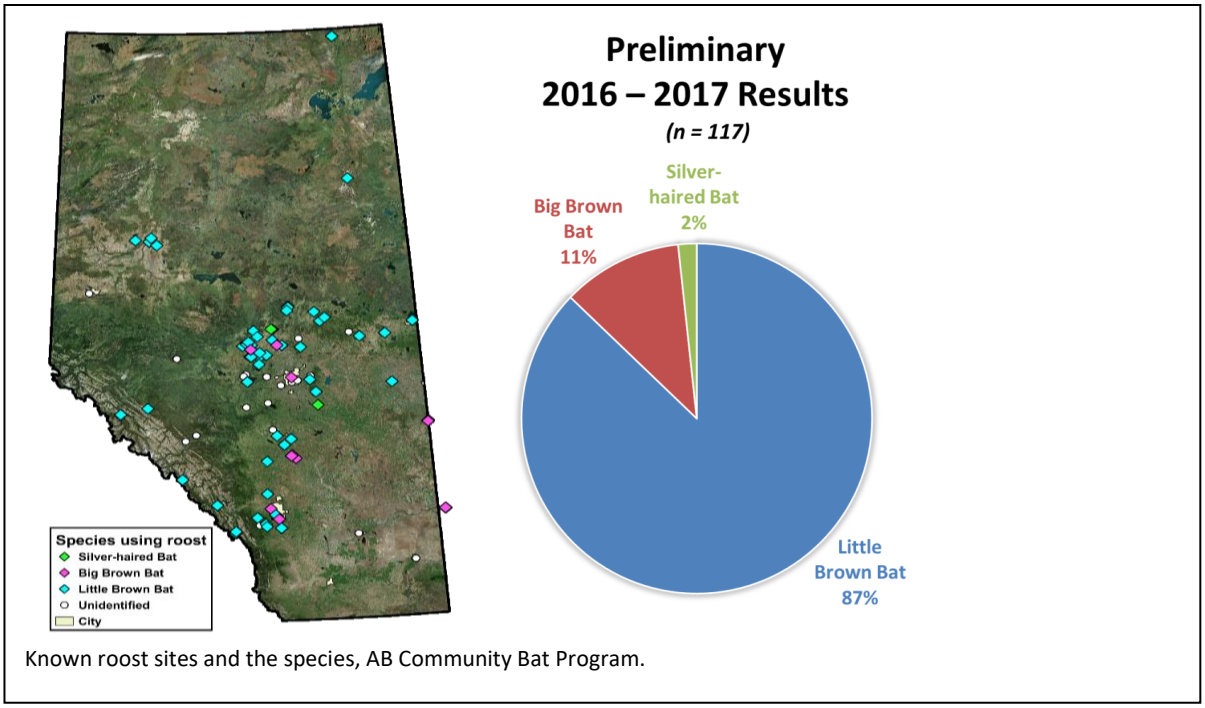
Our work on the ground has included several site visits to properties to assist with bat management, including an exceptionally large building colony with over 1,100 Little Brown Myotis roosting under concrete roof tiles. This site will be the home of Alberta’s first “bat condo”, which is being installed in advance of a planned exclusion over the winter. The condo is planned to be monitored next summer to collect information on occupancy and internal temperatures.

Requests for information through both our new toll-free phone number, email and Facebook messaging continues to increase (with over 400 conversations so far in 2018). Our online community continues to grow with 1,700 followers on Facebook, almost 2,400 followers on Twitter and a growing Instagram following. On average we reach more than 1,000 people per day with our Facebook page, and many additional people are reached from our Twitter and Instagram pages. In addition to the program Facebook page, we also launched a “group discussion” page on Facebook called “Alberta Bats” which allows followers to post and discuss any bat-related photos, articles or news items. Recently, we added a donate button on the webpage and Facebook page to allow people to donate directly to the program, and includes functionality to send donations on behalf of others using e-cards.

We had an extremely high rate of engagement throughout “Bat Week 2018”, which we take as a sign that our community is interested and consuming the material we are offering. This year we made a request to the City of Calgary to declare “Bat Week” and received an official proclamation. We plan to lobby for this designation again next year and include all our major cities.

There were several submissions to the citizen science program, which will be compiled over the winter. Overall, participation appears to be similar, or possibly slightly lower, than previous years. The focus in 2019 will be to increase participation outside the Edmonton to Calgary corridor, and to increase engagement among people who already contributed to the program. Results from the previous two years indicate that most reported bats are Little Brown Myotis, which currently represent about 87% of guano submissions (see diagram on next page).

Special thanks to Cori Lausen, Lisa Wilkinson, Mike Kelly, Erin Low, Christine Godwin, Darcey Shyry, and the team at WCS Canada for making this project a success. The Alberta Community Bat Program is supported by grants to WCS Canada from Alberta Conservation Association, Alberta Ecotrust, and Chawker's Foundation.




Known roost sites and the species, AB Community Bat Program.

## Castle Bat Inventory Summary

Cory Olson, ACBP Coordinator, Alberta Community Bat Program, WCS Canada

From July 30 to August 2, a group of 22 volunteer biologists completed an inventory ("bat blitz") of Castle Provincial Park and Castle Wildlands Provincial Park (Castle parks). This inventory provided some of the first bat inventory data for the Castle parks, which were designed Provincial Parks in 2017.

We had four productive nights of capture using mist-nets, with bats caught every night of the inventory. In total, we captured 119 individuals of six species, which included Hoary Bats (10 captures), Silver-haired Bats (32 captures), Big Brown Bats (4 captures), Little Brown Myotis (65 captures), Long-legged Myotis (6 captures), and Long-eared Myotis (2 captures). Eastern Red Bats were not captured, and acoustic data indicated they were likely rare, or absent, during the surveyed period. We deployed acoustic detectors at 5 locations, with each monitoring 2 nights. Results of the acoustic detection were consistent with capture results, with few indications of missed species. Both capture and acoustic detection suggest the Castle parks are within an important migration corridor for both Hoary and Silver-haired Bats.

Special thank you to all the volunteers who contributed to the success of this project. Funding and in-kind support was generously provided by Alberta Environment and Parks. Thanks also to WCS Canada for hosting this event.

Mist-netting over the Carbondale River during the 2018 Castle Bat Inventory. Photo: J. Headley

## Bat House Case Study

Cory Olson, Sky Ecological

During the summer of 2018, I conducted a bat house temperature case study at a farm near Red Deer, Alberta, with the aim of testing bat house recommendations that are often promoted in many areas of Canada.

Using iButtons, I monitored the temperature of three bat houses and a barn roost, all within about 50 m of each other and exposed to similar climatic conditions. This included a 4-chambered nursery house and a single-chambered bat house (following Bat Conservation International designs) installed on the south side of a calf shelter, and another 4-chamber design on the east side of the same calf shelter. Bat houses were stained black and unshaded. All bat houses, and the barn, had evidence of use by Big Brown Bats and/or Little Brown Myotis, but not necessarily on all days of the monitoring period. Little Brown Myotis were most often found roosting in the barn, while Big Brown Bats typically roosted in the

bat houses. Temperatures were monitored at 30-minute intervals from June 22 to August 3, 2018, which approximately coincided with the lactation period of bats (when pups are present).

All bat houses showed signs of over-heating, but especially the single-chambered design, which reached potentially stressful temperatures (defined as exceeding 40°C) on three-quarters of the nights monitored. As expected, the barn roost rarely, if ever, over-heated, providing relatively stable temperatures for the duration of the monitoring period.

Several other studies of bat houses are underway in western Canada, including projects led by WCS Canada and the University of Calgary. This case study, and the results of others, highlight the need to form better management recommendations, and the potential need for constraint in the use of single-chamber designs, which are often used as part of outreach programs by various agencies in western Canada. This project will likely continue in 2019, potentially incorporating additional locations and continuous occupancy monitoring.

Preliminary results from roost temperature monitoring from June 22 to August 3, 2018.

| Location | Temperatures (°C) | | | | | | # days ≥40°C | % days ≥40°C |
|---|---|---|---|---|---|---|---|---|
| | Project Mean | Daily Mean (range) | Project Max | Mean Daily Max | Project Min | Mean Daily Min | | |
| **East 4-chamber bat house - outer chamber** | 21.8 | 15.8 - 27.7 | 50.0 | 37.5 | 3.0 | 9.9 | 19 | 43% |
| **East 4-chamber bat house - inner chamber** | 20.5 | 15.7 - 26.7 | 44.0 | 31.2 | 3.5 | 10.7 | 3 | 7% |
| **South 1-chamber bat house** | 22.0 | 16.4 - 27.3 | 55.5 | 43.4 | 2.5 | 8.8 | 32 | **73%** |
| **South 4-chamber bat house - outer chamber** | 21.3 | 16.6 - 27.0 | 49.0 | 38.6 | 3.0 | 9.3 | 21 | 48% |
| **South 4-chamber bat house - inner chamber** | 21.0 | 16.4 - 26.6 | 44.0 | 32.8 | 5.5 | 11.3 | 7 | 16% |
| **Barn west - rafters (hay loft)** | 20.0 | 15.6 - 24.8 | 40.5 | 32.1 | 5.0 | 10.4 | 1 | 2% |
| **Barn east - rafters (hay loft)** | 20.1 | 15.9 - 24.8 | 38.5 | 30.3 | 5.5 | 10.6 | 0 | 0% |

***June 21 - August 3rd (44 days); 30 min intervals***

Calf shelter showing the two bat houses on the south side and the bat house on the east side (far right). Photo: C. Olson.

Western Small-footed Myotis caught in Grasslands National Park. Photo: C. Olson.

# British Columbia

## Critical Assessment of Bat Boxes as a Mitigation Tool in Post-WNS Population Recovery Efforts

Cori Lausen, Wildlife Conservation Society Canada

WCS Canada is beginning a new project in 2019, collaborating with Thompson Rivers University (Dr. Karl Larsen), and Dr. Leigh Anne Isaac, who will share in the supervision of MSc student Susan Dulc. Partners include Dr. Vikram Misra (University of Saskatoon), and Dr. Glenna McGregor (BC Animal Health Centre) who will help investigate health impacts of bat boxes on bats, and Dr. Purnima Govindarajulu, Orville Dyer, Tanya Luszcz, and Mandy Kellner are additional collaborators. This project is funded by the US Fish and Wildlife Service.

Our goal is to investigate roosting ecology and the characteristics of building versus box roosts. Specifically, we will quantify the reproductive success for Little Brown Myotis and Yuma Myotis in buildings and bat boxes, and document microclimates offered in these structures. We will also examine the use of satellite roosts (and roost switching behaviour) to determine if this plays an important role in bat box occupancy during extreme ambient temperatures, and whether heat-stress related mortalities or behaviours are observed. We will compare roosts within and among two study areas which differ in habitat and thus climate. The Okanagan region of B.C. is a dry, hot climate, and the Kootenay region of B.C. has a moister, more moderate climate. Our objectives are to: 1) characterize roost use; 2) describe temperature and humidity profiles at roost sites and; 3) compare reproductive success based on roost type for focal taxa, in two different types of roosts (buildings, and box roosts).

It is possible that these small, isolated roost structures may be counter-productive to conservation and recovery efforts, especially if they produce micro- climate characteristics that lead directly to mortalities (as reported by Flaquer et al. 2014 “Could overheating turn bat boxes into death traps?”) or lower reproductive success. Increasingly, conservation organizations (e.g., Bat Conservation International and various Community Bat Programs) promote building/installing of bat boxes to enhance bat roosting habitat, or as replacement for displaced maternity roosts from buildings, yet there seems to be no follow up on reproductive success or health of bats using

A bat box containing Little Brown Myotis in West Kootenay, BC. Adults and pups are seen crowding the exit of the bat box during a hot day and thought to be experiencing heat stress, according to the landowner who submitted this photo to the B.C. Community Bat Program. This situation was reportedly solved when the landowners installed a white sheet above the bat house to provide shade, and this coincided with bats retracting back up into the house (G. Sanders (pers. comm.). Photo: S. Latour.

these features. Instead, most studies have focussed on occupancy rates in relation to box design, staining, positioning, etc. Many bat-box designs do not provide suitable microclimates for females and pups during the reproductive period because temperatures inside bat boxes often do not differ significantly from ambient temperature unlike building roosts which do. Notably, we could find no published studies examining the reproductive rates of bat box roosting bats even though these rates will be critical to recovery of populations, post-WNS.

Indeed, there is growing concern that bat boxes might in fact be detrimental to bat populations due to issues of over-heating as climate change continues and heat waves become more common in some areas. Bulging colonies of bats at bottoms of bat boxes and mysterious piles of dead bats under bat boxes have been reported occasionally over multiple years in California and British Columbia. Anecdotally, hot days have been called into question as a cause of mass mortality events.

To examine whether bats experience heat stress, we will collect guano samples from bat boxes and building roosts throughout the summer and particularly during periods of extreme temperatures. These samples will be analyzed by University of Saskatchewan to determine the relative number of viruses that are shed by roosting bats (boxes vs. buildings) when exposed to varying roost microclimates and specifically in bat boxes when temperatures may exceed that of those in building roosts. This is because it has been shown that bats under stress shed viruses (V. Misra). We will also collect carcasses in an attempt to determine when heat shock is the cause of mortality.

In parallel with this project, we are leading the first international effort to develop Best Management Practices for use of bat boxes, guidance that will have applicability in both Canada and the US. This is being done as sub-committee of the Conservation and Recovery Working Group and its Canadian equivalent, and being facilitated by Jordi Segers, Canadian WNS Coordinator.

---

## Yoho National Park Bat Inventory

Cory Olson, Sky Ecological and Anne Forshner, Parks Canada

Over the summer of 2018 we completed a bat inventory of Yoho National Park and continued our migration monitoring project that began in 2017 in Kootenay National Park. Inventory activities included four nights of live capture using mist-nets (July 4 to 8, 2018) and acoustic detection. Bat detectors were deployed at six locations in Yoho National Park and again at the Vermilion Pass in Kootenay National Park. These detectors were set to run throughout the fall migration period, with some continuing into the winter months. Analysis of the acoustic data is underway.


Setting up an acoustic detector near a cliff face above Lake O'Hara in Yoho National Park. Photo: A. Forshner, Parks Canada.

The inventory team was successful at capturing bats on 2 of the 4 nights of the survey, with poor weather conditions impeding captures on the other two nights. In total, 29 bats of four species were captured: Little Brown Myotis, Long-legged Myotis, Long-eared Myotis, and Big Brown Bats. Interestingly, most captures were males (86%) or non-reproductive females (10%). Only 1 reproductive female (Long-eared Myotis) was captured.

Special thanks to the following volunteers and Parks Canada staff for assistance in the field: Erin Low, Kelsey Low, Susan Holroyd, Mike Kelly, Jason Headley, Aaron Wong, Jen Greenwood, Sean Higgins, Nikki Heim, and Jill Packham.

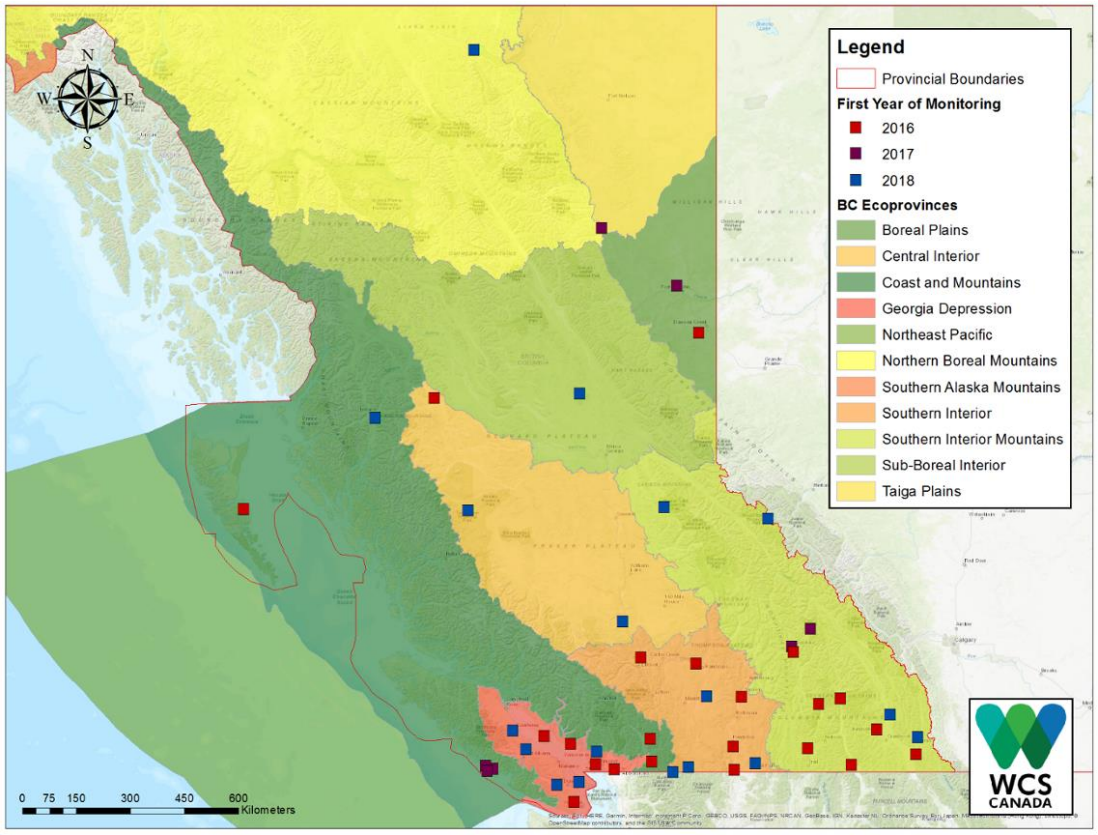

Crew setting up a triple-high net at the Yoho Ranch in Yoho National Park. Photo: A. Forshner, Parks Canada.

# BC NABat Update

Jason Rae, WCSC, BC NABat Coordinator

The 3rd year of BC's North American Bat Monitoring (NABat) took place this past summer. Under the coordination of Jason Rae, WCS Canada, NABat monitoring in B.C. is taking place in 46 grid cells. Since its first implementation in 2016, our monitoring efforts have grown to increase sample sizes and cover a greater geographic range across the province. This year's expansion included 17 new NABat grid cells orchestrated in part by Orville Dyer, BC Ministry of Environment, and fulfilled through the participation of BC Parks and BC Ministry of Environment.

We are using the acoustic data collected through these efforts to establish critical baseline data that will serve as reference points for future monitoring, which will be key to identifying species diversity changes and to evaluating the impacts of stressors on bat populations, such as white-nose syndrome and habitat changes. This program wouldn't be possible without the dedication of many volunteers and biologists from across the province – a list that continues to grow! WCS Canada would like to thank everyone who helps make this monitoring possible, including our funders: Habitat Conservation Trust Foundation, Forest Enhancement Society of B.C., Columbia Basin Trust, Fish and Wildlife Compensation Program Columbia, and the BC Government.




Map of British Columbia NABat monitoring sites categorized by year in which grid cells were first established. Ecoprovinces provided for context.

# Burke Mountain Naturalists Continue to Contribute to Bat Conservation and Research

John Saremba, Burke Mountain Naturalists Bat Team Coordinator

During the early summer of 2018, volunteers from the Burke Mountain Naturalists Society (BMN) collaborated with Leah Rensel to help with her graduate research. This assistance included field work at Blakeburn Lagoons Park in Port Coquitlam, BC, as well as subsequent work to protect a maternity colony in Pitt Meadows, in conjunction with the local BC Community Bat Program. As a result of this work, the BMN volunteers learnt about the set-up and use of mist nets for bat capture, the opportunity to see several live bats up close and view proper handling of the bats, as well as the documentation protocol for recording bat features.

Mist-netting at Blakeburn. Photo: J. Saremba

Tracking of radio-tagged bats led to the discovery of a maternity colony in the walls of a private farm residence. Monitoring by volunteers of the BMN Bat Team (John and Christina Saremba) provided an estimate of the bat population and helped identify key emergence points, and the team (this time John Saremba, Dee Dee Bonhomme, Wayne McCallum, and Gord Mayenburg) again volunteered to help with the installation of bat houses in preparation for a bat-friendly exclusion at the site. This roost site will be included in the 2019 BC Annual Bat Count. The BMN Bat Team volunteers and the BC Community Bat Program Regional Coordinators look forward to determining the success of the conservation measures at this site.

Radio-tagging to locate a maternity roost. Photo: J. Saremba.

A hole in cedar siding houses a maternity colony in Pitt Meadows, BC. Photo: J. Saremba.

Bat house complex (shade-roof constructed by G. Mayenburg) installed as part of a bat-friendly exclusion in Pitt Meadows. Photo: J. Saremba

Another bat house was installed on a tree to provide a cooler roost option. Photo: J. Saremba.

## BC Bat-friendly Communities Gather Momentum

Mandy Kellner, BC Community Bat Program Provincial Coordinator


The BC Bat-friendly Communities Program is continuing to evolve and garner interest across the province. We are working with communities and local project champions to encourage habitat stewardship and enhancement, provide information, and promote educational activities at a local/municipal scale.

The relatively-new Bat-friendly Communities Guide is the anchor to this program, and like the Alberta counterpart on which it is based, encompasses topics from habitat requirements, common hazards for bats, and ideas for bat-friendly landscaping. The Guide and more information can be found online at http://www.bcbats.ca/index.php/get-involved/bat-friendly-communities .

Peachland Bat Education and Ecological Protection Society (BEEPS) is spearheading the bat-friendly movement in Peachland, BC, and will be hosting a conference/workshop in April 2019 to share ideas and approaches. We also have an informal working group, made of people actively promoting this concept in their communities, who participate in topical conference calls and email discussions. Contact Mandy at bcbats@gmail.com to join.

The BC Community Bat Program is funded by the Habitat Conservation Trust Fund/ Forest Enhancement Society of BC and Habitat Stewardship Program, in partnership with the Ministry of Environment and BC Conservation Foundation and local bat programs and land conservancies in 20 regions across the province.

## Wanted – Dead Bats! WNS Surveillance Year 3


The BC Community Bat Program and the Province of BC are continuing surveillance for White-nose Syndrome in BC bats. Regional coordinators are soliciting reports of winter bat activity and dead bats, and collecting and shipping any dead bats to the lab for WNS testing.

If you find a dead bat in British Columbia please do not touch it with bare hands – you can refer to the BC Wildlife Health page on bat health at http://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/wildlife/wildlife-health/wildlife-diseases/white-nose-syndrome for more information and the appropriate protocols, or contact the BC Community Bat Program at 1-855-9BC-BATS or www.bcbats.ca.

**REPORT DEAD BATS**

# Saskatchewan

## Brigham lab update

Mark Brigham, University of Regina

Audrey Lauzon is nearing completion of her MSc. regarding bats and forestry. She is currently in Australia for 4 months on A QEII scholarship doing a bat project. She will be back in the lab after Christmas to complete her degree.

Erin Swerdfeger wrapped up the second field season of her Masters' program in October. She is studying movement patterns of Saskatchewan's migratory tree-roosting bats during autumn migration. A preliminary look at the acoustic data show greater migratory bat activity in the eastern part of the province during July-September. She looks forward to further analysing the data. She is currently doing a MITACS internship with SaskPower to learn more about the ins and outs of wind energy development. She gave a talk about her work at the recent NASBR meeting- you can find the link to abstracts below.

Lauren Bailey is currently working on the revisions to her M.Sc. at Rhodes University in Grahamstown, South Africa and will be done by mid-December or so. She is planning on undertaking a PhD in fisheries biology at Rhodes starting in January.

Matt Noakes (who is a PhD student at the University of Pretoria, South Africa) spent June-October in the lab doing a project in Cypress Hills on how bats (Hoarys, Silver-hairs and Little browns) coped with being exposed to high temperatures (e.g., up to 45 or so degrees). This work was supported by a QEII scholarship and follows on from similar work Matt is doing for his PhD on birds.

Brighamites at NASBR. Photo: M. Brigham.

Zenon Czenze is now a PDF at the University of Pretoria with Andrew McKechnie. He helped me complete a long overdue paper on Poorwill hibernation (the data are 20 years old!).

Adam Sprott is doing a M.Sc. in Forestry related things in the Department, but in 2019 he is going to add a bat component to his working. He will set out to evaluate how bats treat clutter in the form of fallen tress over the main drainage in the Cypress Hills.

Dr. Erin Baerwald is a PDF in the lab and working on bat migration and the resulting interactions with wind energy developments. She gave a talk on her work at NASBR.

Eric and Dana Green joined the lab on Sept. 1 to undertake PhD projects. Dana will be working on Silver-haired Bats and Eric on Hoarys in the Cypress Hills, where people from the lab have been doing things for nearly 30 years. Eric plans on using a variety of techniques to investigate the factors that affect hoary bat space use within the Cypress Hills and during migration.

---

## Grasslands National Park Bat Inventory: Year 1 Update

Cory Olson, Sky Ecological and Stefano Liccioli, Parks Canada

From July to August 2018, we completed the first year of a comprehensive inventory of Grasslands National Park (GNP). A total of seven bat species were captured, or could be confidently identified from acoustic recordings, confirming the presence of all bat species known to occur in southern Saskatchewan.

Activities included five nights of live capture using mist-nets (July 13-17), acoustic detection, and inspections of buildings for signs of roosting bats. We captured a total of 64 bats at four different locations, which included four species: Little Brown Myotis, Long-eared Myotis, Western Small-footed Myotis, and Big Brown Bats. Captures of pregnant or lactating Little Brown Myotis and Big Brown Bats indicate these species are breeding in the park. Our capture of a single (male) Western Small-footed Myotis confirms the presence of this species along the Frenchman River basin, which is a tributary to the Milk River (in Montana).

Three other species could be reliably identified from acoustic recordings, including the Silver-haired Bat, Eastern Red Bat, and Hoary Bat. A relatively large number of migratory bat detections in August, especially of Eastern Red Bats and Hoary Bats, suggests the park may be along a potential migratory route for these species, possibly providing a corridor to the Milk and Missouri Rivers. Several park buildings showed signs of roosting bats. Guano samples were collected for genetic species confirmation, with results expected in 2019. Both solitary Long-eared Myotis and a maternity colony of Little Brown Myotis were confirmed using buildings in GNP.

Little Brown Myotis are one of the most common occupants of GNP. Population monitoring has been identified by the GNP Species at Risk Action Plan as a priority program to inform species conservation and park management decisions. To further this objective, the inventory is tentatively planned to continue in 2019 and will include an expanded monitoring program based on first year results. We will also be on the lookout for Long-legged Myotis – a species that occurs throughout much of Montana and southern Alberta. We are grateful to Susan Holroyd, Erin Low, and Erin Swerdfeger for assistance in the field.

# Alaska

## Alaska Little Brown Myotis Maternity Roost Monitoring – Autumn Update

Jesika Reimer and Paul Schuette, Alaska Center for Conservation Science, University of Alaska Anchorage
jpreimer@alaska.edu

Mistnetting at a maternity colony in Southeast Alaska. Photo: ACCS.

Radio tracking in the Copper River region, AK. Photo: ACCS.

The Alaska Center for Conservation Science completed its third year of Little Brown Myotis maternity roost monitoring in Alaska. Emergence counts and capture surveys were performed at 18 roosts located throughout the state, including regions such as Southeast Alaska, the Kenai Peninsula, the Mat-Su valley, the Copper River and the greater Fairbanks area. No significant declines in population have been observed at roosts with multi-year surveys. Acoustic detectors and temperature loggers were deployed at 15 of these roost sites to assess active season length and variation in arrival and departure of bats at roosts across the state. A pilot radio telemetry study was also initiated to assess roost switching by reproductive females at four colonies. Data analysis is currently underway. More information about our maternity roost monitoring project can be found on our website: http://accs.uaa.alaska.edu/zoology/bat-research

# Western

## Calling All WBWG Members – Renew your Membership!

Lorraine Andrusiak, BC Contact for WBWG rrainea@yahoo.com

The Western Bat Working Group has been expanding and growing, but unfortunately there has been some loss of membership data. At this point there are only a few BC members on the official WBWG membership list. If you were a member, or if you want to be a member, please renew or sign up for your membership at : http://wbwg.org/membership/ Paying membership dues is required to be a voting member, but paid membership is not necessary to be on the email list or to attend meetings.

## WNS Survivorship Modelling for BC and AB Bats

Cori Lausen, Wildlife Conservation Society Canada

In B.C. – Although we wrapped up our WNS Survivorship Modelling project in B.C. last winter, having collected respirometry and arousal rate data for 3 species of bats (Yuma Myotis, Californian Myotis, and Silver-haired Bat), we have been asked by our collaborators (WCS, Texas Tech, and others) to measure these same parameters for Townsend's Big-eared bats this winter. One of the goals of the western continental scale project being coordinated by WCS is to develop survivorship models that take latitude into consideration. We are already doing this with Little Brown Myotis (see next paragraph), where the differences in WNS susceptibility are being examined from Montana, through to mid-latitude (Cadomin) and high-latitude (Wood Buffalo) Alberta. These survivorship models are providing a predictive tool such that we can quantify likely reduction in survival of species exposed to Pd in certain microclimate conditions. Respiration rates are being measured by Dr. Yvonne Dzal (Postdoctoral Fellow, Univ of Winnipeg); models are being developed by Massey University in New Zealand (Dr. David Hayman and PhD candidate Reed Hranac) in conjunction with Montana State University's Postdoctoral Fellow Katie

Haase. Other survivorship model collaborators include Dr. Sarah Olson (WCS), Dr. Liam McGuire (Texas Tech. Univ.) and Dr. Raina Plowright (MSU). Field work this winter will focus on the Phoenix Mine (Greenwood/Grand Forks region), where 50- 100 Townsend's bats hibernate.

In Alberta – We now have respiration rates of Little Brown Myotis just prior to hibernation in the most northern location ever recorded in North America. A big congratulations to the field crew Lisa Sims, Chuck Priestly and Cory Olson for successfully capturing late season Little Brown Myotis in September in Wood Buffalo National Park.

Mike Kelly and Cory Olson sample a bat in Cadomin Cave hibernaculum. Photo: J. Headley

Thank you also to Parks Canada (Sharon Irwin, Katie McNab, Danika Gerylo, and Lori Parker) for field and equipment logistics. Dr. Yvonne Dzal, University of Winnipeg made the long journey from Winnipeg to Fort Smith, NWT with metabolic chambers and gas analyzers lent to our project by Dr. Craig Willis. She then moved the equipment to Hinton, Alberta where she, Cory Olson, and field team (Saakje Hazenberg, Mike Kelly, Jason Headley, Dave Hobson, Henkka Kwokkanen, Beth MacCallum, Matt Bertolissi, Erika Synder, Mirabai Alexander, Brittany Taylor) measured oxygen consumption and carbon dioxide production of pre-hibernating Little Brown Myotis exposed to various potential hibernation temperatures.

This work completes the study that was started last year at Cadomin, providing a larger sample size of adults. As with the BC data (see paragraph above), these data will be used by WCS, Texas Tech, Massey University, MT State Univ, and other collaborators ("SERDP" team) as critical parameters in generating WNS survivorship models for this species at differing latitudes. These data are also being used to examine the role that latitude plays in WNS mortality rates. A massive field effort will take place this winter at Cadomin Cave (year 2 of 2) to document arousal rates of Little Brown Myotis, increasing the sample size from last year's winter work. This field effort is being led by Cory Olson. This Alberta work is being funded by a grant to WCS Canada from the US Fish and Wildlife Service and the Alberta Conservation Association.

A Little Brown Myotis peers out of a metabolic chamber where its use of oxygen and production of carbon dioxide are measured to determine how quickly it will use stored fat reserves in winter hibernation. Photo: J. Headley

## WCSC Communications with Government

Cori Lausen, Wildlife Conservation Society Canada

In B.C. – This fall, WCS Canada submitted a letter to BC Ministry of Environment and Climate Change, Ministry of Forests Lands Natural Resource Operations and Rural Development, and Min of Agriculture. This letter acknowledged the progress that BC has made on bat conservation as part of our official Memorandum of Understanding that we have with the BC Government. This is in large part thanks to the creation of Orville Dyer's position within FLNRORD/MOECC to work on bat conservation. Orville has

been working long hours to help network bat folks, drum up internal funds for projects and programs, facilitate guidance documents including the updating of the provincial RISC standards, and most recently chairing the BC Bat Action Team. I am sure I speak for all BC Bat Action Team Folks when I say that we greatly appreciate the efforts of Purnima Govindarajulu, Orville Dyer, Helen Schwantje and others in government who are helping advance bat conservation efforts. After acknowledging this progress, our WCSC letter goes on to outline the critical need in BC to have secured funding for bats from the BC government for monitoring of bats as WNS spreads into the province. We also expressed concern over the fact that Orv's position is only temporary, and part-time, but it is critical that there be a person in government with time and expertise to address these 16 species, many of which are likely to be listed as species at risk in the near future.

In Alberta – WCSC has not yet heard anything from the Alberta Government in response to an Op-Ed that we placed in the Edmonton Journal in the summer: https://edmontonjournal.com/opinion/columnists/opinion-everyone-can-help-save-albertas-bats. In BC, our approach to getting government support for bat conservation started with some op-ed articles and radio interviews, and eventually we made inroads to getting the ear of the ministers. We hope to repeat this process in Alberta. Few resources are available for bats in this province, and with WNS now in Manitoba, there is even less time to drum up the support that will be needed. The Alberta Community Bat Program for example, is a long term program that will require dedicated and secured sources moving forward if it is to be maximally effective in preparing the province for the arrival of this disease. Stay tuned -- we hope to make progress on communications with Alberta government officials over the coming year.

---

## BatCaver Program Continues

Cori Lausen, Wildlife Conservation Society Canada

In Alberta – Under the leadership of Dave Critchley and Greg Horne, we are gearing up for another season of BatCaver, locating and monitoring caves as potential bat hibernacula in Alberta. Last year was highly successful with several new Little Brown Myotis hibernacula identified. We thank Alberta Ecotrust, Chawker's Foundation, Alberta Conservation Association, and Environment Canada and Climate Change (Habitat Stewardship Program Species at Risk Prairie Region) for funding BatCaver in Alberta.

In B.C. – If you were wondering about BatCaver in BC – we are still doing some monitoring this winter, largely in the Columbia Basin, where we continue to find mines that house bats in winter. In fact, all of our largest and most diverse bat hibernacula in BC are located in the Columbia Basin. However, in general across the rest of the province, because each cave or mine typically houses few bats, and there is increasing speculation that rock crevices play a huge role in hibernation, we are winding down our monitoring of caves in BC. We will continue to be supported by Fish and Wildlife Compensation Program

Columbia, Habitat Conservation Trust Foundation, and Forest Enhancement Society of B.C. Our past funding for BatCaver has largely come from Environment Canada (HSP SAR), for stewardship at caves or mines, but they have notified us that they will not support examining rock crevices. We are hopeful that a different funding source might be tapped into in the future to understand the role that crevices play as critical winter habitat for possibly the majority of species at risk in BC. Stay tuned, or if you have ideas, please join the Underground Committee of the BC Bat Action Team!

---

## Reduction of WNS Mortalities through Proactive Probiotic Summer Applications

Cori Lausen, Wildlife Conservation Society Canada

Nicknamed the "Probiotic Protection Program", this project is a WCS Canada collaboration with Thompson Rivers University (Dr. N. (Ann) Cheeptham), McMaster University (Dr. J.P. Xu), UBC Okanagan (Dr. Karen Hodges), and many other partners. This project is funded by US National Fish and Wildlife Foundation as a grant to TRU, with additional grants to WCS Canada from Habitat Conservation Trust Foundation, FightWNS (MicroGrants for MicroBats), and Forest Enhancement Society of BC. Further funding was received in 2018 from a 'Tri-universities' grant that promotes collaboration between BC universities and additional research partners. This project is being conducted by 3 graduate students, one funded by Mitacs. Our team is working closely with an Advisory Committee (Dr. Glenna McGregor, Dr. Helen Schwantje, Dr. Purnima Govindarajulu, Orville Dyer, and Dr. David Sedgman). We would like to thank numerous other partners including Dr. Craig Willis University of Winnipeg, the BC Wildlife Park (Jorrit Koedooder, Paige McKnight, Ardice Fleck, Glenn Grant), TRU School of Trades and Technology (Tom Haag), Kamloops Naturalist Club (Nancy Flood, Doug Burles, Frank Ritcey), Kamloops South Canadian Tire (Justin Mondoore), the Canvas Man (Jen Breckenridge) and *many* biologists across Alberta and BC who contributed bat swab samples in our search for anti-*Pd* microbes. This project is funded in part by the US National Fish and Wildlife Federation (Bats for the Future Fund – grant to TRU), Habitat Conservation Trust Foundation (grant to WCS Canada), fightWNS (MicroGrants for MicroBats – grant to WCSC), and Tri-Universities Grant (TRU).

The goal of this project is to source bacteria from bat wings in western Canada that naturally inhibit the growth/reproduction of *Pseudogymnoascus destructans*, and provide these anti-*Pd* bacteria to bats in BC prior to the arrival of *Pd* in the province in order to prevent WNS or minimize its impact through reduced mortality rate in bats. The probiotic would be applied to bats in late summer at maternity roosts. See articles in the BC section on probiotic development and testing (with Nicholas Fontaine and Aaron Wong) and field preparation and study (with Leah Rensel).

This project made the news earlier in 2018 - The yogurt cure: can 'good' bacteria save bats? , Researchers closer to preventing spread of bat-killing fungus , and Ground-breaking science aims to save bats.

---

# Testing the Efficacy of an Anti-Pd Probiotic Cocktail on Live Bats — A Preliminary Trial

Nicolas Fontaine, MSc student, and Aaron Wong, Thompson Rivers University (with Cori Lausen, WCSC)

The team that helped build the bat enclosure (seen in background) at the Kamloops BC Wildlife Park. From left to right, Tom Haag, Cori Lausen and her husband Michael Proctor, Monique Nijjer, Gabrielle Kam, Aaron Wong, and Nick Fontaine. Missing from photo: Frank Ritcey, Chadabhorn Insuk, Marta Fa Binefa, Brandon Hayashi, and Julianna Bissonnette. Photo: F. Ritcey.

The first of two captive bat trials testing and refining a probiotic cocktail inhibiting the WNS fungus *Pseudogymnoascus destructans* was conducted this fall (see background story below). Dr. Ann Cheeptham, Thompson Rivers University, Dr. JP Xu, McMaster University, and Dr. Cori Lausen, Wildlife Conservation Society Canada have developed a prophylaxis approach to fend off the incoming bat disease and/or reduce its severity. With funding and inkind assistance from the Kamloops Naturalist Club and Thompson Rivers University School of Trades and Technology, an enclosure was built in late August at the BC Wildlife Park.

With assistance from Doug Burles of Kamloops Community Bat Program, a small number of Yuma myotis bats were taken captive. A total of 11 bats from the Vernon and Creston areas of British Columbia were trained to feed and drink on their own in the enclosure flight chambers. They were divided into treatment and control groups. Once the bats were acclimated, the probiotic experiment was conducted (September 18$^{th}$ to November 4$^{th}$) which entailed probiotic treatments being applied directly to wings, and regular health checks of bats from the BC Wildlife Park's vet Paige McKnight. Our goal is to determine whether cutaneous wing microflora can be altered to resist WNS. Nicolas Fontaine (MSc student, Thompson Rivers University) and Aaron Wong (Research Assistant, Thompson Rivers University) tended to the bats daily and applied the probiotic to their wings (Figure 2), swab sampling frequently to test for the presence and density of the probiotic microbes. Swab samples were processed by Adrian Forsythe (PhD student, McMaster University) using quantitative PCR procedures that he designed specifically to quantify the microbes in the probiotic cocktail. Adrian was also instrumental in helping develop the probiotic cocktail, currently consisting of two bacteria sourced from Big Brown bat wings in B.C. We await metagenomics results to determine how wing microbiomes were altered compared to the control group. No adverse effects were observed in the probiotic group, lending further promise to this technique as a mitigation tool to fight WNS. We are awaiting results of laboratory-based tests.

Learning from this preliminary trial, a new trial will begin in spring 2019 with a larger sample size and a more refined probiotic cocktail. The goal is to have a final probiotic cocktail ready to field deploy in the Vancouver area mid-summer 2019 (see submission by Leah Rensel, UBCO MSc student).

Applying probiotic to wings of captive Yuma myotis inside Kamloops enclosure. Aaron Wong on left, N. (Ann) Cheeptham in middle, and Nick Fontaine on right.

## Monitoring Maternity Colonies in Vancouver Region

Leah Rensel, MSc student, UBCO (with Cori Lausen, WCSC)

My name is Leah Rensel and I am a master's student at the University of British Columbia Okanagan. My supervisors are Dr. Cori Lausen (Wildlife Conservation Society Canada) and Dr. Karen Hodges (UBC Okanagan). I conducted bat research in the greater Vancouver area during summer 2018. I chose to research how bats use urban landscapes, specifically roost selection by maternity colonies affects reproductive success. This research project is additionally establishing the foundation and baseline data for future application of an anti-WNS probiotic being developed by WCS Canada, Thompson Rivers University and McMaster University (see submission by Nick Fontaine and Aaron Wong). As part of my 2018 field work, and together with my field assistant Nick Hindley, I also developed and tested applicators to dispense the probiotic prophylaxis.

I first developed an interest in bat conservation when White Nose Syndrome arrived in my home state of Washington. As soon as I saw my first Little Brown Bat up close, I was mesmerized by its fighting spirit and beautiful, membranous wings. I knew in that moment that I could make a difference and I decided to pursue a graduate degree in bat conservation in the Pacific Northwest.

As part of my master's research, I monitored 5 Little Brown and Yuma Bat roosts throughout Vancouver, as far north as Squamish and as far east as Mission. My team of 4 biologists and 16 volunteers caught 510 bats from these 5 sites during 12 nights of mist-netting. We also used emergence counts and roost loggers to monitor bat activity and installed temperature loggers to track microclimates inside the roosts. Using radio-telemetry, I also located undiscovered roosts!

We used radio telemetry attached to pregnant and lactating bats to find unknown maternity colonies. Here Leah Rensel listens to a telemetered bat crossing Pitt River.

Biologists (Chris Currie, Aimee Mitchell and Nick Hindley) and volunteers (Kirk Miles and Emily Hyde) work quickly to process as many as 50 bats a night!

I intend to return next summer to continue my research. It is my hope that my data can be used to make long term management recommendations for landowners who want to encourage healthy, stable maternity colonies. In the few precious years before White Nose Syndrome arrives in Vancouver, I believe that this knowledge may help our Little Brown and Yuma bat populations.

After all my late-hour escapades, I have a new appreciation for the wonderful city of Vancouver and the amazing people I had a chance to work with during the summer. I was inspired by the community support that exists for bat conservation and research in Vancouver.

Leah Rensel checks the temperature loggers installed in the Colony Farms Regional Park bat boxes.

Technician Nick Hindley holds his first Little Brown Bat!

As a result, I'd like to give specials thanks to the organizations and landowners who aided my research. I'd like to thank Chris Currie, Aimee Mitchell, Patrick Burke and Danielle Dagenais of SCBats for their knowledge and expertise. I'd also like to thank the BC Community Bat Program and the Burke Mountain Naturalists, particularly John and Christina Saremba and Kiyoshi Takahashi, for their collaboration. I am grateful to the staff members at Metro Vancouver Regional Parks (Marcus Merkens, Robyn Worcester, Simon Walkley, Andrea Pont), BC Hydro (Harry van Oort, Susan Pinkus, Ben Forster, Brent Wilson), Stanley Park Ecology Society (Vanessa Sadler, Ariane Comeau, Nick Page) , Alaksen National Wildlife Area (Pat Bishop, Tanya Luszcz, Erin Roberts, Courtney Albert), and Alice Lake Provincial Park (Joanna Hirner, Kevin Wagner) for their gracious cooperation and off-hours access to the bat roosts on their property. I'd like to thank the following individuals who trained me in various aspects of bat research: Dr. Glenna McGregor, Dr. Shelly McErlane, Laura Kaupas and co-supervisor Dr. Cori Lausen. I'd also like to thank Dr. Karen Hodges, my UBCO supervisor for making this MSc opportunity possible. I'd like to thank my incredible team volunteers for the generous donation of their time and assistance.

# International

## 48th North American Symposium on Bat Research (NASBR) – Puerto Vallarta, Mexico

Lisa Sims, University of Calgary


NASBR 2018. Robert Barclay's lab (University of Calgary) posing for their first NASBR conference. Dominique Maucieri (left), Lisa Sims (center), Brittany Steed (right). Photo by B. Steed.

This year's NASBR took attendees to the beautiful city of Puerto Vallarta, Mexico thanks to hosts Jorge Ortega and Rodrigo Medellin.

Looking out at the Bay of Banderas from the Westin Resort and Spa beach. Photo by L. Moretto.

The conference was held Oct 24-27, 2018 at the Westin Resort and Spa, overlooking the Bay of Banderas and conveniently located within walking distance to Marina Vallarta, a great place for local cuisine, drinks and shopping. Attendees especially enjoyed the pool, beach, air-conditioned conference rooms, and great views walking the property, where you would often spot *Artibeus jamaicensis* (Jamaican fruit bat) roosting.

Pair of *Artibeus jamaicensis* (Jamaican fruit bat) roosting in the hotel. Photo: J. Segers.

With Hurricane Willa projected to hit north of the city some individuals cancelled this year, but the majority still came with approximately 300 attendees. Many pre-conference events and tours were offered including the Spallanzani 6K fun run, sea turtle camp adventure, Marieta island bird sanctuary & wildlife reserve tour, botanical garden and tequila distillery tour, and of course the welcome reception.

The Canadians met up for dinner and drinks downtown at the Restaurant and Bar El Panorama which had fantastic panoramic views of the city. Approximately 35 individuals came, which was a great turn out!

Student presentations filled up the first day and ended with a student social that included more great food and trivia bingo. Talks continued on day two with another poster session that evening, and the final day of talks on day three. The conference ended with a fantastic banquet and salsa dancing! Other highlights of the conference include a 'Diversity in Science' breakfast, where women and diversity in science was discussed, acoustic workshops sponsored by Wildlife Acoustics and Titley Scientific, two mist-netting expeditions, and the daily lunch with a mentor meeting.

Next year's NASBR is scheduled for Oct. 23-26 in Kalamazoo, MI, and take note that Winnipeg has bid to host NASBR in 2021!

Conference talks from Canadians or from Canadian universities included the following:

- Are *Eptesicus fuscus* resistant to, or tolerant of, *Pseudogymnoascus destructans?* By Nicole A.S.-Y Dorville.
- Improving Bat House Designs to be Efficiently Used as a Conservation Tool by Amélie Fontaine.
- The Influence of Energetic and Time Constraints on Home-range and Habitat Use in Female *Myotis lucifugus*. By Andrew K. Habrich.
- Ecological Adaptation or Phylogenetic Constraint in Evolution of Echolocation Call and Morphology in Molossus? By Livia O. Loureiro.
- Stable Isotope Analysis Reveals Community Structure of a Diverse Neotropical Bat Fauna in Northern Belize. By Phillip J. Oelbaum.
- Deciphering the Bat Signal: Evaluation of Mobile Acoustic Transect Surveys on Prince Edward Island. By Tessa S. McBurney.

- Do Remnant Little Brown Bats Show Increased Evidence of Pre-hibernation Hyperphagia Following Invasion of Whitenose Syndrome? By Sarah Y. Teillet.
- Consumption of Spiders by Bats. By Dominique G. Maucieri.
- Sublethal Effects of Neurotoxic Pesticides on Bats: from Cells to Behavior. By Natalia I. Sandoval-Herrera
- Effects of Hurricane Maria on the Bat Community on the Caribbean Island of Dominica. By Lisa Sims
- Management of Surviving Bats, People, and White-nose Syndrome at the Caves of the Rockwood Conservation Area. By Derek Morningstar
- "Stress" Compromises the Normally Benign Virus-bat Relationship Leading to Increased Viral Replication. By Vikram Misra.
- Disruption of Cutaneous Respiration Plays a Role in WNS Pathophysiology. By Craig K.R. Willis.
- Movement Patterns of Migratory Tree-roosting Bats During Autumn Migration. By Erin C. Swerdfeger.
- The Value of Working with First Nations Communities to Discover and Monitor Endangered Bats in Ontario. By Eryk T. Matczak.
- Landscape Features Associated with Fatalities of *Lasiurus cinereus* at Wind Energy Facilities. By Erin F. Baerwald.
- Endangered Bats in the Greater Toronto Area. By Toby J. Thorne.
- Population Changes in the Migratory Bats of Calgary, Alberta. By Brittany Steed.
- Temporal and Diet Segregation in Bats Emerging from Santa Catalina Cavern, Matanzas, Cuba. By Melissa Donnelly.
- Frugivorous Bats in Brazil's Atlantic Forest: Effects of Habitat Fragmentation on Diet. By Hugh G. Broders.
- Community Ecology and Phylogeography of Bats in the Guianan Savannas of Northern South America. By Burton K. Lim.
- A Field Test for Interspecific Comparisons of Behavioral Responses in Novel Environments. By Doris Audet.
- A Small-scale Response of Urban Bat Activity to Tree Cove. By Lauren Moretto.
- Setting the Bat High: Metabolic and Ventilatory Strategies of Bats Living at Extreme Altitudes. By Yvonne A. Dzal.
- Stress-induced Changes in Body Temperature of *Lasionycteris noctivagans*. By Kristina A. Muise.

Part of the Canadian representation at NASBR 2018. Photo: E. Kunkel.

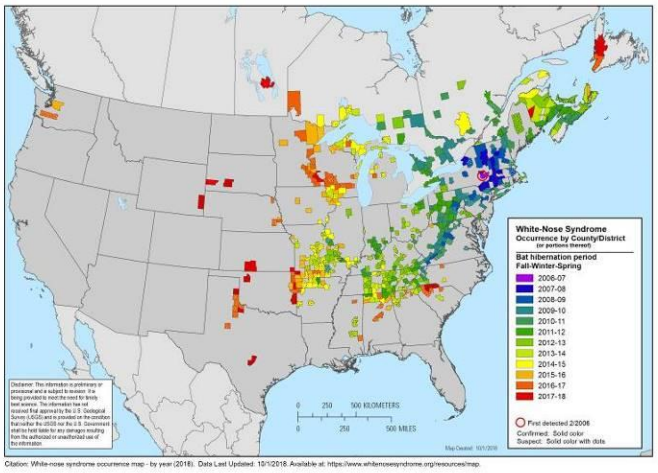
Conference abstracts can be found here:

https://www.nasbr.org/resources/docs/meetings/year/2018/NASBR%20Final%20Abstracts%20181003.pdf

# White nose syndrome

## Current decontamination protocols

With the discovery of WNS in western North America, an updated Canadian decontamination protocol was produced. The most recent Canadian decontamination protocol for WNS continues to be available on the Canadian Cooperative Wildlife Health website (http://www.cwhc-rcsf.ca/wns_resources.php ) or http://www.cwhc-rcsf.ca/docs/WNS_Decontamination_Protocol-Mar2017.pdf . The CWHC website has a variety of WNS resources, and is well worth investigating.




Oct 2018 WNS occurrence map. From www.whitenosesyndrome.org

## Funding for WNS research

The Canadian Cooperative Wildlife Health website also has information on funding for WNS-related research (http://www.cwhc-rcsf.ca/docs/WNS%20Funding%20opportunities.pdf)

# Recent literature/resources

Bonwitt, J., Oltean, H., Lang, M., Kelly, R.M. and Goldoft, M., 2018. Bat rabies in Washington State: Temporal-spatial trends and risk factors for zoonotic transmission (2000–2017). *PloS one*, *13*(10), p.e0205069.

Brigham, R.M. 2018. Listening to learn; A primer on bat echolocation research. Canadian Journal of Zoology 96:iii-iv. dx.doi.org/10.1139/cjz-2018-0060

Brigham, R.M., H. G. Broders, C.A. Toth, J.P. Reimer and R. M.R. Barclay. 2018. Observations on the roosting and foraging behaviour of Woolly false vampire bats, *Chrotopterus auritus,*in Belize. Caribbean Naturalist 47:1-7.

Czenze, Z.J., J.L. Tucker, E.L. Clare, J.E. Littlefair, D. Hemprich-Bennett, H.F.M. Oliveira, R.M. Brigham, A.J.R. Hickey and S. Parsons. 2018.Spatiotemporal and demographic variation in the diet of New Zealand lesser short-tailed bats (*Mystacina tuberculata*). Ecology and Evolution 8:7599-7610. doi: 10.1002/ece3.4268

Jung, T.S., Bat activity in the boreal forest: short-term effect of fire on habitat use by little brown bats (Myotis lucifugus).

Lausen, C., Proctor, M.F., Nagorsen, D., Burles, D., Paetkau, D., Harmston, E., Blejwas, K., Govindarajulu, P. and Friis, L., 2018. Population genetics reveal Myotis keenii (Keen's myotis) and Myotis evotis (long-eared myotis) to be a single species. *Canadian Journal of Zoology*, (ja).

Reichert, B., Lausen, C., Loeb, S., Weller, T., Allen, R., Britzke, E., Hohoff, T., Siemers, J., Burkholder, B., Herzog, C. and Verant, M., 2018. *A guide to processing bat acoustic data for the North American Bat Monitoring Program (NABat)* (No. 2018-1068). US Geological Survey.

Reimer, J.P., Baerwald, E.F. and Barclay, R.M., 2018. Echolocation activity of migratory bats at a wind energy facility: testing the feeding-attraction hypothesis to explain fatalities. *Journal of Mammalogy*.

# Conferences and training

## Conferences

2019 Western Bat Working Group Workshop and Meeting: April 22 -25, 2019. Tulsa, Oklahoma. http://wbwg.org/2019-biennial-workshop-and-meeting/

Columbia Mountains Institute of Applied Ecology: Nelson, BC May 8-9, 2019 "Regulated Rivers II: Science, Restoration, and Management of Altered Riverine Environments" .

## WCSC Acoustic Training Courses

WCS Canada provided two bat acoustic training courses in 2018: Vancouver (described in last newsletter), and Edmonton. Hosted by Dave Critchley, Northern Alberta Institute of Technology, 4 - 8 June 2018, Cori Lausen taught a bat acoustics course to 16 participants from across Canada. This 5 day course covered all of the basics of bat echolocation and species identification, with hands on instruction and practice for many bat detectors, emphasizing Wildlife Acoustics and Titley Scientific models. Cori thanks both of these acoustics companies for providing detectors for the course. Field activities included mobile monitoring, passive detector deployment and active monitoring with bat spotlighting. The analysis portion of the class included Sonobat, Kaleidoscope, Analook, and Bat Call Identification (BCID). Cori thanks the software designers for their support for this portion of the course. Also a big thank you NAIT for hosting.

Potential acoustic and capture courses in 2019 include:
8 – 12 July 2019. Saskatoon, Saskatchewan. Comprehensive Bat Acoustics Course.
29 July – 3 August 2019. Lillooet, B.C. Bat Capture Training.
*Date to be determined.* Thunder Bay, Ontario.
For updates, check: http://batsrus.ca/training-courses/

# WBCN newsletter submissions

Please submit all newsletter submissions to Mandy Kellner: Western.canada.bat.network@gmail.com
Submissions can be made at any time.

# Archived newsletters

This newsletter first started in Fall 2002. It is produced two times per year and is housed by the Alberta Sustainable Resource Development on the Alberta Bat Action Team website. All past issues can be accessed at the following link http://aep.alberta.ca/fish-wildlife/wildlife-management/bat-management/abat-programs-publications.aspx

# Distribution list

| Name | Email address | Prov/ State |
|---|---|---|
| Ian Agranat | ian@wildlifeacoutics.com | |
| Sharon Anderson | sanderson@kyroconsulting.ca | |
| Lorraine Andrusiak | rrainea@yahoo.com | BC |
| Doris Audet | auded@augustana.ab.ca | AB |
| Janine Bacquie | Janine.bacquie@nextraenergy.com | |
| Erin Baerwald | girlborealis@gmail.com | AB |
| Robert Barclay | barclay@ucalgary.ca | AB |
| Roger Barrett | rcocme@gmail.com | AB |
| Janet Bauman | janet.bauman@amecfw.com | AB |
| M Bayless | mbayless@batcon.org | |
| Carita Bergman | carita.bergman@pc.gc.ca | BC |
| Dora Berry | dora_berry@hotmail.com | |
| Nicole Bessler | nbesler91@gmail.com | |
| Bill | globalfish@dccnet.com | |
| Vivian Birch-Jones | vivianbj@telus.net | BC |
| Karen Blejwas | Karen.blejwas@alaska.gov | AK |
| Julia Boland | julia.boland88@gmail.com | Internat. |
| K Bondo | kbondo1@hotmail.com | |
| Bob Brett | bob@whistlerbiodiversity.ca | BC |
| Mark Brigham | mark.brigham@uregina.ca | SK |
| Kent Brown | brownwk@telus.net | AB |
| Stephanie Bujold | stephanie.bujold@boralex.com | QC |
| Patrick Burke | paddraig.bourke@gmail.com | |
| Doug Burles | dburles@telus.net | BC |
| Faye Burles | fburles@telus.net | |
| Joanna Burgar | Joanna.burgar@gov.ab.ca | AB |
| Lynne Burns (nee Henderson) | hendersonle2003@yahoo.ca | NS |
| Tony Burrows | td_burrows@hotmail.com | WY |
| Lisa Burt | lisa.burt@amec.com | AB |

| | | |
|---|---|---|
| Gerry Carter | batbum@gmail.com | ON |
| Trudy Chatwin | Trudy.Chatwin@gmail.com | BC |
| Joanna Coleman | dbscmj@nus.edu.sg | Internat. |
| Doug Collister | collistr@gmail.com | |
| John Cooper | jcooper@cooperbeauchesne.com | BC |
| Karl Cox | Karl_cox@gov.nt.ca | NWT |
| Juliet Craig | julietcraig@uniserve.com | BC |
| Vanessa Craig | vanessa.craig@ecologicresearch.ca | BC |
| Erica Crowther | Erica.Crowther@advisian.com | AB |
| Martin Davis | mdavis@conumacable.com | BC |
| Paula Rodriguez de la Vega | prvega@telus.net | BC |
| Rita Dixon | rita.dixon@idfg.idaho.gov | ID |
| Bill Doering | Bill.Doering@powereng.com | ID |
| Orville Dyer | Orville.Dyer@gov.bc.ca | BC |
| Yvonne Dzal | Yvonne.Dzal@gmail.com | SK |
| Derek Ebner | Derek.Ebner@stantec.com | AB |
| Michelle Evelyn | mjevelyn@gmail.com | BC |
| Scott Falkingham | scott@falkingham.ca | MB |
| Greg Falxa | gregfalxa@gmail.com; gregf@efn.org | WA |
| A-J Fedoruk | anita.fedoruk@gov.bc.ca | BC |
| Dashiell Feierabend | dsfeierabend@gmail.com | AK |
| Matthiue Feret | mferet@pescaenv.com | |
| Mitch Firman | mfirman@golder.com | BC |
| Jason Fisher | Jason.fisher@innotechalberta.ca | AB |
| Laura Friis | laura.friis@shaw.ca | BC |
| Wendy Gardner | wendykev@telusplanet.net | AB |
| Angus Glass | Angus.glass@bchydro.bc.ca | BC |
| Christine Godwin | cgodwin@owlmoon.ca | |
| Guy Goulet | gouletg@gmail.com | |
| Purnima Govindarajulu | Purnima.Govindarajulu@gov.bc.ca | BC |
| Eric Green | eg.biology@gmail.com | |
| Scott Grindal | Scott.D.Grindal@conocophillips.com | AB |

| | | |
|---|---|---|
| Jeff Gruver | jgruver@west-inc.com | WY |
| Robin Gutsell | robin.gutsell@gov.ab.ca | AB |
| Brenda Hamilton | birdchic@telusplanet.net | AB |
| Blair Hammond | blair.hammond@ec.gc.ca | BC |
| I-J Hansen | ingebjorgjean@gmail.com | BC |
| Matt Heavner | Matt.heavner@uas.alaska.edu | AK |
| Anne Hetherington | Anne.Hetherington@gov.bc.ca | BC |
| Chelsea Himsworth | Chelsea.himsworth@gov.bc.ca | BC |
| Dave Hobson | dave.hobson@gov.ab.ca | AB |
| Jennifer Holifield | jholifield@fs.fed.us | MT |
| Lydia Chaisson Hollis | lydiachiasson@yahoo.ca | |
| Susan Holroyd | susanlholroyd@hotmail.com | AB |
| Gary Hornbeck | hornbeck@telusplanet.net | AB |
| Anne Hubbs | anne.hubbs@gov.ab.ca | AB |
| Francis Iredale | Francis.Iredale@gov.bc.ca | BC |
| Sharon Irwin | Sharon.Irwin@pc.gc.ca | NT |
| Leigh Anne Isaac | laisaac@gmail.com | BC |
| Dave Johnston | djohnston@harveyecology.com | |
| Pierre Johnstone | pierre.johnstone@gov.bc.ca | BC |
| Ken Jones | kjones@roynorthern.com | AB |
| Thomas Jung | Thomas.Jung@gov.yk.ca | YK |
| Matina Kalcounis-Rüppell | matina_kalcounis@uncg.edu | NC |
| Lesley Kalmakoff | Lesley.kalmakoff@calgary.ca | AB |
| Laura Kaupas | laurakaupas@gmail.com | AB |
| Mandy Kellner | myotis@telus.net | BC |
| Allicia Kelly | Allicia_Kelly@gov.nt.ca | NT |
| Reid Kennedy | reidkennedy@gmail.com | |
| Jeff King | jeff@wildlifeacoustics.com | |
| Brandon Klug | bjklug@gmail.com | AB |
| Terry Krause | Terry.Krause@gov.ab.ca | AB |
| Elodie Kuhnert | elodie.kuhnert@gmail.com | BC |
| Piia Kukka | piia.kukka@gov.yk.ca | YK |

| | | |
|---|---|---|
| Paul Langevin | plange02@telus.net | BC |
| Cori Lausen | corilausen@birchdalebc.ca | BC |
| Audrey Lauzon | audreylauzon@hotmail.com | SK |
| Louie | louie@creb.com | |
| Tanya Luszcz | tluszcz@yahoo.com | BC |
| Beth MacCallum | ovis@telusplanet.net | |
| Glen Mainland | _ravenscot@xplornet.com | AB |
| Bryce Maxell | bmaxell@mt.gov | MT |
| Alexis McEwan | amcewan@mt.gov | BC |
| Glenna McGregor | Glenna.mcgregor@gov.bc.ca | BC |
| K. Anré McIntosh | Anre.McIntosh@bchydro.com | BC |
| Natalka Melnycky | Natalka.melnycny@gov.ab.ca | AB |
| Jackie Metheny | jd_metheny@hotmail.com | SK/NC |
| Rhonda Millikin | rmillikin@echotrack.com | BC |
| Les Misch | lmisch@aet-consultants.com | |
| Derek Morningstar | Derek_Morningstar@golder.com | ON |
| Dave Nagorsen | mammalia@shaw.ca | BC |
| Cait Nelson | Cait.Nelson@gov.bc.ca | BC |
| Kyle Nelson | krnelson112@gmail.com | BC |
| Lisa Nutt | lnutt@fs.fed.us | ID |
| Cory Olsen | colson@ualberta.net | AB |
| Peter Ommundsen | inquire@capewest.ca | OR |
| Allysia Park | apark@ccwhc.ca | |
| Brian Paterson | bpaterson@hemmera.com | BC |
| Dale Paton | ptarmig@telusplanet.net | AB |
| Krista Patriquin | lasiurus_cin@yahoo.ca | NS |
| Brad Phillips | bjphillips@fs.fed.us | |
| Kirsten Pinney | kirsten.melanie@gmail.com | AB |
| Delanie Player | dplayer@matrixsolutions.com | AB |
| Joe Poissant | ayresx@gmail.com | |
| Norma Powell | n.powell.neuper@gmail.com | |
| Joanna Preston | joanna.preston@stantec.com | BC |

| | | |
|---|---|---|
| Margo Pybus | margo.pybus@gov.ab.ca | AB |
| Jason Rae | jrae@wcs.org | **BC** |
| Daniela Rambaldini | daniela.rambaldini@gmail.com | SK |
| Lea Randall | learandall@gmail.com | AB |
| Jesika Reimer | Jesika.reimer@gmail.com | AK |
| Dylan Rhea-Fournier | Dylan.rhea.fournier@gmail.com | |
| Sharon Ringel | sringel@shaw.ca | TX |
| Jody Rintoul | rintoul@ualberta.ca | AB |
| Roger Rodriguez | roger@zotzeco.com] | AB |
| Kent Russell | kentrusell1@hotmail.com | |
| Ryan | ryan@mccallumenvironmental.com | AB |
| Mike Sarell | ophiucon@vip.net | BC |
| John Saremba | johnsaremba@gmail.com | BC |
| Dave Schirokauer | Dave_Schirokauer@nps.gov | AK |
| Tim Schowalter | tim.schowalter@gmail.com | AB |
| Helen Schwantje | Helen.Schwantje@gov.bc.ca | BC |
| Jordi Segers | jsegers@cwhc-rcsf.ca | BC |
| Rachel Shively | rdshively@alaska.edu | AK |
| Amie Shovlain | ashovlain@fs.fed.us | MT |
| Sam Skalak | Sskalak1@gmail.com | MT |
| Brian Slough | slough@northwestel.net | YK |
| Carlie Smith | carlie.smith@boralex.com | BC |
| Marian Snively | Marian.snively@alaska.gov | AK |
| Sherwood Snyder | sherwoodsnyder@me.com | |
| Donald Solick | doremeso@yahoo.com | |
| Dan Soprovich | dsop@mymts.net | MB |
| Kari Stuart-Smith | Kari.Stuart-Smith@canfor.com | |
| Erin Swerdfeger | erin.swerdfeger@gmail.com | |
| Jen Talerico | jentalerico@gmail.com | AB |
| Julie Thomas | julie.thomas@gov.yk.ca | YK |
| Joel Tigner | joeltigner@gmail.com | |
| Matthew Timm | Matthew.timm@nlsd.ab.ca | AB |

| | | |
|---|---|---|
| Melissa Todd | Melissa.Todd@gov.bc.ca | BC |
| Sarah Tyne | sarah.tyne@pc.gc.ca | |
| Debbie van de Wetering | debbie.vandewetering@canada.ca | |
| Kelli van Norman | kvannorm@blm.gov | |
| Megan Watters | Megan.Watters@gov.bc.ca | BC |
| Lisa Wilkinson | Lisa.Wilkinson@gov.ab.ca | AB |
| Craig Willis | c.willis@uwinnipeg.ca | MB |
| Shari Willmott | islandgisservices@gmail.com | BC |
| Joanna Wilson | Joanna_Wilson@gov.nt.ca | NT |
| Bob Young | Hanging_out@thebatcave.ca | AB |