Western Canada Bat Network Newsletter

Issue No. 28 Spring 2016

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Cover – Not from western Canada, but gorgeous – a *Glossphaga* in flight in Belize. *Photo by Anne Brigham*.

Updates by region

British Columbia

Long-eared bat taxonomy: Nuclear genetic evidence eliminates the species status of Keen's Myotis (*Myotis keenii*)

Cori L Lausen, Wildlife Conservation Society Canada, clausen@wcs.org; Doug Burles, dburles@telus.net; Dave Nagorsen, Mammalia Biological; mammalia@shaw.ca; Karen Blejwas, Alaska Dept. of Fish & Game,karen.blejwas@alaska.gov; Purnima Govindarajulu, BC Ministry of Environment, Purnima.Govindarajulu@gov.bc.ca; Laura Friis, laurafriis@shaw.ca.

The following abstract was for a presentation was made by C. Lausen at the Society for Northwestern Vertebrate Zoology conference in April 2016:

Four species of long-eared myotis bats occur in British Columbia: Keen's Myotis (*Myotis keenii*), Northern Myotis (*M. septentrionalis*), Long-eared Myotis (*M. evotis*), and Fringed Myotis (*M. thysanodes*). *Myotis keenii* and *M. evotis* are especially difficult to tell apart in the hand in areas where the species are sympatric. Field differentiation is desired given the 'vulnerable/sensitive' conservation status listings of *M. keenii* across its range, versus the 'secure' listing of *M. evotis*. Small differences in skull morphology, colouration, and mitochondrial DNA have been used to try to distinguish the 2 species, but it has been unclear as to whether species distinction is biologically warranted. To examine this question, we microsatellite genotyped 257 long-eared myotis, sampled from a wide range of locations along the BC, Alaska and Washington coasts, and as far east as Alberta. One hundred ninety-five of these samples were potential *M. keenii* or *M. evotis* based on morphology. We also included 24 Little Brown myotis (*Myotis lucifugus*), as a closely related outgroup. We used 14 microsatellite markers and plotted all genotypes in Genetix (factorial correspondence analysis) to observe the nuclear population genetics relationships. Four clear clusters, representing 4 species were delineated: *M. septentrionalis, M. thysanodes, M. lucifugus* and a mixed cluster of *M. keenii/M. evotis*. The highly mixed cluster of all potential *M. keenii* and *M. evotis* provides clear evidence that these individuals represent a single species that interbreeds. A few cases of hybridization between *M. thysanodes* and *M. evotis/keenii* were also noted.

We thank Wildlife Genetics International laboratory staff of Nelson, BC for processing the genetic samples. For field assistance we thank AJ Fedoruk, C Engelstoft, R Wilson, M Proctor, F Burles, A Hetherington, K Staiger, LA Isaac, B Klug, M Kohan, L Beard, D Rhea-Fournier, M Cady, J Delabrue and J Fiely. For additional samples we thank G. Falxa, D. Player, M. Kellner, H. Davis, Royal BC Museum, and Royal AB Museum. This project was funded by the Forest Investment Account of B.C., BC Habitat Conservation Trust Foundation, the Alaska Dept. of Fish & Game and a USF&WS State Wildlife Grant.

The Williston Reservoir Bat Ecology Program

Inge-Jean Hansen, Brian Patterson, and Dr. Cori Lausen

The Williston Reservoir Bat Ecology Program was developed by Dr. Cori Lausen, Brian Paterson and Inge-Jean Hansen to gather baseline data on the winter ecology of bats in this northern region. The 2015-2016 season was the first year of the program and the focus was on acoustic monitoring. Despite the challenges of poor access in this remote region, we managed to deploy nine acoustic monitors (Anabat SD1 and SM2Bat+) and recorded almost 1000 detector nights. We detected winter bat calls 74 times between November 2015 and March 2016 at six locations indicating the presence of nearby hibernacula. An additional three monitoring locations did not detect any winter bat activity. Big brown bats (*Eptesicus fuscus*) were confirmed during the winter monitoring program, with a possible recording of the *Myotis* species group. Calls made by the big brown bat / silver-haired bat (*Lasionycteris noctivagans*) species group were detected; however, no diagnostic silver-haired bat calls were recorded.

Some acoustic monitoring was also conducted outside of winter during the 2015 fall and 2016 spring seasons. A total of 1082 bat calls were detected during the spring and fall monitoring period confirming the presence of five species: big brown bat, silver-haired bat, eastern red bat (*Lasiurus borealis*), little brown myotis (*Myotis lucifugus*), long-eared myotis (*Myotis evotis*), and northern long-eared myotis (*Myotis septentrionalis*). Long-legged myotis may also be present; however, confirmation was not possible given overlap in call characteristics with other *Myotis* spp.

In addition to the bat detectors deployed along the Peace Reach of Williston Reservoir, three bat roost-logging units were installed by experienced cavers, Kirk Safford and Trent Blair, in the Bocock Caves located in remote Bocock Provincial Park within the Reservoir boundary. These roost-loggers were installed in late August 2015 and have been left in the karst system over the winter of 2016. Data from these roost loggers will be analyzed in year two of the Program after the units are retrieved in summer of 2016.

This Williston Reservoir bat ecology program is part of a large-scale western Canada winter bat initiative (in BC, AB, and NWT) which has three main goals:

1. Establish baseline winter bat data to determine level of risk of WNS to western bats, to monitor populations, and to obtain necessary habitat/behavioural information in winter to protect critical winter habitats, minimize impacts of WNS, and in the worst case scenario for some species, facilitate future plans for post-WNS population recovery.

2. Determine reasons for winter bat flight under natural disease-free conditions, to provide insight into how this disease affects hibernating bats.

3. Conduct baseline sampling of bats in B.C., due to its proximity to coastal ports and history of European caving activity for *Pseudogynmnoascus destructans*, the fungus responsible for WNS.

Our current work in Williston Reservoir focuses mainly on goal #1, though contributes to the other goals indirectly. The objectives of this project also fall within the high priority action items outlined in the Canadian White Nose Syndrome Management Plan prepared by the Canadian Interagency WNS Committee, of which co-investigator, Dr. Cori Lausen, is a member, and on several of the working groups within this committee. The Peace Region is a focal point for this research due to a paucity of regional data regarding bat habitat and ecology, location within the foothills of the eastern Rockies, sizeable bluffs / crevices, relatively unexplored karst topography that may be used by bats as hibernacula, and availability of calm open bodies of water in winter (Williston Reservoir).

Year two of this program will entail further acoustic monitoring to detect and confirm winter bat activity across the study site, as well as mist-netting and radio telemetry to determine roosting locations and increase the pool of likely hibernacula to monitor throughout the winter.

Thanks to the financial support of the Fish and Wildlife Compensation Program on behalf of its program partners BC Hydro, the Province of BC, Fisheries and Oceans Canada, First Nations and public stakeholders, as well as the Wildlife Conservation Society of Canada, Northern Lights College and the Northern BC Cavers Club.

Trent Blair (left) and Kirk Safford are two cavers who entered remote caves in Bocock Provincial Park to deposit bat detectors. Photo: Inge-Jean Hansen.

Cavers Kirk Safford and Trent Blair descend into White Dwarf cave, Bocock Provincial Park, September 2016

Hibernation Ecology of Silver-haired Bats Overwintering in British Columbia, Canada

Cori L Lausen, Wildlife Conservation Society Canada clausen@wcs.org;
Thomas J Hill tjhill18@hotmail.com

The following oral presentation was made by C. Lausen at the Society for Northwestern Vertebrate Zoology conference in April 2016:

Abstract -- The Silver-haired Bat (*Lasionycteris noctivagans*), is generally considered a 'migratory-hibernator,' migrating to areas where it overwinters with periods of dormancy. It has long been hypothesized that this species may not be migratory in British Columbia, or migration distances are short, supported by its year-round detection in the province. We studied *L. noctivagans* at three study locations in SE B.C. from 2009 – 2014. Using temperature-sensitive transmitters in winter, we documented arousal patterns of both sexes. We determined that *L. noctivagans* hibernate in mines, rock-crevices, trees and snags, often switching roosts during the winter period. Hibernacula microclimates are high in humidity, but colder than required for optimal growth of *Pseudogymnoascus destructans*. By banding individuals at two mines in both summer and winter, we documented the first evidence of year-round residency at mines by male *L. noctivagans*. Recaptures of both males and females banded as juveniles and recaptured as adults in subsequent years confirms roost fidelity. Evidence of winter mating was found in some January and February captures. Patterned acoustic recordings by *L. noctivagans* could be described as "songs" and may be associated with mating behavior given their predominance during fall and winter. This project was funded largely by the Fish and Wildlife Compensation Program (Columbia Basin), Habitat Conservation Trust Foundation, and Waneta Terrestrial Compensation Program.

Silver-haired bat (*Lasionycteris noctivagans*). Photo: Travis Brown.

Dead bats reveal interesting findings at the BC Animal Health Lab

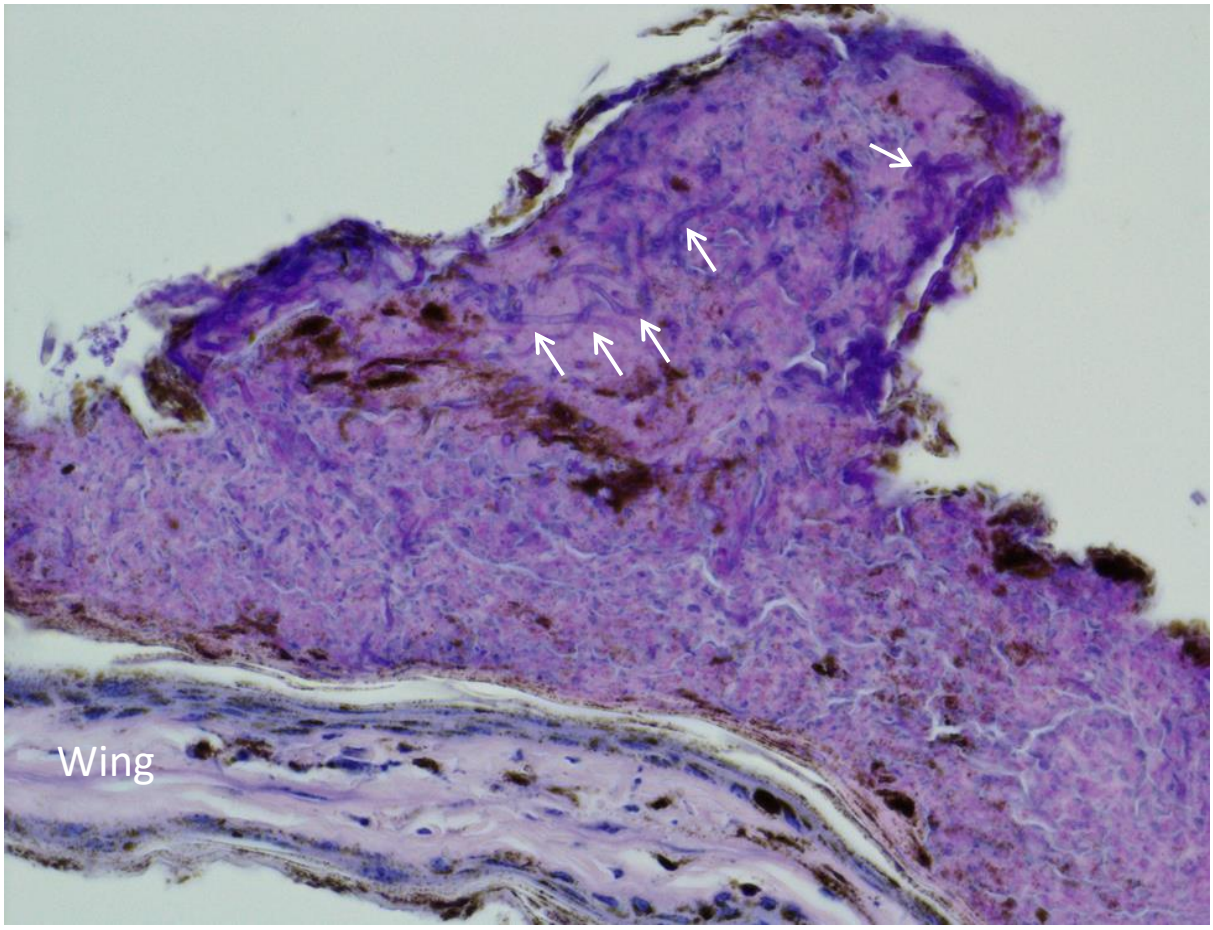
Glenna McGregor, Veterinary Pathologist
Animal Health Centre, BC Ministry of Agriculture

Since the confirmation of White Nose Syndrome in Washington in late March the pressure has been on in BC to get as many incidental bat mortalities into the Animal Health Centre, BC's provincial veterinary diagnostic lab, as possible. The BC Community Bat Project, a network of 14 community bat projects across BC (http://www.bcbats.ca), is serving as the primary point of contact for the public through a toll free line; collecting mortalities, coordinating and shipping them to the lab for necropsy and WNS testing, as well as educating and fielding calls from the public. Thanks to these efforts, in the last month, 27 incidental mortalities and one wing swab, spanning 7 bat species, have been submitted to the lab, a significant increase over the number of bats submitted to the lab in previous years. At the lab a complete necropsy has been completed on every bat as well as rabies testing (by immunohistochemistry) and testing for *P. destructans* (by PCR).

Happily, so far all cases are negative for WNS. In addition to screening for WNS, testing of incidental mortalities provides information on common causes of death, which can be used to guide efforts to mitigate other threats to bat populations. Among the bats submitted, trauma is the most common cause of death, accounting for the cause of death in 11 cases. The trauma is mostly predation, likely by domestic cats, and crushing trauma such as being run over by a car or stepped on. Emaciation and dehydration was the cause of death in 6 cases, and rabies combined with trauma was the cause of death in 1 case. In 9 cases the cause of death could not be determined due to poor specimen preservation.

The most interesting necropsy finding so far is how common fungal skin infections are in WNS-negative bats in BC. Of the 18 bats that were examined microscopically, 11 had evidence of fungal infections on their nose, tail and wings. In all of these cases PCR for *P. destructans* was negative, and in most the microscopic appearance of the fungal hyphae and the nature of the inflammatory response were very different than in WNS. The variety of the fungal infections was also quite surprising – among the 11 bats with evidence of some type of fungal infection, there were at least 5 morphologically distinct fungi involved. Almost nothing is known about normal fungal infections in bats. Testing to determine the species' of these fungi is ongoing. It is unknown whether or not infection with these fungi had a clinically-significant impact on the bats, perhaps by rendering them more prone to trauma, or decreasing their ability to catch insects. Further testing in future years will be necessary to determine whether this is normal in the population, or if this is an unusual finding.

For more information on how you can help BC's bats or to report dead or oddly-behaving bats please see http://www.bcbats.ca and http://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/wildlife/wildlife-health/wildlife-health-matters/bat-health.



Bat wing from a WNS-negative bat infected with "Mystery Fungus 1". This fungus was common, affecting 6 out of 18 bats examined. Arrows indicate fungal hyphae penetrating through a large pustule within the epidermis of the wing. This lesion and the appearance of the fungus is very different from bats with WNS.

"Got Bats?" B.C. Community Bat Program

Mandy Kellner, Juliet Craig, and Purnima Govindarajulu

"Got Bats?" is a network of community bat projects across BC that was launched in May, 2014 and continues to grow. This network promotes bat conservation, particularly of bats in buildings. The objectives of this project are to:

1) increase detection of bat roosts in anthropogenic structures through public education, targeted information solicitation, and a reporting program called "Got Bats?",
2) decrease destruction of bat roosts by encouraging landowners to either protect the roost site or use bat-friendly exclusion methods and installation of alternative roost features,

3) initiate baseline bat population assessment using the Annual Bat Count, a Citizen Science program at multiple sites around BC, and
4) enhance bat habitat in human altered landscapes through installation and monitoring of bat-houses.

Field work can be relaxing! A participant waits for emergence outside a roost for the 2016 Annual Bat Count.

The Community Bat Project was immediately involved once White Nose Syndrome (WNS) was detected south of the border in March. Guano was collected at known *Myotis lucifugus* roosts, for WNS research in conjunction with the Provincial Government. The regional Coordinators also providing a contact point for the public to report dead bats or unusual bat behaviour, and discuss WNS. Dead bats were collected from the public by regional Coordinators and sent to the BC Animal Health Lab for analysis (see article this newsletter).

Funded by the Habitat Conservation Trust Fund and Habitat Stewardship Program, and in partnership with the Ministry of Environment and BC Conservation Foundation, the network is now comprised of 14 regions across BC including: Southern Vancouver Island, Gulf Islands, Salt Spring Island, South Coast,

Haida Gwaii, Sunshine Coast, Okanagan, Thompson, Columbia-Shuswap, Lillooet, Kootenays, Skeena, Peace, and Cariboo regions.

The network has a toll-free number (1-855-9BC-BATS) which links to various parts of the province as well as a Facebook page and a website.

WCS Canada's Bat Conservation Program Spring 2016 Update

C. Lausen, Wildlife Conservation Society Canada

Winter Bat Research

WCS Canada has been working across BC this past winter. Below we describe the 2 main winter projects (WNS Survivorship Modelling, and Acoustic Monitoring in Winter) and the geographic areas that we have been working in. We also highlight some bat acoustic training courses offered this spring.

Southern BC –From fall 2015 to spring 2016 we focused largely on White Nose Syndrome (WNS) survivorship modelling for Myotis species in Columbia Basin. We captured bats in fall and winter and measured mass (as an indication of stored fat), respiration rates (metabolic measurements at cold temperatures), and arousal rates (using temperature sensitive transmitters). Using these main measurements as model parameters in a model already validated on eastern North American species (recent publication by David Hayman and others in 2016), we developed new WNS survivorship models for Yuma and California Myotis. Although preliminary, and based on small sample sizes, these models suggest that in the northern portion of their range, these two species in BC will be affected by WNS, but conspecifics further south may not. However, mortality rates due to WNS are predicted to be substantially lower for these 2 species than that experienced by Little Brown Myotis in eastern North America. Temperature and humidity conditions within hibernacula of these species have not yet been well described, and could influence the predicted survivorship values to some extent.

In addition to survivorship modelling, we also continued monitoring species and population abundance at key hibernation sites in Columbia Basin and deployed bat detectors at additional cave and mine sites that were potential new hibernacula (through our BatCaver program, www.batCaver.org). At BC's largest and most diverse bat hibernaculum (ReMac mine), we focused on continued mark-recapture and establishing baseline diversity and winter bat activity levels. Estimated population size in winter is approximately 3000 individuals of 4 species: Big Brown, Townsend's Big-eared, Silver-haired, and

California Myotis. The former species is represented by only a few captures, while the latter two species are the most prevalent winter occupants.

This was our final year for our FWCP-funded winter ecology research project, and as such we presented recommendations for moving forward with bat conservation and management in Columbia Basin. We proposed that it is important, especially now that WNS has arrived in the Pacific Northwest, that extensive and systematic baseline inventory and monitoring be conducted as a means of surveillance for the disease, and measuring differential impacts on species across the Basin. As species distributions and relative abundance change over time due to a variety of factors including WNS, climate change, changes in mine and forestry practices, future WNS mitigation or recovery efforts, etc., it will be important that quantifiable outcomes can be measured for directing appropriate management and conservation actions. We also recommended that the FWCP Columbia Basin's Species of Interest Action Plan be updated to reflect current knowledge and threats for bats in the Basin. And finally, we highlighted the growing issue of mine closures in the Basin. Many mines have been closed in the past decade with little to no consideration for bats. Given that bat habitat would have already been reduced with the flooding caused by dams on the Columbia River, it is important that low elevation habitat, and especially winter habitat which is thought to be more limiting than summer habitat, be conserved. Securing low elevation mines and their surrounding complement of trees -- because we now know that some bats alternate between tree and mine roosts during winter -- is important in the Columbia Basin as it may be a form of mitigation from the impact of dams, and secure critical hibernation habitat for bats that now face the imminent threat of WNS.

Continued WNS survivorship modelling will be critical to help determine which bat species are likely to be most affected or least affected by WNS over the coming years, and this will allow us to better focus research, monitoring and mitigation efforts. We have confirmed funding from Waneta Dam Terrestrial Compensation Program, and from BC Min FLNRO to continue to do this modelling for one more year in the south Selkirk region. FLNRO provided funding for this project in 2015-6 also. We thank Brandon Klug (U of R), Yvonne Dzal (UBC), David Hayman and Reed Hranac (Massey Univ, New Zealand), Sarah Olson (WCS, Bozeman), and Liam McGuire (Texas Tech) for their assistance on this project to date. We thank Robert Barclay and Mark Brigham for use of the metabolic measuring equipment. For assistance in the field we thank T. Hill, B. West, H. Gates, G. Sanders, L.A. Isaac, A. Gagne, and D. Goff.

We have also been conducting general winter bat acoustic inventories in a few southern locations thanks to a number of collaborators in various locations: Vancouver Island (P. Govindarajulu, M. Davis), Texada Island (A. Mitchell, C. Currie, K. Stanway), Columbia Basin (T. Hill, H. Gates, R. Beech), Okanagan (K. Safford, T. Luszcz), and Stanley Park Vancouver (P. Higginson), including some cave/mine sites being monitored through BatCaver.org.

Northern and Central BC – Bat detectors were deployed at various areas across northern and central BC this winter to determine where and when bat activity was detected in these regions. Many detectors have now been retrieved from the field, but analysis has yet to be completed. We thank the following for their assistance: W. Ray (Fraser Lake), B. Sabal (Lakelse Prov Park, Terrace), D. Belton (Lava Beds Prov Park, Nass region), H. and T. Hebb and S. Dennis (Telegraph Creek, Stikine River), M. Connor (Atlin), I-J

Hansen (Liard Hot Springs, Muncho Lake Prov Park, Peace River), P. Shaughnessy (Bluff Lake and Tatlayoko Lake, Chilcotin region), B. Cadsand (Williams Lake), M. Pharand and D. Christianson (Dease Lake), N. Lebedick (Prince Rupert). We also thank D. Burles for his assistance in retrieving detectors from the field. Funding was provided by Habitat Conservation Trust Foundation. More concentrated bat acoustic monitoring took place in the Peace River (Williston Reservoir) with lead by I-J Hansen and B. Paterson, with funding by FWCP Peace Region. Several roostlogger bat detectors were deployed in caves as part of the BatCaver program in this same region (Bocock Prov Park) by cavers K. Safford and T. Blair. Trent Blair also deployed a roostlogger into Fang Cave near Prince George. These cave detectors have yet to be retrieved due to their high elevation.

Acoustic Trainings

Because of the growing importance of bat acoustic monitoring as a tool for bat conservation, I offered 2 bat acoustic training courses this spring: Creston, BC (host: Creston Valley Wildlife Management Area) and Leamington, ON (host: Pt Pelee National Park). In the former course several NABat (North American Bat Monitoring Program) B.C. Grid Leaders and the new B.C. NABat Coordinator (J. Craig) attended to learn how to deploy bat detectors and analyze data. The latter course largely targeted Parks Canada biologists in eastern Canada, many gearing up for NABat monitoring. We had representatives from Newfoundland, Ontario and Quebec National Parks. Wildlife Acoustics and Titley Scientific provided equipment support. These courses focused largely on instruction in how to deploy bat detectors appropriately to increase the likelihood of being able to identify recordings to species level; how to deploy detectors of various types including full spectrum, zero-cross, omni-directional and directional microphones, etc.; how to differentiate species acoustically; and how to analyze datasets using various software packages including auto-identification and manual verification.

North American Bat Monitoring Program in BC

Juliet Craig, Silverwing Ecological

Guided by the expertise of Cori Lausen with the Wildlife Conservation Society Canada, the North American Bat Monitoring Program is being launched this summer in British Columbia. Using the North American protocols, this program samples 10 km by 10 km grid cells using up to four passive units and two driving transects during a one-week period in June. The goal of this program is to monitor bat species distribution and relative abundance over time. Funded by the Habitat Conservation Trust Foundation (throughout BC) and the Columbia Basin Trust (Columbia Basin portion), BC will be sampling at least 14 grid cells over a 5 year period including areas on Vancouver Island, Sunshine Coast, Lower Mainland, Okanagan, Kootenay, Kamloops, Peace, and Skeena.

For more information on the North American Bat Monitoring Program, see: https://www.fort.usgs.gov/news_item/99426 and http://www.treesearch.fs.fed.us/pubs/48442

For information on the BC Program contact jcraig@silverwingecological.ca.

The BC NA Bat Team at the Creston Acoustics Course, May 2016. Photo: Juliet Craig

A vampire bat breaks a beam and triggers a photo at a cistern, Belize. Photo: Anne Brigham.

Saskatchewan

University of Regina Bat Lab Report

Mark Brigham

Brandon Klug-Baerwald has completed his fieldwork towards his PhD and is in full analysis and writing stage. He has submitted as a MS chapter one on winter bat activity in Dinosaur Provincial Park and is currently working on Chapter 2 which he will present at the Life in the Cold - International Hibernation meetings in Las Vegas in August.

Erin Baerwald is doing a Post Doc affiliated with an NGO in the US but physically living in Regina. She continues to work on bats and windfarm issues.

Shelby Bohn is about to undertake field season #2 of her M.Sc. program working on silverhaired bat roost selection in the Cypress Hills of Saskatchewan. She is also undertaking a neat side project in conjunction with the Saskatchewan Science Center on the energetic costs of PIT tagging. This will continue next winter.

Audrey Lauzon is about to formally join the lab. She will be beginning her M.Sc. doing field work in Nelson BC literally repeating a project undertaken by Scott Grindal in the mid 1990's. She is going to assess how bats treat cutblocks that were harvested then and now have those edges "blurring" as re-growth occurs. This project has been largely facilitated by Dr. Darren Sleep who undertook his M.Sc. in the lab about 15 years ago. He now works for NCASI (National Council for Air and Stream Improvement) in Montreal.

Bat release from the Saskatchewan Science Centre

Anne Brigham

May 12 brought the successful release of Big Brown Bats who had overwintered at the Saskatchewan Science Centre. The newspaper claimed that a 'small' crowd of 400 people... (the writer was a sports reporter who is used to football game turnouts)...but it was actually pretty impressive how many people showed up on a near freezing night. Quite the contrast to the 30C temps the week before.

People were quite keen to listen to both Mark Brigham and graduate student Shelby Bohn speak in the Science Center first, then the 12 bats, taken in by the Science Center during the winter for making poor hibernation choices, were given the opportunity to be free. Brandon Klug and Erin Baerwald were also in attendance to help show off the bats to the public and help release the bats. A light tag was attached to each bat to allow the public to see the bats fly off.

Four of the 12 bats decided that they would prefer to remain at the Science Center, until a warmer evening. However the other 8 bats merrily flitted off to find a place to hang up, clean off their colourful tag and head into torpor. It was to be much warmer by the weekend. See the CBC story at: http://www.cbc.ca/news/canada/saskatchewan/bats-saskatchewan-science-centre-1.3580324

A Big Brown Bat sporting a light tag just before release. Photo: Ann Brigham.

Another Big Brown Bat showing off its teeth before taking flight. Photo: A. Brigham.

International

White Nose Syndrome Workshop, Denver, CO, 7-10 June 2016

C. Lausen, WCS Canada

This year's workshop was held in Denver, Colorado. It was attended by approximately 140 people. The first day and a half was made available to others to attend via Webex. Early in the workshop there was an announcement made about the genetic origin of the WNS-infected bat that was found in Washington this past March. There was some speculation on whether it would turn out to be the same strain as found in eastern North America or another strain, such as from Asia. I'd like to be able to give you the answer to this, but an announcement was made at the workshop that there is a publication ban on the genetic results until the official press release comes out, planned for later in June. Sorry! Stay tuned. Related to this publication ban I am forced to be rather vague on some related topics, but I am able to give you brief overview of the science presented and the discussion topics.

Washington State WNS Case: The Washington state WNS-infected bat was found by a hiker along a trail, not far from i90 highway in the North Bend area. This is approximately 150 km from the Canadian border and ~ 30 miles from the port of Seattle. It was a little brown myotis of the subspecies *alascensis*, a mitochondrial haplotype that is most often found in the coastal area. It had full blow WNS, as evidenced by wing histology and positive PCR for *Pseudogymnoascus destructans* (Pd). Environmental and swab samples of bats were collected and tested soon after the discovery of the WNS-infected bat, and no further Pd positive samples were found. Most bats sampled for potential presence of Pd were Townsend's Big-eared bats, as these were the predominant species that could be readily accessed in the "Ground Zero" area of North Bend. Sick/dead bats were submitted from a larger area, and all tested negative. No general mistnetting was conducted in the general vicinity of Ground Zero, and there was some criticism of this decision expressed by surrounding states during the discussion of this. The reason that mistnetting was not conducted was largely due to the absence of 40kHz recordings of bats in that area, suggesting that the chance of capturing little brown myotis in that area was low.

Canadian Update: Jordi Segers, Canadian WNS Coordinator, provided an update on what is being done in Canada. He highlighted the implementation of North American Bat Monitoring (NABat) program in many provinces, and the www.batwatch.ca website that has been successful in gathering information about maternity roosts for little brown myotis in eastern Canada. He gave a summary of the high level of bat declines that have been observed in the eastern portion of the country, with the exception of Newfoundland, where Pd has not yet been detected at known hibernacula. Prince Edward Island is in the process of provincially listing their two main species of bats: little brown and northern myotis. New Brunswick has stopped doing hibernacula surveys as the sites have no bats remaining.

Jordi Segers, Canadian WNS coordinator, at the WNS workshop in Denver, CO. Photo: C. Lausen

Disease Management Working Group: Arising from discussions mainly in the Western States working session was this growing concern that infected bats may be transported to other places of the continent on long haul trucks/trains. With the large reservoir of infected bats in the east, there is a growing risk that this could occur. When you examine the western ports, there are only a few major ones in the west – and they see an astounding number of trucks hauling cargo for export/import each day. Seattle is the major port in the Pacific Northwest. I brought this 'bat stowaway' idea forth in an email this spring to the USFWS and again during several discussions in this workshop. The USFWS along with many workshop participants acknowledged that this could indeed be an issue and should be examined closely for potential continued spread along the western seaboard and further inland in the west. While there are many that still believe that cavers could spread WNS into the west, there is acknowledgement that the lack of caves, the lack of bats in the few caves around Seattle (mainly Townsend's Big-eared bats), and the high volume of train and truck traffic to the port of Seattle coming from the east, may support the notion that this invasive fungus could have caught a long distance ride. While the bat that was found was clearly of western origin, it is not known if the introduced source of the infection could have been an eastern bat.

The Disease Management Group will be working on an educational anti-stowaway bat campaign over the coming months. A number of western bat biologists agreed that this may also be a good topic for the Western Bat Working Group to address in their upcoming biennial working meeting in April in Colorado.

Little brown bat with WNS. Photo: Jonathan Mays, Wildlife Biologist, Maine Department of Inland Fisheries and Wildlife

Testing Guano for Pd: Ann Ballman and Kyle George (USGS- National Wildlife Health Center) presented on the potential for using guano in spring roosts to detect Pd. This method is in its early stages of testing, and while it does look promising, it is not a proven method to date. Ann recommends collecting guano as early in the spring as possible when bats are grooming fungal spores. These spores can be cleaned off a bat quite quickly in spring. Placing ~10 guano pellets in each envelope and sampling weekly is recommended.

Resistance: To respect the request by authors to not provide many details of their unpublished work, I would at minimum just point out that there are bats that are surviving WNS in the east and it seems that they get WNS, but then their Pd loads plateau. Why this is, is not yet known. Both Kate Langwig (Harvard School of Public Health) and Winifred Frick (Bat Conservation International) both presented studies of this nature. Jeff Lorch (USGS- National Wildlife Health Center) has been examining natural wing microbiomes on bats in east and west and is starting to piece together some correlations that perhaps wing biota can predict impact of WNS. Paul Cryan (USGS) put together a summary based on phylogenetics and suggested that maybe we should look to close relatives between eastern and western species to try to predict which ones may be more susceptible to WNS based on relatedness.

Decontamination: For those of you who did not see the new USFWS decontamination protocol this spring, you'll be happy to know there are some new chemical options. Jessie Glaeser (US Forest Service – Northern Research Station) presented results of these new options, which include 60% rubbing alcohol, 60% ethanol, and 3% hydrogen peroxide. See https://www.whitenosesyndrome.org/sites/default/files/resource/national_wns_decon_protocol_04.12.2016.pdf. While alcohol and peroxide are almost immediate in their ability to kill the fungus, other previously used chemical treatments such as Lysol wipes take up to 10 minutes to be effective and were thus removed from the recommended list of decon chemical. Clorox wipes take only 4 minutes and were thus retained on the list of recommended options. 55^{o}C for 20 minutes is the preferred non-chemical method of decontamination. This is up 5^{o}C from previous recommendations.

Field Trials of Potential Anti-Pd Treatments: A number of researchers spoke of field trials on anti-Pd treatments. To date, there is only minor success to report, with most reporting field complications that prevented conclusive findings.

Non-Bat Sources of Spread Within Hibernacula: Two researchers, Karen Vanderwolf (Univ of Wisconsin) and Natalia Martinkova (Czech Republic), described movement of Pd spores by cave arthropods and wing mites, respectively.

Unique Roosting of Western Little Brown Myotis in Winter in Alaska: Karen Blejwas (AK Fish and Game) reported on finding little browns roosting in root wads and rock rubble slopes during winter; she showed video footage of bats entering these for winter.

Working Sessions: **NABat** (North American Bat Monitoring Program) had a session where some states presented on the grid cell monitoring they have done to date (in the west this included Idaho, Oregon and Washington). Jordi Segers also presented on the NABat monitoring that he has been doing in PEI.

There were sessions on **banding/PIT-tagging**, **decision analysis**, and **commercial cave guidance**, along with meetings of the **US national WNS working groups**.

The **western states working session** spearheaded by Chris Servheen (Univ of Montana), Bronwyn Hogan (USFWS) and Don Campton (USFWS), produced a list of main topics that they wanted to focus on. Much discussion involved formation of "Task Teams (SWAT)" to be ready for the appearance of the disease. Preparing for the imminent arrival of WNS includes conducting and compiling baseline

information and establishing important on-the-ground teams of citizen scientists, multi-agency biologists (within a state and neighboring states), and federal biologists. I mentioned to the group how the BC Community Bat Program was an integral component of BC's WNS response when we found out about the WA case and I highly recommended that a similar program be established in states. Many of the government attendees at this working session were new to bats, responding to the crisis of WNS in the west. I suggested that instead of starting from scratch with "SWAT teams", the state and federal biologists reach out to the Western Bat Working Group to make use of the multi-agency framework that already exists among and within states/provinces for networking among bat biologists and managers. Other items on the list generated by this western session included an anti-stowaway bat campaign, websites for interacting with the public, working with cavers, and various means of surveillance including spring swab, guano sampling, and acoustic monitoring.

White nose syndrome

Decontamination protocol

PLEASE CHECK REGULARLY FOR UPDATES

The most recent BC Provincial Decontamination Protocol can be found here: http://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/wildlife-wildlife-habitat/wildlife-health/wildlife-health-documents/decon_protocol_for_bat_work_april_2016.pdf

Dead bats

If you have a sick or dead bat, contact the BC Wildlife Health Program: 250-751-3234 / Helen.Schwantje@gov.bc.ca or the BC Community Bat project 1-855-9BC-BATS / info@bcbats.ca

To submit dead bats for testing, follow the CWHC submission protocol: http://www.cwhc-rcsf.ca/docs/WNS_Specimen_Submission_Protocol.pdf

Recent literature/resources

A few papers from or relating to Canada:

Baerwald, E.F. and R.M.R. Barclay. 2016. Are migratory behaviours of bats socially transmitted? Royal Society Open Science. 3: 150658. http://dx.doi.org/10.1098/rsos.150658

Davy CM, Whitear AK. 2016. Feasibility and pitfalls of ex situ management to mitigate the effects of an environmentally persistent pathogen. Animal Conservation. 2016 Apr 1.

Klüg, B. J. and R. M. Brigham. 2015. Changes to metabolism and cell physiology that enable mammalian hibernation. Springer Science Reviews 3:39-56. DOI 10.1007/s40362-015-0030-x.

Luszcz TM, Rip JM, Patriquin KJ, Hollis LM, Wilson JM, Clarke HD, Zinck J, Barclay RM. A Blind-Test Comparison of the Reliability of Using External Morphology and Echolocation-Call Structure to Differentiate Between the Little Brown Bat (*Myotis lucifugus*) and Yuma Myotis (*Myotis yumanensis*). Northwestern Naturalist. 2016;97(1):13-23.

McGuire, L.P., J.M. Turner, L. Warnecke, G. McGregor, T.K. Bollinger, V. Misra, J.T. Foster, W.F. Frick, A.M. Kilpatrick and C.K.R. Willis. 2016. White-nose syndrome disease severity and a comparison of diagnostic methods. EcoHealth. DOI: 10.1007/s10393-016-1107-y. **PDF**

Webber, Q.M.R., R.M. Brigham, A.D. Park, E.H. Gillam, T.J. O'Shea, and C.K.R. Willis. 2016. Social network characteristics and predicted pathogen dynamics in summer colonies of female big brown bats (*Eptesicus fuscus*).Behavioral Ecology and Sociobiology. 70:701-712. **PDF**

Wilcox, A. and C.K.R. Willis (2016) Energetic benefits of enhanced summer roosting habitat for little brown bats (*Myotis lucifugus*) recovering from white-nose syndrome. Conservation Physiology. 4:cov070. **PDF**

A very interesting FREE ONLINE book:

Voight, C. C. and T. Kingston (eds). 2016. Bats in the Anthropocene: Conservation of Bats in a Changing World. ISBN: 978-3-319-25218-6 (Print) 978-3-319-25220-9 (Online)

Conferences

NASBR 2016: Oct 12 - 15, NASBR 46, San Antonio, TX, USA. Registration is now open. Activities include a trip to Bracken Cave. http://www.cvent.com/events/nasbr2016/event-summary-6fce7b2106d14e00aa14ba72fccbc276.aspx

WBCN newsletter submissions

Please submit all newsletter submissions to Mandy Kellner: Western.canada.bat.network@gmail.com
Submissions can be made at any time, with newsletters produced in spring and fall.

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/alberta-bat-action-team/abat-programs-publications.aspx

Distribution list

Name	Email address	Prov/ State
Ian Agranat	ian@wildlifeacoutics.com	
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@amec.com	AB
Carita Bergman	carita.bergman@pc.gc.ca	BC
Dora Berry	Dora_berry@hotmail.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.
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
Joanna Burgar	Joanna.Burgar@gov.ab.ca	AB
Doug Burles	dburles@telus.net	BC
Faye Burles	fburles@telus.net	

Joanna Burgar	Joanna.burgar@gov.ab.ca	AB
Patrick Burke	paddraig.bourke@gmail.com	
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@gov.bc.ca	BC
Walter Clevenger	walter@webtropolis.com	BC/CA
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	jcraig@silverwingecological.ca	BC
Vanessa Craig	vanessa.craig@ecologicresearch.ca	BC
Erica Crowther	Erica.crowther@advisian.com	
Martin Davis	mdavis@conumacable.com	BC
Rita Dixon	rita.dixon@idfg.idaho.gov	ID
Bill Doering	rwdoering@gmail.com	ID
Kristi Dubois	kdubois@mt.gov	MT
Orville Dyer	Orville.Dyer@gov.bc.ca	BC
Yvonne Dzal	Yvonne.Dzal@gmail.com	SK
Derek Ebner	Derek.Ebner@stantec.com	AB
Carol Engstrom	Carol.Engstrom@huskyenergy.com	AB
Michelle Evelyn	mjevelyn@gmail.com	BC
Scott Falkingham	scott@falkingham.ca	MB
Greg Falxa	gregfalxa@gmail.com; gregf@efn.org	WA
Dashiell Feierabend	dsfeierabend@gmail.com	AK
Mitch Firman	mfirman@golder.com	BC
Jason Fisher	Jason.Fisher@arc.ab.ca	AB
Shawn Freeman	sfreeman@rescan.com	BC
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
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
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
Tyler Jans	tyler@bluearth.ca	AB
Jen Talerico	jentalerico@gmail.com	
Joe Poissant	ayresx@gmail.com	
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	
Julia Kilgour	julia.kilgour@utoronto.ca	ON
Jeff King	jeff@wildlifeacoustics.com	
Brandon Klug	bjklug@gmail.com	AB
Paul Knaga	Paul.Knaga@shell.com	AB
Terry Krause	Terry.Krause@gov.ab.ca	AB
Paul Langevin	plange02@telus.net	BC
Cori Lausen	clause@wcs.org	BC
Audrey Lauzon	audreylauzon@hotmail.com	SK
Janene Lichtenberg	janenel@cskt.org	MT
Louie	louie@creb.com	
Tanya Luszcz	tluszcz@yahoo.com	BC
Beth MacCallum	ovis@telusplanet.net	
Glen Mainland	_ravenscot@xplornet.com	AB
Inge-Jean Mattson	ingebjorgjean@gmail.com	BC
Bryce Maxell	bmaxell@mt.gov	MT
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
Rob Mies	rmies@batconservation.org	MI
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
Lisa Nutt	lnutt@fs.fed.us	ID
Marc Obert	Marc.obert@stantec.com	AB
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
Kirsten Pinney	kirsten.melanie@gmail.com	AB
Delanie Player	dplayer@matrixsolutions.com	AB
Veronica Pocza	veronicapocza@icloud.com	
Norma Powell	n.powell.neuper@gmail.com	
Joanna Preston	joanna.preston@stantec.com	BC
Margo Pybus	margo.pybus@gov.ab.ca	AB
Daniela Rambaldini	daniela.rambaldini@gmail.com	SK
Lea Randall	learandall@gmail.com	AB
Jesika Reimer	Jesika.reimer@gmail.com	AB
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	
Erin Rutherford	erutherford@scbat.org	BC
Mike Sarell	ophiucon@vip.net	BC
Dave Schirokauer	Dave_Schirokauer@nps.gov	AK
Tim Schowalter	tim.schowalter@gmail.com	AB
Helen Schwantje	Helen.Schwantje@gov.bc.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
Marian Snively	Marian.snively@alaska.gov	AK
Sherwood Snyder	sherwoodsnyder@me.com	
Donald Solick	doremeso@yahoo.com	
Dan Soprovich	dsop@mymts.net	MB
Katharine Staiger	KStaiger@nwcc.bc.ca	BC
Kari Stuart-Smith	Kari.Stuart-Smith@canfor.com	

Jen Talerico	jentalerico@gmail.com	AB
David Tessler	David_Tessler@fishgame.state.ak.us	AK
Joel Tigner	joeltigner@gmail.com	
Matthew Timm	Matthew.timm@nlsd.ab.ca	AB
Melissa Todd	Melissa.Todd@gov.bc.ca	BC
Jill Viccars	Jill.Viccars@cenovus.com	AB
Drajs Vujnovic	Drajs.Vujnovic@gov.ab.ca	AB
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