WESTERN CANADA BIRD BANDING CONFERENCE

29-31 March 2019 in Edmonton

Abstract

This gathering will share recent monitoring and research techniques and results of migratory birds. The participants will leave with increased knowledge and an enthusiasm to learn and share more about our feathered friends.

Beaverhill Bird Observatory
chair@beaverhillbirds.com

Northern Goshawk courtesy of David Brinker

WESTERN CANADA BIRD BANDING CONFERENCE – 29-31 MARCH 2019

At King's University Theatre, 9125 50 St NW, Edmonton, Alberta
Visitor parking available is in the East parking lot, located at the back of the building and only in designated visitor parking stalls.

Friday, 19:00h 29 March - registration opens

1. 19:30. Long Point Bird Observatory – an overview and celebration. Steven Price, President, and Stuart Mackenzie, Migration Program Director, Bird Studies Canada

Saturday, 8:00 30 March - registration and doors open

2. 8:30. Beaverhill Bird Observatory – A new direction and expansion. BBO Board and Staff.

3. 8:50. Lesser Slave Lake Bird Observatory – Overview. Patricia Campsall and Robyn Perkins

4. 9:10. From Mountain to "Mountain": What we are learning at Last Mountain Bird Observatory. Ryan Dudragne, LMBO.

5. 9:40. Calgary Bird Banding Society: 23 years of monitoring neotropical migrants. Cyndi M. Smith and Doug Collister.

10:00 Health Break

6. 10:20. Dispersal distance and age/sex structure of Purple Martins in central Alberta. Carolyn Cook, Glen Hvenegaard, Geoff Holroyd, and Hardy Pletz

7. 10:40. Migration patterns of Purple Martins nesting in central Alberta. Glen Hvenegaard, University of Alberta, Kevin Fraser, Myrna Pearman, and others.

8. 11:00. Ellis Bird Farm: Using technology to inform and inspire. Alisha Ritchie, Myrna Pearman, Maureen Carey, Leo de Groot

9. 11:20. MOTUS – A collaborative approach to radio telemetry. Catherine Jardine and Stu Mackenzie, Bird Studies Canada.

10. 11:40. MOTUS – discussion about setting up a system of MOTUS towers in Alberta (western Canada)

12:00 LUNCH BREAK – on your own; King's University cafeteria is recommended and ready for us.

11. 13:00. Rise and Fall of Northern Goshawks in the Central Appalachians: Is there reason for conservation concern in the Northeastern U.S.? David F. Brinker, Central Appalachian Goshawk Project, Maryland

12. 13:30. Pinfeather Ecology: Applying our understanding of molt to migration science. Jeremiah Kennedy, University of Alberta

13. 13:50. Are all feathers equal when it comes to quill mites? Distribution of *Betasyringophiloidus seiuri* infesting Ovenbird (*Seiurus aurocapilla).* Alexandra Grossi University of Alberta

14. 14:10. Photographs can emulate spectrophotometric measures of plumage hue of tree swallows as a non-invasive metric of pollution exposure. Natalia Lifshitz and Colleen St. Clair, University of Alberta

14:30 Health Break

15. 14:50. Long-term monitoring of boreal bird community at Calling Lake Alberta, 1993-2018 and counting. Lionel Leston, Department of Biological Sciences, University of Alberta

16. 15:10. Influence of audio lure during spring and fall migration in southwestern Alberta. Cyndi M. Smith and Peter Achuff, Calgary Bird Banding Society

17. 15:30. Differential migration of Yellow Warblers and Least Flycatchers across southern Canada. Emily Grose, Geoff Holroyd, and Richard Krikun, Beaverhill Bird Observatory.

18. 15:50 Tree Swallows at Beaverhill Lake – 35 years of change and their annual migrations. Geoff Holroyd, Beaverhill Bird Observatory. (Not presented due to lack of time)

16:00 End for the day. Travel to Edmonton Nature Club Banquet for those with tickets at THE MOOSE FACTORY 4810 Calgary Trail (Southbound) NW Edmonton.

SUNDAY 8:30 31 March - open and social

19. 9:00 Projects Owlnet & SNOWstorm: The power of collaborative bird banding. David F. Brinker, Natural Heritage Program, Maryland Department of Natural Resources.

20. 10:00 Twelve years of owl banding in the Nisbet Forest of Saskatchewan. Harold Fisher

10:20 Health Break

21. 10:50 10,000 Owls. Siobhan Darlington and David Bell, Rocky Point Bird Observatory

22. 11:10. Evidence of partial migration: encounters of Northern Saw-whet Owls from Banding Stations in Alberta and Saskatchewan. Lisa Takats Priestley and Chuck Priestley, STRIX Ecological Consulting

23. 11:30. What can we learn from patterns of owl movements using other species? Geoff Holroyd, BBO.

11:50 LUNCH BREAK – on your own; King's University cafeteria is recommended and ready for us.

24. 13:00. Examining Timing in Banding Protocols of Northern Saw-whet Owls. Sara Pearce Meijerink, BBO.

25. 13:20. Lunar and weather effects influencing Northern Saw-whet Owl migration. Stephanie Thunberg

26. 13:40. Workshop on aging NSWO from photos – a review.

14:00 Health Break

27. 14:30 Symposium: How to sex Northern Saw-whet Owls

28. 14:30 Building the Project Owlnet Northern Saw-whet Owl sex determination guidelines. David Brinker

29. 14:50 Gender assignment of Northern Saw-whet Owls caught in central Alberta. Chuck Priestley, Jeremy Lambe, Darcy Visscher, Geoff Holroyd, and Lisa Priestley.

30. 15:20 Discussion

31. 15:30 End of Conference.

WESTERN CANADA BIRD BANDING CONFERENCE – 29-31 MARCH 2019

PROGRAM ABSTRACTS * presenter

1. **Long Point Bird Observatory – an overview and celebration.**
*Steven Price, President, and Stuart Mackenzie, Migration Program Director, Bird Studies Canada. Email: sprice@bsc-eoc.org

Abstract - Founded in 1960 by the Ontario Bird Banding Association, the Long Point Bird Observatory was the first bird observatory in the Western Hemisphere. Located on the north shore of Lake Erie in Ontario, LPBO hosts researchers and banders from across Canada and around the world. Combinations of bird monitoring methods – tested at LPBO, developed in concert with stations of the Canadian Migration Monitoring Network, and funded in large part by Environment and Climate Change Canada – serve as an index to monitor migratory species, especially those of the boreal forest not easily monitored by other means, such as Breeding Bird Surveys. Special spin-off programs such as Youth Education and dedicated Latin American training efforts support exchange and training of youth and experts from countries of the Western Hemisphere, where a majority of species breeding in Canada migrate to escape the northern winter. In spring of 1960, a Song Sparrow was the first bird banded at LPBO; in May 2017, a Tennessee Warbler – enigmatic of boreal species in need of monitoring – was the one millionth bird banded. Partnerships with universities, funders, governments, natural history clubs, volunteers, and fellow banding stations of the CMMN, have grown LPBO from a small dedicated group of pioneer banders into a force for bird science, awareness and conservation. As other observatories have done, LPBO developed a broader geographic scope and a wider mandate to understand, appreciate and conserve Canada's wild birds. Within the national non-profit Bird Studies Canada, LPBO remains its founding and entrenched program.

2. **Beaverhill Bird Observatory – A new direction and expansion.**
Geoff Holroyd, Chair, BBO Board and Staff. Email: chair@beaverhillbirds.com

Abstract - The second oldest bird observatory in Canada, BBO (Beaverhill Bird Observatory) was established in 1984 after several individuals banded at Beaverhill Lake for some years. BBO's core programs are migration monitoring using CMMN protocol, Monitoring Avian Productivity and Survivorship following IBP protocol, Saw-whet Owl migration monitoring and tracking Tree Swallow productivity. Using interns funded by SCiP (Serving Community internship Program) we have been monitoring bats, house wrens, breeding birds, and butterflies. In recent years, and with the help of imprint Saw-whet Owls, a Barred Owl and a Peregrine Falcon we have given over 200 presentations per winter to schools, and other groups. The talks are specific to each grade to match the Alberta curriculum with an emphasis on conservation action, climate change and birds. BBO has also been involved in bird research in USA, Mexico, Guatemala, Ecuador, and Spain.

3. **Lesser Slave Lake Bird Observatory – Overview.**
Patricia Campsall and *Robyn Perkins, LSLBO. Email: bic@lslbo.org

Abstract - In 1993 three enthusiastic volunteers conducted a pilot study in the Lesser Slave Lake area to determine if an observatory at Lesser Slave Lake was viable. Results were positive, so in 1994 an independent, non-profit society, the Lesser Slave Lake Bird Observatory, was born. In 1997 the LSLBO was incorporated. Although still directed and run mostly by local volunteers, the organization does currently hire contract and seasonal staff for research and education programs as well as a year-round Executive Director. The Lesser Slave Lake Bird Observatory is a member of the Canadian Migration Monitoring Network (CMMN) and one of only a handful of banding stations located in the Boreal Forest. As such, it is well-positioned to collect critical information on the boreal forest breeding grounds of Neotropical migratory bird species. Its goals are to contribute data to an international effort to determine changes in populations of migratory birds and to document migration at the station itself. Since it was established in 1994, the LSLBO has been involved in many different research and monitoring programs. Migration monitoring is the LSLBO's core monitoring program but there are also many other programs that take place from spring to fall each year including: the Monitoring Avian Productivity and Survivorship (MAPS) Program and Northern Saw-whet Owl Monitoring. The LSLBO is also committed to providing curriculum-based education programs for school groups and community-focused programs and events for the general public. Experienced educators develop and deliver year-round programming on a variety of topics from birds to boreal forest ecology. This presentation will update the activities of LSLBO.

4. **From Mountain to "Mountain": What we are learning at Last Mountain Bird Observatory.** *Ryan Dudragne, LMBO. Email: pl8guy@sasktel.net

Abstract - Last Mountain Bird Observatory was founded in 1989, and as a member station of the Canadian Migration Monitoring Network since 1992 our data are pooled with several stations across Canada and the northern United States to study and monitor landbird populations from across the Boreal. Through banding and other monitoring operations, we have learned much about the local avifauna in south-central Saskatchewan and continue to learn about the population dynamics of local breeding birds. Furthermore, LMBO serves as an important instrument for conservation engagement in Saskatchewan and supports local research and monitoring projects year-round, including several MAPS stations. Studies at LMBO and beyond have done much to elucidate the stopover ecology and migration strategies of neotropical migrants that must pass the Northern Great Plains en route between breeding and wintering grounds. Data from birds captured at LMBO were used in a broad stable-hydrogen isotope analysis to help delineate the primary boreal breeding catchment areas for several species. As we continue to monitor birds at LMBO, statistically significant population trends are beginning to emerge for species such as Canada Warbler and Alder Flycatcher; however, more years of monitoring are required to determine if recent observed changes in migration phenology are statistically significant.

5. Calgary Bird Banding Society: 23 years of monitoring neotropical migrants.

*Cyndi M. Smith and Doug Collister, CBBS. Email: cyndi.smith9@gmail.com

Abstract - CBBS was incorporated in 1995 and the primary objective of the society is to quantify long-term population trends of neotropical migratory birds using constant-effort mist netting. CBBS has been a full member of the Canadian Migration Monitoring Network since 1998. The main projects are spring and fall migration monitoring, and a Monitoring Avian Productivity and Survival (MAPS) station, all at the Inglewood Bird Sanctuary (IBS) in Calgary, Alberta. Northern Saw-whet Owl migration monitoring is conducted in the foothills southwest of Calgary. Spring migration monitoring of neotropical migrants has also been undertaken since 2002 at sites in Costa Rica, Mexico and, since 2015, in Belize. Population trends for 46 species captured from 2002-2017 during migration at IBS have been calculated. Peer-reviewed papers have been published using data we collected in Alberta, Costa Rica and Mexico.

6. Dispersal distance and age/sex structure of Purple Martins in central Alberta.

*Carolyn Cook, Glen Hvenegaard, Geoff Holroyd, and Hardy Pletz.
Email: ccook2@ualberta.ca

Abstract - Across North America, Purple Martins (*Progne subis*) show high fidelity to natal sites or previous nesting sites. As a result, dispersal distances are generally small. However, at the northern edge of its breeding range, little is known about dispersal distances, in general or by age or sex classes. In central Alberta, bird banders have banded 2-3 thousand nestlings and adults per year over the past several years, providing an opportunity to learn about the dispersal patterns, age structure, and sex ratio of this species. Staff from the Beaverhill Bird Observatory and the University of Alberta – Augustana Campus recaptured and released 37 martins in 2017 and 91 martins in 2018 at nest box colonies during June and July that were banded in previous years.

In 2017, recaptured adults were mostly males (60%) with 35% female and 5% of unknown gender. Around 65% of the recaptured birds were 'second year' juveniles with 'after second year' birds accounting for 35%. About 35% of the birds returned to the colony at which they were initially banded as nestlings. Only 4 individuals dispersed further than 50 km (maximum was 82 km).

In 2018, recaptured adults were evenly split between males (48%) and females (50%) with only 2% of unknown gender. About 23% of the recaptured birds were 'second year' juveniles while 77% were 'after second year'. Just under two thirds (61.5%) returned to the same colony at which they were initially banded as nestlings. Only 2 individuals dispersed further than 50 km (maximum was 74 km).

7. **Migration patterns of Purple Martins nesting in central Alberta.**
*Glen Hvenegaard, University of Alberta, Kevin Fraser, Myrna Pearman, and others.
Email: gth@ualberta.ca

Abstract - Aerial insectivores have declined significantly in North America in the past few decades. Knowing the migration patterns of bird species can assist conservation efforts by identifying critical breeding areas, stopover sites, and wintering regions. While the migration patterns for Purple Martins (*Progne subis*) have been determined for eastern, mid-western, southern, and western populations, the patterns for the northerly population in Alberta have only been revealed recently. We deployed light-level geolocators on Martins that nested in Camrose and Lacombe, Alberta in 2012-2014, recovering 16 in subsequent years. Based on maps produced with daily locations, Alberta's martins began their southward migration in early to mid-August, sometimes assembling along the way in fall martin roosts that include hundreds of thousands of birds. Continuing south, they mostly flew over (but occasionally skirted) the western side of the Gulf of Mexico, and then often stopped in the Yucatan, Mexico for 3-5 weeks. They arrived in Brazil by early November, spending their time in 3-4 locations in the Amazon basin. Martins typically departed their wintering grounds in late April and arrived in Alberta by mid-May. These birds travelled at rates of up to 600 km/day, with speeds on northward migration much faster than on southward migration. These results are helpful in directing conservation efforts toward key stopover and wintering sites. Future research will increase accuracy about key locations on migration.

8. **Ellis Bird Farm: Using technology to inform and inspire.**
*Alisha Ritchie, *Myrna Pearman, Maureen Carey, Leo de Groot.
Email: mpearman@ellisbirdfarm.ca

Abstract - Over the past few years, Ellis Bird Farm has developed and deployed various technologies to monitor and track cavity-nesting birds: CCTVs, cavity cameras; light level geolocators; GPS units; and the use of RFID technology. This presentation will briefly summarize and demonstrate the highlights of how these technologies have been used to collect scientific data and how they have been shared to educate and inspire the public.

9. **MOTUS – A collaborative approach to radio telemetry.**
*Catherine Jardine and Stu Mackenzie, Bird Studies Canada. Email: cjardine@bsc-eoc.org

Abstract - The Motus Wildlife Tracking System (Motus; https://motus.org), is an international network of researchers using coordinated automated radio-telemetry arrays to study movements of small flying organisms at local, regional, and hemispheric scales. Automated receivers, along with recent miniaturization and digital coding of tags, have improved the utility of radio-telemetry by allowing many individuals to be tracked continuously and simultaneously across broad landscapes. Motus is novel among automated arrays in that collaborators employ a single radio frequency across receiving stations over a broad geographic scale, allowing individuals to be detected at sites maintained by others. Motus also coordinates, disseminates, and archives detections and associated metadata in a central

repository. Motus has expanded the scope and spatial scale of research questions that can be addressed using radio-telemetry from local to regional and even hemispheric scales. Since its inception in 2012, more than 17,000 individuals of over 173 species of birds, bats, and insects have been tracked. This rich and comprehensive dataset includes detections of individuals during all phases of the annual cycle (breeding, migration, and nonbreeding), and at a variety of spatial scales, resulting in novel insights into the movement behavior of small flying animals. The value of the Motus network will grow as spatial coverage of stations and number of partners and collaborators increases. With continued expansion and support, Motus can provide a framework for global collaboration, and a coordinated approach to solving some of the most complex problems in movement biology and ecology.

10. MOTUS – discussion about setting up a system of MOTUS towers in Alberta (western Canada)

11. Rise and Fall of Northern Goshawks in the Central Appalachians: Is there reason for conservation concern in the Northeastern U.S.?

*David F. Brinker, Central Appalachian Goshawk Project, Maryland.
Email: dfbrinker@verizon.net

Abstract - During the late 1800s Northern Goshawks (*Accipiter gentilis*) were driven to near extirpation in the Northeastern U.S. by excessive timber harvesting and persecution as a robber of game. Over the past 50+ years, as the forests recovered and human attitudes changed, the goshawk population increased and the breeding range expanded back southward into West Virginia. Since 1994, the Central Appalachian Goshawk Project has monitored 177 goshawk nesting attempts, banded 81 nesting adults, and investigated winter movements of breeding adults from NW Pennsylvania down the Appalachian Mountains into the high country of West Virginia. The positive population trend and range expansion during the late 20th Century abruptly reversed in the 21st Century. Breeding Bird Atlas declines have been recorded in all Northeastern states that have completed second atlas projects. After recovering breeding range in Maryland and West Virginia, goshawks no longer breed south of central Pennsylvania. Eastern hawk watch data document the virtual cessation of irruptive movements and significant declines at most major sites, including the two lowest counts of goshawks at Hawk Mountain since establishment of routine counts in 1970. Banding data from nest sites show frequent reproductive failure and poor female survival vs. male survival. Possible factors causing the declining trend include changes in nest predation pressure, prey population decline and West Nile Virus.

12. Pinfeather Ecology: Applying our understanding of molt to migration science.

*Jeremiah Kennedy, University of Alberta. mail: jckennedy@ualberta.ca

Abstract - As banders we are given a unique set of opportunities and obligations. We get to see birds up close and discover details that few others have the chance to appreciate. Yet, we are responsible for making sure that the information we collect gets used in a meaningful way. Though we, as banders, suggest that migration monitoring research is important science, the data produced is not often used to its full potential. This is likely because of its inconsistent, and often questionable, quality. Here I will suggest three changes that can easily be applied to any banding program and could help to make migration monitoring data compatible at a national and global scale. These changes will be to (1) post-banding validation, (2) aging precision and (3) molt education.

13. Are all feathers equal when it comes to quill mites? Distribution of *Betasyringophiloidus seiuri* infesting Ovenbird (*Seiurus aurocapilla).*

*Alexandra Grossi, University of Alberta. Email: grossi@ualberta.ca

Abstract - Quill mites (Acariformes: Syringophilidae) are permanent parasites that live and reproduce inside the hollow calamus of feathers. They feed by using their long chelicerae to pierce the wall of the quill to reach the living tissues surrounding the base of the feather. When determining if a live bird is infested with quill mites, one is limited in the number of feathers that can be removed for examination; therefore, it is important to select feathers that have a high probability of being infested. Ovenbirds (Parulidae: *Seiurus aurocapilla* [Linnaues]) are host to the quill mite *Betasyringophiloidus seiuri* (Clark), which has been reported to inhabit 'flight feathers', but there is currently no information on the prevalence of infestation of individual flight feathers. We exhaustively examined the flight feathers from the wings and tail of 21 dead Ovenbirds for quill mites by dissecting each calamus and examining it using a dissecting microscope. Nine birds had at least one feather infested with mites. Of these, seven had only wing feathers infested, one had both wing and a single tail feather infested, and one had a single tail feather infested. The mean and range of mites per infested feather were 74 and 1-331. Within the wing feathers, primaries 1 and 2, and secondaries 1, 2, and 5 were infested with a prevalence greater than 20%. Of these feathers, primaries 1 and 2 and secondary 1 contained the highest intensities of mites. Therefore, to maximize the chance of finding *Betasyringophiloidus seiuri* in Ovenbirds we recommend removal of primary 1 or 2, or secondary 1.

14. **Photographs can emulate spectrophotometric measures of plumage hue of tree swallows as a non-invasive metric of pollution exposure.**
*Natalia Lifshitz and Colleen St. Clair, University of Alberta. Email: lifshitz@ualberta.ca

Abstract - Anthropogenic pollution causes habitat degradation for many species, but its effects on individuals can be difficult to detect until they result in the decline or disappearance of populations. Techniques to monitor the effects of pollution on wildlife usually include invasive sampling of expendable species, but a close link between individual condition and colouration of ornamental traits could make photography an alternative, non-invasive method that is suitable for species of conservation concern. We advanced such a technique by comparing color metrics (hue, saturation, and brightness) of the same tree swallows (*Tachycineta bicolor*) obtained via spectrophotometry and in-hand photographs, and, for different birds, determined whether a similar range of colour variation could be obtained with remote photography alone. We found that hue of tree swallows was moderately to highly correlated between techniques. On the contrary, saturation and brightness were uncorrelated, probably due to the structural properties of iridescent plumage and its dependence on the angle of light incidence. Plumage hue calculated from in-hand photographs was weakly related to exposure to environmental metals. Additionally, hue values measured using remote photography fell within the range of plumage hue obtained using spectrophotometry, while the colour references showed very low variation between photographs, even when taken on different days and under different illumination conditions. These results suggest that hue of iridescent plumage can be measured effectively with photography and potentially reflects metal pollution in bird diets. Remote photography offers similar promise for consistent measurement of hue provided photographs can be properly calibrated. Our study extends the suggestions by several previous authors that ornamental colouration could provide a non-invasive tool for assessing pollution exposure in birds while advancing tools for achieving that goal using remote cameras.

15. **Long-term monitoring of boreal bird community at Calling Lake Alberta, 1993-2018 and counting.** *Lionel Leston, Department of Biological Sciences, University of Alberta. Email: llestonraptor@live.com

Abstract - The boreal bird community has been monitored every year from 1993 to the present day within the Calling Lake Fragmentation Study. This long-term study is a partnership between Alberta-Pacific Forest Industries Inc. and the University of Alberta. Established in 1993, and encompassing ~120 sq. km of older, mixedwood forest, the core experiment involved the use of harvest to create forest fragments 1, 10, 40, and 100 hectares in size in 1994, either completely isolated by surrounding harvest units, or left connected by riparian forest corridors to unharvested forest. Control sites were established in an extensive tract of unharvested forest within the study area. Over 26 years, we have studied short-term and long-term effects of harvest, forest recovery after harvest, insect outbreaks that may affect resources and reproductive success, and weather events that may affect survival and future abundance. With the development of GIS techniques for summarizing yearly environmental changes and new techniques for analyzing repeated visits to each station across many years, the Calling Lake study will allow us to predict how the boreal bird community will change with global warming.

16. Influence of audio lure during spring and fall migration in southwestern Alberta.

*Cyndi M. Smith and Peter Achuff, Calgary Bird Banding Society.
Email: cyndi.smith9@gmail.com

Abstract - We compared the influence of different lengths of audio playback to no playback to attract migrating passerines during spring and fall in southwestern Alberta in 2014. The short audio playback was started 1.5 hours before sunrise while the long audio playback was started 4.5 hours before sunrise. The audio was played in an endless loop until nets were closed six hours after sunrise, weather permitting. During both spring (27 days) and fall (30 days) migration periods we captured significantly more birds on days when we played the audio lure than on silent days. During spring migration, the short audio was equally as good at attracting birds as was the long audio, whereas during fall migration, the long audio attracted more birds than the short audio. However, there were differences among species and age and/or sex classes. Overall, using a short audio lure seems to be an acceptable compromise between increasing capture rates and early landfall, which may affect behaviour or flight resources.

17. Differential migration of Yellow Warblers and Least Flycatchers across southern Canada.

*Emily Grose, Geoff Holroyd, and Richard Krikun. Beaverhill Bird Observatory.
Email: education@beaverhillbirds.com

Abstract - Many species of passerines exhibit differential migration between sexes and age classes and a wide range of hypothesis exist attempting to explain this phenomenon. For example, differential migration may be advantageous due to intrasexual competition for mates and territories or perhaps larger individuals (usually males) can tolerate a wider range of environmental conditions present at the breeding grounds which allows them to set-up breeding territories before the females arrive. Factors such as these and among others are possible explanations for differential migration. For the purpose of this study, we examined possible differential migration patterns of the Yellow Warbler (*Dendroica petechia*) and the Least Flycatcher (*Empidonax minimus)* from 1992 to 2000. Both species are commonly captured and observed at the Beaverhill Bird Observatory. Yellow Warblers exhibit differential migration patterns between sexes in the spring, as male Yellow Warblers are on average caught 4.3 days before females, but in the fall both sexes of Yellow Warblers and Least Flycatchers migrate synchronously. However, HY flycatchers migrate later than AHY. We compare the differences at BBO to those at easterly observatories. The need to continue to investigate when other species of passerines are arriving at the wintering grounds as well as the breeding grounds and if there is a differential migration pattern between sexes, age classes, or both. The continued study of these trends during both spring and fall migration is necessary to be able to determine the causes.

18. Tree Swallows of Beaverhill Lake – 35 years of change and their annual migrations.

*Geoff Holroyd (Beaverhill Bird Observatory), Helen Trefry (BBO), Ryan Norris, (University of Guelph) and David Bradley (Bird Studies Canada).
Email: chair@beaverhillbirds.com

Abstract - The Beaverhill Bird Observatory has studied and monitored nesting Tree Swallows on the south shore of Beaverhill Lake since 1984. Swallows at this site have the largest clutches and broods of anywhere in North America. Drying of the lake and climate change in the past 30 years have resulted in later egg laying and smaller broods. Other threats come from our use of neonicotinoids, a persistent insecticide that kills aquatic insects, a major food of Tree Swallows. Recent research using geolocators has revealed other parts of their annual life cycle. We recovered 24 geolocators providing valuable insight into post-breeding dispersal, migration and wintering grounds around the Gulf of Mexico. Despite declines elsewhere, Beaverhill Lake's swallows continue to prosper.

19. Projects Owlnet & SNOWstorm: The power of collaborative bird banding.

*David F. Brinker, Natural Heritage Program, Maryland Department of Natural Resources.
Email: dave.brinker@maryland.gov

Abstract - Conceived from simply thinking "outside the box", Project Owlnet and Project SNOWstorm have radically changed what is known about Northern Saw-whet Owls (*Ageolius acadicus*) and Snowy Owls (*Bubo scandiacus*). Keeping pace with changes in technology, harnessing the power of collaboration, and embracing crowd funding were essential to the success of the projects. In today's connected world, working together produces powerful results that single individuals could never accomplish. Northern Saw-whet Owls are now the most banded owl in North America. These banding data present many opportunities to improve our understanding of life history of these little owls. From a simple start, Project SNOWstorm has grown into the largest Snowy Owl telemetry effort in the world. Cross discipline collaboration was key to this success. Overviews of the two projects and their results will be used to illustrate the power of collaboration in bird banding and migration research. Thinking big and working together are essential to maximizing what is learned from bird banding projects.

20. Twelve years of owl banding in the Nisbet Forest of Saskatchewan.

*Harold Fisher. Email: fisher@skyvelocity.ca

Abstract - During the last 12 years we have carried out a study of Northern Saw-whet Owls (*Aegolius acadicus*) in the Nisbet Forest of Saskatchewan. Our study has been expanded to include Boreal Owls (*Aegolius funereus*) and Long-eared Owls (*Asio otus*) once we found that these species were present in the study area. Capture methods using mist nets and audio lures were implemented for these 3 species during autumn and spring migration periods. Nest boxes for the *Aegolius* species were constructed and placed throughout the study area and monitored during the breeding season.

21. 10,000 Owls.

*Siobhan Darlington and David Bell, Rocky Point Bird Observatory. Email: darling@uvic.ca

Abstract - 2019 marks the 25th anniversary of Rocky Point Bird Observatory's migration monitoring project, but in many ways, the Northern Saw-whet Owls have stolen the spotlight. A project started by Paul Levesque in 2002 to test if owl monitoring at RPBO had any potential, has turned into one of the most productive sites in North America. In 2019, RPBO is on track to band it's 10,000th Northern Saw-whet Owl since the beginning of the project. RPBO banders Siobhan Darlington and David Bell will take you through the project's history, results and potential areas for investigation.

22. Evidence of partial migration: encounters of Northern Saw-whet Owls from Banding Stations in Alberta and Saskatchewan.

*Lisa Takats Priestley and Chuck Priestley, STRIX Ecological Consulting.
E-mail: lisa@strixeco.ca

Abstract - Movements of banded Northern Saw-whet Owls (*Aegolius acadicus*) have been monitored extensively during spring and autumn in eastern North America and re-encounter data indicates that Saw-whets migrate in a north-south direction in the east. Since 2002, researchers have banded over 10,000 Saw-whet Owls during autumn at 10 migration-monitoring stations between 2002 and 2019 in Alberta and Saskatchewan, Canada. The first in Alberta began in 2002 at Beaverhill Lake (Beaverhill Bird Observatory), then Bragg Creek in 2003 (Calgary Bird Banding Society), Lesser Slave Lake Bird Observatory and Pletz Park near Millet (H. Pletz) in 2004, North Ministik in 2014 (L. Priestley and C. Priestley), and some banding near Grande Prairie (M. Russell); in Saskatchewan, Matador in 2003, Last Mountain Lake National Wildlife Area (R. Dickson), Langham (M. Blom) and North Saskatoon (M. Stoffel) in 2004, Edenwold in 2006 (J. Clarke) and Nisbet Forest north of Prince Albert in 2007 (H. Fisher). Re-encounters of banded Saw-whets appear to be common in regions where banding effort is high. For example from 2002-2007, 61 band encounters were reported from these stations. We present re-encounter data from 2002 through 2019 which shows Saw-whet Owls in Alberta and Saskatchewan employ more than one movement strategy during the non-breeding season, including migrating, overwintering in the region, and possible nomadism. This suggests the species in is a variable partial migrant in these two prairie provinces. We thank all the staff and volunteers that have worked at the banding sites. All contributors will be mentioned in the presentation. We will be working on publishing this update, and encourage interested researchers to co-author the paper as in the previous publication: Priestley et al. 2010 Journal of Raptor Research 44(4): 300-310.

23. What can we learn from patterns of owl movements using other species?

*Geoff Holroyd and Helen Trefry, Beaverhill Bird Observatory.
Email: chair@beaverhillbirds.com

Abstract – Migration and fidelity patterns of owls are highly varied. In this talk we will review our research on the migration and fidelity of Burrowing Owls and Short-eared Owl using satellite telemetry. We will compare those species to movement patterns of Peregrine Falcons and Whooping Cranes, and other species from the literature. We will compare these patterns to the information available on movements of Northern Saw-whet Owls.

24. Examining Timing in Banding Protocols of Northern Saw-whet Owls.

*Sara Pearce Meijerink, Beaverhill Bird Observatory. Email: biologist@beaverhillbirds.com

Abstract – Northern Saw-whet Owls (NSWO) have been researched by biologists and observatories in North America for over 20 years, yet no standardized North America banding protocols have been established regarding the set-up of nets, start times of banding, audio lure volume, duration of banding hours, or method of evaluating capture rate. This talk examines the protocol timings for banding NSWOs at the Beaverhill Bird Observatory (BBO) from the years 2012 to 2018. We compare start time of owl nets being opened 1 hour after sunset to 30 minutes after sunset, compare running mist nets for 4 hours to 6 hours to 7 hours in duration, and we examine the importance of using playback hours as a unit of measurement instead of net hours. Our data shows that a start time of opening mist nets 30 minutes after sunset is valid as owls are flying and being captured at that time. Running mist nets for 6 hours into the night is sufficient at the start and end of the banding season, but during the month of October, which is the peak in NSWO migration at the BBO, nets should remain open for 7 hours in order to fully document NSWO movements. Due to the fact that most migratory owl banding normally involves the use of an audio lure to attach the owls to the mist nets, using playback hours as a unit of measurement is most appropriate as it is the audio lure that is attracting the owls to the netting area. The number of owls caught is not directly proportional to the number of nets around the audio lure. The BBO encourages all biologists and observatories to examine their current NSWO banding protocols and urges them to work together to standardize our communal monitoring efforts for these small flying owls. Any comparisons between banding sites should take into account differences in the sampling timing and effort.

25. Lunar and weather effects influencing Northern Saw-whet Owl migration.

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Abstract - The Northern Saw-whet Owl (*Aegolius acadicus)* is a small nocturnal migrant found widespread across North America. In central Alberta, migration starts in early September, however, environmental factors that affect fall migration are not well understood. We used linear mixed effect models to identify significant migration factors. Data was collected from the Beaverhill Bird Observatory and the Elk Island National Park Weather Station between 2012-2014, and 2016-2017. We found precipitation, moon visibility, cloud cover and annual population fluctuations had the most profound impact on owl migrant capture rates. Less captures occurred during times of increased precipitation. Secondly, increased visibility, i.e. moonlight, reduces capture rates either due to predator avoidance, or increased mist net visibility. Thirdly, annual population fluctuations may be dependent on small mammal population oscillations. Future models may be able to project nightly migrant numbers based on precipitation, visibility, and regional population demographics.

26. Workshop on aging NSWO from photos – a review.

27. Symposium: How to sex Northern Saw-whet Owls.

28. Building the Project Owlnet Northern Saw-whet Owl sex determination guidelines.
*David F. Brinker, Natural Heritage Program, Maryland Department of Natural Resources. Email: dave.brinker@maryland.gov.

Abstract - While Northern Saw-whet Owls do not exhibit plumage dimorphism that can be used to determine sex, they are sufficiently sexually dimorphic in body size measures to permit assignment of sex to a portion of the population. Early attempts to establish sex criteria using wing chord measurements were eventually shown to be unreliable. In the 1990s Project Owlnet developed a two variable model to assign sex to saw-whet owls based on body mass and wing chord measurements for the most dimorphic individuals. Owls that weight less than 78 grams are males and those individuals that weight more than 93 grams are females. For owls between 78 and 93 grams the two variable model is 95% reliable after an unknown overlap zone was defined. Independent studies have tested the validity of the two value model and verified its performance. Development of the wing chord-body mass criteria for assigning sex to Northern Saw-whet owls will be summarized and reviewed.

29. Gender assignment of Northern Saw-whet Owls caught in central Alberta.
*Chuck Priestley, Jeremy Lambe, Darcy Visscher, Geoff Holroyd, and Lisa Priestley. Email: chuck@strixeco.ca

Abstract - Considerable controversy has surrounded the determination of sex of migrant Northern Saw-whet Owls (*Aegolius acadicus*). We determined the sex of 363 owls caught in autumns of 2004 and 2005 in central Alberta using DNA extracted from feathers. We evaluated field sexing criteria proposed by Weir et al. (1980), Buckholtz et al. (1984), and Brinker (2000) to determine error rates and sex ratios of birds in the unknown-sex class. Of the three sexing criteria, Weir et al. (1980) had the fewest incidents of incorrectly assigning owls as male or female (1.9%) and the most evenly distributed unknown-sex class sex ratio (42% male; 58% female). Brinker (2000) had the highest incidents of incorrectly assigning owls as male or female (7.4%); all incorrectly sexed owls were female and females comprised 90% of the unknown-sex class. We found that a discriminant function that used wing chord length and body mass as independent variables assigned the fewest owls incorrectly to either male or female sex class and had the smallest percentage of owls in the unknown-sex category than wing chord or body mass alone. Therefore, we generated a new table for assigning gender of Northern Saw-whet Owls using these two measures. We have tested these criteria with a 2018 sample using wing chord and mass data from known-sex Saw-whets caught at BBO. Additionally, we recommend that DNA sexing of Saw-whets caught in autumn be repeated in eastern North America to determine if size varies geographically.

30. Discussion and Close of Conference.

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