



Barred Owl // Chouette rayée (*Strix varia*). Photo: Charles Francis.

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Editors' Message

Rob Warnock and Barbara Bleho

Welcome to the final issue of *Picoides* in 2021. We hope everyone is having a good autumn and is continuing to be safe during the pandemic.

In Nicola Koper's latest President's Report, she discusses the success of the 2021 virtual conference with American Ornithological Society (AOS) in August, the recent activities of the Equity, Diversity, and Inclusion Committee and upcoming SCO-SOC fundraising activities. Her report is on page 2.

We encourage all eligible students to apply for the SCO-SOC student research awards. The student research awards notice is on pages 32-33. New nominations for the Huestis Speirs Award, the Jamie Smith Memorial Mentorship Award, the Early Career Researcher Award are now open. Nomination instructions and deadlines are in this issue and please submit nominations for these SCO-SOC awards.

In this issue, we have two plenary talk summaries from Early Career Researcher Award (ECRA) Symposium at the AOS/SCO-SOC Joint Meeting. These are from Ryan Germain (2021 ECRA recipient) and Barbara Frei (2020 ECRA recipient). We hope to have Mariana Villegas' (2021 Special ECRA recipient) plenary talk summary in the next issue.

Part four of the six-part series on Brown-headed Cowbird brood parasitism on the Canadian prairies by Spencer Sealy is in this issue. Thank-you Spencer for preparing this series! There is also an interesting article on current loon research by Doug Tozer. Also in this issue, mini-bios of the candidates for the upcoming SCO-SOC election (please vote!), a notice about the new *Birdography* book, two SCO-SOC award citations, a thesis abstract and the table of contents from the latest issue of *Avian Conservation and Ecology*. Check them all out!

The next *Picoides* deadline is February 15, 2022. We look forward to your next submission. Without submissions, there is no *Picoides*. We also welcome your feedback as it your publication and we wish everyone a safe, healthy holiday season and a Happy New Year.

FRANÇAIS—Message des éditeurs – Rob Warnock et Barbara Bleho

Bienvenue au dernier numéro de *Picoides* en 2021. Nous espérons que tout le monde passe un bel automne et que vous continuez de faire attention à vous pendant la pandémie

Dans le dernier rapport de la présidente, Nicola Koper évoque le succès de la réunion virtuelle 2021 avec l'American Ornithological Society (AOS) en août, les activités récentes du comité sur l'équité, la diversité et l'inclusion et les prochaines activités de collecte de fonds de la SCO-SOC. Son rapport se trouve à la page 2.

Nous encourageons tous les étudiant.e.s éligibles à postuler pour les bourses de recherche étudiantes de la SCO-SOC. L'avis concernant les bourses de recherche pour étudiants se trouve aux pages 32-33. Les nominations pour le prix Huestis Speirs, le prix commémoratif Jamie Smith et le prix de début de carrière en recherche ornithologique sont maintenant ouvertes. Nous vous invitons et encourageons à soumettre des candidatures pour ces prix SCO-SOC et les instructions et dates limites pour le faire se retrouvent dans ce numéro.

Dans ce numéro, nous vous proposons deux résumés des séances plénières du symposium pour le prix de début de carrière en recherche ornithologique (ECRA) qui ont eu lieu lors de la réunion AOS et SCO-SOC 2021. Il s'agit des résumés des séances plénières de Ryan Germain (lauréat ECRA 2021) et de Barbara Frei (lauréate ECRA 2020). Nous espérons avoir un résumé de la séance plénière de Mariana Villegas (lauréate du prix spécial ECRA 2021) dans le prochain numéro.

La quatrième partie de la série de 6 articles écrite par Spencer Sealy sur le parasitisme de couvées par le vacher à tête brune dans les prairies canadiennes se retrouve également dans ce numéro. Merci à Spencer d'avoir préparé cette série ! Il y a également un article intéressant écrit par Doug Tozer sur les recherches qui sont conduites actuellement sur le plongeon huard. Vous trouverez également

dans ce numéro des mini-biographies des candidat.e.s aux prochaines élections de la SCO-SOC (votez S.V.P !), un avis sur le nouveau livre *Birdography*, deux textes sur les récipiendaires des prix de la SCO-SOC, un résumé de thèse et la table des matières du dernier numéro d'Écologie et Conservation et des Oiseaux. Consultez-les tous !

La prochaine date limite pour soumettre des articles et autres matériels pour *Picoides* est le 15 février 2022. Nous attendons avec impatience votre prochaine soumission. Sans vos articles, il n'y a pas de *Picoides*. Nous vous invitons également à nous faire part de vos commentaires sur *Picoides*, car il s'agit de votre publication et nous souhaitons à tous un temps des fêtes en sécurité et en bonne santé et une bonne année.



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Message de la présidente

Nicola Koper

Alors que le long été que nous avons connu ici à Winnipeg a finalement laissé place à l'automne, je suis heureuse de revisiter les réalisations de la SCO-SOC des derniers mois.

Notre réunion virtuelle avec l'American Ornithological Society en août a été un grand succès. Bien que nous soyons tous fatigués de n'assister qu'à des réunions virtuelles ces derniers temps, le format virtuel a considérablement augmenté l'accessibilité de nos conférences. Plus de 1200 participants de 59 pays ont assisté à la réunion, dont beaucoup n'auraient pas pu y assister si elle avait été en personne. Les bénévoles présents à cette réunion se sont vus offrir l'adhésion à la fois à la SCO-SOC et à l'AOS, ce qui a permis à plus de deux douzaines de nouveaux membres de rejoindre la SCO-SOC, dont 10 nouveaux membres d'Amérique latine. Il est de plus en plus important de renforcer nos partenariats avec nos collègues d'Amérique latine, étant donné les besoins importants en matière de conservation des oiseaux migrateurs qui se reproduisent au Canada et passent l'hiver en Amérique latine, et nous sommes donc ravis d'accueillir ces nouveaux membres venus de loin. Lors de notre conférence, nous avons également eu droit à des séances plénières fantastiques de la part de nos conférenciers canadiens, Barbara Frei, Ryan Germain et Mariana Vilegas, tous lauréats du prix de « Début de carrière en recherche ornithologique » de la SCO-SOC, et d'Alice Boyle, conférencière invitée de la SCO-SOC en 2021 pour une séance plénière.

Au cours de la prochaine année, le principal objectif de la SCO-SOC sera d'accroître l'équité, la diversité et l'inclusion au sein de notre organisation et au sein de l'ornithologie au Canada. Notre comité de l'EDI a travaillé activement pour nous aider à atteindre cet objectif, et je suis sincèrement reconnaissante à Alana Westwood, Janet Ng, Cesar Estevo, Lesley Howes, Roxanne Chicalo et Leanne Grieves pour leur travail au sein de ce comité qui nécessite un grand investissement en temps. Le comité EDI a entre-autres réalisé un sondage auprès de nos membres pour évaluer la diversité et les besoins des membres de notre communauté. Leur rapport a été envoyé par courriel à nos membres en octobre.

Nos principales collectes de fonds en 2021-2022 auront toutes pour but de recueillir des fonds pour soutenir les initiatives de l'EDI, y compris un futur prix, des discussions de groupe, des ateliers et d'autres activités de sensibilisation et d'inclusion. J'attends avec impatience notre collecte de fonds d'hiver/vente aux enchères silencieuse, qui amènera plus d'opportunités de gagner des conférences, de l'artisanat et d'autres articles liés aux oiseaux - personnellement, j'espère avoir une autre chance de gagner cette conférence sur le kiwi. Nous aurons également une équipe SCO-SOC qui participera au Baillie Bird-a-thon au printemps prochain, comme autre collecte de fonds ; pour vous impliquer, envoyez un courriel à Amélie Roberto-Charron arobertocharron@gmail.com. Nous ferons d'autres annonces

concernant les collectes de fonds et les activités de l'EDI lors de notre assemblée générale en novembre, et dans le prochain numéro de *Picoides*.

Je vous souhaite le meilleur alors que la saison migratoire tire à sa fin et que nous entrons dans les mois plus sombres.

ENGLISH— President's Message – Nicola Koper

As the long summer we've had here in Winnipeg has finally turned to fall, I'm happy to reflect on the accomplishments of the SCO-SOC over the last few months.

Our virtual joint meeting with American Ornithological Society in August was a significant success. Although we are all tired of attending nothing but virtual meetings these days, the virtual format has significantly increased access to our conferences. More than 1,200 attendees from 59 countries attended the conference, and of course, many of those individuals could not have attended an in-person meeting. Volunteers at this meeting were offered membership in both SCO-SOC and AOS, and this led to more than two dozen new members joining SCO-SOC, including 10 new members from Latin America. Increasing our partnerships with colleagues from Latin America is becoming more and more important, given the significant conservation needs of migratory birds that breed in Canada and overwinter in Latin America, so we are delighted to welcome these new members from afar. At our conference we also had fantastic lectures from our Canadian plenary speakers, Barbara Frei, Ryan Germain, and Mariana Vilegas, all SCO-SOC Early Career Research Award winners; and Alice Boyle, SCO-SOC's invited plenary speaker for 2021.

The main focus of SCO-SOC for the next year will continue to be increasing equity, diversity, and inclusivity within our organization, and in ornithology in Canada. Our EDI committee has been actively working to help us achieve this goal, and I'm sincerely grateful to Alana Westwood, Janet Ng, Cesar Estevo, Lesley Howes, Roxanne Chicalo, and Leanne Grieves for working on this time-consuming committee. Among other activities, the EDI committee completed a survey of our membership to assess diversity and the needs of our community members. Their report was emailed to our members in October.

Our main fundraising drives in 2021-2022 will all be to raise money to support EDI initiatives, including a future award, panel discussions, workshops, and other outreach and inclusion activities. I'm looking forward to our winter fundraiser/silent auction, with more opportunities to win donated guest lectures, crafts, and other bird-y items – personally, I'm hoping to get another chance to win that kiwi lecture. We will also have an SCO-SOC team participating in the Baillie Bird-a-thon in the spring, as another fundraiser; to get involved, email Amélie Roberto-Charron arobertocharron@gmail.com. We will make further announcements about EDI fundraisers and activities at our AGM in November, and in the next issue of *Picoides*.

All the best to you as we move out of migration season and into our darker months.

Student contributions wanted for *Picoides*!

SCO-SOC encourages students to submit material for *Picoides*. In particular, we would like each issue to feature abstracts of at least one or two recently published theses. They must be from students at a Canadian university, but need not necessarily focus on Canadian birds. Abstracts should be 250-400 words long, preferably accompanied by one or two relevant photos.

We also welcome articles describing aspects of student research in greater detail; these should focus on a subject relevant to Canadian ornithology, require references, and may be up to 1,000 words long, again preferably accompanied by one or two photos. See page 31 for submission details.

SCO-SOC Council Election Candidates

Please vote for candidates for positions on the SCO-SOC Council by following the link that will be emailed out to you. // Veuillez voter pour les candidats à des postes au sein du Conseil SCO-SOC en ligne en suivant le lien qui sera envoyé par courrier électronique.

SARAH GUTOWSKY - COUNCILLOR

My name is Sarah Gutowsky and I'm from Halifax, Nova Scotia. Currently, I am a Postdoc Research Fellow at Acadia University, where I am conducting research on Common eider (*dresseri*) in partnership with Ducks Unlimited Canada and Environment & Climate Change Canada under the Mitacs Accelerate program. Our research is two-fold, examining drivers of long-term trends using a suite of monitoring and environmental data as well as investigating various aspects of movement ecology through biologging. The birdy road that led me to my current status as a Canadian ECR in the field of Ornithology has been windy and wonderful to say the least. I have been incredibly fortunate to meet and work with a wide range of folks from coast to coast to coast in Canada over the past 15 years working on projects covering a broad scope of families and habitats. Throughout that time, the SCO-SOC has inspired me through ACE, Picoides, and conferences, and has supported me via a number of awards early in my career. I've also been mentoring and teaching Ornithology at Dalhousie University for the past 8 years and have watched countless students discover and fall in love with birds, ultimately finding some connection themselves to the SCO-SOC. I'm grateful to have this centralized professional society for both myself and my students to look to. I finally feel I've amassed enough experience to be in a position to give back to our community and connect with Canadian colleagues in a more formal capacity as a Member of Council. My intention would be to contribute by serving on awards committees, working toward the development of inclusivity policies and opportunities for mentorship for students and ECRs, and serving in any other capacity as needed.



Sarah Gutowsky holding an Atlantic Puffin. Photo courtesy of Sarah Gutowsky.



Ann McKellar. Photo courtesy of Ann McKellar.

ANN MCKELLAR - COUNCILLOR

I am a Research Scientist with Environment and Climate Change Canada and Adjunct Professor at the University of Saskatchewan. I have over 12 years of experience planning, implementing, and overseeing research and monitoring programs for wild birds. In my current role, I specialize in the research and conservation of migratory birds in prairie ecosystems. I have a particular interest in using new technologies (drones, light-level geolocators, satellite tags, Motus Wildlife Telemetry) to track and monitor migratory birds. I am a past recipient of SCO-SOC's Taverner Award and have enjoyed being a member and attending meetings since my PhD (2008-2012), where I studied American Redstart demographics under the supervision of Dr. Laurene Ratcliffe and Dr. Pete Marra. I now supervise students who are members of the SCO-SOC, and I would love to increase my involvement and take a more active role in contributing this great society which has had such a positive impact on my career.

BETH MCDUGALL SHACKLETON – MEMBERSHIP SECRETARY

Research in my lab addresses the evolutionary ecology of migratory songbirds. We test hypotheses about mate choice, communication, immune defence, personality, migration and dispersal, all through the lens of host-parasite interactions. Much of our work focuses on a population of song sparrows breeding near the Queen's University Biological Station, which my students, collaborators and I have colour-banded and monitored for nearly 20 years. When I'm not in the field, I teach evolution, behavioural ecology and first-year biology at Western University.



Beth McDougall Shackleton. Photo courtesy of Beth McDougall Shackleton.



GREG MITCHELL – RECORDING SECRETARY

I am a Research Scientist with the Wildlife Research Division of Environment and Climate Change Canada at the National Wildlife Research Centre in Ottawa, Ontario, Canada. I am also an Adjunct Professor in the Biology Department at Carleton University. My research focuses on determining the drivers of population declines in birds and Species-At-Risk in human dominated ecosystems in southern Canada. I have a particular research interest in migration and stopover ecology. I also currently sit as the Canadian Co-chair (Federal Representative) on the Tri-national Monarch Conservation Science Partnership.

Greg Mitchell. Photo courtesy of Greg Mitchell.

JUNIOR TREMBLAY - TREASURER

Dr. Tremblay completed a bachelor's degree in biology and a master's degree in forestry at Laval University in 2002 and 2004 respectively. His master thesis was entitled: "Passive restoration of second-growth mixed balsam fir forests: An alternative for the conservation of old-growth mixed balsam fir forests". Subsequently, he completed a Ph.D. at the University of Quebec at Chicoutimi from 2004 to 2009, entitled: "The nesting ecology of the black-backed woodpecker in unburned boreal forest". Since 2013, Dr. Tremblay is a research scientist at Environment and Climate Change Canada (ECCC) and his research program aims to understand the potential impact of natural and anthropogenic disturbances and climate change on habitat selection and demographic parameters of boreal forest birds in an annual life history context, with a particular interest in species at risk.



Junior Tremblay. Photo courtesy of Junior Tremblay.

Early Career Researcher Award Symposium at the AOS/SCO-SOC Joint Meeting in August 2021

Dorothy Hill, outgoing Chair SCO-SOC ECRA Committee

I can think of no better way to finish my term as an SCO-SOC Council member and Chair of the Early Career Researcher Award (ECRA) Committee than having the honour of hosting SCO-SOC's ECRA Symposium at the AOS/SCO-SOC Joint Meeting in August 2021. Since its inauguration in 2017, the Early Career Researcher Award has been presented annually to an early career professional for outstanding contributions and leadership potential to Canadian ornithology. In 2021 we also presented a Special award to an early career professional who has made outstanding contributions to South American, Central American, Mexican, or Caribbean ornithology. The 90-minute symposium featured three ECRA recipients: Dr. Barbara Frei, 2020 recipient; Dr. Ryan Germain, 2021 recipient; and Bolivian ornithologist Dr. Mariana Villegas, our Special ECRA recipient. I cannot thank these exceptional ornithologists enough for making our symposium a huge success! I also want to thank my fellow committee members, Andy Horn, Tony Gaston, Steve Wilgenburg and in-coming Chair Danielle Ethier, and the Special award committee, Letícia Soares and Greg Mitchell.



Mariana Villegas. Photo supplied by Dorothy Hill.

2020 Early Career Researcher Award Research Synopsis – Barbara Frei

I feel greatly honoured to have received the 2020 ECRA from SCO-SOC. It was my privilege to share my experiences as a conservation biologist broadly working on migratory birds in a rapidly changing world, my role as a scientist in the public service, and share some pebbles (not quite pearls) of wisdom to the graduate students in the (virtual) room.

At the tender age of five, I first told my parents of my humble goal - to become a scientist and help save the world. While the *where* and *how* I would achieve this feat fluctuated over the years, the goal, in some parts, has always remained the same. Drawn to working with species-at-risk, I pursued my graduate studies at McGill University on two threatened bird species, the Bobolink (MSc) and the Red-headed Woodpecker (PhD). Working with species that are almost entirely dependant on human-modified landscapes, I explored multi-scale habitat use, nestling growth rates and nest success, community associations with invasive species, and fecundity as a driver of population dynamics. Beyond the research, I grew increasingly interested and involved in two additional (in my mind) critical components of conservation science: scientific communication and policy. Working in the agricultural landscapes of Quebec and Ontario gave me a growing appreciation of the need to work with, and listen to, various stakeholders.

After completing my PhD, I felt capable and sure of myself as a field ecologist and ornithologist, but more confused and frustrated than ever as a conservation biologist. The ‘wicked’ problem of conserving nature while balancing human needs gave me pause. Humans and nature have had a long-standing, tumultuous relationship in the history of conservation biology. I felt the distinct need to change from a species-centric view in which humans were painted dually as both nature’s antagonist and savior, to a more multi-layered, multi-faceted relationships of human’s dependence on, and role within, nature. I wanted to change the conversation, to put people’s well-being and nature conservation on the same side of the table. I evolved my research focus from a purely ecological viewpoint, to applying a social-ecological lens, and using the framework of ecosystem services to quantify the multifunctionality of a landscape. Using



Barbara Frei with Pileated Woodpecker (*Dryocopus pileatus*).
Photo courtesy of Barbara Frei.



Bobolink (*Dolichonyx oryzivorus*). Photo courtesy of Barbara Frei.

a ‘bright spots’ approach, I searched out areas that exceeded expectations for ecosystem services multifunctionality across a large agricultural landscape in southern Quebec. By exploring patterns of multifunctionality bright spots over time and space, and how they related to multiple measures of diversity, I found that areas growing more multifunctional over time are also growing more biologically and agriculturally diverse. This research highlighted the solutions that were already present in the real world, that it was feasible to have complementary goals for food security, resilient landscapes, and conserving biodiversity.

The most drastic and challenging aspects of our changing world migratory birds face is climate change. Changes in the phenology of migrating birds, or lack thereof, in consequence of a changing climate have distinct implications for the success, survival, and management of migratory birds worldwide. While there is ample evidence on the

influence of climate change on spring bird migration, fall migration remains understudied in climate change research, despite its ecological and socioeconomic importance. As a public service scientist with Environment and Climate Change Canada, understanding how and why waterfowl migration is changing is critical for the effective planning and management of a species group with vast ecological and cultural significance. Using 45-years of community-science the St-Lawrence Lowlands of Quebec, I have found that six out of 12 species of waterfowl have significantly delayed their timing of peak migration, a shift ranging from a one week to over a month delay over the 45-year time period. Lagged climate at species-specific scales ranging from 50 – 1,000 km north of their stopover sites significantly explained changes in migration phenology. Using 60 years of banding and harvest encounter data for three waterfowl species banded in the Canadian prairies demonstrated spatio-temporal shifts in fall migration for ducks over time. This includes short-stopping (i.e., birds shortening their fall migration and remaining further north) and shifts between flyways. Further linking these changes to climate can

serve as a powerful tool for the communication of the effects of climate change to important stakeholder groups such as waterfowl hunters in the southern U.S.

Lastly, if I could go back in time and share my pebbles of wisdom with myself, here are my top six pieces of advice:

1. *Communication is half the battle (if not more) in science.* From sharing your findings clearly with your peers, to the moral and ethical obligation as scientist to disseminate our work broadly, communication is key.
2. *You will learn more from failing than from easily succeeding.* You will not be at the pinnacle of your research success during your graduate studies – nor should you be! Your thesis is your journey, not your end point.
3. *Trust your instincts and follow your passion.* Science can be tough, embracing the things you love about science, whether it is communication, the artistry, the education, or the outreach, don't be shy to continue with what you love and what makes you excited to get up in the morning and be a scientist.
4. *Play to your strengths – but strengthen your weaknesses.* Now is the time to explore new skills – identify what skillsets you may need for your dream position and work on those (if that scares you remember pebble # 2).
5. *Choosing where to go? Think Place, People, Project – and in that order.* You can do good, robust, worthwhile science in almost any project. Don't forget to consider where and who with you will be spending your next 2-4 years. Choose the environment that is right for you.
6. *Prioritize your health and happiness.* This won't mean there won't be hard and tough times. But healthy and happy people do better and more sustainable science.

Unlocking the past to help predict the future: Genomic data reveal traits mediating sensitivity of avian demography to past climate change

Ryan Germain, University of Copenhagen

Human-induced climate change is affecting global biodiversity at an alarming rate. Determining how contemporary populations will respond to climate change in the near future requires understanding the demographic history of species over evolutionary time scales of intense global climate fluctuations. Modern genomic tools allow for unprecedented insight into the demographic history of species via patterns of historical recombination events. Such molecular 'log books' reveal changes in effective population size (N_e) over thousands-to-millions of years (Figure 1) that can be cross-referenced with paleo-climate records (Figure 2) to infer demographic change during periods of abrupt climate warming or cooling.

In this talk, Ryan described his ongoing postdoctoral work where he uses full-genome sequence data from over 200 bird species (representing all major avian families) to identify common demographic responses to climate fluctuations over the past one million years. He further detailed how this work allows for testing a suite of species-specific traits to identify those associated with demographic sensitivity to past climate change, with the aim of determining the role of life-history variation in adapting to changing environments. The ultimate goal of Ryan's research is to describe the key morphological and life-history traits most likely to dictate population responses to current climate warming and help direct conservation efforts towards species more sensitive to such broad-scale environmental challenges.

Ryan's talk also described the importance of incredible mentors in shaping how he approaches asking questions about the natural world, and his grateful thanks to the SCO-SOC in supporting his growth as an ornithologist.

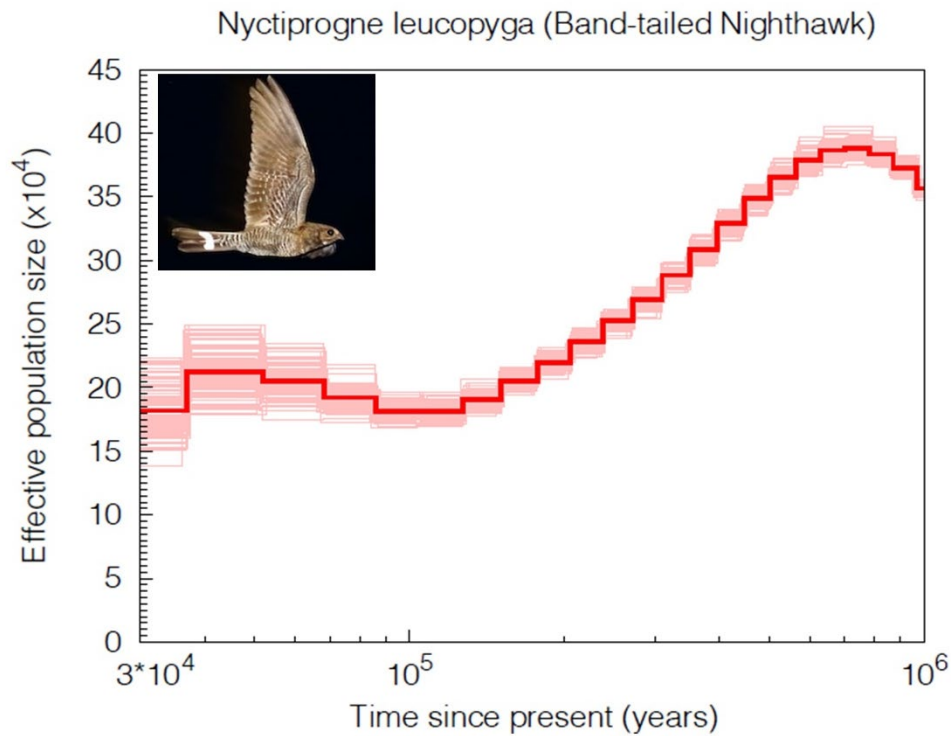


Figure 1: Example of Pairwise Sequential Markovian Coalescent (PSMC) analysis, reconstructing the demographic history of a given species over the past one million years.

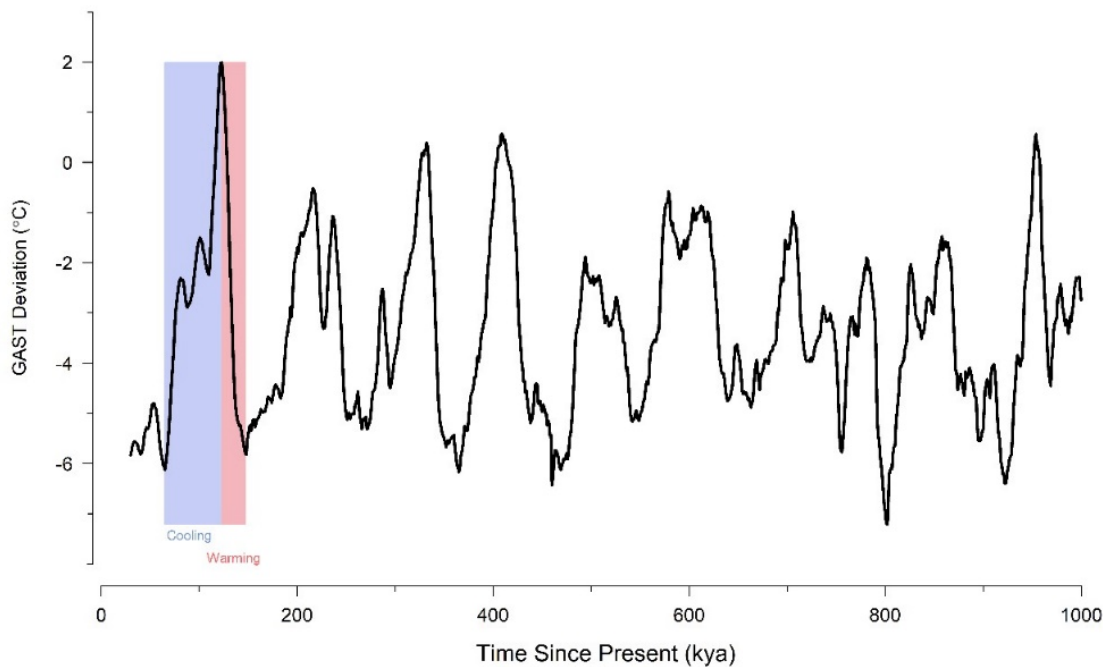


Figure 2: Estimated deviation of global average surface temperature (GAST, °C) from present levels. Blue and red bars depict periods of abruptly increasing (Warming) and decreasing (Cooling) temperatures, respectively.

2021 Jamie Smith Memorial Award Recipient – Kathy Martin

The Jamie Smith Memorial Award for Mentoring is one of the top honours of the Society and recognizes individuals who have made exceptional contributions to the fledging of new generations of Canadian ornithologists. Nominees are ranked based on their commitment to fostering achievement among their students and peers and demonstrating the importance of mentoring in their professional life. On behalf of the Jamie Smith Committee, who also consisted of Andrea MacLeod and Oliver Love, I am pleased to announce that this year's award is being presented to Kathy Martin. The following summary has been written by Kristina Cockle, a former student of Dr. Martin, and we are grateful for her summary of some of Dr. Martin's lengthy career.

-Kyle Elliott, Chair of Jamie Smith Committee

If you've ever been in the field with Kathy Martin, you'll know she's about the best mentor and field-collaborator you could ask for: up before dawn to boil the cowboy coffee, first into the swamp, curious, observant, insightful, generous, patient, attentive and intentional in her role as a mentor, and ready to chase the chickens out of the house when she gets back to camp. Among my students and park ranger friends in Argentina, she's famous for setting the pace through deep flooded grasslands, clinging one-handed to the roof of a moving pick-up while spotlighting nightjars along a bumpy track, and then driving that same stuck truck out of a treacherous, cactus-ringed mudhole during a 200-mm rainstorm. Across the global scientific community, she is highly respected for her mentorship of multiple generations of scientists, including 35 graduate students and 20 post-doctoral fellows, resulting in over 125 co-authored publications, especially on community ecology of cavity-nesters and life-history of alpine birds. Importantly, Kathy's mentorship



extends well beyond grad school, as she helped many of us to secure and excel in faculty and government positions in Canada, the USA, Europe and Latin America, and helped build and cement our current networks of collaboration across hemispheres.

As a Research Scientist at Environment and Climate Change Canada (1993–2020); professor at the Universities of Sherbrooke (1988–1989), Toronto (1989–1992) and British Columbia (1993–present); editor for several journals; and most recently president of the American Ornithological Society, Kathy has worked consistently to increase the representation and inclusion of women in ornithology. At the system scale, she does much of the behind-the-scenes legwork to ensure women are recognized at conferences and included in leadership roles. On a more personal scale, she facilitates collaborations (and friendships) among women ornithologists,

and helps all her mentees to maintain their research programs while juggling career and family responsibilities. Jamie Smith continues to impact colleagues through Kathy, as she imparts select “Jamie words of wisdom” when occasions arise. I know I can always count on Kathy for a candid appraisal of situations and sage advice on moving forward as I face major career decisions, navigate new institutions and professional relationships, and mentor my own students.

-Kristina L. Cockle, Research Scientist, Instituto de Biología Subtropical-CONICET-UNaM, Puerto Iguazú, Argentina

2021 Student Research Award Recipients

Récipiendaires des bourses de recherche étudiante 2021

Continuation from the June 2021 issue of Picoides, which featured the other recipients. // Suite du numéro de juin 2021 de Picoides, qui présentait les autres récipiendaires.

Ryan Leys – Taverner Award // Prix Taverner

I am an MSc candidate in biology at the University of Waterloo and am studying the use of nocturnal heterothermy (lowered body temperature at night) in small migrating birds using temperature-sensitive PIT tags. I am exploring how reduced body temperature at night is related to the ambient temperature the birds experience during migration and what energy savings can result from using this migratory strategy. My focus is on Ruby-crowned and Golden-crowned Kinglets (*Corthylio calendula* and *Regulus satrapa*), Brown Creepers (*Certhia americana*), and Yellow-rumped Warblers (*Setophaga coronata*).

Je suis un étudiant à la maîtrise en biologie à l'Université de Waterloo et j'étudie l'hétérothermie nocturne (baisse de la température corporelle la nuit) chez les petits oiseaux migrateurs à l'aide de transpondeurs passifs intégrés sensibles à la température. J'étudie l'influence de la température ambiante lors de la migration sur la réduction de la température corporelle la nuit et les économies d'énergie qui peuvent résulter de l'utilisation de cette stratégie migratoire. Je me concentre sur les roitelets à couronne rubis et à couronne dorée (*Corthylio calendula* et *Regulus satrapa*), les grimpeaux bruns (*Certhia americana*) et les parulines à croupion jaune (*Setophaga coronata*).



Ryan Leys holding a Red-tailed Hawk (*Buteo jamaicensis*) he banded at Hawk Cliff, ON. Photo courtesy of Ryan Leys.

// Ryan Leys avec une buse à queue rousse (*Buteo jamaicensis*) qu'il a baguée à Hawk Cliff, Ontario. Photo gracieuseté de Ryan Leys.

Feature Articles and Reports

Loon Research takes Flight

An update on recent developments in Common Loon science¹

Doug Tozer²

New information that packs a punch surfaces infrequently in ornithology. We go along thinking we know and understand this species or that ecosystem, and then “wham,” all of a sudden some new book, series of papers, or report comes out that says differently.

This is indeed what has happened over the past year or so in loon science and research. A landmark book on loon natural history, evolution, and conservation was written; a series of game-changing scientific papers came out; and Birds Canada released a report entitled *Canadian Lakes Loon Survey: Celebrating 40 Years of Conservation, Research, and Monitoring*.

¹ A version of this article appears in the October 2021 issue of *OFO News*, the newsletter of the Ontario Field Ornithologists.

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As a result, our knowledge of loons, especially Common Loons, and the information available to us on loons has recently increased by leaps and bounds. Much of the new information is directly relevant to Canada's loons, so in this article I give an update on the developments and I describe where to find more information.

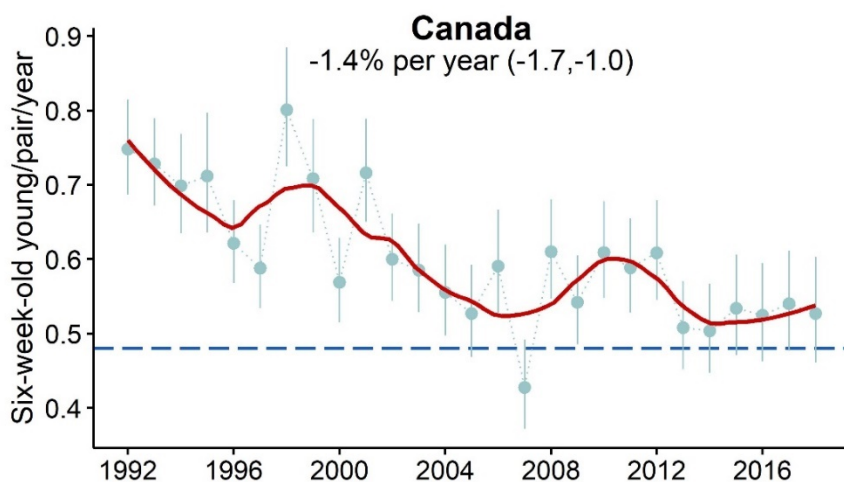
For decades, the authoritative source of information on the Common Loon was by far Judith McIntyre's *The Common Loon: Spirit of the Northern Lakes*. This epic book, which was published in 1988, is still a wonderful, accurate, and very detailed compendium on most aspects of loon ecology and conservation.

But now we can add an exciting new second volume to the "absolutely-must-read" list for serious loon watchers and lovers. This past summer, James Paruk, a long-time loon researcher and world authority on loons, released *Loon Lessons: Uncommon Encounters with the Great Northern Diver*. The book is a very engaging and entertaining read that, in part, essentially updates McIntyre's *Spirit* by describing first-hand many of the exciting scientific discoveries made in loon research since that time.

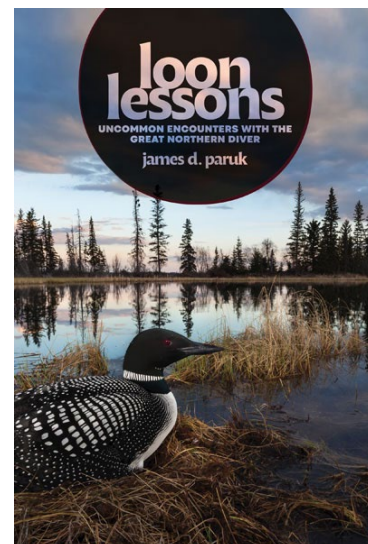
The past year has also seen a flurry of heavyweight scientific papers on loons. One of them used data collected by the Canadian Lakes Loon Survey of Birds Canada to document the shocking result that Ontario's Common Loons are raising fewer chicks to independence now than they did 4 decades ago! The same declining pattern in Common Loon productivity is also occurring across most of southern Canada.

This trend is monumentally important because declines in Common Loon productivity have been formally documented in only one other study, focused on a single county in northern Wisconsin. This supporting study is extremely important, but without the dedication of many thousands of Loon Survey volunteers, many of whom are SCO-SOC members (thank you!), we would have no idea that the Common Loon is in trouble across such a wide area!

Of course, the "million-dollar" question is why is loon productivity declining? To help answer this burning question, Birds Canada scientists again used data from the enormous Canadian Lakes Loon Survey database in the biggest study of its kind to date to test the influence of



Common Loon productivity has declined across southern Canada by 1.4% per year since the early-1990s, which equates to a drop of 20% over all of the years in the period. Circles are annual values; vertical lines are 95% confidence intervals; values in parentheses are lower, upper 95% confidence limits; solid line is a smoothed line of best fit showing overall trend; horizontal dashed line is an estimate of the productivity needed to maintain a stable breeding population (0.48 six-week-old young/pair/year). Source: Canadian Lakes Loon Survey, Birds Canada.



Published by University of Minnesota Press, *Loon Lessons* is especially notable for presenting new information on why Common Loons are the way they are, or behave the way they do, and for including loads of information on recent discoveries on their wintering grounds. These topics are not covered in an accessible way in any other source. Photo: University of Minnesota Press.

over a dozen different factors on loon productivity. The analysis suggests that a complex interplay between past damage from acid rain, mercury pollution, and increasingly potent climate heating may be at least partly to blame for the loon productivity declines across Ontario and beyond. The authors dub this the "acid-mercury-climate hypothesis" and they are pursuing research to further test if it has merit. Doing so will provide much needed guidance on what to do next to best conserve this impressive symbol of pristine Canadian wilderness.

For a clear and engaging overview of the potential reasons behind the declines, I encourage you to read the *Loon Survey 40-year Report* available online at birdscanada.org/loons. The report also describes productivity trends across southern Canada and has ample information on how to help conserve loons and lakes. Together with Jim Paruk's *Loon Lessons*, these two sources give an excellent overview of the recent

developments in Common Loon science. And for the more technically savvy, I suggest a perusal of the underlying scientific papers for further details.

Because let's face it: without the haunting cry of a loon from a distant lake, the northern woods would just feel wrong, and not nearly as enjoyable and relaxing. And something very special would be missing from the migration, stop-over, and wintering sites that we love birding so much.

Further reading: below is a list of recent scientific papers that have major ramifications for the conservation of Common Loons in Canada. If you wish to read these papers in full, but require assistance accessing them, please contact dtozer@birdscanada.org.

- **Bianchini, K., D.C. Tozer, R. Alvo, S.P. Bhavsar and M.L. Mallory.** 2020. Drivers of declines in Common Loon (*Gavia immer*) productivity in Ontario. *Science of the Total Environment* 738:139724.
<https://doi.org/10.1016/j.scitotenv.2020.139724>
- **Bianchini, K., R. Alvo, D.C. Tozer and M.L. Mallory.** 2021. The legacy of regional industrial activity: is loon productivity still negatively affected by acid rain? *Biological Conservation* 255:108977.
<https://doi.org/10.1016/j.biocon.2021.108977>
- **Bianchini, K., R. Alvo, D.C. Tozer and M.L. Mallory.** 2021. Late ice-off negatively influences breeding in Common Loons (*Gavia immer*). *Northeastern Naturalist* 28:65-76.
<https://doi.org/10.1656/045.028.0105>
- **Piper, W.H., J. Grear, B. Hoover, E. Lomery and L.M. Grenzer.** 2020. Plunging floater survival causes cryptic population decline in the Common Loon. *Ornithological Applications* 122: duaa044.
<https://doi.org/10.1093/condor/duaa044>



The Canadian Lakes Loon Survey has been tracking loon and lake health for 40 years, thanks to thousands of volunteers. This new report summarizes what the program has learned, including possible reasons why the number of loon chicks raised to independence has been declining. It can be found online at birdscanada.org/loons. Photo: Birds Canada.

Cowbird-Host Interactions in the Region of Crane Lake, Saskatchewan, and Beyond³

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Introduction

Ornithological exploration continued in the Cypress Hills through the early decades of the 1900s, but the region of interest eventually extended to the plains north and east to the Crane Lake region of southwestern Saskatchewan (map in Figure 1), a body of water of considerable extent before the drought of the 1930s (Chapman 1908, Houston 1983, Piapot History Group 1979). In the previous instalment in this series, I highlighted observations of host species of the Brown-headed Cowbird (*Molothrus ater*) that were recorded in the Cypress Hills by rancher-naturalist Laurence B. Potter near Eastend and during oologist Solomon J. Darcus's year-long sojourn at his brother-in-law's ranch southwest of Cypress Lake in 1919-20. Working primarily in the vicinities of Rush Lake and Moose Jaw, but also as far west as Crane Lake and the Cypress Hills, Walter Raine described his collections of parasitized egg-sets and speculated on other naturalists' observations of the cowbird's behaviour in *Bird-nesting in North-West Canada* (1892), and in journals of the day, which I highlighted in the second instalment.

Other egg collectors and ornithologists heeded Raine's call to visit this productive region. Their observations and specimens not only increased the number of host species identified in the region, but questions concerning the cowbird's behaviour provided the building blocks for studies that increased our understanding of the dynamics of this host-parasite system. These connections are highlighted in this instalment.

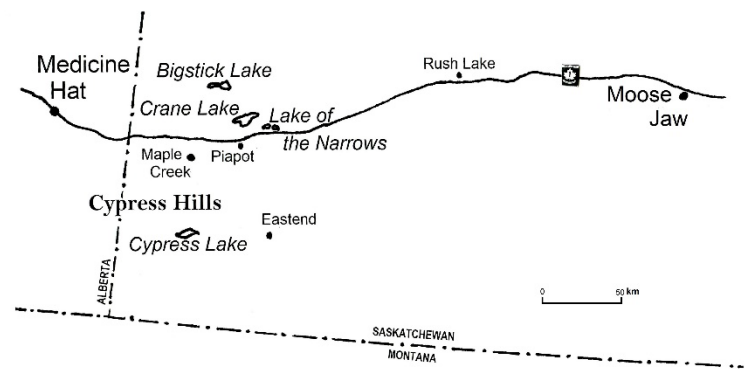


Figure 1. Map of the Crane Lake region, Saskatchewan.

Houston (1983) chronicled the importance and lure of Crane Lake and the surrounding region (Figure 1) to the early naturalists and ornithologists. The first to visit the area was John Macoun who made his way north from the Cypress Hills to a muddy Crane Lake, north of Piapot, in 1880. Raine stayed briefly at Crane Lake station during his second trip west, in 1893, although his activities during that trip were concentrated at Rush Lake and east to Moose Jaw (Houston 1981, 1983). Macoun returned to Crane Lake in 1894 and collected specimens with William Spreadborough, followed by other naturalists who spent short but productive periods in the region, most arriving from eastern Canada and the United States. Raine worked privately, as did Arthur Cleveland Bent, whereas John Farwell Ferry and Percy A. Taverner were affiliated with museums. Some of the visitors stayed with local ranchers on their vast holdings and whose support proved invaluable to their success (Houston 1983).

The earliest naturalists

John Macoun was one of Canada's most widely travelled naturalists of the late 19th century. As the first botanist employed by the Geological Survey of Canada, he was considered by Ernest Thompson Seton to be Canada's pioneer naturalist. Macoun received many accolades (e.g., Bird 1970; Spalding 1973, 1981; Waiser 1989), among which were a village in south-central Saskatchewan and a lake northeast of La Ronge named for him (see Kerfoot 1981, Barry 2005), and his pioneering botanical work across Canada was commemorated on a stamp issued by Canada Post on July 22, 1981 (Figure 2, also see Robertson 2021). Following a visit to Crane Lake in 1894, in which he was accompanied by William Spreadborough, Macoun (1896, p. 117A) described the region as "... one of numerous lakes and marshes

³ Fourth in a series on historic observations of cowbird parasitism on the Canadian Prairies.

in that vicinity about which many species of water-fowl and waders were breeding.” Similarly impressed, Bent (1907, p. 416) recorded vast numbers of waterfowl, shorebirds, gulls and terns breeding at Crane and Bigstick lakes in 1905 and 1906, and described the lakes as ornithologically the “crowning glory of the whole region.” Rush Lake was eventually drained to increase the amount of arable land, whereas Crane Lake and Bigstick Lake dried up during the 1930s and ceased to be the ornithological wonders they once were. In the early 1900s, the water level of Crane Lake was high enough to support a sail boat (Figure 3); a photograph in Godfrey’s (1950, p. 6) treatise on the birds of the Cypress Hills shows a nearly dry Crane Lake in 1948 and it was nearly dry when Houston (1983) visited the lake in 1980.



Figure 2. John Macoun remembered on a commemorative stamp issued by Canada Post, July 22, 1981.

Macoun was responsible for developing natural history collections of the Geological Survey of Canada, the precursor to the national museum system (McNicholl and Cranmer-Byng 1994). In an early account of his visits to western Canada, Macoun (1883, p. 358) recounted his observations of the cowbird, which he considered one of the most conspicuous species on the prairies, at the same time capturing the essence of aspects of early life on the prairies,

Of all the birds on the prairie none will attract more attention than the Cow-birds. As they build no nests they are great travellers, often keeping with a train of carts crossing the trackless plains for weeks together. Both in 1879 and 1880, while travelling without a trail, these birds have kept with us for weeks. When on the march they would fly alongside the carts and light in the grass, and immediately pounce on any grasshopper which lit near them. In July when Bull-dogs (Gad-flies) [horseflies: Tabanidae] were troublesome these birds would sit on the horses’ backs and pick them off. Often one would take up its position on the horse’s rump and catch every fly that dared approach. At night they sometimes sit in the grass, or on the carts, or even perch on the horses, if no bushes were in the vicinity.

Macoun apparently assumed the constant presence of cowbirds around the carts as they crossed the prairie involved the same individuals, because not being tied down to their own nests, they could be free to roam in search of them, harkening to the days cowbirds apparently followed migratory herds of Bison (*Bison bison*) and other large native grazing mammals (e.g., Ortega 1998). The cowbird’s parasitic nature has been suggested to have developed as a result of this association (Hill 1976), with them subsisting on insects flushed by the grazing mammals, but the Bison’s nomadic nature made it impossible for cowbirds to remain with the herd and simultaneously perform nesting duties. Although cowbirds were a constant presence, individuals came and went as the herds moved on.

Macoun on kingbirds and cowbirds

In Macoun’s three-volume catalogue of Canadian birds (1900-1904, Figure 4), followed by the 1909 revision (co-authored with his son, James; Macoun and Macoun 1909), each species account relied heavily on information provided by other ornithologists, which included notes on the behaviour of the Brown-headed Cowbird. Injecting his own observations from Assiniboia, Macoun (1903, p. 393) noted cowbirds “... dropping their eggs in all kinds of small birds’ nests in the summer of 1894. In 1895, the prairie was traversed in a westerly direction for 500 miles; in all this distance [the cowbird] was a common object around our camps...” He concluded (p. 394) that “[The cowbirds’] nesting habits are such that almost every small bird becomes a foster parent for them except the tyrant flycatcher [Eastern Kingbird, *Tyrannus tyrannus*], which far from being the aggressive bird he is supposed to be is only a successful defender.”

Macoun was not the only naturalist who commented on the kingbird’s aggressive behavior, because it begged the question of whether the defence is effective enough to protect the nest against parasitism and predators. Cowbirds take only a few seconds to lay (Sealy et al. 1995), in the minutes before sunrise (Scott 1991) when kingbirds are not closely guarding their nests (Neudorf and Sealy 1994). This begs the question: How could kingbirds aggressively fend off parasitism when they are not present? As it turns out, cowbirds tend to avoid Eastern Kingbird nests (see below). The cowbird’s early-morning laying was not appreciated by early naturalists because few observers watched nests so early in the day. Visits by female cowbirds to nests during the day were generally interpreted as leading up to laying



Figure 3. The water level of Crane Lake sustained recreational sailing in the early 1900s (circa 1910; Piapot History Group 1979).

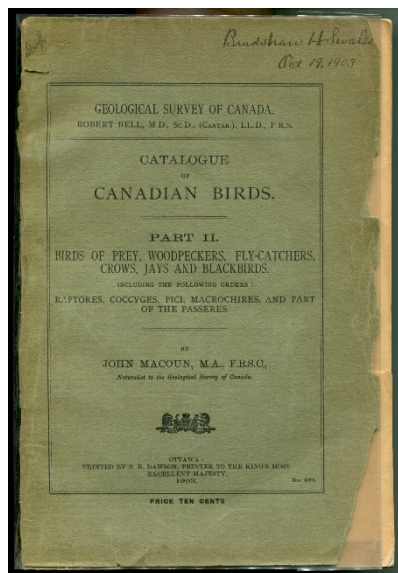


Figure 4. Part II of John Macoun's *Catalogue of Canadian Birds* (1903). This copy was originally owned by Bradshaw H. Swales, who co-authored important papers on Ontario birds with Percy A. Taverner.

Sealy 1994). That unguarded nests were not parasitized supported the hypothesis that cowbirds avoid kingbird nests, as did the results of the egg-addition experiment described below.

Because cowbirds remove an egg from about one-third of nests they parasitize (Sealy 1992), and occasionally prey on nestlings (e.g., Du Bois 1956, Beane and Alford 1990), kingbirds may have responded to them as another potential predator, not as a brood parasite. These observations lead again to the question of whether aggressive responses by kingbirds and other potential cowbird hosts deter parasitism or predation, a question that has been difficult to answer. Calculations of the frequency of parasitism among species that accept cowbird eggs tell us how many nests have been parasitized, but this metric says nothing about how many nests may have been parasitized if the cowbird's attempt at parasitism had not been thwarted (Sealy et al. 1998). Blancher and



Figure 6. Eastern Kingbird nest containing four eggs of the "host" plus one experimentally introduced real cowbird egg, forested dune ridge, Delta Marsh, Manitoba. Photo credit: S.G. Sealy.

events, but eventually it became known that females probably were searching for host nests or were removing a host egg, rather than laying one of their own (Sealy 1992; Figure 5, see Mayfield 1965, p. 19). During studies of cowbirds and their hosts at Delta Marsh, Manitoba, we were seldom fortunate to observe a cowbird leaving a nest carrying the punctured host egg in its bill, before consuming it on the ground. All five species of parasitic cowbird lay during a narrow window around sunrise (Scott 1991), but some Brown-headed Cowbirds return to the nest later on the day or on the following day to remove a host egg (Sealy 1992). By contrast, Common Cuckoos (*Cuculus canorus*) parasitize nests later in the day and invariably remove a host egg during the act of parasitism. Not surprisingly, observations of cuckoos carrying an egg prompted early naturalists to believe those eggs were their own, having been laid first on the ground and then carried to the host nest (Schulze-Hagen et al. 2009).

Among the 70 species confirmed as cowbird hosts in Saskatchewan (Sealy 2019a), the Eastern Kingbird is rarely recorded as a cowbird host. This may be due to effective nest defence, egg ejection or avoidance by the cowbird. We tested the first of these alternative hypotheses by presenting a stuffed female cowbird and egg predator (Common Grackle [*Quiscalus quiscula*]) near kingbird nests at all stages of the nesting cycle (Sealy and Bazin 1995). Although kingbirds aggressively defended their nests, they did not respond uniquely to the "threats" of parasitism or predation (Bazin and Sealy 1993), and they rarely roosted on their nests or were near them in the minutes leading up to sunrise on the days that cowbirds laid their eggs (Neudorf and

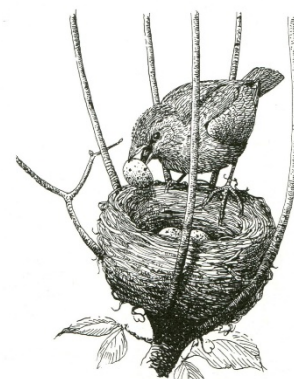


Figure 5. A female Brown-headed Cowbird removing a host egg from a nest by piercing it with her bill. Sketched by William C. Dilger (see Mayfield, *Living Bird* 4, p. 19, 1965). Courtesy of Cornell Laboratory of Ornithology.

Robertson (1982) found that a substantial proportion of kingbird nests were preyed upon in Ontario, despite high levels of aggression against a human predator. On the other hand, Hayes and Robertson (1989) reported that widowed female kingbirds lost more nests, which suggested effective defence. But unsuccessful attempts to thwart predators, which result in depredated nests, are more readily accounted for than successful ones.

To test the second hypothesis, we introduced a real cowbird egg into kingbird nests (Figure 6) during laying and early incubation to determine how rapidly the egg is ejected (Sealy and Bazin 1995). Observers may overlook parasitism in ejector species if cowbird eggs are ejected before or between nest inspections, thus leading to the conclusion that nests are infrequently parasitized, or not at all. Kingbirds ejected >95% of experimental eggs, but about 40% of them remained in nests for >24 hours before being ejected, which was long enough to have been detected during the next inspection. This result supported the hypothesis that cowbirds avoided kingbird nests and that parasitism was rare, and that the results were unbiased by rapid ejection. In fact, we recorded only two naturally parasitized nests among 430 kingbird nests inspected daily. Infrequent parasitism at Delta is consistent with reports of parasitism on this species from Alberta and Saskatchewan (Friedmann 1934) and elsewhere

(Friedmann et al. 1977). The few records may have been at nests from which kingbirds did not eject the egg or more likely the eggs were collected before they did, as in the case of parasitism on an incomplete clutch that Sievert A. Rohwer collected at Delta, Manitoba on June 12, 1979 (Burke Museum of Natural History, University of Washington [UWBM 32261]; Figure 7).

Macoun on Yellow Warblers and cowbirds

Contrasting with the Eastern Kingbird's indiscriminate defence of the nest, whether directed towards a predator or a brood parasite, Yellow Warblers (*Setophaga pectechia*) distinguish between risks posed by those threats. They utter *seet* calls toward female cowbirds that approach the nest during the warblers' egg-laying period, and *chip* calls toward mammalian and avian predators throughout the nesting period (Figure 8) (Hobson et al. 1988, Hobson and Sealy 1989; Gill and Sealy 1996, 2004). In addition to *seet* calls uttered upon the approach of a cowbird, female Yellow Warblers rush to sit in their nests as they would if roosting or incubating (Figure 9), although we have observed cowbirds rousting them from this position

(Sealy et al. 2000). Recently, a meta-analysis confirmed the discrimination of parasite and predator by several host species, including the Yellow Warbler (Lawson et al. 2021a, also see Sealy et al. 1998). Research focused on the association of the Yellow Warbler's referential calls with the stage-specific risk of brood parasitism continues to be a fruitful area of investigation (Lawson et al. 2021b).

If this front-line defense fails, some Yellow Warblers reduce the cost of parasitism by deserting the parasitized nest or burying the clutch and laying a new one in a nest built on top of the old (Sealy 1995, Guigueno and Sealy 2010), but this decision results in lost time. About two-thirds of parasitized Yellow Warblers, however, accept cowbird eggs (Figure 10). Of 1885 nests inspected at Delta Marsh (1974-1987), this species was among the most important hosts, parasitized at a frequency of 21% over 12 years (13.6% [1980] to 27.7% [1987]) (Sealy 1995).

Macoun (1903, p. 393) referred to the Yellow Warbler's response to parasitism, citing Ernest Wintle's (1896, p. 91) observations of birds near Montreal, Quebec, where he "... observed nests of the Yellow Warbler, rebuilt on top of the first nest which contained an egg of the cowbird, while other species of birds appear to adopt the imposers eggs and raise the young cowbirds with as much attention as their own offspring." This species' unique form of rejection of cowbird parasitism – egg burial, a specialized form of nest desertion – and what elicits it, was highlighted in

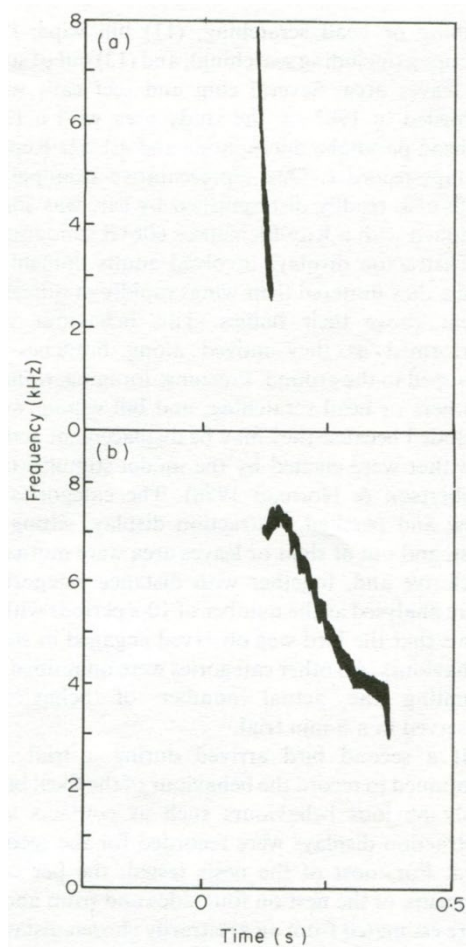


Figure 8. Tracings of sonograms of (a) *chip* and (b) *seet* calls of the Yellow Warbler (after Hobson and Sealy 1989).

the second instalment in this series. As Wintle noted correctly, however, most host species tolerate cowbird parasitism, which comes with costs that are usually stacked against them because they generally rear the cowbird at the expense of all or some or all of their own young (Lorenzana and Sealy 1999, Rasmussen and Sealy 2006). Ejection of the cowbird's egg by the few species so far known to eject cowbird eggs, sets in motion an "arms race" between cowbird and host (Rothstein 1990).



Figure 7. Incomplete clutch of the Eastern Kingbird (UWBM 32261): one egg each of the kingbird (right) and cowbird, collected by Sievert A. Rohwer, Delta, Manitoba, June 12, 1979. Photo credit. Christopher Wood, courtesy of the University of Washington

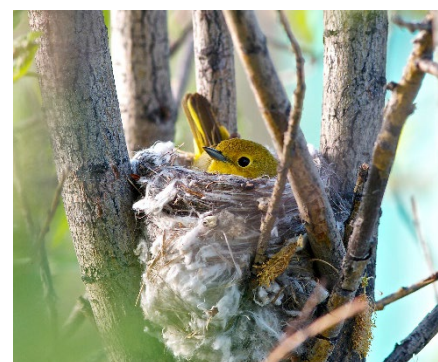


Figure 9. Female Yellow Warbler sitting in the nest, Delta Marsh, Manitoba. Photo credit: Kyle H. Elliott.

Specimens by Spreadborough

Hearing a tanager while serving as a cook on a Geological Survey of Canada expedition with John Macoun's son, James M. Macoun, led to William Spreadborough's employment with the Survey as a collector and specimen preparer, and eventual service on most of Macoun's later expeditions (Taverner 1933). Spreadborough joined Macoun in the field for the first time in 1889 and spent the next three decades collecting specimens throughout Canada. Of the five expeditions to the Canadian

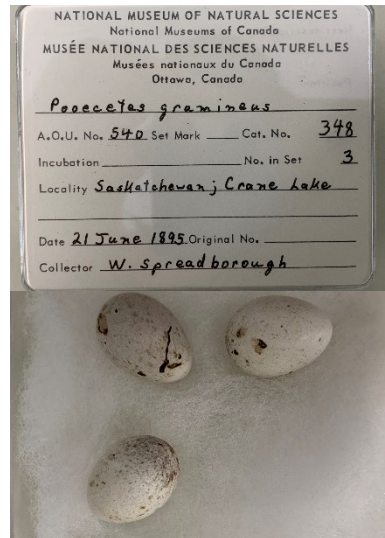


Figure 11. Unparasitized set of Vesper Sparrow eggs (CMNAV E348) collected by William Spreadborough at Crane Lake, Saskatchewan, June 21, 1895.

Prairies between 1891 and 1895, three were to Saskatchewan. On their return from an 1891 collecting trip at Banff, Macoun and Spreadborough stopped off at Indian Head in the fall, but Spreadborough returned alone the following year. Together with sight records and nest records quoted by Macoun, Spreadborough observed at least 154 species at Indian Head, including specimens of cowbirds taken on May 16 and 21 and June 3, 1892, although those specimens were not located no. Spreadborough's records and field notes from Indian Head provided a historical context for *Birds of the Qu'Appelle* (Callin 1980).

In the vicinity of Medicine Hat, Spreadborough collected ~160 specimens of birds from April to June, 1894 (Rand 1948), and later that year with Macoun at Crane Lake, he collected eggs of 64 species of birds (Macoun 1896), mostly waterbirds, but also unparasitized egg-sets of six potential host species catalogued in the Canadian Museum of Nature (Figure 11). It was not until the following year, again near Crane Lake, that Spreadborough collected their first and apparently only parasitized clutch, a Le Conte's Sparrow's (*Ammodramus leconteii*; CMNAV E348; Table 1) that contained three cowbird eggs and a broken host egg (figured in the second instalment of this series).



Figure 10. Parasitized clutch of the Yellow Warbler, Delta Marsh, Manitoba. Photo credit: S.G. Sealy.

Spreadborough's observations and specimens taken in southern Saskatchewan and elsewhere in Canada provided important base-line information on the status of birds before the turn of the century, and in part underlaid the foundation of the Macouns' *Catalogue of Canadian Birds*, "... the real beginnings of our national systematic collection and the basis of many scientific papers by specialists" (Taverner 1933). John Macoun's biographer, historian William Waiser, commented that while working on his book, he kept coming across references in the research materials to Spreadborough, Macoun's long-serving assistant. He summed up his far-reaching contributions to Canadian ornithology, stating, "He worked quietly in the shadow of naturalist John Macoun and his son James. But William Spreadborough's life was one of great accomplishment ... A tireless field worker, largely unknown outside Survey circles, [and] was one of the foremost bird men of his generation" (Waiser 2002).

Table 1. Early records of parasitism by the Brown-headed Cowbird – Crane Lake and Quill Lake, Saskatchewan.

Species	Provenance ¹ and notes
Crane Lake	
Clay-colored Sparrow (<i>Spizella pallida</i>)	Bent (1908) "found 5 nests in one day, June 3, 1905 ... and almost invariably contained Cowbird's eggs"
Vesper Sparrow (<i>Pooecetes gramineus</i>)	YPM ORN 14487 (host eggs), YPM 15762 (cowbird egg): June 12, 1906; "A favorite victim of the Cowbird" (Bent 1908)
Savannah Sparrow (<i>Passerculus sandwichensis</i>)	YPM ORN 142458 (cowbird eggs), YPM 114016 (nest): June 23, 1906; 0 h + 4 c ² (Figure 15); noteworthy record of multiparasitism, with four cowbird eggs and no host eggs (collected by L.B. Bishop); mentioned in Friedmann (1929, p. 218)
Le Conte's Sparrow (<i>Ammodramus leconteii</i>)	CMNAV E347: 1 h (broken) + 3 c; June 1895; multiply parasitized egg-set collected by William Spreadborough for John Macoun (also see Friedmann 1963, p.156)

Table 1. Continued.

Species	Provenance ¹ and notes
Quill Lake ^{3,4}	
Clay-colored Sparrow	FMNH 11157: June 16, 1909; 4 h + 1 c; merely listed as a host of this species in Friedmann (1929, p. 223)
Clay-colored Sparrow	FMNH 9915: June 17, 1909; 4 h + 1 c (Figure 16); vague reference to this parasitized nest in Friedmann (1929, also see Ferry 1910)
Savannah Sparrow	FMNH 10875: June 11, 1909; 3 h + 2 c; listed in Ferry (1910)
Savannah Sparrow	FMNH 9901: June 14, 1909; 3 h + 2 c; listed in Ferry (1910)
Savannah Sparrow	FMNH 10029: June 14, 1909; 0 h + 4 c (Figure 15); "... contained four Cowbird's eggs and none of the rightful owner, all partly incubated" (Ferry 1910); listed in Friedmann (1929, p. 218)
Savannah Sparrow	FMNH 1767: June 20, 1909; 3 h + 2 c; listed in Friedmann (1963, p. 154); "... heavy rain preceding night, and eggs half-submerged in water" (Ferry 1910)
Savannah Sparrow	July 14, 1909; 2 h + 1 c; late date in season (Ferry 1910); clutch apparently not collected
Le Conte's Sparrow	FMNH 1768: June 29, 1909; listed in Ferry (1910), but neither data-slip nor egg-set were located
Le Conte's Sparrow	June 22, 1909; 2 h + 2 c; nest abandoned, one sparrow egg remained on June 29 (Ferry 1910)
Swamp Sparrow (<i>Melospiza georgiana</i>)	FMNH 9925: June 7, 1909; 3 h + 1 c; data-slip examined; "A pair of these birds behaved as if their nest was close by" (Ferry 1910)
Red-winged Blackbird (<i>Agelaius phoeniceus</i>)	FMNH 9892: June 11, 1909; 2 h + 2 c; listed in Ferry (1910)

¹ Canadian Museum of Nature (CMNAV), Field Museum of Natural History (FMNH), Chicago and Peabody Museum of Natural History (YPM), Yale University.

² h (= host eggs) + c (= cowbird egg(s)).

³ On the data-slips that accompanied each egg-set collected at Prince Albert and the Quill Lakes, the collector was given as J.F. Ferry or R.M. Barnes.

⁴ Ferry (1910) listed parasitized species without details, except for the Savannah Sparrow nest (FMNH 10029), which contained only cowbird eggs. Additional details for all parasitized clutches were obtained from information and data-slips in the respective museum collections.

Taverner's influence

In 1911, Percy A. Taverner began his long career as an ornithologist with the National Museum of Canada (and its predecessors), working in the early years in association with Macoun (Figure 12). Among his many collecting trips across Canada, Taverner observed and collected birds in the vicinity of Crane Lake and elsewhere in Saskatchewan as far east as Last Mountain Lake in 1920, and in the southern reaches of the Cypress Hills, particularly around Cypress Lake and east to Eastend, in 1921 (Cranmer-Byng 1996). He probably observed cowbirds everywhere, but despite not writing specifically about them, his observations provided the impetus for others to study a little-known host species, the Yellow-breasted Chat (*Icteria virens*), which he observed and collected at Cypress Lake (Taverner 1927). He described the moment when he first heard the bird's song: "... the writer was awakened on the shores of Cypress Lake, southwestern Saskatchewan, by the characteristic calls of this bird in the brush of the dry creek in whose shelter we were camping. It was only when the bird was taken that he could believe the evidence of his ears." It was not that Taverner was unfamiliar with the Yellow-breasted Chat, he did not expect to encounter it in southwestern Saskatchewan. Building upon these observations, Potter (1935) observed Yellow-breasted Chats along the Frenchman River near Eastend and located Saskatchewan's first nest of this species, which was parasitized by a cowbird and highlighted in the previous instalment of this series.



Figure 12. John Macoun (left) and Percy Taverner on a field outing, probably upriver of Chaudiere Falls, Ottawa, June 1911. Image number J-5535 © Canadian Museum of Nature.

Taverner had studied the Yellow-breasted Chat in Michigan (Taverner 1906a) and was impressed with its song, whether uttered from a perch or in flight (Figure 13). He (1906b, pp. 132-133) described the song,

From some elevated perch from which he can survey the surrounding waste for a considerable distance, he flings himself into the air—straight up he goes on fluttering wings—legs dangling, head raised, his whole being tense and spasmodic with ecstasy. As he rises he pours forth a flood of musical gurgles, and whistles that drop from him in silvery cascades to the ground, like sounds of fairy chimes. As he reaches the apex of his flight his wings redouble their beatings, working straight up and down, while the legs hanging limply down remind the observer of those drawings we sometimes see from the brushes of Japanese artists. He holds his hovering position for an instant, then the music gradually dies away; and, as he sinks toward the ground, he regains his natural poise, and seeks another perch like that from which he started.

At least two authors commented on Taverner's power of description, drawn initially to his account of the Yellow-breasted Chat (Taverner 1906b): a style that stood out to McAtee (1948) "[a]s an example of sustained good writing", and "anthropomorphic and literary; completely out of keeping with the aims of present day ornithology... and much more in this vein. It is intuitive ... deliberately playing for effect" (Cranmer-Byng 1996, p. 32). Chapman (1907a, p. 267-268) quoted from Taverner's description of the chat's flight song in *The Warblers of North America*. Remember that Taverner's words were published in *Bird-Lore*, a journal intended for mainly National Audubon Society members, whereas his writings in articles and books published in the ensuing decades more than met the standards of scientific ornithology at the time and revealed the breadth of his written communication skills.

Taverner on "sibling" competition

In the account of the Brown-headed Cowbird in *Birds of Western Canada*, Taverner's (1926, p. 265) summary of important interactions between cowbirds and their hosts confirmed his prowess as a writer. He understood the nature of this host-parasite system as it was known at the time, although some interpretations required modification as new information emerged,

... [Brown-headed Cowbird] is our only habitually parasitic bird. It never builds a nest nor incubates nor cares for its young. In the absence of the rightful owners it takes the opportunity of depositing one of its own eggs in the unguarded nest of other birds. Usually the birds imposed upon accept the foreign egg without protest, at other times there are strong objections and final resignation. In a few cases, the nest is deserted or a new nest is built over the offending egg, as is sometimes done by the Yellow Warbler. On incubation an interesting adaptation is shown. The Cowbird's egg usually hatches a few hours before those of the original occupant of the nest and consequently the interloper is strong and well grown when the proper occupants of the nest break their shell. It can monopolize the food, thus increasing the difference in strength, and is able finally to hoist its competitors from the nest to perish on the ground while it receives the attention that should have been given to the rightful brood. Thus practically every Cowbird is raised to maturity at the expense of a brood of another species and the Cowbird must be considered one of the greatest enemies of the species imposed upon. Once the foster-parents accept the intruding egg they do not make any distinction between it and their own.



Figure 14. Nestling Brown-headed Cowbird (left, with white rictal flanges) and two nestling Red-winged Blackbirds, Kidder Co., North Dakota.
Photo credit: Lawrence D. Igl.



Figure 13. Song flight of the Yellow-breasted Chat, sketched by P.A. Taverner (*Bird-Lore* 8, p. 132, 1906b).

Taverner's description of the development of the cowbird nestling was reminiscent of that of the Common Cuckoo, which usually hatches first and evicts the host's eggs and young from the nest, thus becoming the sole recipient of the host's care. We now know that cowbirds are raised with the host young (Figure 14), and with adaptations of their begging behaviour they tend to monopolize the food brought to them and their "siblings" (Dearborn and Lichtenstein 2002), as Taverner noted. In cases where cowbird nestlings are larger than the hosts and reach higher when food arrives at the nest, they fare especially well when hatched first (Lichtenstein and Sealy 1998). The latter authors showed that cowbirds that reached the highest and were closer to the parents were more likely to be fed. Interactions such as these often reduce the number of host nest mates that fledge, and of those that do fledge, many succumb within days of leaving the nest, as competition with the cowbird continues (Smith 1981, Rasmussen and Sealy 2006). Not surprisingly, the cost of parasitism increases with each cowbird egg added to the host's clutch (Lorenzana and Sealy 1999, Trine

2000). Would the adult Savannah Sparrows have had to work harder to feed four cowbirds in the nests described below?

The dynamics of the interactions between nestlings in broods of hosts and cowbirds continue to attract researchers' attention, with field studies, some involving cross-fostering experiments, focused on begging behaviour of cowbird and host nestlings in single and multiply parasitized nests, development of begging calls (possible mimicry?), and cowbird growth and survival in host species of different size (see papers in Wright and Leonard 2002, Soler 2017). Even before hatching, cowbird eggs interact with host eggs, apparently by prolonging the incubation needed by eggs of smaller birds, such as the Yellow Warbler. In an elaborate set of experiments on clutches of this host species at Delta Marsh, Manitoba, Glen McMaster discovered that the larger cowbird egg prevents the incubating warbler from making optimal contact with her eggs (McMaster and Sealy 1998). Coupled with rapid embryonic development and disruption of the host's incubation, cowbirds hatch ahead of smaller host nestlings, possibly in response to stimuli from the host's eggs to which they are in contact, or in the case of precocial species, facilitate synchronization of the hatch (Vince 1968, Davies and Cooke 1983). The former authors pointed to the need to compare incubation periods of cowbird eggs placed in host nests at various times throughout the host's laying period to test whether cowbird eggs, stimulated by heterospecific eggs, hatch early.

Visits to Crane Lake: 1905-1906; Quill Lake, 1909

Arthur Cleveland Bent, editor and compiler of the *Life Histories of North American Birds*, visited southwestern Saskatchewan in 1905 and 1906. Field work extended south into the Cypress Hills, north to Crane and Bigstick lakes and east to Lake of the Narrows. In 1905, Bent was accompanied by the Rev. Herbert K. Job and Chester S. Day, and in 1906 he was joined by Louis B. Bishop and Alfred Eastgate, followed later by Jonathon Dwight, Jr. Noting also that cowbirds were "Very abundant on the prairies, about the ranches and in the timber", Bent

(1908) reported parasitism on Clay-colored Sparrow (*Spizella pallida*), Vesper Sparrow (*Pooecetes gramineus*) and Savannah Sparrow (*Passerculus sandwichensis*), all of which are supported by egg-sets collected by Bishop that were eventually catalogued in the Peabody Museum of Natural History at Yale University (Table 1). Only Bent returned to Saskatchewan, in 1917, but that visit was cut short by ill health (Houston 1959).

Field work continued in Saskatchewan in 1909, this time in the Prince Albert region, followed by nearly two months at the Quill Lakes in central Saskatchewan conducted by John F. Ferry, an assistant zoologist for Chicago's Field Museum of Natural History. Accompanied by Richard M. Barnes, they collected specimens of birds and their eggs at these sites and were the first ornithologists to explore the Quill Lakes area thoroughly (map in Houston 1980), and briefly described the landscape around the lakes. Ferry (1910) obtained five records of parasitism on the Savannah Sparrow, including the multiply parasitized nest noted below (Figure 15), plus two parasitized Clay-colored Sparrow nests (one set shown in Figure 16) and two Le Conte's Sparrow nests at the Quill Lakes, as well as one each of Swamp Sparrow (*Melospiza georgiana*) and Red-winged Blackbird (*Agelaius phoeniceus*) taken at Prince Albert (Table 1).

As was standard procedure in an earlier era, identification of nests and eggs were confirmed when possible by collecting at least one



Figure 15. Parasitized Savannah Sparrow nests, each containing four cowbird eggs but no host eggs. Top: YPM 114016, collected by L.B. Bishop at Crane Lake, Saskatchewan, June 23, 1906 (courtesy of the Peabody Museum of Natural History, Yale University). Bottom: FMNH 10029, collected by R.M Barnes at Quill Lake, Saskatchewan, June 14, 1909 (courtesy of the Field Museum of Natural History, Chicago).

of the adults, in this case by Barnes, a lawyer for the Central Illinois Railroad and an enthusiastic egg collector. Barnes had recently embarked on the editorship of *The Oologist*, a monthly magazine dealing with egg-collecting, one in which Walter Raine published several nesting records and described some of his collecting experiences in western Canada (e.g., Raine 1895). Ferry was best known for his collecting activities in the West Indies and Central and South America, but it is not known whether he intended to return to Saskatchewan,

as he died in 1910, less than six months after returning from his initial visit there. Barnes had life-long memories of the birds they encountered in Saskatchewan, but he never returned (Houston 1980).

The Savannah Sparrow nest (YPM ORN 114016) collected at Crane Lake in 1906, noted above, contained four cowbird eggs and “... none of the rightful owner” (Figure 15). Although multiparasitism of this extreme has been recorded occasionally (Bent 1958), a clutch of this species taken at Quill Lake also contained four cowbird eggs and no host eggs (FMNH 10029, Table 1), “...all partly incubated”, where Ferry (1910) reported cowbirds as “Exceedingly abundant.” These were not the only records of multiparasitism on the Savannah Sparrow, as each of three additional clutches collected by Ferry contained two cowbird eggs. Not only were these early records of multiparasitism (see McLaren et al. 2006), two of the records provided instances of apparent acceptance of only cowbird eggs, following loss of all of the host eggs. The sparrow’s eggs probably were removed one by one by the cowbird(s), as about one-third of females remove a host egg before or following parasitism (Sealy 1992). As cowbirds usually do not lay their own eggs and remove host eggs at the same time, females that return to steal an egg must often choose between it and their own egg. When forced to make this choice, however, cowbirds infrequently remove their own or another female’s egg (Nolan 1983, Sealy 1992; but see Elliott 1978). Despite the disturbance that would have ensued at the Quill Lake nest caused by multiple cowbird visits, the cowbird eggs were incubated (see Table 1), which confirms that they were accepted. Additional support for acceptance of multiple cowbird eggs by the Savannah Sparrow comes from a nest that contained one host and four cowbird young recorded at Melville, Saskatchewan, in 1961 (Feather 2019); the outcome of that nesting attempt was not given.

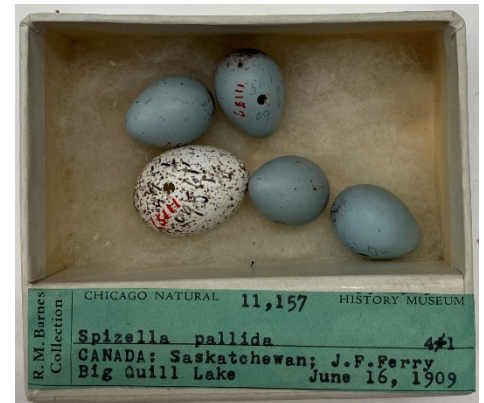


Figure 16. Parasitized set of Clay-colored Sparrow eggs (FMNH 11157), containing four host eggs plus one cowbird egg, collected by J.F. Ferry at Big Quill Lake, Saskatchewan, June 16, 1909. Photo credit: John Bates, courtesy of the Field Museum of Natural History.

As noted by the collector (Table 1), the similarity of colour and pattern among three out of four of the cowbird eggs in the Crane Lake nest suggests that they were laid by two cowbirds, whereas the differences, to my eyes, among all four cowbird eggs in the Quill Lake nest (Figure 15) suggest possibly three to four females parasitized the nest (one egg is smaller and rounder); however, molecular genetic confirmation is required. Results of a genetic study in Manitoba revealed multiparasitism on another species of sparrow, the Song Sparrow (*M. melodia*), that some cowbirds laid one or more eggs in the same nest, but more frequently nests were parasitized by different females (McLaren et al. 2003).

A new but “short-lived” subspecies

Grinnell (1909, p. 276) described a subspecies of the Brown-headed Cowbird, *Molothrus ater artemesiaae*, based on a male taken in Nevada on May 31, 1909. It was “[s]imilar to *Molothrus ater* (Boddaert) of the eastern United States, but somewhat larger, with proportionally longer and more slender bill; similar to *M. a. obscurus* (Gmelin), of the Lower Sonoran zone in Arizona and southeastern California, but much larger.” These subspecies are recognized today. The following year, Bishop (1910, p. 63) described a subspecies based on a series of nine adult male Brown-headed Cowbirds, including the type specimen (FMNH 15759), taken at Crane Lake, Saskatchewan, on June 24, 1906 (Figure 17). Although Maple Creek was given as the collecting locality (shown more clearly on the label of the other type specimen (Long-billed Curlew, *Numenius americanus parvus*) taken during that trip (Figure 18), the type locality of both subspecies is Crane Lake (Bishop 1910, also see Sealy 2019b). Bishop named this subspecies *M. a. dwighti* for his friend, Dr. Jonathan Dwight, Jr., also a former medical doctor whose massive collection of specimens was acquired after his death by the American Museum of Natural History. The larger portion of Bishop’s vast collection was sold to the Field Museum of Natural History, and the smaller was given to the Peabody Museum at Yale University (Howard 1951).

Although not alone, Bishop had a propensity for describing subspecies with incomplete material that precluded appropriate comparisons with other specimens and statistical analyses. Not surprisingly, *M. a. dwighti* was not accepted by the American Ornithologists' Union (1912, p. 386) because it was, "Too close to *M. ater*." Bishop's (1910, p. 62) description of this new subspecies read, "Cowbird breeding in Saskatchewan is considerably larger than in our Eastern States, as is shown by the subjoined measurements of breeding birds. The bird



Figure 17. Type specimen of *Molothrus ater dwighti* (FMNH 15759), collected by L.B. Bishop at Crane Lake, Saskatchewan, June 24, 1906. Note the red label that is typically attached to type specimens. Photo credit: Ben Marks, courtesy of the Field Museum of Natural History.

breeding in eastern North Dakota is intermediate, but somewhat nearer that in Saskatchewan. The bird inhabiting Alberta, Manitoba, and northern Montana is doubtless the northern race, but I have not seen specimens from those localities." For the record, Friedmann (1927) listed *M. a. dwighti* among the synonymy of *M. a. artemisiae*, but it was ignored in subsequent check-lists. The new subspecies of Long-billed Curlew described by Bishop from specimens collected on the same trip (Sealy 2019b) is currently recognized by the American Ornithologists' Union (1957).

M. a. dwighti was not the only subspecies of the Brown-headed Cowbird that the AOU did not recognize. Dickey and van Rossem (1922) described *M. a. californicus* from specimens collected in the southern (upper) end of the San Joaquin Valley of southern California. Although Grinnell (1934) recognized this race, Friedmann (1927, 1934) did not, and reiterated his belief that *californicus* is "the same as the Dwarf Cowbird [*obscurus*]". Of the three recognized subspecies of Brown-headed Cowbird (Friedmann 1927), *M. a. artemisiae* (Grinnell) occupies the Northwest and Great Plains (Ortega 1998, p. 138), including the Canadian Prairies (e.g., Mitchell 1924, Rand 1948). Four cowbird specimens that William Rowan collected on the outskirts of Winnipeg between May 6 and 11, 1920, were referable to *M. a. artemisiae* (catalogued in the Museum of Vertebrate Zoology

[MVZ], University of California, Berkeley, as MVZ: Bird 75946-7 [males] and MVZ: Bird 75948-9 [females]). Rowan took another adult male, at Shoal Lake in southeastern Manitoba, in the same year, which was referred to the eastern subspecies, *M. a. ater*, by P.A. Taverner. On geographic grounds, this specimen may have been misidentified or was a vagrant, but it was not located now. Furthermore, Taverner (1919, p. 253) qualitatively described cowbirds taken on the Red Deer River in Alberta: "Examining our series of western Cowbird specimens I can only see that they average slightly larger than eastern ones. The bills are comparatively a little longer but the concave character shown by Grinnell [1934] as characteristic of *artemisiae* is not recognizable even though the sage brush *Artemisia tridentata* with which its range is supposed to coincide extend far north of here to the Peace River Valley. Without further data I can only regard these Red [Deer] River birds as almost *ater*."

The concept of the subspecies, in the context of the process of speciation of birds, has come under fire in recent decades (e.g., Patten and Unitt 2002, Zink 2004), although subspecies continue to provide foci for studies of geographic variation and speciation (Klicka et al. 2011, Pruett et al. 2013) and guiding conservation efforts (Pruett et al. 2001). Foremost among the problems is that most subspecies were described before the advent of appropriate statistical methods in ornithology and were named on the basis of mean differences only, rather than on the extent of overlap, as was the case with *M. a. dwighti*. In many cases too few specimens of similar freshness of plumage, or wear, made comparisons difficult (e.g., Godfrey 1951), and subsequent studies of geographic variation, particularly combined with the use of modern genetic markers, occasionally failed to uphold a subspecies' genetic distinctiveness and, for this reason, they have in some cases outlived their importance.

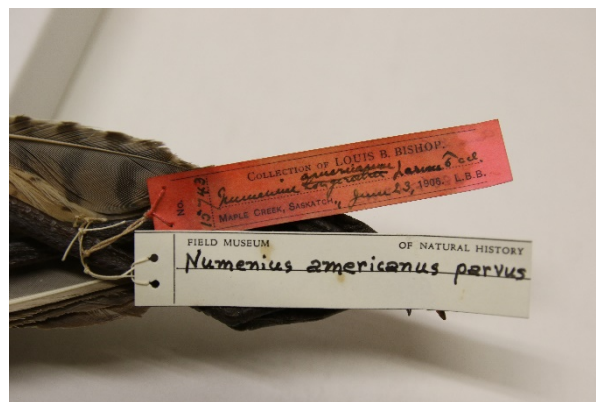


Figure 18. Labels attached to the type specimen of *Numenius americanus parvus* (FMNH 15743) give the location of collection as Maple Creek; the correct type locality is Crane Lake, Saskatchewan. Photo credit: Ben Marks, courtesy of the Field Museum of Natural History.

Legacy of Crane Lake

Rand (1948) and Godfrey (1950) listed more than two dozen field expeditions in which participants observed birds and collected specimens in southeastern Alberta and southwestern Saskatchewan. Most visits lasted a few days or weeks, and were focused on the birds of the higher parts of the apparently unglaciated Cypress Hills as well as on the plains as far as Medicine Hat and Crane and Bigstick lakes. Heeding Raine's encouragement, ornithologists such as Bent and others followed, most of whom did not write about cowbirds but contributed important information and specimens of birds that laid the foundation for the accounts of the birds of the region and of Alberta and Saskatchewan (Mitchell 1924, Rand 1948, Godfrey 1950, McGillivray 1992, Smith et al. 2019). Among the latter group, Frank M. Chapman and noted artist Louis Agassiz Fuertes spent several days at Crane and Bigstick lakes in 1907, collecting material for habitat groups of water and shore birds for the American Museum of Natural History. Chapman wrote mostly about waterbirds, but he was particularly impressed with the flight song of the male Lark Bunting (*Calamospiza melanocorys*), just as Taverner had been of the Yellow-breasted Chat's flight song fifteen years later and, quoted in the first instalment of this series, was Thomas Blakiston's eloquent description of Sprague's Pipit's (*Anthus spragueii*) flight song, heard several decades earlier. But Chapman also was concerned about changes in the landscape that were already underway. He wrote (1907b) on his return to New York,

The region has been well called the nursery of wild fowl, as at one time were the border states to the south. But the advance of civilization, which first transforms a buffalo range to a cattle country, and later to wheat ranch, has already reached the early stages of its agricultural development about Maple Creek, and the forced retreat of the wild fowl to the remote north is only a question of time. The Canadian Government would do well to set aside some of its still unsettled lands as permanent breeding reservations, to which each year, the water-fowls could return to nest. Such reservations would in truth be nurseries, and, in permitting a bird to reproduce, would be of infinitely more importance than preserves which afford protection only during the winter.

Potter (1930) echoed this concern more than 20 years later after observing changes in the landscape and documenting declines in bird populations on his ranch at the eastern end of the Cypress Hills. Indeed, many cowbird hosts identified in the early decades of the 1900s inhabited landscapes that differ greatly from those of today, and some species are threatened.

Typical of many shallow lakes on the Prairies, water levels fluctuated through periods of drought and high water. Noted earlier, the water level at Crane Lake was high enough to support sailing when ornithologists visited the lake in the early 1900s. Indeed, Bent (1907) and Chapman (1907) described islands on which several species of waterfowl, plus shorebirds, gulls and terns nested. Crane Lake dried up during the drought of the 1930s, following the highest shoreline marks recorded from 1922 through 1929, with levels that also supported the use of a motor launch (Houston 1983). Growing up near Crane Lake in the 1930s, Fern Wudrick remembered "those sand storms – how the sand piled up on the window sills and the house would be dark for two or three days. I grew up not knowing that Crane Lake was supposed to have water in it" (Piapot History Group 1979, p. 277).

Houston (1983) described the ups and downs of the water levels of Crane Lake, which had only a narrow channel of "shallow muddy water" separating one of the islands and the mainland in 1961, a year after he visited the island. Houston lamented, "The myriads of waterfowl that once drew so many distinguished naturalists to the area, regrettably are mere memories of the ever-more distant past." Ducks Unlimited Canada has undertaken an effort to conserve the smaller, deeper containments of Crane Lake, and thus prevent total loss from evaporation in dry years. The southeast shoreline and lake bed were dry when I visited them in mid-July 2021; infrastructure associated with the oil and gas industry was visible in the distance.

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Recent Canadian Ornithology Theses

Scopel, Lauren C. 2021. Developing seabird bioindicators for the Gulf of Maine: a demographic study of an Arctic Tern (*Sterna paradisaea*) metapopulation. Ph.D. Thesis. University of New Brunswick, Fredericton, NB.

As climate change proceeds, ecosystems are changing rapidly. Marine ecosystems are complex and difficult to monitor, making the prediction of future changes a daunting task. Seabirds are often suggested as potential bioindicators, yet the development of their data for general predictive use is rare. I, using the data of many collaborators, examined the potential use of Arctic Tern (*Sterna paradisaea*) data as bioindicators in the rapidly warming Gulf of Maine (GOM) ecosystem. The collapse of the breeding colony at Machias Seal Island, formerly the largest in North America, was primarily driven by unmitigated egg predation by large *Larus* gulls, not a decline in Atlantic herring (*Clupea harengus*). At the metapopulation scale, reproductive success of Arctic Terns was subject to multiple environmental interactions. The proximity of a colony to shore was associated with higher diet quality, but also greater fluctuations in predator pressures. Interactions between diet quality, weather, and predator behaviour strongly influenced the reproductive success of terns. At the ecosystem scale, the diets of Arctic and Common Terns (*S. hirundo*) could be combined with environmental data to describe and track ecosystem states. Arctic Terns were more likely to consume white hake (*Urophycis tenuis*) and small marine invertebrates, but their dietary trends also tracked the herring fishery. Common Terns were more likely to target high-lipid fish, but they showed stronger spatial trends that limited regional inferences. Finally, we estimated rates of survival, dispersal, and return rates. Arctic Terns have strong dispersal behaviour and regularly leave the bounds of the “metapopulation” within the GOM, but adult survival has not changed, despite major warming trends. Multiple types of tern data indicated that the weakest period of the past 30 years was between 2004-2012, when salinity was reduced and small copepods like *Centropages typicus* were less abundant. Arctic Terns were able to react to major declines in habitat quality, and have adjusted well to recent warming. Although Arctic Terns are affected by both top-down and bottom-up forcing, multiple types of Arctic Tern data are useful as indicators. Terns could function well as ecosystem, guild-, or site-specific indicators, depending on the desired use.

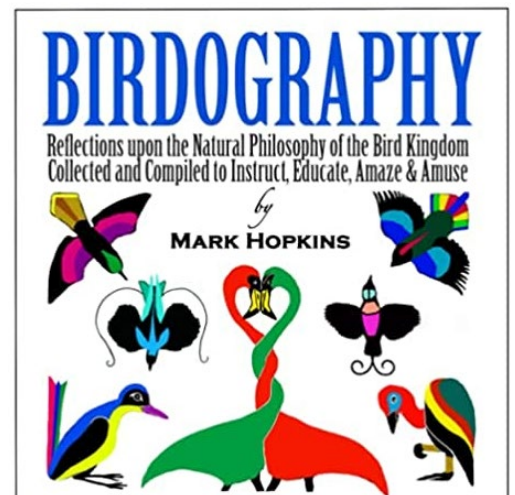
Ornithological News and Announcements

Book Release– *Birdography: Reflections upon the Natural Philosophy of the Bird Kingdom Collected and Compiled to Instruct, Educate, Amaze & Amuse* by Mark Hopkins. August 2021

BIRDOGRAPHY features a series of 96 humorous cartoons aimed at a specialized audience: birdwatchers. Although it will be especially appreciated by those having deep field experience with birds, anyone who is drawn to wildlife, hiking in a forest, or watching nature specials on TV will enjoy this book.

Revenue from this book will go to avian conservation and climate change charities.

Now Available for purchase at Amazon.ca.




LOVE LAB


Integrative Ecology


 Laboratoire
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 University
of Windsor

 Université du Québec
à Rimouski

Snow Bunting Graduate Research Positions

We seek two graduate students (MSc or PhD) to lead projects on the direct effects of climate change on the performance and success of this rapidly declining Arctic songbird. Projects will integrate physiology, behaviour and breeding ecology within a life history framework. The projects will be conducted in parallel at both a Low- and High-Arctic site in Nunavut, Canada.



Project #1 at East Bay Island (64°N) will be supervised by Dr. Oliver Love at the University of Windsor. It will examine i) real-time responses of body temperature to climate change, ii) sex-specific costs to thermal challenges, and iii) whether adjustments to provisioning to avoid thermal stressors and subsequent overheating have consequences for breeding success.

Project #2 at Alert (82°N) will be supervised by Dr. François Vézina at the Université du Québec à Rimouski. It will i) investigate how consecutive days of warm temperature affect condition, provisioning rate and reproductive success, and ii) use an ecophysiological approach to study energetic and physiological compromises made by birds to sustain provisioning.

Supervision and collaboration: Students will be co-supervised by Drs. Love and Vézina. Projects will be highly collaborative with regular team meetings and opportunities to visit counterpart laboratories for experiments and training. Projects are supported by long-term partnerships with Environment and Climate Change Canada (ECCC) and the Department of National Defense (DND). Students will work alongside other scientists in the field to help support ongoing long-term studies (seabird ecology at East Bay, biodiversity surveys at Alert).

Skills required: Ideally previous research experience in songbird field systems (Arctic work not necessary), with analytical and writing experience via an honours BSc or MSc degree. Projects involve field research as part of diverse scientific teams at well-supported, but remote, Arctic field sites for up to 3.5 months per year. Students will receive Wilderness First Aid and Firearms Safety training to work with confidence and safety in these locations within teams.

Funding: All research and personal stipend costs are fully covered for both student projects.

Approach: Our labs pride themselves on taking a supportive and positive approach to student mentorship and training. Our goal is to provide equitable, diverse and inclusive training environments that inspire and support enthusiastic scientists to explore and conserve the world.

Environment: Both Universities have very strong Ecology and Evolution research groups and teams leading international Arctic research. Both home departments place a strong emphasis on high quality graduate training and graduate research support, with large cohorts of diverse, interesting, high-achieving and yet balanced graduate students.

Application: Please send: CV/resume, undergraduate/graduate transcripts, statement of research interest, clearly stating which project you wish to apply for, to Dr. Oliver Love (olove@uwindsor.ca). All inquiries will be responded to, and candidates will meet with Drs. Love and Vézina and lab members via video-conferencing to discuss projects and ask questions.



Projets MSc/PhD : effet du réchauffement de l'Arctique sur le plectrophane des neiges

Nous recherchons deux étudiants (MSc ou PhD) pour examiner les effets du réchauffement de l'Arctique sur la performance et le succès reproducteur de cet oiseau en déclin. Les projets intégreront la physiologie, le comportement et l'écologie et seront menés en parallèle sur deux sites du Bas et du Haut-Arctique.



Projet #1 à East Bay (64°N), supervisé par Oliver Love à l'U. Windsor (Ontario). Le projet examinera i) les conséquences sur le succès reproducteur des ajustements de l'effort d'approvisionnement pour éviter le stress thermique et la surchauffe et ii) si les mâles et les femelles subissent le même stress thermique pour un même environnement.

Projet n°2 à Alert (82°N), supervisé par François Vézina à l'UQAR. Le projet vise i) à étudier comment des jours consécutifs de température chaude affectent la condition, l'approvisionnement et le succès reproducteur, et ii) à étudier les compromis énergétiques et physiologiques faits par les oiseaux pour maintenir l'approvisionnement.

Supervision et collaboration : Les étudiants seront co-supervisés par les Drs Vézina et Love. Les projets seront collaboratifs, avec des réunions d'équipe régulières et des opportunités de visiter/travailler dans les deux laboratoires. Les projets se font en partenariat avec Environnement et Changements Climatiques Canada (ECCC) et le Ministère de la Défense nationale (DND). Les étudiants travailleront avec d'autres scientifiques sur le terrain dans le cadre d'études à long terme (oiseaux marins à East Bay, suivi de la biodiversité à Alert).

Compétences requises : Avoir des aptitudes pour le travail d'équipe et la vie en conditions isolées avec d'autres personnes jusqu'à 3,5 mois par an. Pouvoir s'adapter à un horaire variable selon les besoins et contraintes. De l'expérience avec les oiseaux est un atout. Être en mesure de communiquer en anglais et en français. Les étudiants recevront une formation en secourisme et en maniement d'armes à feu afin de travailler sur le terrain en toute sécurité.

Financement: Les étudiants obtiendront une bourse d'études de leurs laboratoires respectifs. Les dépenses logistiques et les frais de recherche sont entièrement couverts par le projet.

Approche : Nos équipes adoptent une approche positive et favorable à la formation. Notre objectif est de fournir un environnement équitable, diversifié et inclusif qui inspire les étudiants à explorer le fonctionnement et le comportement des organismes. Les deux universités disposent d'équipes très solides reconnues pour leurs recherches en Nordicité.

Candidature : Veuillez envoyer vos CV, relevés de notes (1^{er} et 2^e cycles) ainsi qu'une lettre de motivation indiquant clairement le projet sur lequel vous souhaitez postuler et les coordonnées de deux référents, à l'attention de François Vézina (francois_vezina@uqar.ca). Les candidats rencontreront les Drs Love et Vézina ainsi que les membres de leurs laboratoires par vidéoconférence pour discuter des projets et poser des questions.

Doris Huestis Speirs Award

Prix Doris Huestis Speirs

CALL FOR NOMINATIONS / APPEL DE NOMINATIONS - 2022

The Doris Huestis Speirs Award is the most prestigious award given by the SCO-SOC. The award is presented annually to an individual who has made outstanding lifetime contributions in Canadian ornithology. Past awardees include professionals who work at museums, government agencies, private companies and universities, as well as amateur ornithologists and people who have contributed to ornithological infrastructure of Canada. // *Le prix Doris Huestis Speirs est le plus prestigieux prix décerné par la SCO-SOC. Le prix est remis annuellement à une personne qui a apporté une contribution significative à long terme en ornithologie au Canada. Les précédents récipiendaires sont des professionnels qui travaillent dans les musées, les organismes gouvernementaux, les entreprises privées, les universités, ainsi que des ornithologues amateurs et des personnes qui ont contribué à la cause ornithologique au Canada.*

Doris Huestis Speirs was born on 27 October 1894 in Toronto, Ontario, and passed away in Ajax, Ontario, on 24 October 1989. Doris was highly prominent in art, literary, and ornithological circles. She founded the Margaret Morse Nice Ornithological Club, which was the only such group specifically for women, and she was also a founding member of the Pickering Naturalists' Club. In her lifetime, Doris made several prominent contributions to the ornithological literature on Evening Grosbeaks and Lincoln's Sparrows (the latter with her husband, J. Murray Speirs). // *Doris Huestis Speirs est née le 27 octobre 1894 à Toronto, en Ontario, et est décédée à Ajax, Ontario, le 24 octobre 1989. Doris a été très importante dans les milieux artistiques, littéraires et ornithologiques. Elle a fondé le club ornithologique de Margaret Morse Nice, qui était le seul groupe ornithologique pour les femmes et elle a également été membre fondateur du Club des naturalistes de Pickering. De son vivant, Doris a fait plusieurs contributions importantes à la littérature ornithologique du Gros bec errant et le Bruant de Lincoln (ce dernier avec son mari, J. Murray Speirs).*



Process//Processus: Nominations should clearly articulate the nominee's cumulative, significant contributions to ornithology in Canada. Nomination packages containing attestations from more than one individual about the scope and impact of the nominee's contributions are particularly welcomed. To nominate a candidate for the Speirs award, preferably with supporting detailed information, contact the Chair of the award committee: // *Les candidatures doivent exprimer clairement le cumul et l'importance des contributions du candidat à l'ornithologie au Canada. Les dossiers de candidature comprenant le soutien de plus d'une personne au sujet de la portée et l'impact des contributions du candidat sont particulièrement les bienvenues. Afin de désigner un candidat au prix Speirs, de préférence avec à l'appui des informations détaillées, contactez le président du comité d'attribution:*

Colleen Barber
Department of Biology
Saint Mary's University
923 Robie Street, Halifax, NS B3H 3C3
Tel: 902-223-1211
Email/courriel: colleen.barber@smu.ca



Society of Canadian Ornithologists
Société des ornithologistes du Canada

Deadline for receipt of nominations is 9 April 2022. // La date limite de réception des candidatures est le 9 avril 2022.

Jamie Smith Memorial Award for Mentoring **Prix Memorial de Jamie Smith pour le mentorat**

CALL FOR NOMINATIONS / APPEL DE NOMINATIONS - 2022

In recognition of Jamie Smith's contribution to fostering ornithological research, the Society of Canadian Ornithologists has created The Jamie Smith Memorial Award for Mentoring in Ornithology.

This award honours established ornithologists - either in academia, industry, non-government or government agencies - nominated by students, colleagues and/or peers to have displayed excellence in mentoring a new generation of professional or amateur biologists. The award will be presented to the recipient at the Society's annual meeting.

Nomination: Details concerning nominations can be found online at www.sco-soc.ca/smith-award. A cover letter (max 1,000 words) outlining why the nominee should receive the distinction should accompany the nomination. The nomination must be accompanied by at least two additional letters of support (max 500 words) that indicate they have seen and support the nomination letter. They may then add their own comments on the nominee.

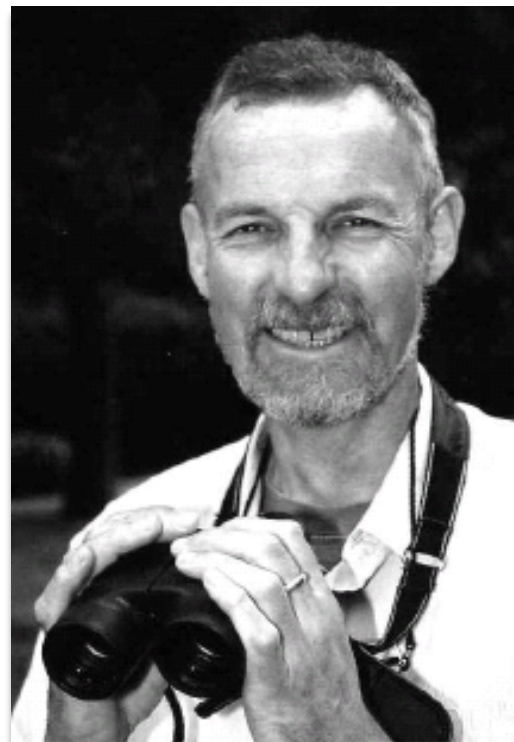
Deadline for submission of nominations is **15 January 2022**.

Nominations should be sent, by email, to:

Kyle Elliott

Chair - Jamie Smith Memorial Mentoring Award Committee

Email: kyle.elliott@mcgill.ca



En reconnaissance pour la contribution de Jamie Smith à la recherche en ornithologie au Canada, la Société des ornithologistes du Canada a créé le Prix Mémorial de Jamie Smith pour le mentorat en ornithologie.

Le prix est remis à un ornithologiste établie, soit dans le domaine académique, industriel, gouvernemental ou ONG, nommé par des étudiants ou collègues pour avoir excellé dans le mentorat d'une nouvelle génération de biologistes amateurs ou professionnels. Le prix sera présenté au récipiendaire à la réunion annuelle de la Société.

Nomination: Les détails concernant les nominations peuvent être trouvés au site de la SCO-SOC (www.sco-soc.ca/smith-award). Une lettre (max 1 000 mots) expliquant pourquoi la personne nominée devrait recevoir ce prix doit accompagner la nomination. La nomination devrait aussi inclure au moins deux autres lettres de support (max 500 mots) dans lesquelles il est indiqué que ces personnes ont lu la lettre de nomination et qu'ils la supportent. Ils peuvent également ajouter leur propres commentaires sur le nominé.

Date limite pour la remise des nominations est le **15 janvier 2022**.

Les nominations devraient être envoyé, par courriel, à:

Kyle Elliott

Comité pour le Prix Mémorial de Jamie Smith pour le mentorat

Courriel: kyle.elliott@mcgill.ca



Society of Canadian Ornithologists
Société des ornithologistes du Canada

Early Career Research Award Prix de recherche en début de carrière

CALL FOR NOMINATIONS / APPEL DE NOMINATIONS - 2022

The Early Career Researcher Award honours fledgling ornithologists – in academia, industry, non-government or government agencies – that show strong potential for future leadership in Canadian ornithology. The award will be presented to the recipient at the Society's annual meeting where they will be invited to give a 30 minute keynote address, and travel to the meeting will be subsidized. The recipient will also be asked to provide a synopsis of their work to appear as a multi-page colour feature in the Society's *Picoides* newsletter. // *Le prix de recherche en début de carrière honore les jeunes ornithologistes – en université, en industrie et en agences non-gouvernementales et gouvernementales – qui démontrent un fort potentiel pour le futur leadership en ornithologie canadienne. Le prix sera présenté au récipiendaire à la réunion annuelle de la société où il sera invité à donner un discours d'ouverture de 30 minutes, et le voyage à la réunion sera subventionné. Le récipiendaire devra également fournir un résumé de son travail qui sera publié comme un article à plusieurs pages dans le bulletin de la société, Picoides.*

Nomination: Candidates can be nominated by themselves, former/current supervisors, colleagues and/or peers. A nomination letter should include a short statement (max 1,000 words) describing the nominee's accomplishments to date. To be eligible, the candidate must have received their PhD from or currently working at a Canadian institution. The researcher should have obtained her or his PhD no more than five years prior to the SCO meeting where the award is to be given. Periods where the researcher has not been active due to parental or personal leave would be excluded from the five years. Nominations are accepted in French or English. // *Les candidats peuvent se nommer ou peuvent être nommés par leurs anciens superviseurs, par leur superviseurs actuels, par leurs collègues, ou par leurs pairs. Une lettre de nomination devrait inclure une courte déclaration (max 1 000 mots) décrivant les accomplissements du nominé à ce jour. Pour être éligible, le candidat doit avoir reçu son doctorat d'une institution canadienne ou doit présentement travailler à une institution canadienne. Le candidat doit avoir obtenu son doctorat au plus tard 5 ans avant la réunion de la SOC où le prix sera remis. Les périodes durant lesquelles le candidat n'était pas actif à cause d'un congé parental ou personnel seront exclues de cette période. Les candidatures sont acceptées en français ou en anglais.*

Deadline for submission of nominations is 31 January 2022. // Date limite pour les nominations est le 31 janvier 2022.

Nominations should be sent, by email, to // *Les nominations devraient être envoyées, par courriel, à:*

Danielle Ethier, Chair/Chaire

Early Career Research Award Committee/ Comité de prix de recherche en début de carrière

email/courriel: dethier@birdscanada.org



Society of Canadian Ornithologists
Société des ornithologistes du Canada

STUDENT RESEARCH AWARDS

TAVERNER AWARDS

Taverner Awards are offered by the SCO-SOC to honour Percy A. Taverner and to further his accomplishments in increasing the knowledge of Canadian birds through research, conservation, and public education. The awards are aimed at people with limited or no access to major funding, regardless of professional status, who are undertaking ornithological work in Canada.

Two awards of up to \$2,000 each are made annually.

JAMES L. BAILLIE AWARD

The James L. Baillie Student Research Award is open to any student at a Canadian university. It honours the memory of James L. Baillie and is to support research, monitoring, education and conservation projects that involve any wild bird species occurring in Canada. More specifically, studies eligible for the award will involve a high proportion of field work or will have direct conservation benefits. The Baillie Student Research Award is funded by Bird Studies Canada from proceeds of the Great Canadian Birdathon.

One award of up to \$2,000 is made annually.

FRED COOKE AWARD

The Fred Cooke Student Award is offered jointly by the SCO-SOC and Bird Studies Canada to honour the contributions of Professor Fred Cooke to Canadian ornithology. It supports ornithological conference travel or research activities by a student. The award shall be open to any student conducting ornithological research at a Canadian university, except that previous recipients of the award shall not be eligible. The award shall be for travel to ornithological conferences at which the student will make an oral or poster presentation, or research in any aspect of ornithology anywhere in the world.

One award of up to \$1,000 is made annually.

FOR FULL DESCRIPTIONS/APPLICATION FORMS, VISIT:

<http://www.sco-soc.ca/studentawards.htm>

- Applicants must be members of the SCO-SOC to be eligible (\$15/year for students)
- A single application can be made to apply for all three award types. Application Deadline: 1 Mar 2022

For further information, or to submit an application (e-mail only), contact:

Dr. Matt Reudink, Chair, SCO-SOC Student Awards Committee

Department of Biological Sciences, Thompson Rivers University, 805 TRU Way, Kamloops, BC V2C 0C8

e-mail: mreudink@tru.ca



Society of Canadian Ornithologists
Société des ornithologistes du Canada



BIRD STUDIES
ÉTUDES D'OISEAUX CANADA

BOURSES DE RECHERCHE

BOURSES TAVERNER

La bourse Taverner est offerte par la SCO-SOC afin d'honorer Percy A. Taverner et de faire progresser ses accomplissements en améliorant les connaissances sur les oiseaux canadiens par la recherche, la conservation et l'éducation du public. Les bourses sont destinées aux gens qui n'ont aucun accès ou un accès limité aux subventions majeures, peu importe leur statut professionnel, et qui entreprennent des travaux ornithologiques au Canada.

Deux bourses d'une valeur atteignant 2000 \$ chacune sont décernées annuellement.

BOURSE JAMES L. BAILLIE

La bourse de recherche pour étudiant(e)s James L. Baillie est ouverte à tout(e) étudiant(e) qui entreprend une recherche ornithologique à une université canadienne. La bourse est en honneur de James L. Baillie et subventionne la recherche qui correspond aux objectifs du fond James L. Baillie. Ces objectifs sont de supporter financièrement les études d'oiseaux canadiens dans leurs milieux naturels, les projets contribuant à la sauvegarde d'oiseaux et les projets visant à propager le savoir ornithologique. La bourse de recherche étudiante James L. Baillie est subventionnée par le d'Études d'oiseaux Canada par les revenus du Great Canadian Birdathon et est administrée par la Société des ornithologues canadien(ne)s.

Une bourse atteignant 2000 \$ est présentée annuellement.

BOURSE FRED COOKE

La bourse de recherche pour étudiant(e)s Fred Cooke est offerte conjointement par la SCO-SOC et Études d'oiseaux Canada afin d'honorer les contributions à l'ornithologie canadienne par le professeur Fred Cooke. Cette bourse vise à subventionner les coûts de voyage vers une conférence ornithologique ou la recherche d'un(e) étudiant(e) d'université canadienne. La bourse est ouverte à n'importe quel(le) ornithologue poursuivant sa recherche dans une université canadienne, sauf les gagnant(e)s précédent(e)s de la bourse. La bourse doit être utilisée pour le voyage aux conférences ornithologiques auxquelles l'étudiant(e) donne une présentation orale ou une affiche (poster), ou pour la recherche ornithologique n'importe où à travers le monde.

Une seule bourse atteignant 1000 \$ est présentée annuellement.

DESCRIPTIONS COMPLÈTES/FORMULAIRE D'APPLICATION À:

http://www.sco-soc.ca/studentawards_fr.htm

- Les candidats doivent être membres de la SCO-SOC pour être éligible
- Une seule demande par candidat pour les trois types de bourses. Date limite d'inscription: 1 mars 2022

Pour de plus amples renseignements ou pour soumettre une candidature (courriel seulement), veuillez communiquer avec:

Dr. Matt Reudink, Directeur du Comité de SCO-SOC bourses de recherche pour étudiant(e)s

Department of Biological Sciences, Thompson Rivers University, 805 TRU Way, Kamloops, BC V2C 0C8

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BIRD STUDIES
ÉTUDES D'OISEAUX CANADA

Avian Conservation and Ecology Articles

Volume 16, Issue 2

An efficient method for sampling aerial arthropods at nest sites of an insectivorous songbird in steep decline

Une méthode efficace d'échantillonnage des arthropodes aériens sur les sites de nidification d'un passereau insectivore en forte baisse

Adam Haberski, Julie C Hagelin, Christopher P Barger, Derek S Sikes, and Kristin A DuBour

[Avian Conservation and Ecology 16\(2\): 1](#)

Pollen analysis as an ecological proxy for the assessment of habitat use of the endangered Black-pollled Yellowthroat (*Geothlypis speciosa*) and sympatric Common Yellowthroat (*G. trichas*)

Analyse du pollen comme substitut écologique de l'évaluation de l'utilisation de l'habitat par l'espèce menacée de la paruline à face noire (*Geothlypis speciosa*) et de la paruline masquée (*G. trichas*)

Gabriela Domínguez-Vázquez, Susana Raygadas, Jorge L. León-Cortés, and Alejandro Pérez-Arteaga

[Avian Conservation and Ecology 16\(2\): 2](#)

Does habitat reclamation following energy development benefit songbird nest survival?

La remise en état de l'habitat après installation d'aménagements énergétiques est-elle bénéfique pour la survie des nids de passereaux?

Christopher P Kirol and Bradley C Fedy

[Avian Conservation and Ecology 16\(2\): 3](#)

Marbled Murrelet nest site selection at three fine spatial scales

Sélection des sites de nidification du Guillemot marbré à trois échelles spatiales fines

Thomas E. Hamer, Kim Nelson, Jay Jones, and Jake Verschuyt

[Avian Conservation and Ecology 16\(2\): 4](#)

Trends in avian use of reclaimed boreal forest habitat in Canada's oil sands

Utilisation par les oiseaux de milieux de forêt boréale remis en état dans la région des sables bitumineux du Canada

Virgil C Hawkes, Nathan Hentze, and Travis G Gerwing

[Avian Conservation and Ecology 16\(2\): 5](#)

Functional connectivity of managed forest landscapes for the Ovenbird: an experimental assessment of within-patch movement behavior

Connectivité fonctionnelle de paysages forestiers sous aménagement: évaluation expérimentale des mouvements de la Paruline couronnée à l'intérieur de parcelles

Catherine Geoffroy, Marc-André Villard, and Marc Bélisle

[Avian Conservation and Ecology 16\(2\): 6](#)

Why is the Common Grackle becoming less common?

Pourquoi le Quiscale bronzé devient-il moins commun?

Noah P. Horsley and Michael P. Ward

[Avian Conservation and Ecology 16\(2\): 7](#)

Residency patterns and apparent survival in a cavity-nesting bird: population consequences of nest-box supplementation revealed by a long-term study

Modèles de résidence et survie apparente d'un oiseau nichant dans les cavités : les conséquences des nichoirs supplémentaires sur la population révélées par une étude de longue durée

Francisco Valera and Radovan Václav

[Avian Conservation and Ecology 16\(2\): 8](#)

Neotropical bird communities in a human-modified landscape recently affected by two major hurricanes

Des communautés d'oiseaux néotropicaux dans un paysage modifié par l'être humain récemment touché par deux ouragans majeurs

Dallas R. Levey and Ian MacGregor-Fors

[Avian Conservation and Ecology 16\(2\): 9](#)

Regional variability in trajectories of Barn Swallow populations across Canada are not predicted by breeding performance

La variabilité régionale des trajectoires des populations d'hirondelles rustiques dans l'ensemble du Canada n'est pas liée à la performance reproductrice

Julia E Put, Greg W Mitchell, Nancy A Mahony, Jeffrey Costa, Tara L Imlay, Scott Bossuyt, Chloe K Boynton, Gary Burness, Dean R Evans, Keith A. Hobson, Jackson W Kusack, Olga Lansdorp, Ariel K Lenske, Beverly McClenaghan, Erica Nol, Antonio Salvadori, Adam C Smith, Tony D Williams, Rebecca Whittam, and Michael D Cadman

[Avian Conservation and Ecology 16\(2\): 10](#)

Habitat selection and interspecific competition between Sylvia warblers in Cyprus following the rapid expansion of a recent colonizer

Sélection de l'habitat et compétition interspécifique entre les fauvettes des jardins à Chypre à la suite de l'expansion rapide d'une espèce colonisatrice récente

Nikolas Papanikolas, Thomas G. Hadjikyriakou, Matteo Sebastianelli, and Alexander N. G. Kirschel

[Avian Conservation and Ecology 16\(2\): 11](#)

Secretive marsh bird habitat associations in the Mississippi Flyway: a meta-analysis

Associations entre l'habitat et les oiseaux de marais discrets dans la voie migratoire du Mississippi : une méta-analyse

Kristen M Malone, Elisabeth B Webb, Doreen Mengel, Laura J Kearns, Sumner W Matteson, and Ann E McKellar

[Avian Conservation and Ecology 16\(2\): 12](#)

Grassland bird diversity and abundance in the presence of native and non-native grazers

Diversité et abondance des oiseaux de prairie en présence d'herbivores indigènes et non indigènes

Andy J Boyce, Hila Shamon, Kyran E Kunkel, and William J McShea

[Avian Conservation and Ecology 16\(2\): 13](#)

Diurnal and nocturnal habitat preference of Eastern Whip-poor-wills (*Antrostomus vociferous*) in the northern portion of their breeding range

Les préférences d'habitats diurnes et nocturnes de l'engoulevent bois-pourri (*Antrostomus vociferous*) dans la partie nord de leur zone de nidification

Elora R. M. Grahame, Kayla D. Martin, Elizabeth A. Gow, and D. Ryan Norris

[Avian Conservation and Ecology 16\(2\): 14](#)

Factors affecting intentional bird poisoning on bean farms in Taiwan: seeding methods and the presence of adjoining duck farms matter

Facteurs qui affectent l'empoisonnement intentionnel des oiseaux dans les exploitations de haricots à Taiwan : les méthodes d'ensemencement et la proximité d'élevages de canards jouent un rôle

Shiao-Yu Hong, Hui-Shan Lin, Yuan-Hsun Sun, and Jo-Szu Tsai

[Avian Conservation and Ecology 16\(2\): 15](#)

A fisheries take on the fishy decision to implement a Double-crested Cormorant cull in Ontario

Steven J Cooke

[Avian Conservation and Ecology 16\(2\): 16](#)

SCO – SOC Information

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Henri Ouellet	1994-1996	Susan Hannon	2006-2008	Colleen Barber	2018-2020

Membership Information

www.sco-soc.ca/membership.html

SCO-SOC membership forms can be found at the link above. Current membership rates are as follows:

Student	\$15.00/year
Early Career (<5 y post-grad)	\$25.00/year
Retired	\$25.00/year
Regular	\$35.00/year (\$45.00/year international)
Sustained	\$75.00/year
Life	\$500.00

SCO-SOC Website

www.sco-soc.ca/index.html

The SCO-SOC website includes sections on membership, meetings, news, publications, awards, information for students, an overview of SCO-SOC, and links of interest to members and other visitors.

Please direct any suggested additions or edits to the website to the Society's webmaster, Jennifer Foote, at jennifer.foote@algomau.ca.

Submissions to *Picoides*:

Articles and photos relevant to Canadian ornithology are welcomed by the editors. If submitting photos, please save them in tiff or jpeg format with descriptive file names, and supply captions including common names of species, location, date, photographer, and any other notes of interest. Deadlines for submission are February 15, May 15, and October 15; issues are typically published 4-6 weeks later. Please send all submissions to Rob Warnock at warnockr@myaccess.ca.

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