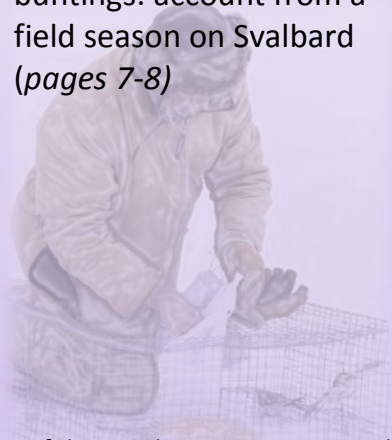
5 T H A N N U A L N E W S L E T T E R

The Snow Bunting Report

Canadian Snow Bunting Network

Highlights



Edition of the newsletter: Marie-Pier Laplante

Welcome to the 5th annual newsletter

We are happy to present the fifth edition of the Canadian Snow Bunting Network Newsletter! Thank you to all of you who have in some ways participated to this project since its establishment. **Last season, we have collectively banded over 18 000 birds**! What a fantastic season it has been and we are now looking forward to another fun winter of banding.

Follow us and share your bunting observations on the CSBN Facebook page at: www.facebook.com/SNBUnetwork

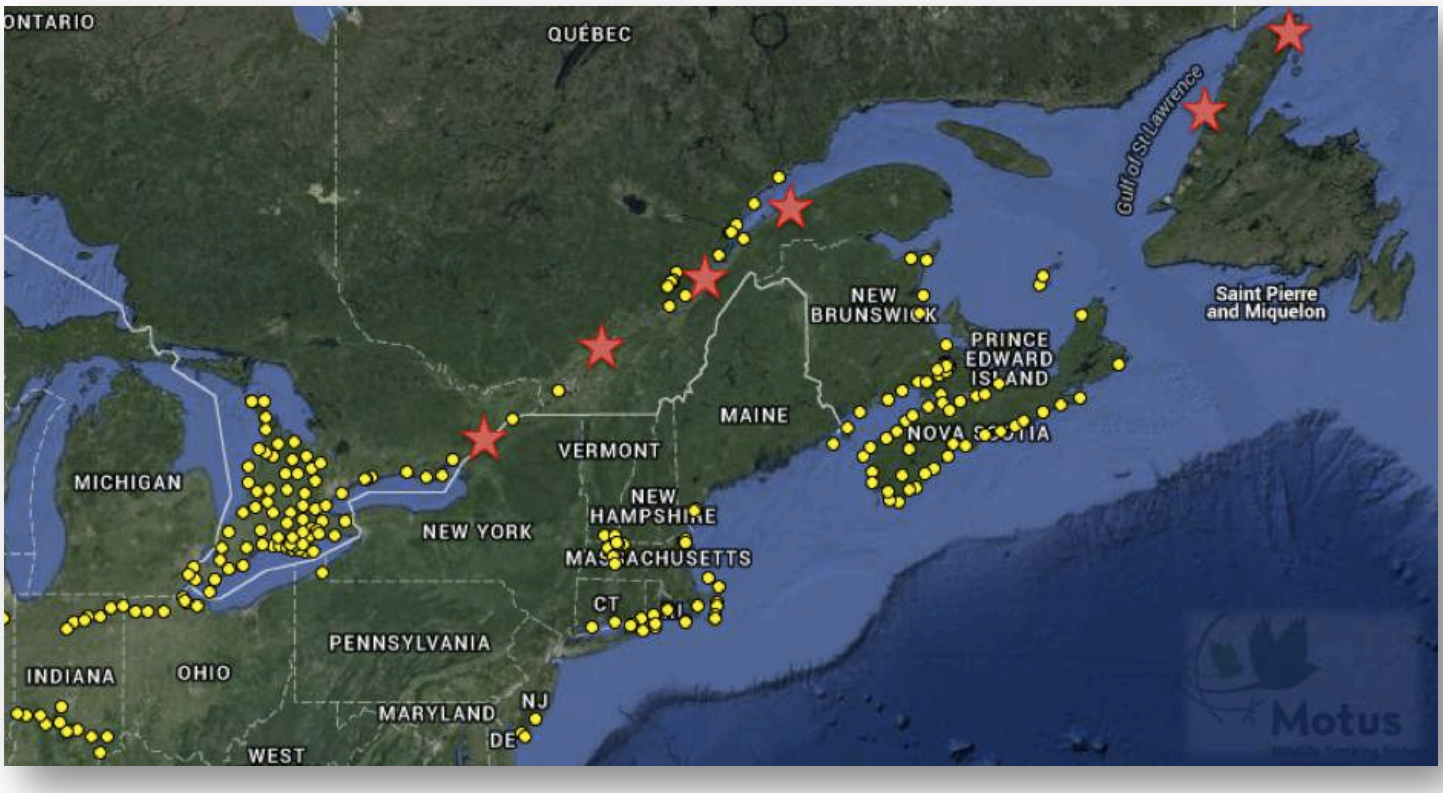
Don't forget to send your banding updates to blog Master Rick Ludkin to post on the CSBN blog (rludkin[AT]hotmail.com) (www.ruthvenparknatureblog.com)

Any questions about Snow Bunting research in Canada? Contact Oliver Love at the University of Windsor (olove[AT]uwindsor.ca)

Using the MOTUS array to track real-time winter movements of Snow Buntings

Oliver Love – Associate Professor, University of Windsor

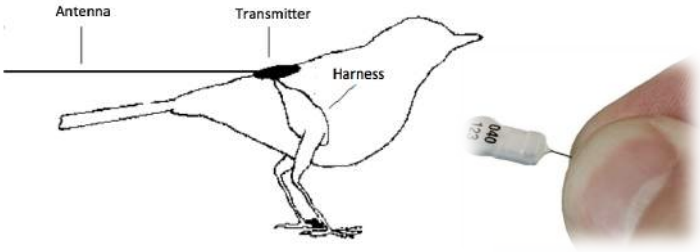
CSBN researchers and volunteer banders have collectively banded over 40,000 buntings over the past 5 winters! In this short amount of time, we have learned a huge amount on the way of life of this fascinating species. We now know that (i) we can successfully band many individual buntings within a winter, (ii) that these birds seem to move quite a bit spatially even within a few weeks and (iii) these movements also seem to be sex- and age-specific. However, while the banding recaptures between CSBN banders have offered great insight on the extent of winter nomadism in this species, we never had a way to track these movements in real-time at a fine-scale. But... That is… until now! Enter the MOTUS Tracking Network (http://motus-wts.org), a collaborative effort between Bird Studies Canada, Environment Canada and multiple Universities to track the migration and movement of birds and bats across Eastern Canada and the US. The MOTUS network currently consists of over 200 automated VHF radio-receiving stations (see the map below) that receive signals from tiny transmitters carried on the backs or legs of passerines, shorebirds and bats. When the telemetry data from multiple towers is looked at collectively, it can reveal patterns of migratory timing, migratory route and potentially even fine-scale, real-time space use within the network. The latter goal is what CSBN coordinators Marie-Pier Laplante (MSc student at the Université du Québec à Rimouski (UQAR) and the University of Windsor) and Dr. Emily McKinnon (MITACS post-doctoral fellow at the University of Windsor) are hoping to begin achieving this winter with our buntings.



Current MOTUS receiving stations (yellow dots)
New stations to be added to the network in 2016 to support Snow Bunting research (red stars)

In collaboration with the MOTUS network and CSBN banders, our lab is deploying six new receiving towers this winter (see red stars on the map above): two towers in Newfoundland and Labrador with CSBN bander and Park's Canada collaborator Darroch Whittaker, three towers along the Saint Lawrence river in Québec with CSBN members Marie-Pier Laplante and Jean-François Lamarre, and one tower in South-Western Ontario with MOTUS technical director Stu Mackenzie and CSBN banders David Lamble, Nancy Furber and Rick Ludkin. We are also very fortunate to have help from long-time CSBN bander Yann Rochepault who is deploying a tower of his own in Magpie, Québec.

In early January 2016 (and again in 2017 and 2018) we will be deploying between 40-80 Avian NanoTags (photo below) on Snow Buntings between southwestern Ontario and Rimouski, Québec. The units will be mounted as back-packs in much the same way as our past work using Geolocator units that tracked the large-scale migratory movement of buntings breeding at East Bay, Nunavut.



The goals of this MOTUS-based work are to assess (i) over what distances do individual birds move throughout the winter, (ii) if and how birds respond to winter storms and (iii) to track the timing of spring migration across sexes and age classes. Since the NanoTags weigh less than a quarter of a gram, we expect little effect on the natural behaviour of our birds, a welcome piece of information for both CSBN researchers and banders. We hope for the first time to be able to report how these wintering populations respond to rapidly-changing weather conditions, and to accurately estimate just how much they roam during a given winter.

The data generated will be of importance not only to researchers and conservation managers, but will offer a fascinating insight into the little-known lifestyle of this highly nomadic winter visitor. Check back in next year for a full update, and stay tuned on the CSBN Blog for news bites on our success as the winter progresses!

Above Left: projected tower set-up on top of UQAR roof (planned for January 2016)
Above Right: The ''Sensor Gnome'' is the radio-receiver that connects to the antennas and records signals emitted by tagged birds

Above Left: Location for new receiving station in St-Jean-Port-Joli, QC. Antennas will be strapped to the cement structure as shown by the picture on the right.

Who goes first? Understanding sex and age patterns of migration timing in Snow Buntings

By Emily McKinnon, MITACS Postdoctoral Fellow

Migration is one of the most complex behaviours in the natural world. Birds like Snow Buntings have to figure out where to go, how to get there, how fast to travel, and importantly, *when* they need to go. The timing of migration is key because if Snow Buntings arrive at their breeding sites too early, they could be wiped out by a late winter storm. If they arrive too late, the rock crevices that they nest in might be filled by earlier arriving birds! In the European Pied-Flycatcher, a mismatch in migration timing has led to birds arriving after their preferred food has peaked, and thus the adults cannot produce as many young, and the population numbers have declined. Therefore understanding patterns in migration timing is key for predicting the effects of a changing climate on migratory birds.

We studied Snow Bunting migration phenology (a.k.a., timing) by examining banding records (from Thunder Cape Bird Observatory, Ontario; Rivière-St.-Jean, Quebec; and East Bay Island, Nunavut) and by using geolocators to directly track different sex and age-classes during fall and spring migration.

Our goal was to provide some baseline information on these patterns so that changes in response to a warmer climate in future would be detectable.

Snow Buntings are known to be harbingers of spring at their northern breeding sites. It has been noted that males can arrive up to 6 weeks in advance of females! Patterns in fall migration are less well studied. Sometimes male birds might remain longest at breeding sites to 'stake out' their claim to territories for the next year. If this were the case with buntings, we would expect females to arrive first at their wintering grounds. First year birds are generally less experienced than adults, so we predicted that they would trail the adults in fall and in spring.

Our results were rather surprising! We found that in fall, there was a lot of variation in timing from year to year, but that overall, young birds (hatch-years) arrived before adults of both sexes. Males tended to pass through fall banding stations first, but this varied in different years. In spring, males did precede females during early migration; but by late migration and at arrival at breeding sites, male and female timing was not very different (Fig. 1).

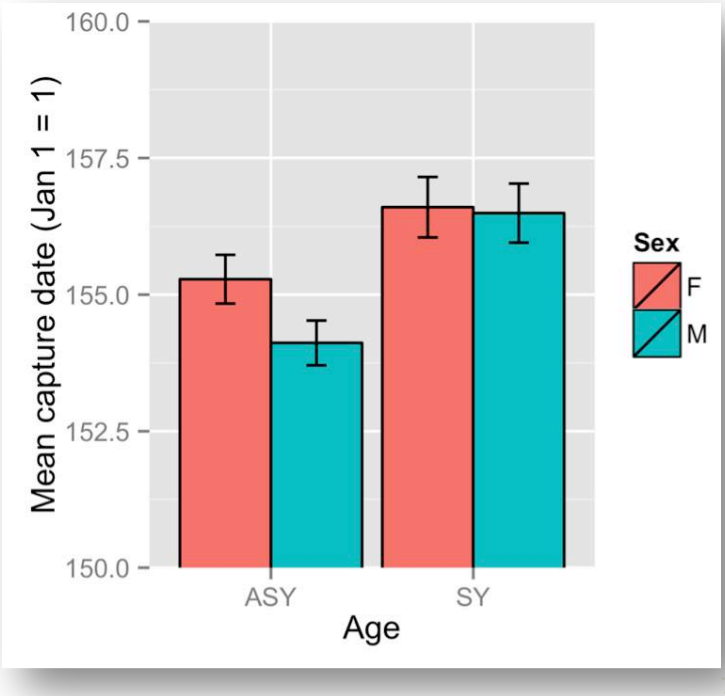


Fig. 1. ***Mean capture dates of Snow Buntings by age (ASY = after-second year, SY = second-year) and sex at East Bay Island during late migration. These birds were not local breeders, but were passing through the island on their way to breed further north.***

We did not detect the huge differences (e.g. 6 weeks) reported between male and female timing. There could be a couple of reasons for this. First-arrival records (first bird seen of the season, for example) are not necessarily reflective of the *average* arrival timing of birds. A lone male might arrive 6 weeks before any females, but the majority of males might arrive closer to when the females show up, leading to very little difference in timing, on average, as we found. Another hypothesis relates to our previous work, which showed that female birds in winter are limited by temperature.

Many of us have noticed that winters are warmer, and this may relieve some of the constraints on females, allowing them to advance their migration timing in spring and get to breeding sites sooner.

Overall, our results, based on both banding efforts and geolocator-tracking, gave us new insight into the patterns in migration timing for Snow Buntings. Stay tuned for more tracking data next year as we are deploying radio-transmitters (MOTUS network) in Ontario this winter to track birds over the winter period and into spring migration!

For more information on this work, keep an eye out for:
McKinnon, EA, Macdonald, CM, Gilchrist ,HG, and OP Love.
Spring and fall migration phenology of an Arctic-breeding passerine.
In Review. Journal of Ornithology.

The joy of being outside on a cold winter day… Have fun with the birds!

Following buntings to the top of the world!

By Marie-Pier Laplante, MSc student at the University of Rimouski and editor of the Snow Bunting Report

The first time I heard about Svalbard, I was in my first year of undergrad in Geography. I had the privilege to have been taught classes such as ''The Circumpolar North" or ''The Canadian Arctic'' by a very old-fashioned white-bearded man who had done part of his PhD studies in Longyearbyen, the main town on Svalbard. He was the kind of teacher who would show us black and white acetates of Northern landscapes on a projector, draw cool Inuit tools with great attention on the board and give us a few bonus points in exams when we could say a few words in Inuktitut, the traditional language spoken by the Inuit. I admired his true passion for the North and I also greatly appreciated his story-telling way of teaching. He would talk about Svalbard whenever he'd get a chance. I vividly remember him mumbling Norwegian words and I could feel how much this place had grown on him. Somehow I just knew all along that I would at some point in my life go see that special place for myself.

When I became aware of the Norwegian Snow Bunting Project in Svalbard last year, I thought: well, there you go, here is my gateway to Svalbard! Frode Fossoy, the lead researcher on this project, was greatly enthusiastic and welcoming in my coming to participate in a field season with him and his team when I first contacted him. I could barely believe it: I was going to follow the buntings to the top of the world! Having spent so much time with these birds in their winter world, I was thrilled to get to see another angle on their way of life.

The first days on Svalbard were blissfully unsettling. Having never experienced the true High-Arctic tundra, the absolute absence of trees, the smell of mosses mixed in with the cold oceanic breeze and the polar sun shining all the way through the night bewildered me and left me speechless. It felt like another planet. Animal species diversity was low, but obviously very different than what is found at home, abundant and ubiquitous. Reindeers were all over the valley surrounding Longyearbyen, grazing peacefully. An enormous Common Eider colony was settled in the village cooing their heart out in perfect vibrance. Being patient enough, an Arctic fox would eventually show up and disrupt the relaxed nesting ambiance to steal a few of these nutritious green eggs. Thousands of Little Auks (Dovekies) nested in the cliffs down the road from our camp. The landscapes were breathtaking. The mountains were unlike any of those I had seen before, showing a characteristically pointy shape and transpiring a particularly mystical energy. The several icebound streams and glaciers encircling the fjords were reassuring and inspiriting.

And not without mentioning… the little sparrows of the North! Only once had I heard the Snow Bunting's song live, when a lost soul longing for some music began singing in the midst of a cold February day right on top of the trap while I was out banding. The buntings were singing with joy all over town and the valley. Everywhere I looked was a Snow Bunting. Such a high density of breeding buntings offers a great study area for researchers like Frode.

In the field, we did a number of things and put special focus on monitoring reproduction. Part of the nests we followed were located in nest boxes built especially for the buntings. Those boxes were mounted on old threstle lines in the valley that were used for coal transport back in the 1940's. The boxes offer a safer place for the birds because they are not accessible to fox predation. Natural nests were very hard to find! Fortunately, they tend to reuse the same entrances over the years, so GPS points were useful for finding nests. Buntings nest in crevasses, boulders and piles of rocks, but they also take great advantage of human structures. For example, they absolutely loved nesting in ski-doo engines… and would not mind raising a family on a dumpster bin! We would visit the nests every couple of days to count the number of eggs, band the nestlings, and take measurements and blood samples.

At the beginning of the season, we invested a lot of energy in resighting the ''pinky birds'' from the previous season. All the birds that had been mounted with geolocators the previous summer indeed were wearing a pink color-band… We were successful at recapturing all of the 6 birds that we had observed with their backpacks on (over 15 that had been mounted in total the previous summer). These birds show high site fidelity in the summer, and two of the birds we recaptured had been caught in the same box the previous season. It was an extremely exciting time!

We know for instance that the birds that spend their winter in Southern Ontario and Québec breed in Western Greenland… but the winter quarters and migratory routes of the Svalbard-breeding buntings were unknown! Because the results are not published and that Frode and his team wait for more returns, it is tricky for me to provide much information on the results now, so stay tuned to the CSBN facebook page and blog for the mystery being unfolded soon! As well, we were able to capture several new adults and mounted over 20 new geolocators. Hopefully, several of these birds will show up again in the valley so we can remove their pack and access this precious information.

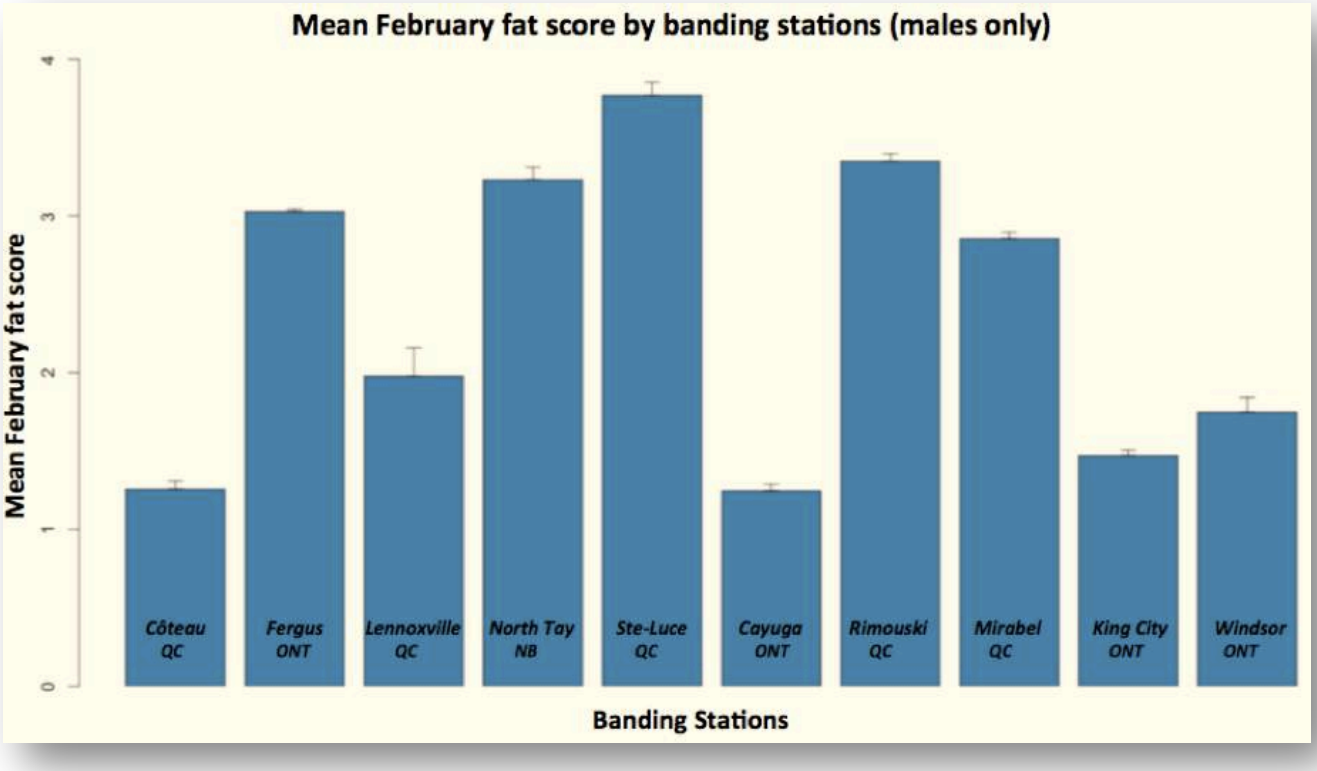
Left page / up: 8-day-old (left) and recently fledged bunting (right)
Left page / bottom right: Searching for nests is like searching for a needle in a haystack!
Right page / upper left: Female with geolocator
Right page / upper right: nest box with a great view
Right page / bottom left: nesting in the ski-doo engine!

Fattening up for the harsh winter: mean mid-winter fat score among CSBN stations

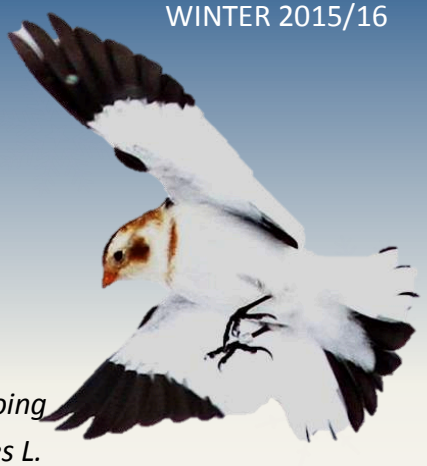
By Marie-Pier Laplante, MSc student at the University of Rimouski and editor of the Snow Bunting Report

Many resident passerines are known to increase fat storage as mid-winter approaches. Fat reserves accumulated during the day act as the primary source of energy to survive the night ahead and offer a safety margin against starvation in case access to food becomes restricted. Like many resident songbirds, Snow Bunting's winter acclimatization involves a seasonal increase in energy reserves. One study from Scotland has shown that Snow Buntings wintering in a snowier and colder site carried on average more fat and were heavier than birds spending their winter in mild coastal locations. Well, data collected by the CSBN banders confirm this phenomenon on a much larger scale. As you can see from the graph below, Oliver, Nancy and Rick's birds in Windsor and Cayuga don't need to carry as much fat as our birds here in Sainte-Luce and Rimouski... Indeed, the latter locations are located further North in Québec, where winters are colder and snowier. When a bird carries large fat loads, it is more vulnerable to being predated because the extra weight decreases flight maneuverability. As well, by being out foraging for food to fatten up, birds increase their exposure to predators. As such, fattening can be seen as a trade-off between starvation and predation. It is therefore a wise decision for Southern Ontario buntings to avoid becoming little fat balls if they actually won't need it to survive!

Banders assess fat score on a scale of 0-6



Graph showing the mean February fat score for males banded by CSBN banders. Birds banded in areas where winters are more severe (colder and snowier), such as the Sainte-Luce site, tend to accumulate more fat. These reserves are used during the long and cold night of fasting and act as an emergency source of energy in case a snow storm prevents access to food.



Special thanks goes out to…

… all the banders that have contributed observations and data to this ongoing research and collaborative conservation program. Thanks also to the James L. Baillie Memorial Fund of Bird Studies Canada, the Wassefall Fund of the Ontario Bird Banding Association, Environment Canada, the University of Windsor, the Nunavut Research Institute, and the Nunavut Arctic College for their funding and logistical support.

Have a great banding season!

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