

Snow Bunting Report

Canadian Snow Bunting Network



Editor of the newsletter: Marie-Pier Laplante

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- ❖ Oatmeal and Snow Buntings: insights from the Scottish Highlands (*page 4*)
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- ❖ Test your vocabulary with a thematic bunting crossword! (*page 8*)



Welcome to the 6th annual newsletter

Happy winter Snow Bunting enthusiasts! This year it does seem like winter truly is upon us, which is good for our bunting trapping and tracking work (see pages 2-3). We have already deployed MOTUS tracking tags on Snow Buntings in Fergus, Ontario, at David Lamble's site, which means interesting data on winter movements of Snow Buntings will be coming in over the next few months. We will post updates on the tracking work on the Snow Bunting Facebook page - please check in and post your own sightings, banding observations and photos, etc. at www.facebook.com/SNBUnetwork!

In this issue, Emily McKinnon shares the results of last year's radio-tracking of Snow Buntings on the MOTUS network. Marie-Pier Laplante is nearing completion of her Masters project on wintering buntings - read about her interesting and important results in this issue. We've also brought you a tale of Snow Bunting research from across the pond, summarized by McGill Bird Observatory's Marcel Gahbauer. We hope you enjoy this report, and we'd love to hear your updates - post on our Facebook page!

Year 1 results: Tracking Snow Buntings by using the MOTUS radio-telemetry network

Emily McKinnon – Postdoctoral fellow, University of Windsor

It almost didn't happen at all, thanks to a record-warm winter throughout southern Ontario in 2015-16. University of Windsor Professor Oliver Love, his technician Chris Harris and myself were excited to deploy 40 radio-tags on overwintering Snow Buntings within the Motus Wildlife Radio-tracking Network. With the support of Stu Mackenzie of Bird Studies Canada, we were eager to try out this tracking system. The premise is that we put the tags out on individual birds using a small back-pack style harness. The birds are then released and the tag emits radio beeps that are recorded by the many Motus receiving towers all around southern Ontario, along the Saint Lawrence, and into Newfoundland (see locations of all towers at www.motus-wts.org). The advantage over traditional radio-tracking is that the towers are passively receiving and so we don't need to go chase around the birds with a hand-held antenna. This way, we can record long-distance movements that would be impossible to detect otherwise.

Our project goals were twofold: 1) Document the patterns of winter movements – how far do they go? Do males move more than females? Do they range further later in the winter, as spring migration approaches? Second, our goal was to try to quantify the weather conditions correlated with movements. Is there a threshold of temperature or snowfall that sends buntings packing further north or south? We know from Université du Québec à Rimouski Masters student Marie-Pier Laplante's analysis of the banding data that Snow Buntings do move substantial distances between sites in the winter – see Marie-Pier's map of within-season recaptures of birds travelling more than 100km on page 5.



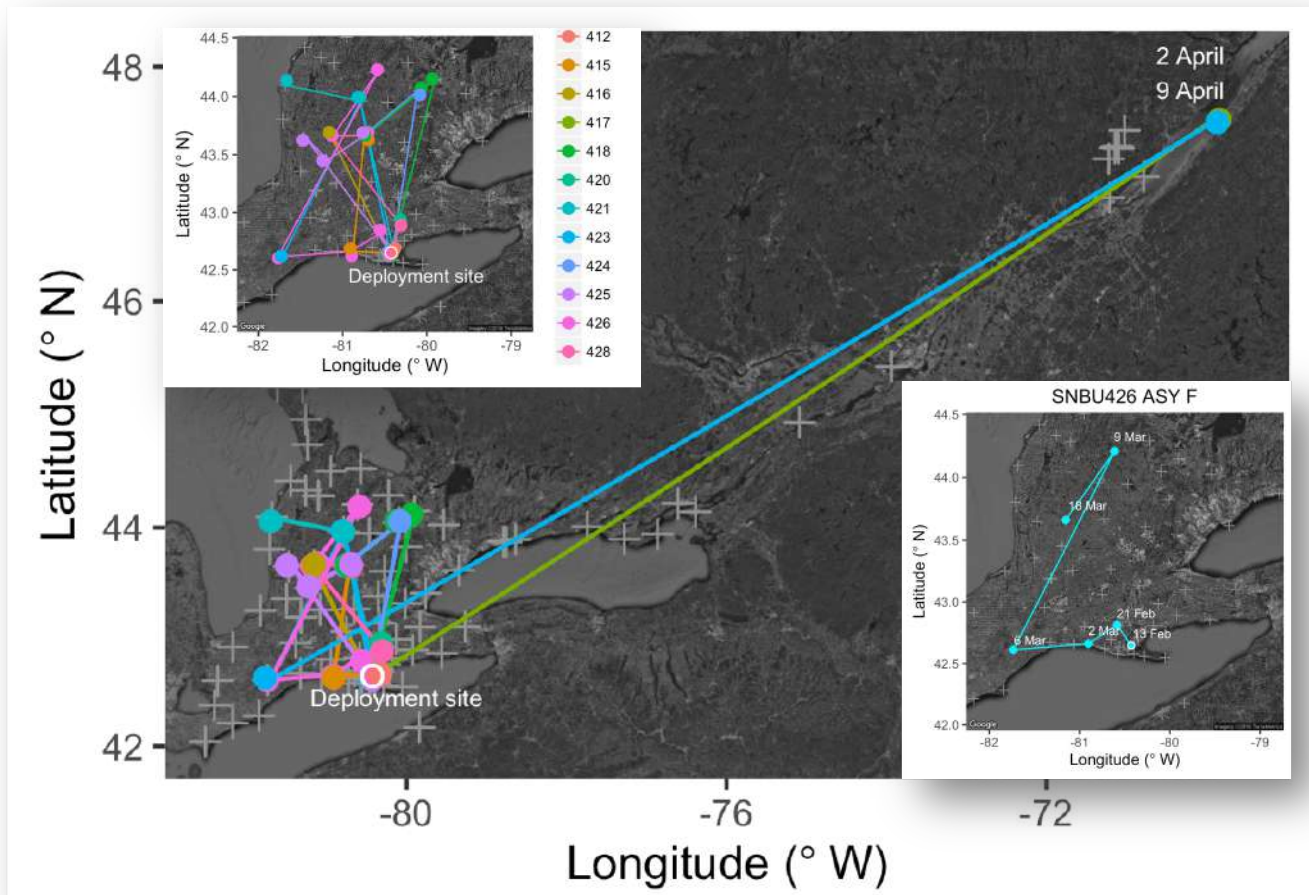
Deployments at Saint-Williams with David Okines in Feb 2016

Back to winter 2015-16. Unfortunately, we picked a 'bad', i.e. warm, winter to start this project! By January, there were still very few Snow Buntings being banded in southern Ontario. Finally, in February we got a big cold snap around Valentine's Day. It was a 'now or never' situation! A last minute scramble ensued, we got the tags activated with help from Stu at BSC, and I met up with David Okines in Saint Williams, who was getting some good Snow Bunting action. Since it was so late in the season, we decided to deploy only 20 tags, which David and I managed to do in no time. We were lucky to get the birds when we did- only a few days later, Ontario was breaking warm-weather records again with temperatures into the teens! So what did the tagged buntings do?



Female bunting with the nanotag backpack

I eagerly checked my computer daily for detections of the birds (many of the towers are 'live', i.e. connected to the internet, so detections are automatically posted online). Starting with a single blip near the deployment site, detections start to roll in. Amazingly, with just about 6 weeks of winter left before Snow Buntings would start migrating, we recorded 12 of 20 of our buntings on at least one receiving tower, on average about 80km away from our deployment site! In early April, we even got two males on spring migration, detected at Kamouraska in Quebec! These birds are likely headed to breeding sites in Greenland. Another interesting bird was an ASY female (tag 426), who covered over 400km within a month, ranging all over southern Ontario – see map of her movements below.



Another surprise was that the birds were relatively synchronous. We had several birds show up at the same tower, 3 within the same 24 hour period, and 2 others together at a different date (but the same week). The tower was just north of Fergus, ON, so maybe they were all on their way to David Lambie's place, which we know is a popular Snow Bunting hangout! Since we only put out 20 tags, and the winter was a little anomalous, we are hoping this year's data will help us answer some important questions about the weather patterns that birds are

tracking. Thankfully, it's a much more wintry situation in southern Ontario this year, and on Christmas Eve Eve, I was able to join up with Dave Lambie in Fergus, ON, to deploy 20 more tags on buntings. Now we have the whole winter for data to accumulate from this birds – it's the Christmas present that keeps on giving! Stay tuned for our next update, or you can always email me if you have any question or comments! I will post any updates on the Snow Bunting Facebook page, so check it frequently! Emilymckinnon12@gmail.com



Left: David Lambie provided the buntings for our Christmas Eve deployments.

Center: The only give away that this is Fergus, ON and not the North Pole is the trees.

Right: Snow Bunting selfie during deployment of tags, Dec 2016 in Fergus.

Oatmeal and Snow Buntings: insights from the Scottish Highlands

By Marcel Gahbauer, founder of the McGill Bird Observatory and biologist at Stantec

The influx of research by members of the Canadian Snow Bunting Network (CSBN) in recent years has already yielded many new insights into Snow Bunting ecology and behaviour. But it can still be informative to look into older research on the species – including studies conducted overseas. A good example of this is the paper “Age, sex and prior site experience have independent effects on the foraging success of wintering Snow Buntings” by Richard Smith and Neil B. Metcalfe, published in 1994 in V. 129 (p. 99-111) of the journal *Behaviour*.

The authors conducted their research over three winters at Cairn Gorm in northeastern Scotland. The latitude of approximately 57°N is on par with northern Labrador and Fort McMurray, while the elevation of up to 1200 m is a fair bit higher than most (perhaps all?) CSBN sites. The first two winters were the “carefree” banding phase, during which hundreds of Snow Buntings were ringed (as they would say in Scotland) and individually colour-marked. Then the researchers committed themselves to a much heavier load in year three, by continuing the existing program but also setting up a feeding platform and recording detailed time budgets by individual. Being a good Scottish study, the food they provided was oatmeal! Given the latitude and altitude, no other species were attracted to the feeder until a few Chaffinches showed up in late winter, making it easy for the study to focus purely on intraspecific comparisons.

So what does one learn from months of watching marked Snow Buntings coming in for their oatmeal fix? Well, they clearly are focused on eating when they show up – that accounted for 86% of their time at the feeding platform. Another 12% was categorized as vigilance, whereas other activities such as preening were clearly reserved for elsewhere. Not surprisingly, birds on the periphery of the group tended to spend more time on vigilance than those near the centre. Have you ever wondered how frequently a Snow Bunting

pecks for food? Okay, I hadn’t either – but fortunately the authors have counted so that we don’t have to (well, unless you feel compelled to assess whether Canadian Snow Buntings eat faster or slower than their Scottish counterparts ... 82.8 pecks per minute is the benchmark for comparison).

Of course a key goal of colour-marking was to allow the researchers to further analyze results by age and sex. One of their key findings was that among solitary birds, those which had been at the site in a previous winter had a 9% higher peck rate – but within a flock it was adults (AHY/ASY) that pecked 8% faster than juveniles (HY/SY). Of course age and sex are highly correlated, since juveniles could not have been present the winter before, but the authors dug deeper by exploring residual statistics and determined that both variables had a measurable effect. Going further still, when they controlled for both age and experience they found that males pecked 27% faster than females within large flocks. Lastly, they reported that inexperienced birds gained foraging efficiency over the course of the season, while experienced birds tended not to.

What can be inferred from the results? The faster pecking rate of males in large flocks suggests that competition can affect feeding efficiency.

The differences by age and experience could be related to learning, but the authors believe it is more likely that the older and more experienced birds foraged more efficiently because their greater familiarity with the site allowed them to reduce their vigilance – basically, they felt more relaxed. So... how does your local Snow Bunting site measure up by those standards?



Using banding data to understand winter movements and fattening dynamics in Snow Buntings

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

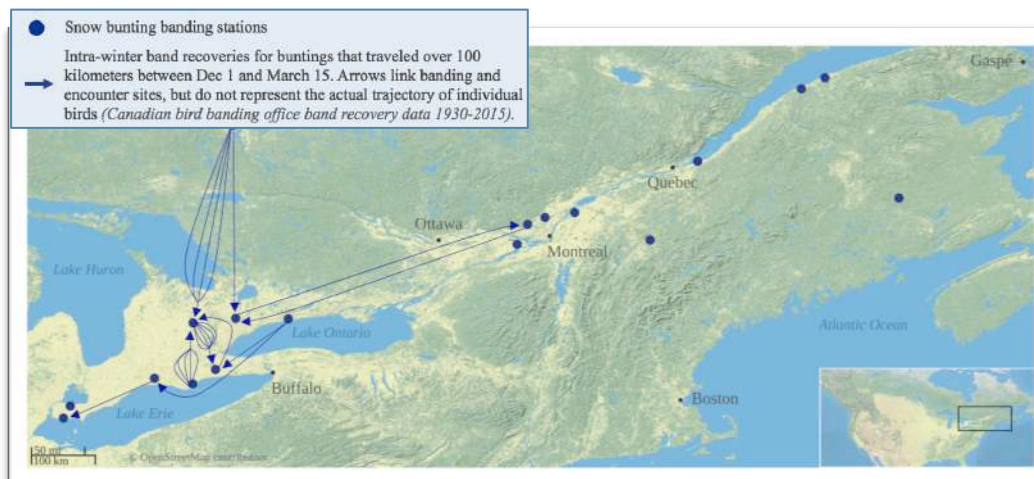
Over the last two years, I used the CSBN banding dataset to answer the central questions of my MSc thesis. I always felt thankful for having access to this precious source of information and it has been a huge motivation for me to make these data mean something for the hard-working people who collected them. My project involved the study of two facets of Snow Bunting's winter ecology, namely winter fattening and within-winter migrations. And here are some of the main findings of my studies on those two topics!

Snow Bunting flock composition at a given site changes in the course of a winter

There has been an important increase in the number of intra-winter band recoveries for Snow Buntings since the CSBN was established in 2009. In fact, over 75 % of these recoveries are from after 2009 in the banding office recovery database (which dates back to 1930)! Below is a map of the intra-winter recaptures among CSBN stations (> 150 km). My aim was to use the banding data to determine the influence of weather in driving winter movements in buntings. To do that, I looked at daily fluctuations in flock composition in terms of age and sex at David Lamble's site over the years he has collected data. The proportion of ASY / SY birds found in the flock at the Fergus site did not change

over the course of a given winter. However, there were clear changes in terms of sex ratio and size (wing length) of birds banded throughout the season. In fact, what I found is that on days where the weather was very severe (i.e. very cold and snowy), David's catches would be composed of a greater proportion of males, and also of structurally larger individuals.

We know that smaller-size organisms lose more heat per unit mass and are therefore not as tolerant to cold weather. We think that those daily fluctuations in the size of birds banded in Fergus may be an indication that on days where the weather is too cold, females and small males move towards warmer climates to avoid low temperatures. Knowing that in Snow Buntings, males are dominant over females and more efficient at feeding, we think that daily change in sex ratio could also be explained in the context of social dominance. For example, on a day where it's very snowy, females might be unable to access food owing to male's control over resources. This may force females to move to areas where milder conditions will allow them to feed. This is a first step and an indirect approach to assess causes of intra-winter migrations. Dr. McKinnon's work on the Motus will reveal more direct information on the influence of weather in driving departure decisions in these buntings.



Buntings adjust daily fat levels based on local weather throughout winter

The second part of my thesis had to do with winter fattening, which I introduced in last year's newsletter. Let's recall that fattening is a strategy used by several passerines to increase their chances of survival in winter. Accumulated fat during the day allows birds to survive the long, cold night ahead but also acts as safety margin in case storms impede access to food. What I found is that not only do Snow Buntings increase their fat load as mid-winter approaches like other resident songbirds, but they also have the ability to perceive subtle changes in weather and use these cues to adjust their fat load on a daily basis. As such, using all CSBN stations combined, I found that on days where the weather is harsh (i.e. cold, windy, snowy, cloudy), birds had higher energy reserves than on days where the weather was mild. This relationship shows that birds fatten strategically. These guys just know that they should fatten more on days where the weather is severe because demand for insurance against starvation is greater. On the other hand, birds rather minimize their fat load when the weather is mild. By doing that, they reduce predation risks that are associated with carrying extra fat (i.e. impaired flight abilities).

Birds increase energy reserves with increasing latitude & climate harshness

Following up on last year, my results also show that fatter birds are found in more northern locations, where winter snowfall is the greatest (fig. 1). Greater energy reserves allow to cope with increased



starvation risk attributed to unpredictable and rigorous winter conditions such as important snowfall that can cover food resources.

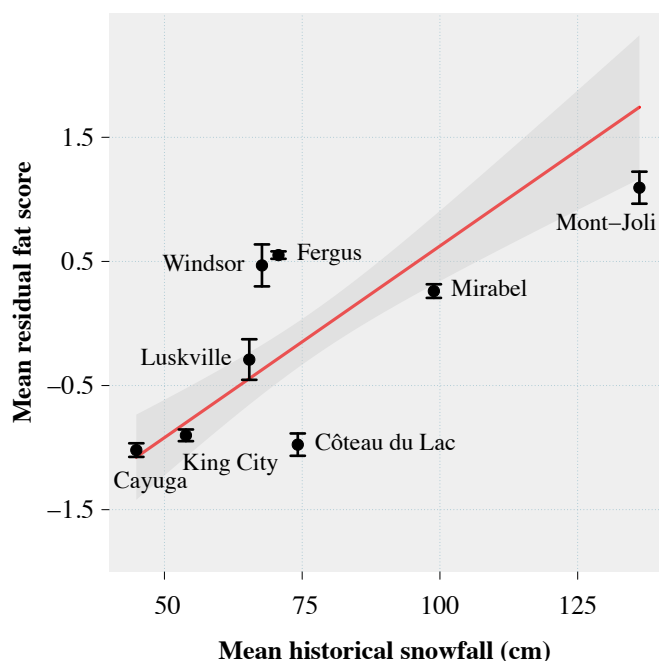


Fig. 1. Mean residual fat score of Snow Buntings per location (correcting for structural size and time of capture) in relation to historical total snowfall at the associated sites

Females are fatter than males

Lastly, I found that females always carry greater energy reserves than males for a given location (fig.2). In several winter-flocking passerines, it is common for dominant individuals (e.g. males) to carry less fat than subordinates (e.g. usually females and younger birds). The theory proposed is that given their priority over food resources, higher-ranked birds can afford to carry less fat -and therefore reduce mass-dependent costs- because they are more likely to have access to food when they return foraging.

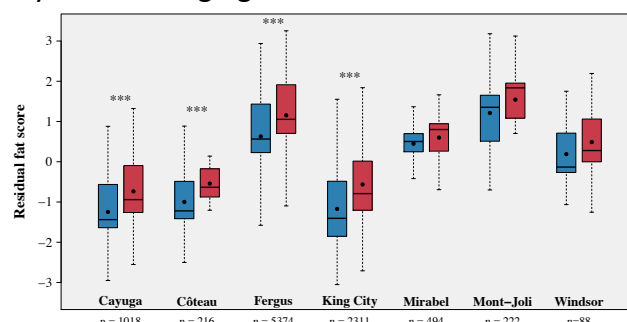
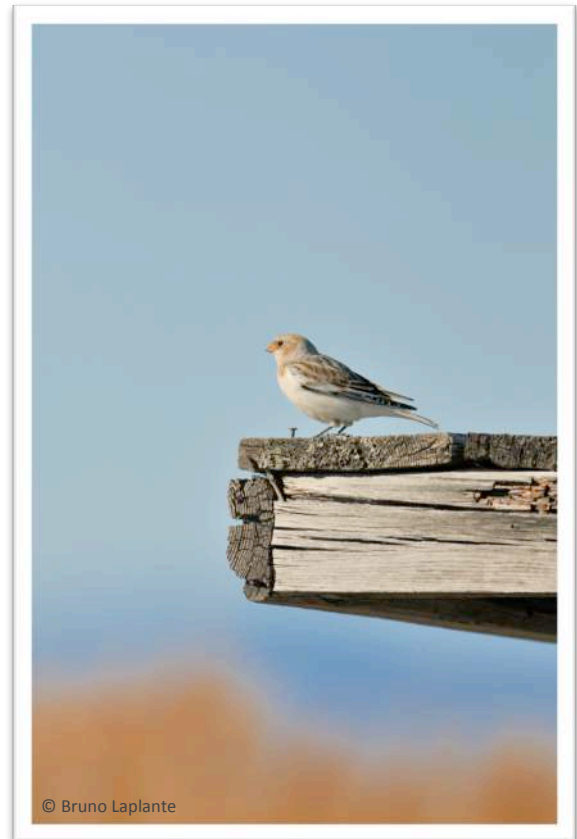


Fig. 2. Mean residual fat score of males VS females per location. Females are always fatter. Points show the mean for each boxplot and stars show how statistically significant the difference is between sexes.

Thanks to the data collected by the network, we were able to contribute together to expand knowledge on Snow Bunting winter ecology. Climate models predict warmer and snowier winters for northern latitudes encompassing current Snow Bunting range. In this context, understanding birds response to winter weather is very important in order to predict how projected climatic changes may affect overwinter population dynamics in the future.



After all, I think that one of the greatest gifts my involvement in winter banding has brought me over the years is the joy of transmitting my passion to young and promising bunting-bander-in-training (Rose Berteaux on the picture).



Snow Bunting banding as part of the curriculum in a post-secondary wildlife program

By Josée-Anne Otis, teacher in the program "CFP en Foresterie de l'Est-du-Québec".

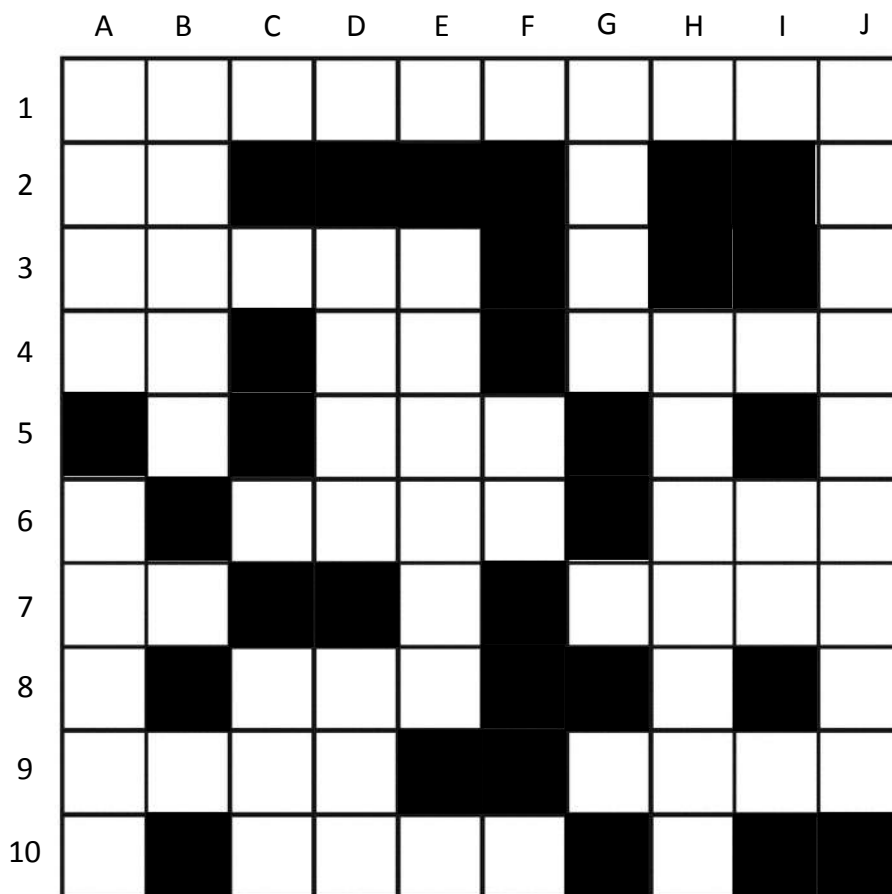
Newly this year, Snow Buntings will be captured along the Matapédia Valley in eastern Québec, more precisely around Causapscal. This initiative is taking place in the context of a course within a technical wildlife program for post-secondary students (CFP en Foresterie de l'Est-du-Québec). Our goal is to initiate students to bird research and help them develop their bird handling skills. We will

be helped by some regional bird enthusiasts to locate good trapping areas and establish bait areas. This first year of capture effort will determine the potential of the region for Snow Bunting trapping and research, and identify the bird's profile in our area. We will be staying in touch and hope to be back next year with exciting news!



Thematic crossword

Solution will be provided both on the Ruthven blog and Facebook page



HORIZONTAL

1. In late autumn, you can see this late-migrating shorebird feeding on beaches with groups of early arriving Snow Buntings **2.** Associated Press **3.** A favorite winter food of buntings **4.** Canadian program that allows individuals who have recently lost a job to receive temporary financial assistance | Chemical symbol for nobellium | Competent and skilled, up to the task **5.** Go overboard with sunbathing **6.** Female piglet parents | www.allaboutbirds.org/Snow_Bunting, e.g. **7.** American Ornithologists | "Not guilty", e.g. **8.** Banded in 1997 - Hatched 1995 or earlier **9.** Earth extremity | Garden annoyance, but the buntings love it **10.** Snow Buntings are a rare winter visitor in this American state

VERTICAL

A. Wise person | Snow Buntings sometimes feed on these winged stingers during summer **B.** The busiest Snow Bunting banding period in Minganie, QC. **C.** Three first letters of most bird band material **D.** Data or facts | Become solid **E.** Northern tip of this land is a famous migratory stopover for Snow Buntings **F.** Mythical city that was built on the coast of Brittany and later swallowed by the ocean **G.** Mauna Loa outflow **H.** Ideal piles for a breeding Snow Bunting. **I.** In music, D in French **J.** Arctic Island

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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