- By checking this box, I understand that I am required to contact the Inuit Research Advisor prior to submission of this research application and that all applications require 2 months (60 days) to be reviewed.

- By checking this box, I understand that completion of the NGRAC Research Compendium Form is a requirement of the approval process of the NGRAC.

**ARE YOU A NUNATSIAVUT GOVERNMENT EMPLOYEE?**

No

## Section A - Project Information

**APPLICATION DATE**

09/28/2020

**RESEARCH PROJECT TITLE**

Labrador Mystery Geese research and monitoring project

**PRINCIPAL INVESTIGATOR**

Regina Wells

**ADDRESS**

PO Box 1116, Stn. C
Goose Bay, Newfoundland and Labrador A0P1C0
Canada

**PHONE**

7098966236

**EMAIL**

regina.wells@canada.ca

**IS THE PRINCIPAL INVESTIGATOR A GRADUATE STUDENT?**

No

**ARE THERE PROJECT PARTNERS ASSOCIATED WITH THIS RESEARCH PROJECT?**

Yes

**NAME**

Meredith Purcell

**AFFILIATION**

Torngat Secretariat

**EMAIL**

meredith.purcell@torngatsecretariat.ca

**PHONE**

(709) 896-6780

**NAME**

Joseph Townley

**AFFILIATION**

NG

**EMAIL**

joseph.townley@nunatsiavut.com

**PHONE**

(709) 896-8582

**NAME**

Carla Pamak

**AFFILIATION**

NG

**EMAIL**

carla.pamak@nunatsiavut.com

**PROJECT DURATION**

Multiple Years

**HOW MANY YEARS DO YOU ANTICIPATE THE PROJECT TO RUN?**

4

**PROPOSED RESEARCH START DATE**

10/19/2020

**PROPOSED RESEARCH END DATE**

09/30/2024

**DO YOU HAVE ETHICS APPROVAL FROM AN APPROVED ETHICS AUTHORITY?**

No

**ARE YOU CONDUCTING ANY HEALTH RELATED RESEARCH?**

No

**DOES YOUR RESEARCH INVOLVE HUMAN PARTICIPANTS (TRADITIONAL KNOWLEDGE, INTERVIEWS, MEDICAL RECORDS, BLOOD SAMPLING, ETC.)**

No

**DOES ANY OF YOUR RESEARCH INVOLVE ARCHAEOLOGY OR COULD IT POTENTIALLY HAVE ADVERSE EFFECTS ON EXISTING ARCHAEOLOGICAL SITES (IE. GEOLOGY, PHYSICAL DISTURBANCE OF THE LAND, ETC.)**

No

**DOES YOUR RESEARCH INCLUDE ANY INVESTIGATION OF NON-HUMAN SUBJECTS?**

Yes

**DOES YOUR RESEARCH INVOLVE THE SAMPLING OR MANIPULATION OF ANIMALS? (THIS INCLUDES TAGGING AND COLLARING OF ANIMALS)**

Yes

**ATTACH ANIMAL CARE APPROVAL HERE (OR EQUIVALENT)**

- ACC-and-Banding-permit-details-NG-Research-Permit.docx

**DOES YOUR RESEARCH INVOLVE THE HARVESTING OF ANY SPECIES (INCLUDES ALL FLORA AND FAUNA)?**

Yes

## PART B - Research Location and Subjects

**WHICH COMMUNITIES / AREAS DO YOU PLAN TO CONDUCT YOUR RESEARCH IN OR BE BASED OUT OF? (SELECT ALL THAT APPLY)**

- Nain
- Hopedale
- Makkovik
- Postville
- Rigolet

**NON-HUMAN RESEARCH SUBJECT(S): THIS SHOULD INCLUDE ALL SAMPLE TYPES (E.G. SPECIES, ROCK TYPE, SUBSTRATE TYPE, ETC.), THE NUMBER OF SAMPLES AND SPECIFIC LOCATION THAT SAMPLES WILL BE COLLECTED. FOR ANIMALS THIS INCLUDES SPECIES, SEX, AND AGE OF RESEARCH SUBJECTS.**

Animal Care Committee and ECCC Banding Permit will be submitted in March 2021 if NG staff wish to proceed with proposed collaring work and/or bird band training.

Species Chosen: Canada Goose, Cackling Goose

Species chosen by Indigenous Harvesters. At this time, we do not know if the species is Canada Goose or Cackling Goose. The whole purpose if the find out the species, sub species, and learn more about its migration patterns and population status.

Harvest Collections

300 samples of wings, heads and tail fans from Canada Goose / Cackling Goose.

Minimum sample size required before we can conduct a genetic or isotope analysis study.

Reference Sample Collections from breeding geese
Reference Samples from nests and/or eggs: up to 20 per regional area.
-20 from Labrador (5-10 from Nunatsiavut)
-20 from Ontario
-20 from Quebec
-20 from Nunavut
-20 from Maritimes
-20 from USA breeding birds (molt migrants)

If possible will be try to take reference samples (feather samples, eggs membranes) from breeding areas either after hatch or during existing CWS banding activities. Eggs will only be collected if other opportunities for collection post hatch don’t exist or if reference data does not exist. Reference sample collections may also coincide with traditional Indigenous egging activities, feather samples from nests could be obtained at that time.

Banded Birds

Estimated that up to 100 birds will be banded and tagged.

-up to 30 Satellite and/or GPS/GSM Collared Birds. A small number of birds per flock will be tagged with collars or back packs.
-up to 100 banded birds (regular metal leg bands)

Sex and age class

Sex and age class are not a factor with this project, however body size is. We will be attaching collars to all small-bodied geese as they are the target species. AHY and HY birds and male and female birds will be banded with metal leg bands. Large-bodied geese that arrive at the site will be banded to learn more about migration movements of Labrador harvested geese and provide training opportunities to Indigenous groups to enhance capacity.

Capture Timing

Mid September to Mid October. That is the only time period that the mystery small geese appear in Nunatsiavut.

Enhancing Capacity and Providing Banding Training Opportunities

Common Murre (100), Thick-billed Murre (100), Razorbill / Tinker (100), American Black Duck (200), Common Eider (200) and/or other harvested species may also be banded to provide hands on training experience on capture and banding of birds prior to the goose collaring work. Will also provide information on migration patterns of birds that breed or moult in Nunatsiavut.

**MAP(S) OF RESEARCH AREA / LOCATIONS:**

- 2020_09_28_NG-research-proposal-attachments.docx

## PART C - Project Purpose and Methods

**PURPOSE OF THE RESEARCH**

Background Information
Under the Labrador Inuit Land Claims Agreement (LILCA), Nunatsiavut Government (NG) and the Torngat Wildlife and Plants Co-management Board (TWPCB) have responsibilities for monitoring Inuit harvest and making harvest recommendations for migratory birds in Nunatsiavut. To inform these recommendations, NG approached CWS to discuss the methods used to track the national harvest of migratory birds. The NG expressed a need for ongoing, community-level monitoring and worked with CWS staff to co-develop a community wingbee to assess locally harvested species as well as provide a venue for identifying community-level priorities and additional research needs. In 2014, CWS Labrador staff implemented the wingbee program with Nunatsiavut Government (NG). Since that time, the project has grown; NunatuKavut Community Council (NCC) and Innu Nation (IN) have also started to collect harvest samples. We have successfully expanded the project to four communities to date with an additional three other communities participating in sample collections.

Since the start, one of the most common questions from harvesters revolved around the origin of small-bodied geese, also known as lesser geese. It was through the NG wingbee and community engagement that CWS was made aware that these geese were starting to show up in Labrador on a regular basis. NG and TWPCB have identified lesser geese as a priority item as the small-bodied geese have become an important part of the harvest. With the reported localized decline in spring and fall NAP geese, its importance has been elevated. It has been noted that the status of NAP birds is an emerging concern. However, NG and TWPCB would first like to address the issue of lesser geese before trying to identify how each group can participate in ECCC’s monitoring of NAP geese.

As an initial step in answering community questions about the small-bodied geese, goose heads were collected and measured at the community wingbees. However, after several years of measurements, the results have not been conclusive in associating these birds with probable populations (such as cacklers). Further information about the birds is required. The plan was to collect heads and to confirm our theory with genetic analysis. However, as the saying goes, geese are complicated and our list of possible suspects has since grown. It is now time took at complementary methods. This is not a new project but a request to include additional methods for a short time period in order to

provide increased resolution. To begin, we can start with further analysis of existing samples.

Meredith Purcell (Torngat Wildlife, Plants and Fisheries Secretariat) and Regina Wells (CWS) have consulted with ECCC staff from across the country, other project advisors (listed below), and it has been recommended to proceed with a multi-pronged approach. To start to run the samples that have been stored and then re evaluate the project design as needed. Many projects in the past have combined genetics and isotopes or genetics and collaring. As Keith Hobson indicated, we would be building our soufflé with the various components with the hopes it will rise. There maybe some rebuilding next fiscal, additional reference samples from local breeding birds may have to be acquired. However, this is an exciting opportunity to address an identified research priority from multiple Indigenous groups with linkages to harvest and climate change that will provide information the NAP subpopulation, as well as fostering positive government-to-government relationships – a cornerstone of reconciliation. Many ECCC priority items all in one soufflé!

Project Components
1) Isotope Analysis
2) Genetics Analysis
3) Satellite Collaring
4) Stewardship / ITK / Capacity Building / Training Activities
5) Collection of Reference Samples

Project Goals
1) Identify the source population of unknown lesser geese (primary focus)
2) Continue to collect Indigenous traditional knowledge on geese (lesser geese and NAP)
3) Continue to develop and strengthen relationships with Indigenous partners
4) Capacity building and provide opportunities for Indigenous groups to lead, develop and/or participate in goose monitoring, research and stewardship activities

Research Questions
1) Where are they coming from?
2) Where do they breed?
3) What are their migration routes?
4) What is their population status?
5) What species or goose subpopulation are they apart of?
6) What species or geese populations are being harvested in Labrador?
7) How has harvest in the Labrador region changed the last decade?

**ACTIVITIES / METHODOLOGY: THIS SECTION SHOULD INCLUDE SPECIFIC ACTIVITIES AND METHODS TO BE USED. IF PROTOCOLS ARE BEING USED, PLEASE ATTACH THEM BELOW. THIS SECTION SHOULD ALSO DESCRIBE WHICH INDIVIDUALS OR PROJECT PARTNERS WILL BE RESPONSIBLE FOR SPECIFIC COMPONENTS OF THE RESEARCH. PLEASE ALSO IDENTIFY HOW THE COMMUNITY OR NUNATSIAVUT GOVERNMENT DEPARTMENTS WILL BE INVOLVED IN PLANNING OR CONDUCTING THE RESEARCH.**

Activities/Methods

Genetics
Meredith Purcell from TWPCB and Regina Wells, ECCC CWS, have met with project advisor Dr. Kim Scribner. It is possible to replicate the work that he has done in the past. There are also reference samples available, however, more may be required. Two types of genetic markers would be run that would aim to assign geese harvested in Labrador to the population they are genetically most similar to. This would allow for identification of what proportion of harvested birds come from different subspecies, and may provide increased resolution on population-level assignment. Collaboration between two labs will likely be required to combine past data sets from Dr. Kim Scribner and feathers collected by ECCC. The Natural Resources DNA Profiling Forensic Center (NRDPFC) has the capacity and expertise to extract DNA and develop a genetic database, which Meredith will then use to complete the population genetic analysis and associated reports. It is our hope that Dr. Scribner still retains samples from his early 2000s investigation of geese in Labrador, so that cross-referencing can be done in order to allow for an in-depth look into the temporal and spatial structure found in Labrador's small, unknown geese. Tail fan feathers can be used for genetic sampling and other items from local hatch birds that Kim has suggested.

Methods –

Samples from harvested birds: tail fans

Samples from local hatch birds: feathers, blood quills, egg membrane

Analysis: Ship samples to NRDPFC in Peterborough, Ontario, extract DNA, sequence a variable fragment of the mitochondrial DNA control region, and genotype samples at approximately 10 microsatellite loci. Post-analysis will comprise phylogenetic tree and network and population assignment.

Report: Meredith will compile results into a short report explaining the methods in detail and giving the results context within the broader research questions.

Isotopes

Stable Isotopes studies use food webs to determine migration patterns. “You are what you eat”! Buy examining the percentage of hydrogen for example in animal issues predications can be made on what the animal was consuming and where it migrated from.

Meredith Purcell from TWPCB and Regina Wells met with project advisors Keith Hobson and Anthony Fox. It was discussed that genetics and isotope work complements each other quite well. Overall, a lot of value in pursuing this work. Studies use them in combination with one another often. Isotopes can be used to provide some answers on a larger scale than collaring work. Although there was discussion over the issue of molt migrants (birds from southern Canada and US) it was determined that bone collagen could be sampled in addition to help resolve some of these problems. From an isoscape perspective the numbers should work, in particular for Greenland since Hydrogen levels are very negative. Other elements maybe added depending on the results. Feathers or bone collagen from wings could be used.

Methods –

Samples from harvested birds: feathers, wing bones (bone collagen)

Samples from local hatch birds: feathers

Analysis: Ship to lab at Western University (WU), analyze for % Hydrogen levels (other elements maybe added)

Report: WU will compile the raw data into useable maps

Hydrogen Isoscape of North America

Collaring Work
NG and TWPCB will be pursuing this portion of the work. ECCC would continue to act as an advisor. This would be an opportunity to look at the question on a finer scale and more importantly build in a hands on stewardship component that community members can participate in. It will allow for the following of multiple geese throughout their migrations and further identify where these geese are spending their time at different parts of the year. This will serve as a great opportunity to train NG staff for future waterfowl banding opportunities. There are also many linkages to the training NG is receiving from the Seabird G&C project that Sarah Wong is coordinating with the Nunatsiavut Research Centre. Based on discussions with ECCC project advisors from across the country if we can get the birds to go to bait it is possible to capture and attach collars. Product recommendations have been received and are currently being reviewed.

Methods-

Community Workshops: Hold harvester workshops to discuss plans. Work with harvesters to develop a project plan and gathering additional Ingenious Traditional Knowledge on geese.

Site Selection: TBD by local harvesters, must be an area that is not used for hunting. Try and find areas on islands where nets can be set up and/or hid under vegetation.
Baiting: See if birds will come to bait. Spread bait on islands and set up trail cameras.

Capture: Type of net TBD. Various options available.

Collaring : Type TBD. Currently comparing GPS GSM collars to satellite collars options.

Sample Collections/Morphometrics

Reference Samples

The list of possible suspects has grown. In order to determine the species or subpopulation collection of reference samples from outside of Labrador is required. Areas include but aren't limited to Nunavut (Baffin Island), Northern Quebec, Southern Ontario and Quebec, NE US, and Greenland. Collection of items from harvested birds in the spring (Indigenous harvest) and fall for morphometric comparison (i.e. heads), isotope analysis (i.e. primary feathers and wing bone), and genetics (i.e. tail fan). In addition to non-invasive collection nesting materials (i.e. feathers, eggshell membrane) shortly after hatch occurs.

Labrador Region

Collections of head, tail fans and outer primaries to continue. With the addition of a wing bone for isotope sampling (bone collagen). Whole bird samples will also be requested so that full morphometric measurements can be obtained.

For Labrador, it is the hope that this will be another big year for sample collections. As suggested by Bruce Pollard this question is being looked at from a Labrador wide scale. Samples from all parts of Labrador will be analyzed. North, West, Central and Southern Labrador!

Methods - Morphometric Measurements:
Head, culmen, bill, tarsus, and wing lengths using in addition to weight, and sexing of birds (is possible). Calipers and scales were shipped to all Labrador Indigenous groups in Spring 2020.

Photos with size comparison of harvested birds (geese vs. common eider). All meat would be donated to the community freezer following measurements.

**DOES YOUR RESEARCH INVOLVE INTERVIEWS OR FOCUS GROUPS?**

No

**WILL LABRADOR INUIT TRADITIONAL, LOCAL OR COMMUNITY KNOWLEDGE BE CONSIDERED AND/OR INCORPORATED INTO THE RESEARCH PROJECT?**

Yes

**PLEASE PROVIDE SPECIFIC DETAILS ON HOW THIS KNOWLEDGE WILL BE USED IN RELATION TO THIS RESEARCH PROJECT.**

Proposed Use of Local Knowledge
This project would not be possible without not just community support but involvement.
• Development and design of the collaring project
• Implementation of the collaring project
• Fill knowledge gaps within the scientific community not much is known about changing migration patterns, molt migrants or status of NAP birds in northern Labrador
• Capture and banding of birds
• Provide project advice and Indigenous traditional knowledge

## PART D - Local Benefits

**WILL THERE BE AN OPPORTUNITY TO TRAIN, EDUCATE OR EMPLOY NUNATSIAVUT BENEFICIARIES AS PART OF YOUR RESEARCH PROJECT?**

Yes

**START DATE**

10/18/2020

**END DATE**

09/30/2024

**OPPORTUNITY DESCRIPTION:**

Assist with sample collections from harvested and breeding birds.

**START DATE**

10/19/2020

**END DATE**

09/30/2024

**OPPORTUNITY DESCRIPTION:**

Attend workshops to share knowledge on geese. Learn how to age and sample birds for genetics projects at the wingbee events. Open to all ages.

**START DATE**

01/31/2021

**END DATE**

09/30/2024

**OPPORTUNITY DESCRIPTION:**

Attend bird banding training workshops for other harvested species. Help determine what species should be banded, project location, time of year, and other project design elements.

**START DATE**

08/27/2023

**END DATE**

10/22/2023

**OPPORTUNITY DESCRIPTION:**

Band and collar geese or in Nunatsiavut. Help develop the project design, capture protocols, and solve logistical hurdles. Provide project advice and Indigenous traditional knowledge.

**WHAT ARE THE POTENTIAL BENEFITS OF THIS PROJECT FOR THE NUNATSIAVUT REGION AND THE COMMUNITIES OF NUNATSIAVUT?**

Potential Benefits
• Potential linkages to climate change monitoring programs
• Work together to find out more clues to the Lesser Geese mystery and hopefully be on a path to learning what species or goose population they are from and determine their migration patterns
• Will provide additional information on the harvest of geese in Labrador; what species or populations make up the goose harvest, what changes have occurred.

• Information will inform harvest management decisions for Indigenous groups.
• Continues to be a community driven and lead project with various ways for members to get involved.
• Determine connections that birds harvested in Labrador have with Greenland, Northern Quebec, Nunavut and Southern Canada/ NE US.
• Many hands on components from measuring head samples and whole birds to participating in the collaring program.
• Opportunity for community members to participate in research and monitoring

## Part E - Data Use, Deliverables and Funding

**DATA USE AND OWNERSHIP: IDENTIFY THE OWNERSHIP, ACCESS TO, AND OTHER POTENTIAL USES OF THE DATA. PLEASE INCLUDE, WHERE APPLICABLE, THE STORAGE AND MAINTENANCE DETAILS FOR DATA AS PER YOUR INSTITUTIONAL RESEARCH REQUIREMENTS.**

Data Use/Ownership

Data will belong to each individual Indigenous group/government.

Storage

Samples will be stored in various locations.

ECCC – Freezers in the Atlantic Region

University of Western – Isotope Lab

Genetics Lab - NRDPFC

TWPCB / NG/ IN/ NCC – Reference samples: to be stored in various freezers in the location they are collected on a temporary basis. Until which time they can be transferred to ECCC offices.

**WOULD YOU BE WILLING TO SHARE THE RAW DATA FROM THIS PROJECT WITH THE NUNATSIAVUT GOVERNMENT? SPECIFIC RIGHTS AND REQUIREMENTS OF THE DATA WILL BE RESPECTED (INCLUDING PUBLICATION RIGHTS, ETC.), AND A DATA SHARING AGREEMENT CAN BE ESTABLISHED. FOR HEALTH RELATED PROJECTS, SPECIFIC DETAILS WILL BE ESTABLISHED THROUGH THE DEPARTMENT OF HEALTH AND SOCIAL DEVELOPMENT.**

Yes

**THE NGRAC EXPECTS RESEARCHERS TO MAKE ANNUAL VISITS TO COMMUNITIES TO PRESENT PROJECT UPDATES AND RESULTS, IN ADDITION TO ANY OTHER WRITTEN OR VISUAL COMMUNICATION MATERIALS THAT MAY BE APPROPRIATE. HOW WILL THE RESULTS BE COMMUNICATED AND SHARED WITH THE INDIVIDUAL PARTICIPANTS, COMMUNITIES, AND NUNATSIAVUT GOVERNMENT?**

Community Consultation Plan

TWPCB and ECCC will provide a project summary upon completion. Results will be discussed with NG staff and/or beneficiaries and shared with other Indigenous groups that provided samples.

TWPCB

Will develop one or more co-authored report(s) on the results of this work, and co-develop infographics to share these results with communities. Results will also be directly communicated in the communities in which this work takes place.

ECCC - Labrador

Through the Indigenous Wingbee program and our open houses, staff will continue to communicate results of any future studies and results to community members and staff on an annual basis during community visits. Project

continues to be an effective way to engage community members and harvesters.

**DELIVERABLES: LIST ALL DELIVERABLES FOR THIS PROJECT AND THE APPROXIMATE DATES THAT THESE DELIVERABLES WILL BE MET.**

Deliverables
• Indigenous Traditional Knowledge
• Collaring data and migration tracks maps
• Isotope Maps
• Phylogenetic tree, network, and population assignment figure(s)
• Presentation and all communication materials required by Quebec Indigenous groups and Nunavut government. Information may be presented on behalf of ECCC or Wildlife Boards.

**FUNDING: PLEASE PROVIDE SPECIFIC DETAILS OF RESEARCH PROJECT FUNDS, INCLUDING ALL FUNDING AGENCIES, AMOUNT OF FUNDING AND WHETHER THESE FUNDS ARE PENDING OR APPROVED.**

$44,000 from Environment and Climate Change Canada for genetics and isotope analysis. $15,000 for ECCC staff travel to events and materials to support sample collection. In-kind contributions of staff time to support project development and implementation.

Genetics analysis of the results will be in an in-kind contribution from Meredith Purcell, TWPCB.

In-kind contribution from all Indigenous groups and harvesters from across Labrador who wish to participate in sample collections, open houses and wingbee events.

As project components continue to be developed by the NG, TWPCB, and ECCC project team additional project funds will be applied for as needed. At present still assessing the possibility of collaring and banding small-bodied geese.

## Part F - Local Contact

**HAVE YOU CONTACTED ANY COMMUNITY, INUIT COMMUNITY GOVERNMENT OR NUNATSIAVUT GOVERNMENT MEMBER REGARDING THIS RESEARCH PROJECT?**

Yes

**NAME**

Todd Broomfield

**POSITION**

Director of Natural Resources

**COMMUNITY**

Makkovik

**DATE CONTACTED**

09/07/2014

**NAME**

Errol Andersen

**POSITION**

Lead Conservation Officer

**COMMUNITY**

Makkovik

**DATE CONTACTED**

09/11/2016

**NAME**

Ian Winters

**POSITION**

Conservation Officer

**COMMUNITY**

Hopedale

**DATE CONTACTED**

09/09/2018

**NAME**

Carla Pamak

**POSITION**

Research Advisor

**COMMUNITY**

Nain

**DATE CONTACTED**

09/14/2014

**NAME**

Rodd Laing

**POSITION**

Director of Environment

**COMMUNITY**

Nain

**DATE CONTACTED**

09/14/2014

## Part G - Acknowledgement

- I have read and acknowledge all the responsibilities and requirements of research projects in Nunatsiavut

**APPLICATION ID**

NGRAC-40874394