UNDERSTANDING HOLISTIC GOOSE HEALTH INDICATORS AROUND ARVIAT, NUNAVUT

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A Thesis Submitted to the School of Graduate Studies in Partial Fulfillment of the Requirements for the Degree Master of Arts

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Lay Abstract

This thesis explores how Inuit in Arviat, Nunavut, assess goose health and how this knowledge can support community-led wildlife monitoring. The research responds to local priorities identified by the Aqqiumavvik Society, which is working to revitalize the goose hunt to support food security, wellbeing, and Inuit food sovereignty. Using the Aajiiqatigiingniq Research Methodology, I worked with Inuit Elders and hunters through interviews, focus groups, and on-the-land trips. Together, we identified the indicators Inuit use to assess goose health across the harvesting process, including behaviour, fatness, injuries, and abnormalities. These indicators help guide decisions about harvesting, preparing, and eating geese. This thesis shows that Inuit knowledge offers a detailed and practical understanding of goose health. It also shows how Inuit-led research can strengthen community monitoring and complement existing scientific monitoring to inform wildlife co-management in the Arctic.

Abstract

Inuit have long relied on country food to support health, wellbeing, and relationships to family, community, and place. In Nunavut, where food insecurity remains a concern, geese are an important source of food. Inuit relationships with geese have been shaped by colonial policies that restricted harvesting and egg collecting for generations, contributing to disruptions in harvesting practices. In Arviat, Nunavut, these histories intersect with contemporary concerns about food insecurity, increasing goose abundance, and interest in revitalizing goose harvesting.

This thesis emerged through an Inuit-led research partnership with the Aqqiumavvik Society. Guided by the Aajiiqatigiingniq Research Methodology and grounded in Inuit Qaujimajatuqangit, I examined how goose health is understood and assessed by Inuit around Arviat. Through focus groups, interviews, and land trips, I aimed to learn how Inuit-defined indicators of goose health might support community-based monitoring.

The findings show that goose health is assessed holistically, and informs decisions about whether geese are suitable to harvest and eat. Assessment occurs across five stages of the goose hunting process: preparation, hunting, retrieving, plucking and gutting, and cooking and eating. Four main categories of indicators were identified: behaviour, fatness, injuries, and abnormalities. Fatness emerged as the most important indicator and was closely tied to goose health, food quality, and wellbeing. Assessment was shaped through social and relational processes. By documenting Inuit-defined indicators

alongside federal migratory bird population monitoring programs, this thesis demonstrates that Inuit knowledge and Western science offer distinct but complementary contributions to goose health monitoring. Bringing together the strengths of both knowledge systems provides a foundation for future community-based monitoring, youth knowledge transmission, and policy discussions grounded in Inuit knowledge and priorities.

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List of Abbreviations

Abbreviation	Definition
AGJV	Arctic Goose Joint Venture
API	Abdominal Profile Index
ARM	Aajiiqatigiingniq Research Methodology
ATV	All-Terrain Vehicle
CBM	Community-Based Monitoring
CFIA	Canadian Food Inspection Agency
CIHR	Canadian Institutes of Health Research
CWS	Canadian Wildlife Service
ECCC	Environment and Climate Change Canada
GPS	Global Positioning System
IQ	Inuit Qaujimajatuqangit
ITK	Inuit Tapiriit Kanatami
MBCA	Migratory Birds Convention Act
MREB	McMaster Research Ethics Board
NISR	National Inuit Strategy on Research
NRI	Nunavut Research Institute
NWRC	National Wildlife Research Centre
RAC	Research Advisory Council

1 Introduction

Inuit have long relied on country food harvested from the land, water, and ice in every season. Their food systems have supported health, survival, and wellbeing across generations, while also sustaining relationships to family, community, and place (Bennett & Rowley, 2004; Karetak et al., 2017). At the same time, food insecurity remains a serious concern across Nunavut. In 2022, 49.5% of people in Nunavut lived in food-insecure households, demonstrating the importance of access to healthy and culturally meaningful country food (Statistics Canada, 2022).

Within Inuit food systems, geese have long held an important place. Within Inuit Nunangat (Inuit homelands in the Canadian Arctic), geese are a valued source of country food that contributes to seasonal harvesting practices, food sharing networks, and community wellbeing (Caughey et al., 2024; Freeman, 1976; Kuhnlein & Humphries, 2017). Spring goose harvesting is especially significant, as it provides an important source of food at a key moment in the seasonal cycle and is closely tied to the return of warmer weather, increased mobility, and family harvesting activities. Geese are important not only for their nutritional value, but also for the social, cultural, and relational practices that surround harvesting, preparing, and sharing them (Henri, Carter, et al., 2020; Kuhnlein & Humphries, 2017; Nunavut Wildlife Management Board, 2004).

However, Inuit relationships with geese have also been shaped by colonial wildlife policies that restricted harvesting and limited Inuit participation in wildlife management (Tester & Irniq, 2008). The Migratory Birds Convention Act (MBCA)

(1917) imposed closed seasons on migratory birds and prohibited egg collecting to address conservation concerns. For several generations, Inuit were long only permitted to harvest geese and eggs under narrow starvation exceptions. These restrictions disrupted harvesting practices and contributed to a broader disconnection from geese and egg harvesting in Nunavut (Henri, Carter, et al., 2020). Although Inuit harvesting rights were later affirmed through the Nunavut Agreement (1993) and changes reflected in the MBCA, 1994, the legacy of these earlier restrictions continues to shape present-day Inuit relationships with geese and efforts to revitalize harvesting. I return to this history in more detail in the literature review, but note it here because current efforts to strengthen goose harvesting remain grounded in a longer history of colonial wildlife management (Henri, Carter, et al., 2020).

Today, questions about geese are important not only because of their cultural and nutritional value, but also because of ongoing concerns related to food security, changing harvesting practices, and the need for locally-led wildlife monitoring. Previous collaborative work in Arviat documented community concern about light goose abundance, habitat impacts, and the role geese could play in supporting food security, while also identifying the need for Community-Based Monitoring (CBM) to guide future harvest decisions (Carter, Henri, Johnston, Emiktaut, et al., 2018; Carter, Henri, Johnston, Irkok, et al., 2018; Carter, Martinez-Levasseur, et al., 2025; Henri, Carter, et al., 2018, 2020).

Understanding goose health is important for co-management because it matters in different but related ways to Inuit and Western science researchers. For community

members, goose health assessments help guide decisions about whether birds are safe to harvest, prepare, share, and eat. For biologists, health is an important indicator of population health that can inform monitoring and harvest management. These two objectives create an opportunity to examine how Inuit harvesting-based assessments relate to Environment and Climate Change Canada (ECCC)-supported monitoring approaches, and where approaches may be complementary.

My thesis is also situated within broader efforts to strengthen Inuit self-determination in research and wildlife governance across Inuit Nunangat. Inuit organizations have increasingly called for research that is guided by Inuit priorities, governance, and ethical relationships, rather than designed externally and later brought back to communities (Inuit Tapiriit Kanatami, 2018; K. J. Wilson et al., 2020). Context of Inuit self-determination is important to my research because it helps frame why an Inuit-led, community-based approach to goose monitoring matters, and why documenting harvesting-based knowledge is important alongside more formal scientific monitoring approaches. In Arviat, Nunavut, geese remain an important source of country food where community concerns about food insecurity, goose abundance, and harvest revitalization have shaped the Inuit-led research partnership that this thesis supports.

1.1 Community context: Arviat, Nunavut

Arviat (meaning “the place of bowhead whale” in Inuktitut) is a coastal Inuit community in Nunavut, located on the western shore of Hudson Bay (Figures 1.1 and 1.2). It is the southernmost mainland community in Nunavut and is part of a region where

harvesting continues to play an important role in everyday life, food systems, and community wellbeing (Beaumier et al., 2015). The local environment supports a wide range of country foods, including caribou, fish, marine mammals, and migratory birds, and many Arviarmiut (people of Arviat) continue to rely on foods for both nutritional and cultural reasons.



Figure 1.1. Map of Nunavut, Canada with box indicating Arviat and area of research (adapted from Polidoro, 2022)

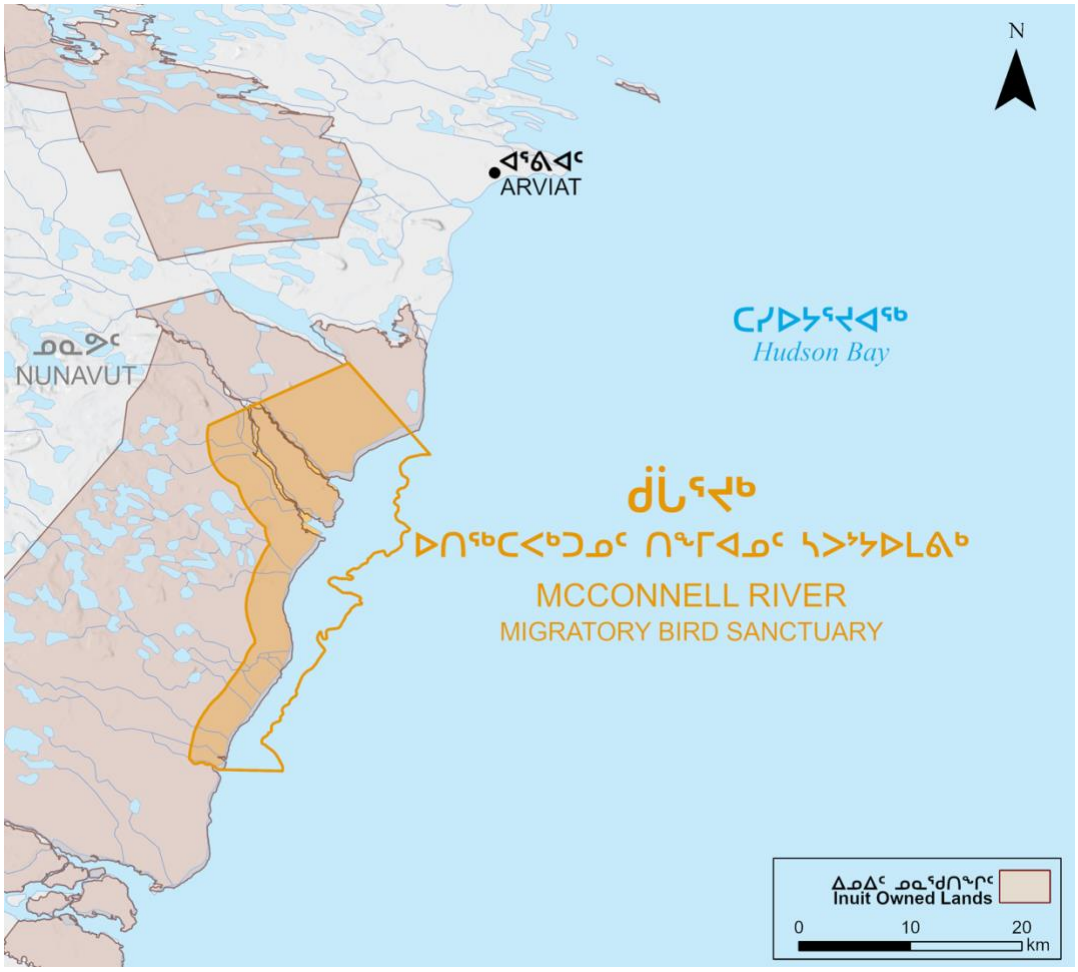


Figure 1.2. Location of Arviat, Nunavut and the Kuugaarjuk Migratory Bird Sanctuary (formerly McConnell River Migratory Bird Sanctuary)
(ACMC, 2019)

Present-day Arviat is also shaped by longer histories of colonial intervention and settlement. Like many communities in the region, Arviat was affected by federal policies that relocated Inuit into permanent settlements during the mid-twentieth century. Inuit, including Ahiarmiut relocated from Ennadai Lake and other inland regions, experienced major disruptions to mobility, harvesting practices, and everyday life through relocations (Laugrand et al., 2010; Tester & Irniq, 2008). These changes altered how people accessed country food and contributed to broader shifts in intergenerational learning, family

harvesting patterns, and relationships to land (Tester & Zawadski, 2026). This history remains important context for understanding current efforts to strengthen harvesting and support food security in Arviat.

Despite disruptions, harvesting remains a central part of life in the community (Nunavut Wildlife Management Board, 2004). Arviat has strong harvesting knowledge and an ongoing commitment to supporting youth learning, land-based skills, and access to country food. At the same time, the community continues to experience significant food insecurity, making local harvesting especially important. Efforts to support harvesting in Arviat therefore need to be understood not simply as responses to food access, but as part of broader efforts to strengthen Inuit knowledge, relationships, and self-determination.

Arviat is also located near the Kuugaarjuk (McConnell River) Migratory Bird Sanctuary, situated approximately 35 kilometres southwest of the community (Figure 1.2; Environment and Climate Change Canada, 2015). The sanctuary and the surrounding coastal region are important nesting and staging areas for migratory birds, including Snow Geese (*kanguq* in Inuktitut; *Anser caerulescens*, Linnaeus, 1758), Ross's Geese (*qaaraarjuk* in Inuktitut; *Anser rossii*, Cassin, 1861), Greater White-Fronted or Specklebelly Geese (*nirliq* in Inuktitut; *Anser albifrons,* Scopoli, 1769), Canada Geese or Honkers (*tingmiarjuaq* in Inuktitut; *Branta canadensis*, Linnaeus, 1758), and Cackling Geese (*tingmiaq* in Inuktitut; *Branta hutchinsii*, Richardson, 1832). In recent decades, local and regional increases in Snow and Ross's Goose populations have become a growing concern (Henri, Carter, et al., 2020). Community members have observed changes in abundance and habitat conditions near Arviat, including visible impacts on

coastal areas (Carter, Henri, Johnston, Emiktaut, et al., 2018; Carter, Henri, Johnston, Irkok, et al., 2018; Carter, Martinez-Levasseur, et al., 2025; Henri, Carter, et al., 2018, 2020). At the same time, many Arviarmiut continue to identify geese as an important and underused source of country food. The combination of ecological change, food insecurity, and interest in harvest revitalization makes Arviat a particularly important place for research on goose health, harvesting, and CBM.

Together, geographic, historical, and social dimensions help explain why Arviat is an important setting for my thesis. Questions about goose health are not only questions about wildlife. They are also questions about food security, harvesting confidence, intergenerational knowledge, and the ability of the community to make decisions about local food systems in ways that reflect Inuit priorities. At the same time, understanding goose health is also important for broader monitoring and harvest management, because it can inform how goose populations are assessed and how local observations contribute to co-management discussions. It is within this context that the Aqqiumavvik Society has played a central role in identifying food security and goose harvest revitalization as community priorities.

1.2 Aqqiumavvik Society and goose harvest revitalization

This research emerged from the Aqqiumavvik Society in Arviat, Nunavut. The Aqqiumavvik Society is a community-based research organization that supports community wellbeing through Inuit-led research and programming focused on food systems, harvesting, and skill development. Aqqiumavvik developed the Aajiiqatigiingniq

Research Methodology (ARM), grounded in Inuit Qaujimajatuqangit (IQ), to support research that reflects Inuit priorities and ways of knowing (Carter, Tagalik, et al., 2025; Ferrazzi et al., 2019; Tagalik, 2012). IQ refers to Inuit ways of knowing and being, the values, knowledge systems, and worldviews that guide how Inuit relate to one another, to the land, and to their responsibilities within the community (Karetak et al., 2017). The Aqqiumavvik Society has also founded the Ujjiqsuiniq Young Hunters Program (hereafter referred to as Ujjiqsuiniq Young Hunters) as part of this effort, supporting youth in Arviat through land-based learning and the development of sustainable harvesting skills and practices.

Through discussion with Arviarmiut, the Aqqiumavvik Society identified food insecurity and the growing abundance of geese as important concerns. Both concerns are closely tied to geese as an important source of country food in the region. While geese have long been harvested as country food, community participation in goose harvesting has declined in recent decades due to colonial policies, including the MBCA of 1917 and subsequent regulations which banned spring goose hunting until amendments were made to legislation in 1994. At the same time, populations of Snow and Ross's Geese, referred to collectively as light geese, have increased in parts of the Arctic resulting in a designation of overabundance in Canada and the United States beginning in 1998 and 1999 respectively (Canadian Wildlife Service Waterfowl Committee, 2025).

To address food insecurity in Arviat and the overabundance of geese populations, Aqqiumavvik has brought together a research team to examine: (a) whether geese are safe to consume around Arviat; and (b) what level of increased community harvest of geese

and eggs is sustainable. My role within this broader project was to focus on understanding Inuit approaches to goose health assessment. In this thesis, I examine how goose health is understood and assessed in harvesting contexts around Arviat, and how Inuit-defined indicators can contribute to CBM and decision-making.

1.3 Goose monitoring and the research gap

Goose health monitoring is an important part of migratory bird conservation and management in Canada. Monitoring programs have generally employed methods derived from Western ecological and biological sciences (hereafter referred to as 'Western science') to establish population trends, understand demographic processes, and track disease at large geographic scales. These approaches provide valuable information, but they do not capture how Inuit assess the health of individual geese during harvesting and preparation.

Despite the importance of goose harvesting within Inuit food systems, Inuit knowledge of goose health indicators has rarely been documented in ways that support wildlife monitoring or management. Inuit regularly observe behaviour, fatness, and abnormalities when hunting, preparing, and consuming geese, yet these observations are seldom incorporated into formal monitoring frameworks. As a result, there remains a gap in understanding how Inuit-defined indicators of goose health could contribute to a more holistic approach to CBM and migratory bird management discussions. My research was designed to begin addressing this gap, by examining how goose health is understood and assessed in harvesting contexts around Arviat, Nunavut.

1.4 Research questions and objectives

The questions driving my research are:

1. How is goose health assessed by Inuit around Arviat? and
2. How could this support more holistic approaches to CBM?

To address these questions, I have five main objectives, including to:

1. Characterize current goose health indicators described in the literature;
2. Learn from Inuit in Arviat about how they assess goose health;
3. Describe goose monitoring in Arviat through Inuit and ECCC-supported community-based assessments;
4. Identify intersections in Inuit and Western science that can contribute to a more holistic approach to monitoring; and
5. Propose considerations for CBM of goose health in Arviat grounded in Inuit knowledge and supported by Western science.

1.5 Research approach and significance of the study

I conducted this study in partnership with the Aqqiumavvik Society, ECCC, and academic collaborators, using the ARM. This approach is significant because it reflects a partnership grounded in community priorities and Inuit-led methodology, while creating space for dialogue across Inuit, government, and academic perspectives on goose health. I centered Inuit knowledge in documenting goose health indicators and in understanding how goose health assessments occur through Inuit harvesting, preparation, and consumption. I also considered how these observations relate to monitoring approaches

used by the Canadian Wildlife Service (CWS) of ECCC. Rather than merging Inuit knowledge and Western science into one framework, I sought to build a shared understanding that could support future monitoring in Arviat.

This approach supports my argument that goose health is assessed in ways important for community decision-making, while also showing that Inuit knowledge and Western science offer different but complementary contributions to monitoring. I demonstrate that stronger CBM can emerge through understanding intersections across knowledge systems without reducing one to the terms of the other (Reid et al., 2021).

My study is also significant for its practical contributions. By documenting Inuit-defined goose health indicators and assessment practices across the harvesting process, I contribute to a stronger understanding of how goose health is evaluated in Arviat. Examining how these indicators relate to ECCC-supported monitoring also helps build a foundation for community education and knowledge sharing about goose health. I identify considerations for a community-based goose monitoring approach grounded in Inuit knowledge and informed by dialogue with Western science. By clarifying areas of intersection and difference between these approaches, I provide context for future co-management and policy discussions related to goose harvest and monitoring.

1.6 Thesis overview

The remainder of this thesis is organized as follows. Chapter 2 reviews literature on goose harvesting, management, and monitoring in Canada, alongside Inuit knowledge, IQ, CBM, and Western scientific approaches to migratory bird health assessment. It also

elaborates the research gap addressed in this thesis. Chapter 3 describes the research methodology, including the Aajiiqatigiingniq Research Methodology, the collaborative research process, and methods of data collection and analysis. Chapter 4 presents findings related to Inuit-defined indicators of goose health and how these are assessed across stages of harvesting, preparation and consumption. Chapter 5 discusses these findings in relation to wildlife monitoring, knowledge systems, and the potential contributions of Inuit-defined indicators to CBM and co-management. Chapter 6 concludes by summarizing the key findings, outlining the contributions of the thesis, and identifying directions for future research.

2 Literature Review

2.1 Inuit Qaujimajatuqangit

IQ refers to Inuit ways of knowing and being, the values, knowledge systems, and worldviews that guide how Inuit relate to one another, to the land, and to their responsibilities within the community (Karetak et al., 2017). As Karetak and Tester (2017, p. 3) share: “IQ is more than philosophy. It is an ethical framework and detailed plan for having a good life. It is a way of thinking, connecting all aspects of life in a coherent way”. IQ is not a static body of knowledge, but a lived and relational system that informs ethical conduct, collective wellbeing, and decision-making in Inuit society (Tagalik, 2012).

This broader understanding is important because IQ is often reduced in policy and research settings to a source of observations that can supplement science (McGregor, 2021; Pederson et al., 2020; Wheeler et al., 2020). Tester and Irniq (2008) caution against this narrowing, arguing that IQ should not be treated simply as a tool for filling gaps in scientific knowledge, but understood in relation to Inuit social history, cosmology, and lived practice. They further show that IQ carries political significance as a form of cultural continuity and resistance, particularly in contexts where colonial governance has disrupted Inuit relationships to land, knowledge, and decision-making.

Elders across Nunavut outlined eight key principles that are the foundation of IQ (Karetak et al., 2017; Nunavut Department of Education, 2007; Wildlife Act, 2003):

1. ***Pijitsirniq*** – The principle of serving and contributing to the greater good.
2. ***Aajiiqatigiingniq*** – The principle of consensus decision-making, ensuring that all voices are heard and respected in reaching agreement.
3. ***Pilimmaksarniq*** – The principle of acquiring skills and knowledge through observation, mentoring, practice, and effort.
4. ***Piliriqatigiingniq*** – The principle of collaborative relationships and working together for a common purpose.
5. ***Avatimik Kamattiarniq*** – The principle of environmental stewardship and respect for the land, animals, and natural resources.
6. ***Qanuqtuurunnarniq*** – The principle of being resourceful and finding solutions to problems through innovation and adaptability.

7. ***Tunnganarniq*** – The principle of being welcoming, inclusive and open in interactions with others.
8. ***Inuuqatigiitsiarniq*** – The principle of respecting others and caring for people.

The eight guiding principles are embedded in everyday practices, including harvesting, food preparation, teaching, and community governance. They shape how knowledge is generated, shared, and applied in Inuit cultural contexts (Karetak et al., 2017). They are also embedded in Nunavut territorial governance where they guide legislation and policy related to wildlife and resource management (Wildlife Act, 2003).

Four *maligarjuat*, translating directly to "big things that must be followed", outline how to embody the Inuit ways of being (Carter, Tagalik, et al., 2025; Karetak et al., 2017):

- Working for the common good;
- Living in respectful relationships with every person and thing that one encounters;
- Maintaining harmony and balance;
- Continually planning and preparing for the future.

Within research contexts, IQ principles and the *maligarjuat* provide both an ethical and conceptual foundation (Carter, Martinez-Levasseur, et al., 2025; Healy & Tagak Sr., 2014; Henri, Carter, et al., 2020; Ljubicic et al., 2018). They emphasize respect, relational accountability, collective responsibility, and the importance of consensus-based decision-making (Carter, Tagalik, et al., 2025; Ferrazzi et al., 2019; Tagalik, 2012). Rather than separating knowledge from lived experience, understanding

is situated within relationships among people, animals, and the land, and recognizes learning as an iterative and collaborative process. These orientations are particularly relevant for health research involving community members which should be shaped by the cultural epistemologies of the communities involved (Healy & Tagak Sr., 2014).

2.2 Inuit relationship with geese

2.2.1 Importance of geese in Inuit communities

Geese have long been an important seasonal food source for Inuit communities across Inuit Nunangat (Freeman, 1976; Kuhnlein & Humphries, 2017; Nunavut Wildlife Management Board, 2004). In Nunavut, oral histories and community-based research indicate that Inuit have lived alongside goose colonies for generations and have long relied on geese, as part of seasonal harvesting practices (Bennett & Rowley, 2004; Carter, Henri, Johnston, Emiktaut, et al., 2018; Carter, Henri, Johnston, Irkok, et al., 2018; Gagnon & Berteaux, 2009). This spring harvest has particular importance because it provides fresh country food at a key seasonal moment, after winter scarcity. In this context, geese and eggs have helped diversify diets and support household food security at a time when other food sources may be less available (Kuhnlein & Humphries, 2017). Geese were – and still are – harvested and valued as a source of meat as well as for feathers and bones used in clothing and tools (Freeman, 1976; Kuhnlein & Humphries, 2017). As a seasonal resource, geese supplement Inuit diets and provide fresh food in spring, summer, and fall. Geese are also embedded in social and cultural practices of harvesting, processing, sharing and eating. Inuvialuit communities, like many others,

work together during the hunting season to prepare and distribute geese within and between communities, reinforcing social relationships and systems of reciprocity (Berkes & Jolly, 2001).

The cultural importance of geese to Inuit also helps explain the impacts of colonial wildlife policy. Beginning in the early twentieth century, federal migratory bird regulations such as the MBCA and the Northwest Game Act of 1917, restricted Inuit spring harvesting of geese and eggs because of concerns about declining bird populations. Inuit were prohibited from hunting geese or collecting eggs except in cases of starvation (Henri, 2012; Kulchyski & Tester, 2007; Migratory Birds Convention Act, 1994). At the federal level, the restrictions remained in place until amendments to the MBCA in 1994 which secured the right of Inuit to harvest migratory birds and eggs for subsistence purposes (Migratory Birds Convention Act, 1994).

In Arviat and elsewhere, these policies disrupted access to an important seasonal food source and interfered with family harvesting practices, knowledge transmission, and relationships with geese, at times forcing Inuit to harvest in secrecy to avoid fines or imprisonment (Qikiqtani Inuit Association, 2013). These disruptions were intensified by relocation into permanent settlements, which made enforcement easier and further altered land-based life (Kulchyski & Tester, 2007). Although Inuit harvesting rights are now recognized and affirmed through agreements such as the Nunavut Agreement (1993), harvesting continues within state wildlife co-management systems, and the effects of earlier restrictions are still felt today (Government of Canada & Tungavik Federation of Nunavut, 1993; Henri, Carter, et al., 2020).

At the same time, the ecological context of light goose harvesting has changed substantially. Since the 1970s, light goose populations across North America have increased rapidly, and Snow Geese and Ross's Geese are now considered overabundant in Canada and the United States (Fox & Leafloor, 2018). Population growth was driven largely by increased adult survival, supported by expanded access to agricultural foods on migration and wintering grounds, reduced harvest pressure, and greater use of refuges (Alisauskas et al., 2011). This population growth has contributed to habitat degradation on Arctic breeding grounds, including around Arviat, where community members have observed major changes to nearby coastal areas caused by overgrazing (Abraham et al., 2005; Alisauskas et al., 2006; Carter, Henri, Johnston, Irkok, et al., 2018). Together, this cultural, historical, and ecological context shows why geese remain such an important species in Inuit food systems and why community-led work on goose harvesting and goose health is so significant.

2.2.2 Hunting, wellbeing, and community resilience

Research on Indigenous goose harvesting links hunting practices to aspects of wellbeing and community resilience (Ahmed et al., 2023; Henri, Carter, et al., 2020; Tsuji et al., 2020). Goose hunts have been associated with increased subjective wellbeing related to time on the land, cultural engagement, and social interaction (Ahmed et al., 2023). In a James Bay Cree goose harvest share program, participants reported strengthened social relationships, intergenerational knowledge transmission, and community wellbeing (Tsuji et al., 2020).

2.2.3 The role of community-driven monitoring in supporting food security

The Inuit Nunangat Food Security Strategy emphasizes that Inuit leadership and Inuit approaches must guide efforts to improve food security, including how priorities are set, how progress is measured, and how decisions are made (Inuit Tapiriit Kanatami, 2021). It calls for food systems to be anchored in Inuit priorities through actions that strengthen harvesting and sharing networks, improve access to country food, support local food production where appropriate, and address infrastructure and skills needed to sustain northern food systems. Community-driven monitoring supports these goals by enabling communities to define locally meaningful indicators and track change over time in ways that reflect Inuit realities of food systems and can inform Inuit-led planning and governance (Naylor et al., 2023).

2.2.4 Inuit knowledge of bird ecology and health

Across the literature, Inuit knowledge of bird ecology and health have most often been applied to understanding themes of abundance, distribution, ecosystem impacts, and body condition (Table 2.1). Inuit knowledge has been shown to be reliable in assessing regional population status and trends when it is systematically documented and compared with other monitoring approaches. This has been demonstrated for seabirds in Nunavut, where Inuit knowledge (described as local ecological knowledge) and scientific surveys were used to identify declining gull numbers in Grise Fiord and Resolute Bay (Mallory et al., 2003). Work documenting Inuit knowledge of abundance and distribution demonstrated Inuit harvesters can make substantial contributions to Arctic Tern research

(Henri, Martinez-Levasseur, et al., 2020). Snow Goose traditional ecological knowledge documented population size and abundance as well as migration and molt timing in Mittimatalik, Nunavut, (Gagnon & Berteaux, 2009). Collaborative work on light geese in the Kivalliq region of Nunavut similarly describes changes in distribution and abundance, ecosystem effects, and the drivers of those changes (Carter, Henri, Johnston, Emiktaut, et al., 2018; Carter, Henri, Johnston, Irkok, et al., 2018; Carter, Martinez-Levasseur, et al., 2025; Henri, Carter, et al., 2020).

Related work on emperor geese in Alaska also emphasizes harvest practices and management, and notes close attention to factors affecting body condition (Naves et al., 2025). Inuit knowledge has also supported disease detection and monitoring, including cases where mortalities were most frequently found in areas that are difficult for biologists to access, such as the sea, sea ice, and small nesting islands (Henri, Jean-Gagnon, et al., 2018).

Table 2.1. Inuit knowledge of bird ecology and health in the literature

Key theme(s)	**Species**	**Literature**
Distribution, ecosystem impacts	Snow and Ross' Goose	Carter et al., 2018
Distribution, ecosystem impacts	Snow and Ross' Goose	Carter et al., 2018
Population dynamics, ecosystem impacts	Snow and Ross' Goose	Carter et al., 2025
Abundance, molt timing	Snow Goose	Gagnon and Berteaux, 2009
Abundance, distribution	Common Eider	Gilchrist et al., 2005
Distribution	Harlequin Duck	Gilchrist et al., 2005
Disease and pathogens	Common Eider Duck	Henri et al., 2018
Distribution, abundance, ecology	Arctic Tern	Henri et al., 2020
Distribution, ecosystem impacts	Snow and Ross' Geese	Henri et al., 2020
Abundance	Ivory Gull	Mallory et al., 2003
Body condition, abundance, distribution	Emperor Goose	Naves et al., 2025

2.3 Western science perspectives of goose health

In Western sciences, perspectives on goose health are spread across many fields, including wildlife biology, physiology, disease ecology, toxicology, and population monitoring (Table 2.2). Indicators are tied to specific research objectives. Measures of individual condition, such as body mass, fat reserves, injuries, deformities, parasites, and physiological traits are studied, as well as population-level indicators such as abundance, survival, reproduction, harvest rates, and disease prevalence. Behavioural and sensory observations also appear in the literature. Together, these approaches provide robust information for regional and continental assessments and form the basis for the Western scientific indicators of goose health described in the following section.

Table 2.2. Goose health indicators according to published Western biological and ecological sciences literature

Indicator category	**Indicator**	**Literature**
Behaviour	(see Population health)	
	Flight initiation distance	Ydenberg & Dill, 1986
	Vocalization	Ryan, 1988
	Wingbeat frequency	Pennycuick, 2001
	Energetics	Ward et al., 2002
Body condition	Size adjusted body mass	Duijns et al., 2017; Labocha & Hayes, 2012
	Protein reserve index (gizzard, leg, pectoral muscles)	Ankney & Macinnes, 1978; Baldwin et al., 2022
	Fat scoring	Haramis et al., 1986; Hupp et al., 2017
	Abdominal fat	Owen, 1981
	Total body lipids	Fowler et al., 2018, 2020
	Amino acid profiles	Wang et al., 2023
Injuries	Impact mortality	Wobeser et al., 2005

Indicator category	Indicator	Literature
Abnormalities	Insects	Grossi & Galloway, 2022
	Molt and feather wear	Shepherd et al., 1999
	Parasites	Ramey et al., 2014
	Masses	Gates et al., 1992
	Conjunctivitis	Maddux et al., 1987
	Freezer burn	Wereńska et al., 2021
	Sensory parameters	Söderquist et al., 2022
	Abundance	Alisauskas et al., 2011
Population health	Harvest rate	Alisauskas et al., 2011
	Survival rate	Alisauskas et al., 2011
	Reproduction	Nichols et al., 1995
	Colony surveys	Blanchong et al., 2006
Disease and toxicology	Pathogens: avian influenza, cholera	Harms, 2015; Samuel et al., 2005
	Contaminants: plastic pollutants, heavy metals	Fry, 1995
Other physiological indicators	Tarsus (mm), wing (cm), head (mm), culmen (mm)	Johnson et al., 1985
Classification	Sex: cloacal examination	Johnson et al., 1985
	Age: brood patch presence, gonad maturity, bursa of fabricius, caruncle presence, feather characteristics	Carney, 1992; Jónsson et al., 2006

2.3.1 Behaviour

Western science uses behavioural indicators that affect goose survival and reproduction. At broader scales, behaviour is also reflected by population health monitored through banding, nest counts, and productivity estimates (Alisauskas et al., 2011; Blanchong et al., 2006; Nichols et al., 1995). At the individual level, response to humans can be quantified using flight initiation distance, a measure of fear response (Ydenberg & Dill, 1986). Heart rate monitoring, oxygen consumption, and respirometry have been used to estimate energy expenditure and metabolic performance in geese,

linking physiological efficiency to movement and flight behaviour (Ward et al., 2002). Measures of airspeed and wingbeat frequency have similarly been used to evaluate flight performance and energy optimization during migration (Pennycuick, 2001). Vocalizations and sound output in relation to metabolic energy has been linked to reproductive success (Ryan, 1988).

2.3.2 Body condition

Body condition is one of the most widely used indicators of goose health in Western science, reflecting energetic reserves relevant to migration, reproduction, and survival. The Abdominal Profile Index (API) was developed as a rapid field-based method to assess body condition in wild geese (Owen, 1981). Field assessments may also include pectoral muscle condition as an index of protein reserves (Ankney & Macinnes, 1978; Baldwin et al., 2022).

Body mass and fat scoring have been shown to relate closely to survival and reproductive success in migratory birds, with better condition associated with improved migration performance, overwinter survival, and gosling viability (Duijns et al., 2017; Haramis et al., 1986; Labocha & Hayes, 2012). The relationship between external morphology and internal fat reserves has been validated in geese, supporting the use of visual and morphometric indices as proxies for physiological condition (Hupp et al., 2017; Labocha & Hayes, 2012).

More recent work has modelled lipid and protein content and compared predicted values to direct measurements of abdominal fat, refining how energetic reserves are estimated (Fowler et al., 2018, 2020). Additionally, Western food science examines

amino acid makeup of goose meat and its influence on freshness and umami flavour (Wang et al., 2023).

2.3.3 Injuries

Goose mortality resulting from collisions with the ground is described, supporting the inclusion of impact injuries and fractures as relevant injury indicators (Wobeser et al., 2005). In harvested birds, wound presence and lacerations may also be recorded, including whether wounds appear infected, because these can indicate broader health concerns.

2.3.4 Abnormalities

Western science literature documents several abnormality indicators relevant to geese, including parasites, feather condition, masses, and visible signs of illness. Parasite prevalence studies on tundra-nesting geese provide examples of how infections are documented in wild populations (Ramey et al., 2014). Chewing lice are among the most consistently documented insects on geese and can host multiple louse species (e.g., *Anaticola, Anatoecus, Ornithobius, Ciconiphilus, Trinoton*) (Grossi & Galloway, 2022). Feather condition is also used as an indicator because molt timing and feather wear affect insulation and flight performance (Shepherd et al., 1999).

In addition to external condition, internal conditions can indicate abnormalities. Spindle cell sarcomas have been found to be one cause of masses found in wild Canada Geese (Gates et al., 1992). Eye appearance can also indicate disease with conjunctivitis a reported symptom of illness (Maddux et al., 1987). Some indicators of food science

examine the implications of freezer burn on goose meat quality. Oxidation activity and lipid oxidation changes in goose muscle stored under freezing conditions documented deterioration of goose muscle in freezing conditions (Wereńska et al., 2021). There has also been some investigation into sensory parameters of duck meat including odor and taste (Söderquist et al., 2022).

2.3.5 Physical metrics

Standard morphometrics are collected to support condition modelling and demographic comparison. Measurements commonly include tarsus, wing, head, and culmen, collected alongside mass to quantify structural size and enable size-adjusted condition indices (D. H. Johnson et al., 1985).

2.3.6 Disease and toxicology

Disease surveillance represents a key component of Western goose health monitoring, particularly in relation to population-level risk and mortality events. Geese have been identified as carriers of avian cholera, with bacterial monitoring used to assess infection dynamics and outbreak potential (Samuel et al., 2005). In Arctic contexts, avian cholera has been documented in Ross's and Snow Geese, highlighting the role of disease monitoring in understanding episodic mortality and population impacts (Harms, 2015). High population densities have also been linked to increased disease risk, although long-term studies suggest that density-dependent effects on productivity are not always evident (Blanchong et al., 2006; Morrissette et al., 2010). In addition, the effects of pesticides and

other contaminants on mortality, reproduction, and survivability have been examined as part of broader assessments of environmental stressors affecting goose health (Fry, 1995).

2.3.7 Classification

Western scientific research and monitoring classifies birds by age and sex to interpret condition, reproduction, and survival. Brood patch presence is used mainly as an indicator of current-season breeding condition in geese, reflecting whether an individual has been laying or incubating (Jónsson et al., 2006). Sex determination in harvested birds can be confirmed through gonad examination protocols, as referenced in banding and measurement contexts (D. H. Johnson et al., 1985).

2.3.8 Indicators in environmental governance

Within Western environmental governance, ecological indicators are used to support management and policy decisions by summarizing complex ecological processes into standardized measures that can be monitored over time and across regions (Nichols et al., 2007; Turnhout et al., 2007). Indicators used to evaluate environmental policy outcomes do not rely solely on Western biological and ecological knowledge, but instead operate at the interface between science and policy, shaped by both scientific measurement practices and governance objectives (Turnhout et al., 2007).

The effectiveness of indicators depends on their ability to function across different users and decision-making contexts. Turnhout et al. (2007) describe indicators as boundary objects that link scientific measurement with policy and management priorities, rather than as neutral representations of ecological conditions. Research examining the

integration of Indigenous and Western knowledge systems shows that indicators can support coordination across knowledge systems, while also highlighting gaps where standardized measures do not fully reflect local understandings of environmental conditions (Kourantidou et al., 2020). These considerations provide important context for goose health assessments within Western scientific environmental governance.

2.4 Evolution of goose management in Canada

In Canada in the early twentieth century, goose management policies were developed in response to widespread declines in migratory bird populations. The MBCA, implemented in 1917, established coordinated international regulation of migratory bird harvests to address population declines linked to unregulated hunting and habitat loss associated with agricultural expansion and urbanization (Migratory Birds Convention Act, 1994; Nichols et al., 1995).

Over time, governance frameworks expanded to recognize Indigenous rights and participation in wildlife management (Wenzel, 2004). Recognition of Indigenous rights under Section 35 of the Constitution Act (Wenzel, 2004), followed by an the amendment of the MBCA in 1994, supported increased Indigenous involvement in decision-making related to migratory birds (Eckert et al., 2020; Migratory Birds Convention Act, 1994). These shifts enabled greater inclusion of Indigenous knowledge alongside scientific monitoring and contributed to the development of co-management approaches grounded in long-term, place-based observations (Henri, Carter, et al., 2020).

Since the 1970s, the establishment of co-management arrangements created more formal roles for Indigenous rights holders in wildlife governance in northern Canada (White, 2020). In the Canadian Arctic, co-management is understood as a process through which responsibilities are negotiated, knowledge is shared, and management adapts over time (Berkes, 2009; Berkes & Armitage, 2011; Natcher et al., 2005). In Nunavut, co-management is rooted in the Nunavut Agreement (1993), which established the Nunavut Wildlife Management Board as the main instrument of wildlife management in the Nunavut Settlement Area (Government of Canada & Tungavik Federation of Nunavut, 1993). For migratory birds, co-management is further implemented through the Inuit Impact and Benefit Agreement for National Wildlife Areas and Migratory Bird Sanctuaries in the Nunavut Settlement Area, which provides for partnership between Nunavut Inuit and ECCC through Area Co-Management Committees (Government of Canada, 2016). These committees advise on management plans, research, permits, and habitat protection, helping ensure that Inuit knowledge and community priorities inform decisions affecting geese and their habitat (Government of Canada, 2014).

2.5 Knowledge braiding and community-based monitoring in co-management

2.5.1 Knowledge co-production and braiding

Knowledge co-production describes research processes where Indigenous and non-Indigenous partners jointly shape the questions, methods, interpretation, and use of results, rather than adding Indigenous knowledge after the research design is set (Ellam

Yua et al., 2022). Knowledge braiding is a useful concept within this context because it emphasizes collaboration across knowledge systems without requiring them to be merged into a single framework (Bartlett et al., 2012; Bowles et al., 2026; Kimmerer, 2013; Reid et al., 2021). Instead, braiding brings Indigenous knowledge and Western science into conversation in ways that maintain the integrity and strengths of each system (Alexander et al., 2021; Bowles et al., 2026; Environment and Climate Change Canada, 2025). Both braiding and knowledge co-production are relevant in co-management where multiple knowledge systems are included in governance and management decisions.

High-quality co-production is consistently linked to shared purpose, clarity about roles and decision-making, sustained relationships, and attention to equity, including Indigenous authority over how knowledge is interpreted and mobilized (Ellam Yua et al., 2022). These processes are inseparable from ethics and governance, since community-based research protocols help clarify consent, reciprocity, and accountability, including expectations for community authority over how knowledge is handled and used (Hayward et al., 2021). In monitoring contexts, these principles are operationalized through Indigenous-led and CBM programs that link knowledge generation directly to local priorities and decision-making (Henri, 2012; Ndeloh Etiendem et al., 2020).

2.5.2 Indigenous-led and community-based goose monitoring

CBM refers to the observation and documentation of environmental conditions by community members, often in ways grounded in local and Indigenous knowledge systems (N. Johnson et al., 2015). CBM is frequently described as a practical approach for strengthening environmental reporting in places where year-round scientific monitoring

can be difficult to sustain (Gilchrist et al., 2005). CBM takes many forms, but it is most effective when it links ongoing observation and reporting with trust, shared decision-making, and governance processes that genuinely value Indigenous knowledge alongside scientific methods (Berkes et al., 2007).

In Nunavut, the development of Indigenous-led and collaborative monitoring must also be understood within broader shifts in wildlife governance. Co-management and participatory approaches have been found to expand Inuit involvement in wildlife governance, even though decision-making often remains shaped by scientific and bureaucratic institutions (Henri, 2012). In Arctic bird research, collaborative monitoring has gained importance because local observations can document changes and events that are not always captured through conventional scientific surveys alone (Henri, Carter, et al., 2018). In light goose research specifically, this shift is reflected in collaborative work that links Inuit knowledge and management concerns (Henri, Carter, et al., 2020).

2.6 Goose populations around Arviat

Since the late 1960s, North American goose populations have increased, particularly Arctic-nesting light geese (Abraham et al., 2005). Population growth has been linked in part to agricultural intensification along migration routes and wintering areas that provide abundant forage, increasing survival and reproductive success (Alisauskas et al., 2022; Fox & Abraham, 2017). Rapid population increases have also been associated with habitat degradation on Arctic breeding grounds (Abraham et al., 2005).

Work combining Inuit knowledge and aerial survey data in the Kivalliq region found that light geese abundance had increased regionally since the 1940s, but some local colonies declined between the 1960s–1990s and the 2010s (Carter, Henri, Johnston, Irkok, et al., 2018; Carter, Martinez-Levasseur, et al., 2025; Henri, Carter, et al., 2020). Inuit observations further suggest that local changes reflect not only abundance, but also redistribution in response to habitat degradation, earlier snowmelt, drying ponds and lakes, and greater predator pressure.

This local context is closely tied to the Kuugaarjuk Migratory Bird Sanctuary, formerly known as McConnell River Migratory Bird Sanctuary, located about 35 km southwest of Arviat on the western coast of Hudson Bay. The sanctuary was established in 1960 to protect a breeding colony of Lesser Snow Geese, Ross's Geese, and Canada Geese, as an important nesting, feeding, and moulting area for geese and many other migratory birds (ACMC, 2019). Kuugaarjuk is managed by the Nivvialik Area Co-Management Committee, established in 2010.

2.7 Research gap: The need to document Inuit indicators of goose health

A central gap identified through this review is that Inuit knowledge of goose health, specifically for monitoring and local decision-making, is not well documented in published literature in ways that reflect Inuit terminology, assessment processes, and contexts of use. As a result, there is limited published work showing how community members assess goose health in practice or how these observations could inform CBM

programs and activities. This gap motivates the focus of this thesis, which documents Inuit-identified goose health indicators in Arviat and examines how they may support monitoring approaches grounded in Inuit priorities and knowledge systems.

3 Methods

3.1 Project development

3.1.1 Start of project

The Aqqiumavvik Society is an Inuit-led organization in Arviat, Nunavut. It supports community wellness and Inuit-led research grounded in local priorities. In 2018, they began research in Arviat to document historical relationships between Inuit and geese, and to assess current consumption and use in the community as part of their wellness, Ujjiqsuiniq Young Hunters, and Community Kitchen programs.

Related groundwork was also established through the Kangut Project (2016-2021). It documented IQ related to geese in Arviat and Coral Harbour through interviews and participatory mapping (June 2017), followed by collaborative analysis workshops and knowledge sharing (September 2018). Dr. Dominique Henri and Dr. Natalie Carter were key contributors (Table 3.1). This early work contributed to understanding the history and lasting impacts of federal restrictions on goose and egg harvesting introduced through the MBCA, 1917, alongside the cultural, nutritional, and social importance of geese for Arviarmiut. It also documented Inuit and Western knowledges of changes in goose distribution and abundance and their impacts on local ecosystems (Carter, Henri, Johnston, Emiktaut, et al., 2018; Carter, Henri, Johnston, Irkok, et al., 2018; Carter, Martinez-Levasseur, et al., 2025; Henri, Carter, et al., 2018, 2020). Later amendments, including the Nunavut Agreement (1993), the MBCA, 1994, changed the legal context,

but the impacts of the earlier restrictions remained an important part of the project's historical context.

Table 3.1. Project partners

Affiliation and Name	Project Responsibilities
Aqqiumavvik Society	
Shirley Tagalik	• Lead all community engagement in Arviat and research ethics • Co-lead analysis and knowledge translation
Kukik Baker	• Coordinate Ujjiqsuiniq Young Hunter involvement • Oversee project and financial management in Arviat and support community engagement and ethics.
Joe Karetak	• Lead all IQ methods and cultural competency training • Advise on all collaborative analysis and knowledge translation
McMaster University	
Gita Ljubicic	• Principal Investigator; lead project coordination with Aqqiumavvik, academic ethics, and research license applications • Co-supervise MA student Rowan Harris (with Dominique Henri)
Natalie Carter	• Lead project assessment and evaluation of project • Mentor students and contribute to analysis and knowledge translation
Rowan Harris	• Lead community-engaged research focused on identifying holistic indicators of goose health around Arviat
Environment and Climate Change Canada	
Dominique Henri	• Lead analysis of migratory bird policy and support IQ research • Co-supervise MA student Rowan Harris and support analysis
Frank Baldwin	• Lead goose banding, population monitoring, and sampling/analysis of pre-nesting nutrient reserves
Carleton University	
Jennifer Provencher	• Lead contaminants and microplastics research and lab analyses • Contribute to collaborative analysis and knowledge translation
Emily Wong	• Conduct laboratory-based analysis of contaminants and microplastics in goose and environmental samples
McGill University	
Murray Humphries	• Lead nutritional analysis, food preparation/use, and food preference dimensions of the project
Léna Bureau	• Lead Fuzzy Cognitive Mapping and qualitative research focused on goose harvesting practices and barriers
Nicole Stafiej	• Lead research on geese cooking practices and food preferences • Support documentation of goose recipes and food preparation

Affiliation and Name	Project Responsibilities
Canadian Food Inspection Agency	
Yohannes Berhane	• Oversee laboratory analysis of pathogens and disease samples
Research Advisory Council	
Dorothy Aglukark, Arden Nibgoarsi, Lisa Gibbons, Mike Gibbons (Tunaala), Andrew Panigoniak, Peter Alagalak	• Provide guidance on research priorities and questions to ensure alignment with Inuit values and community interests • Contribute to interpretation and verification of findings through collaborative analysis • Guide culturally appropriate knowledge sharing and communication

To continue this work, Aqqiumavvik obtained funding through the Inuit Nunangat Research Program (North-by-North), and through CanNor's Northern Food Innovation Challenge (January 2022). With this support, Aqqiumavvik began exploring community interest in goose food products and the feasibility of commercialization. This included experimenting with goose recipes and field testing these in the community to understand preferences. Community engagement guided this, documenting perspectives and questions through radio call-in shows and interviews led by Elder Joe Karetak, Aqqiumavvik's IQ Research Coordinator (Table 3.1). Aqqiumavvik also began mapping nesting sites around Arviat through the SIKU Indigenous Knowledge App (hereby referred to as SIKU) nest-site challenge in spring 2021. This effort was expanded during the spring 2022 nesting season (Arctic Eider Society, 2024).

Building from this work, Aqqiumavvik moved to bring together a full research team to address the central research questions that had emerged. These were (a) whether geese are safe to consume around Arviat; and (b) what level of increased community harvest of geese and eggs is sustainable. Aqqiumavvik developed a CIHR Team Development Grant proposal to support early coordination, planning, and relationship-

building across partners, alongside interviews and community engagement that helped confirm the scope of the work needed to answer these questions. As part of this process, Aqqiumavvik nominated Dr. Gita Ljubicic as the project's Principal Investigator, with McMaster University taking on a central role in supporting project coordination and research capacity.

3.1.2 CIHR team grant

To support this larger project, "Understanding the impacts of climate change on Arctic nesting geese – a key towards Inuit food sovereignty in Arviat, Nunavut", Aqqiumavvik and its academic and government partners received a CIHR Team Grant (2022–2026)**.** bringing together researchers from multiple institutions to address a community-defined question: can geese around Arviat be harvested sustainably, and can harvesting support a community goose harvest over time? Answering this question requires expertise across food safety, ecology, policy, and community-led monitoring (Table 3.1).

To assess whether geese are safe to eat, Dr. Jennifer Provencher is leading contaminants analysis, alongside Dr. Yohannes Berhane, who is testing pathogens relevant to goose consumption. Dr. Murray Humphries is leading nutrition-related work and examining Arviarmiut consumption practices. To understand whether a sustainable harvest is possible, the project includes population monitoring and banding led by Frank Baldwin in collaboration with Aqqiumavvik Society's Ujjiqsuiniq Young Hunter Program, as well as body condition work that contributes to understanding goose health and harvest sustainability (Table 3.1).

To ensure the work stays grounded in community priorities and produces findings that can be used locally, the project also includes evaluation framework development and policy analysis conducted through McMaster University (Table 3.1). Additionally, a Knowledge Mobilization grant has been secured to share results back to community. My component of the project focuses on the social dimensions of goose harvesting and use, and on documenting how Arviarmiut understand and assess goose health.

3.1.3 Western scientific monitoring

Western scientific monitoring provides an important foundation for understanding goose populations and health within the CIHR goose project. Led by the CWS of ECCC, this work applies standardized indicators used in goose management and conservation to generate information on abundance, survival, migration, disease exposure, and physiological condition.

Population-level monitoring is conducted through long-term banding programs under the Arctic Goose Joint Venture (AGJV), led by Frank Baldwin (*Arctic Goose Joint Venture*, n.d.). During molting season, geese are captured, banded, and released. Band recoveries provide data on population health with migration routes, survival, and harvest rates across flyways extending from the Canadian Arctic to the southern United States (Alisauskas et al., 2011). Individual-level data are also collected during spring collections, including body mass and morphometric measurements such as wing length to adjust nutrient reserves of fat and protein for structural size (Ankney & Macinnes, 1978; Baldwin et al., 2022). In Arviat, the Ujjiqsuiniq Young Hunters have assisted with the capture, banding, and release of geese as part of local monitoring activities.

Additional individual-level health information is generated through laboratory and necropsy-based monitoring conducted at the National Wildlife Research Centre (NWRC) of ECCC under the direction of Jennifer Provencher. Oral and cloacal swabs are collected for avian influenza testing by the Canadian Food Inspection Agency (CFIA). Blood and egg yolk samples are analyzed for antibodies indicating past exposure and immune response. Necropsy-based assessments document physical condition and abnormalities, including injuries, muscle condition, fat stores, and egg characteristics that may signal nutritional or environmental stress.

Together, these approaches provide essential information on goose health and population status through a Western scientific lens. They do not fully capture how goose health is understood and evaluated within IQ, particularly in the context of harvesting, preparation, and consumption.

My project was developed within this monitoring landscape to document Inuit-identified indicators of goose health, contributing to a more holistic and community-relevant understanding that can be meaningfully applied alongside existing monitoring approaches.

3.1.4 My project

My thesis research was developed within the broader Aqqiumavvik-led partnership, to better understand goose health and to support community priorities related to goose harvesting and consumption. In 2023 I joined the team after responding to an advertisement for a graduate student position. I began my work as a co-supervised

Master's student under Dr. Gita Ljubicic and Dr. Dominique Henri, following earlier relationship-building and planning completed during the grant development phase.

The CIHR project planning meeting in Arviat, November 2023, was my first in-person introduction to the project. I met Aqqiumavvik staff and the Research Advisory Council (RAC) (Table 3.1). This meeting helped to define my research focus and clarify my role within the broader project. My thesis contributes to the social component of the team grant by documenting Inuit-identified indicators of goose health, and by examining how Arviarmiut understand and assess goose health in relation to harvesting and consumption. By centering Inuit priorities and lived experience, this work supports Inuit-led, holistic monitoring that can strengthen community confidence in both hunting and in eating geese.

My project scope was refined through meetings with the RAC and Aqqiumavvik staff (Table 3.1), who emphasized the importance of ensuring that young people can identify whether a goose is healthy and safe to eat. These discussions highlighted that while Inuit have long used a wide range of indicators to assess goose health, younger hunters may not have the same opportunities for hands-on learning. This can be explained by changing government legislation and colonial disruptions to intergenerational knowledge transmission (Section 2.4). The RAC identified a clear need to support youth learning; to revitalize cultural practices and to rebuild confidence in the safety of geese as a country food.

At the same time, this work contributes to ongoing efforts to respectfully embed Inuit knowledge within monitoring programs and addressing gaps and limitations in

federal goose monitoring activities. Existing ECCC programs focus largely on population-level indicators such as abundance, productivity, and migratory patterns. While these provide important data for regional and continental management, they do not, on their own, respond to Aqqiumavvik's goal of revitalizing goose harvesting and strengthening community food systems in Arviat. Community members need access to broader monitoring information. They also need locally grounded knowledge and confidence to assess, harvest, prepare, and eat geese. In this context, documenting Inuit indicators of goose health strengthens CBM systems that reflect Inuit priorities and harvesting practices that can complement federal monitoring programs.

3.1.5 Governance of this project

The National Inuit Strategy on Research (NISR) developed by Inuit Tapiriit Kanatami (ITK) offers a framework with five key priorities to support Inuit rights: advance Inuit governance in research, enhance the ethical conduct of research, align funding with Inuit research priorities, ensure Inuit access, ownership, control over data and information, and build capacity in Inuit Nunangat research (Inuit Tapiriit Kanatami, 2018; K. J. Wilson et al., 2020).

These priorities provide a foundation for community-engaged research that is accountable to Inuit decision-making and supports community resilience. Evidence from conservation and sustainability research further suggests that outcomes for both people and the environment improve when initiatives are designed and carried out in genuine partnership with Indigenous peoples (Dawson et al., 2021). Within monitoring contexts, this governance lens is especially important because CBM can contribute to Indigenous

self-determination only when Indigenous rights and authority shape how knowledge is generated, interpreted, and used in decision-making (N. J. Wilson, 2025).

Aqqiumavvik Society provided leadership throughout all stages of this project, ensuring activities aligned with community priorities and IQ principles. Aqqiumavvik staff were directly involved in direction, decision-making, and community engagement. They mentored me during each visit in how to work respectfully within the community, shaping my research approach and community involvement (Table 3.1).

The RAC (Table 3.1) played a central role in establishing community priorities and grounding of this project in IQ. Their guidance ensured that workshops, discussions, and project outputs remained culturally relevant and grounded in values embedded in the ARM, while supporting learning through practice.

My supervisors, Dr. Gita Ljubicic and Dr. Dominique Henri, worked closely with Aqqiumavvik to support this community-led governance. Alongside them, Dr. Natalie Carter provided mentorship and guidance, drawing on her own strong relationships with Aqqiumavvik and experience working within the partnership (Table 3.1). Together, they guided me through university and regional ethics processes, helped refine my research questions, and ensured that my methods met both university standards and community expectations. Their expertise in Inuit Nunangat research and long-standing relationships with Aqqiumavvik strengthened my project and helped ground my work in established partnerships and relationships.

3.1.6 Positionality statement

As a researcher, my positionality is shaped by various intersecting identities. I am a *Qablunaat* (non-Indigenous), queer, cisgender woman of mixed Chinese and British ancestry. Currently, I reside on the unceded traditional territories of the xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh (Squamish), and səlilwətaɬ (Tsleil-Waututh) Nations, in the city of Vancouver, British Columbia.

As a fourth-generation *Qablunaat* researcher, my academic journey began with an undergraduate degree at the University of British Columbia, where I earned a Bachelor of Science with a major in biology. I am conscious of the limitations in my Western education, particularly concerning wildlife management. This awareness drives my commitment to expanding my knowledge and methodologies to ensure a more inclusive and holistic approach to environmental research.

In my professional journey, I have contributed to wildlife management with the Government of Canada, an institution historically influenced by colonial priorities but actively engaged in the ongoing process of reconciliation. This experience afforded me insights into the dynamics of conservation. Additionally, I have had the privilege of collaborating with the communities of Mittimatalik (Pond Inlet) and Ikpiarjuk (Arctic Bay), supporting them by collecting and consolidating information – including IQ related to narwal, to assist Inuit in assuming responsibility for the monitoring of narwhal and the ongoing effects of the shipping of iron ore from the Baffinland mine. This experience highlighted the importance of centering community priorities and concerns in decision-making processes.

The intersecting influences of my personal, educational, and professional experiences directly shape how I engage with this research. My academic foundation in biology and exposure to wildlife management grounds me in a Western science framework providing an important reference point for understanding health indicators, while also making me aware of its limitations. One of these is the tendency of Western science to overlook the relationship between people and their environment, or to define elements of the environment as 'resources' there solely for the benefit (enrichment) of people. Western science has a habit of underrepresenting Indigenous perspectives on health and well-being and relationships with lands and species. My upbringing within a family of mixed cultural heritage, taught me to move between worldviews, practices, and social norms, strengthening my adaptability and openness to different knowledge systems. This prepared me, in many respects, to respectfully engaging Inuit cultural practices and ways of knowing.

This positionality makes me aware of imposing Western frameworks on Inuit knowledge, and emphasizes the value of relationship-building, reciprocity, and shared decision-making in research. Ultimately, my positionality shapes my commitment to support Inuit sovereignty and to co-create knowledge in a way that respects Indigenous data governance and IQ.

3.2 Aajiiqatigiingniq Research Methodology

My project and our overall research was guided by the ARM, a research framework created by the Aqqiumavvik Society to support Inuit-led research in Arviat,

Nunavut (Carter, Tagalik, et al., 2025). Through workshops with Elders across Inuit Nunangat, the ARM was developed to ground research in IQ principles (Section 2.1), translating Inuit values into a consensus-based decision-making approach (Aqqiumavvik Society, n.d.). Developed from Aqqiumavvik's long-term leadership in youth, health, and land-based initiatives, the ARM responds to the limits of conventional Western research structures by formalizing an approach that centres Inuit leadership, supports collective learning, and ensures research strengthens community wellbeing (Carter, Tagalik, et al., 2025). It frames research as a relational, iterative process embedded in everyday community life, emphasizing accountability to people, place, and ongoing programs. ARM development has been iterative, shaped through community-led research practice and project-based application (Carter, Tagalik, et al., 2025; Ferrazzi et al., 2019).

The ARM is grounded in the IQ principle of *aajiiqatigiingniq*, which emphasizes coming together to build consensus and shared understanding. Within the ARM, *aajiiqatigiingniq* shapes how research questions are developed, how findings are interpreted, and how decisions are made about the use and sharing of results. The ARM is organized into four stages, each guided by IQ values (Table 3.2, Figure 3.1).

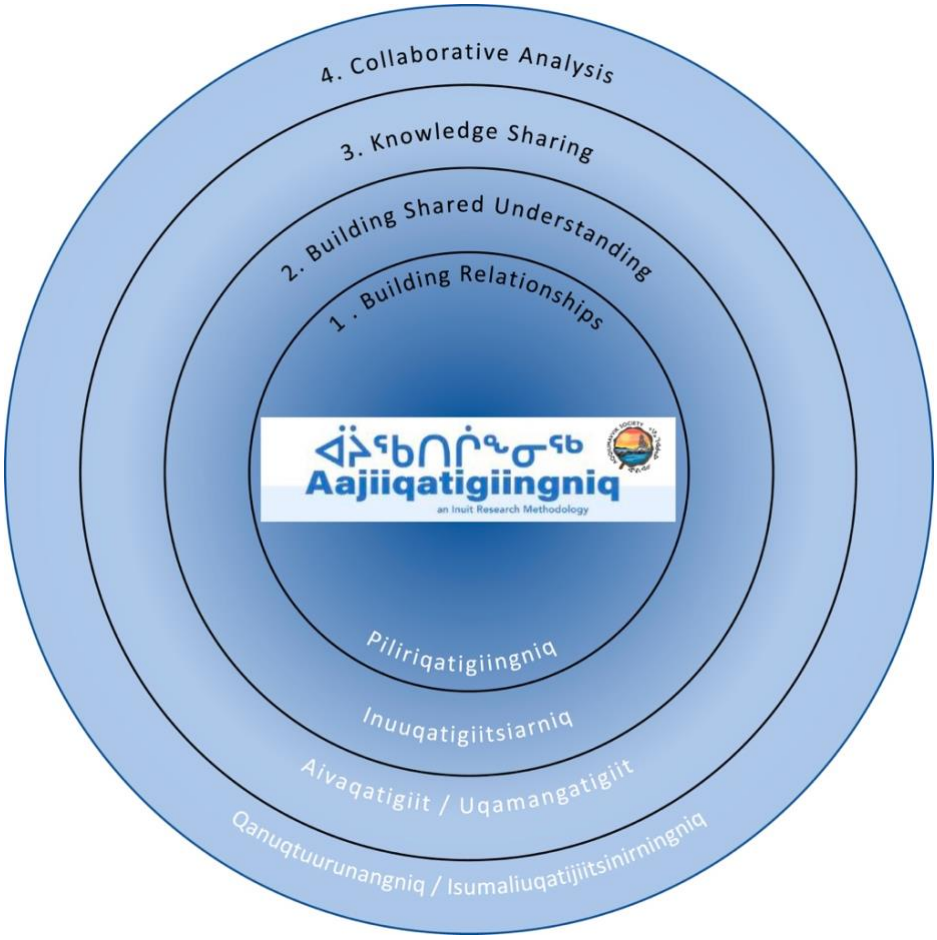


Figure 3.1. Four stages of the Aajiiqatigiingniq Research Methodology and the corresponding IQ principle
(Carter, Tagalik, et al., 2025); see Table 3.2 for Inuktitut definitions)

Table 3.2. Principles of the Aajiiqatigiingniq Research Methodology
(Tagalik, 2012; Ferrazzi et al., 2019; Carter, Tagalik, et al., 2025)

Stage of ARM	**IQ Principle**	**Definition**
Stage 1 – Building Relationships	*Piliriqatigiingniq*	Working together cooperatively toward shared goals.
Stage 2 – Building Shared Understanding	*Inuuqatigiitsiarniq*	Respecting others and fostering harmonious relationships within the community.
Stage 3 – Knowledge Sharing	*Aivaqatigiit / Uqamangatigiit*	Respectful discussion and sharing of lived experiences and knowledge.
Stage 4 – Collaborative Analysis	*Qanuqtuurunangniq / Isumaliuqatijiitsinirningniq*	Being resourceful to solve problems and collective analysis to reach agreement.

Stage One: Building Relationships focuses on establishing trust and shared purpose to ground research in strong relational foundations Relational approaches are central to Inuit methodologies, where knowledge is generated through connections between people and place. Guided by *piliriqatigiingniq* (Table 3.2), this stage emphasizes working together openly and respectfully for meaningful collaboration. This stage continued throughout the research.

Stage Two: Building Shared Understanding establishes a shared understanding of language and context, foundational to collaborative research (Carter, Tagalik, et al., 2025). Guided by *inuuqatigiitsiarniq* (Table 3.2), this stage creates space for open discussion in which project partners share perspectives, establish purpose and align around shared goals. This process reflects Inuit approaches, where knowledge is refined through discussion and group consensus. This was important throughout the project to maintain a shared direction.

Stage Three: Knowledge Sharing creates space for project partners and contributors to share lived experiences and observation, in ways that reflect Inuit values (Carter, Tagalik, et al., 2025). Guided by *aivaqatigiit/uqamangatigiit* (Table 3.2), this stage emphasizes respectful discussion and build shared meaning through open discussion. This stage continued throughout the research through ongoing knowledge sharing across project activities.

Stage Four: Collaborative Analysis focuses on making sense of what was shared and checking interpretations with contributors and project partners (Carter, Tagalik, et al., 2025). Guided by *qanuqtuurunangniq/isumaliuqatijiitsinirningniq* (Table 3.2), this stage

emphasizes being resourceful and thinking things through together. It reflects the relational and consensus-based approaches central to ARM, ensuring that interpretations reflect Inuit knowledge. This occurred iteratively alongside with stage three as interpretations were revisited and refined.

The ARM was well suited to this project, which documents Inuit-identified indicators of goose health within harvesting and food practices. Because this knowledge is experiential, place-based, and embedded in everyday land use, the ARM's emphasis on relationship-building, consensus, and collaborative interpretation supports both the identification and validation of indicators. The ARM also provided an ethically appropriate framework for my role as a non-Inuit researcher working within Inuit Nunangat (Section 3.1.6), establishing clear expectations around accountability, collaboration, and respect, while ensuring that research decisions remained grounded in Inuit priorities.

3.3 Implementing the Aajiiqatigiingniq Research Methodology

The stages in this process are not linear, but iterative and overlapping (Figure 3.2). They reflect Inuit approaches to learning and decision-making that value revisiting ideas and refining understanding through continued dialogue.

Between in-person activities, this approach continued through virtual meetings with project partners and my supervisors, email exchanges, document sharing, ongoing literature review, transcription, preliminary analysis, and preparation of materials for later discussion. Although these between-stage activities are less visible than in-person

fieldwork, they were important to maintaining continuity across stages and supporting the iterative nature of the broader research process.

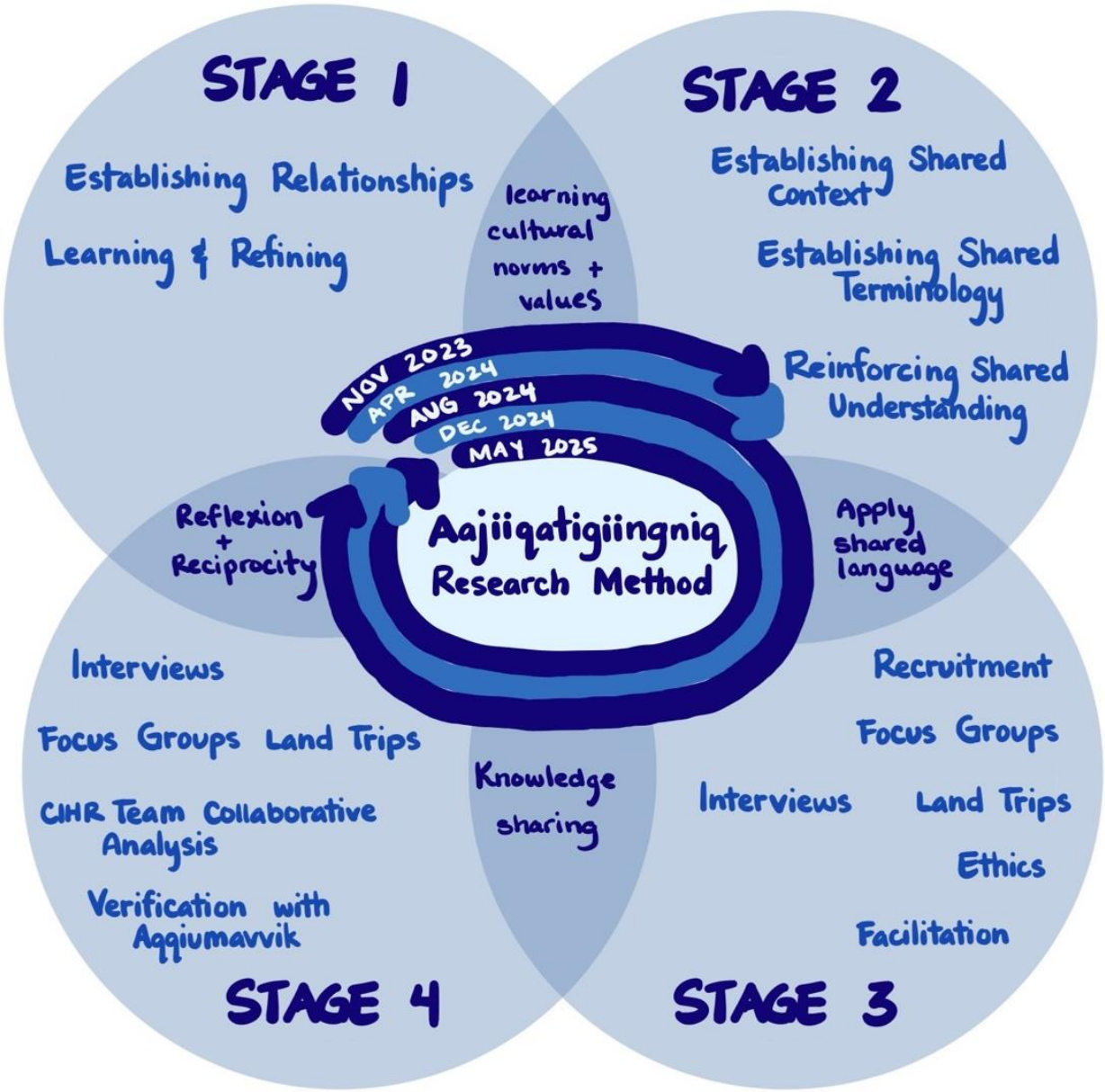


Figure 3.2. Four iterative stages of the ARM across five interconnected trips (Tables 3.2 and 3.3, Figure 3.1)

Table 3.3. Summary of in-person research activities organized by trip and aligned with the four stages of the Aajiiqatigiingniq Research Methodology

	Stage 1	**Stage 2**	**Stage 3**	**Stage 4**
November 2023 Arviat, NU	• Introductory presentations for all CIHR team members • Land trip with Aqqiumavvik Staff • Ujjiqsuiniq Young Hunter graduation celebration • Community open house	• 1 week ARM workshop with full CIHR team • Project ideas/development with Aqqiumavvik staff		
April 2024 Arviat, NU	• Ujjiqsuiniq Young Hunter land trip	• Project development meetings • 2 weeks of terminology workshops		
August 2024 Arviat, NU	• Community BBQ • Ladies berry picking trip • Ujjiqsuiniq Young Hunter land trip	• Project development meetings	• Focus groups • Interviews	• Project analysis with community partners
December 2024 Ottawa, ON	• Family meal	• Presented on terminology workshops with Elder Dorothy Aglukark	• Presented results to CIHR team • Presented on goose indicators with Elder Dorothy Aglukark	• Discussion of project impact • Review of indicators • Project analysis

May 2025 Arviat, NU	• Community kitchen workshop • Goose bag workshop	• Land trips with Aqqiumavvik hunters	• Focus groups • Interviews • Land trips • Informal conversations	• Four verification land trips • Interviews • Project analysis • Informal Conversation

3.3.1 Stage one - Building relationships

In my work, I prioritized relationship building to ground the research in mutual respect and openness. This means arriving to the community as an open-minded learner and positioning myself as a human before researcher by sharing about my own history, family and interests before sharing academic qualifications (Section 3.1.6). It also means positioning myself as an individual open to connection rather than one solely driven by research goals.

3.3.1.1 Establishing relationships

Early relationship-building began through introductory presentations with the full CIHR team. Across visits, relationships were strengthened through participation in Aqqiumavvik and Ujjiqsuiniq Young Hunters activities. I joined Young Hunters land trips including a multi-day muskox hunt. I participated in a Young Hunters graduation celebration. I participated in community gatherings and land-based activities, including a community BBQ, and a berry picking trip (Figures 3.3 and 3.4). These experiences created space to connect with youth, Elders, hunters, and staff through shared time and shared work, while also helping me learn local communication styles and expectations.



Figure 3.3. Enjoying tea and snacks while on a spring goose hunt
(From left to right: Léna Bureau, Nicole Stafiej, Rowan Harris, and Dominique Henri)
(Photo by Anne Bergeron, May 2025)



Figure 3.4. Ujjiqsuiniq Young Hunter instructor Karoo Muckpah and three young hunters eating lunch during a community barbecue
(Photo by Anne Bergeron, May 2025)

Relationship-building also occurred through shared time with the wider CIHR team and through everyday participation in community life. Shared meals and informal conversations with team members created space to connect outside formal meetings and to better understand one another's backgrounds and approaches. In Arviat, I continued building relationships by taking part in broader community and CIHR team activities. These included a community kitchen workshop and a goose bag workshop (Figure 3.5), as well as open gym volleyball or badminton nights.

Between visits, connection continued through email check-ins, planning calls, and full-team update meetings. These touchpoints supported coordination and created space to ask questions and clarify decisions as the project developed.



Figure 3.5. Elder Dorothy Aglukark leading a goose bag making workshop
(Photo by Anne Bergeron, May 2025)

3.3.1.2 Learning and refining

Throughout these activities, I received guidance from Elders, hunters, Aqqiumavvik staff, and my supervisors, which shaped my approach. Early feedback from team members and Aqqiumavvik staff helped refine my facilitation style, to adjust the level of detail in my questions, and ensure conversations were appropriately paced and toned. Their suggestions guided small but important changes to the methods and strengthened my ability to engage respectfully and collaboratively.

For example, I learned the importance of always stating the purpose of a research activity, the importance of silence while facilitating discussion, and the importance of expressing gratitude during introductory and concluding remarks. These are always some of the richest parts of the discussion. Over time, I became more comfortable with community norms. These included the use of humour, the openness to making and learning from mistakes, and the flexible pace activities follow in Arviat.

3.3.2 Stage two - Building shared understanding

Stage two developed iteratively, and was revisited across visits through facilitated workshops, project meetings, and ongoing discussion.

3.3.2.1 Establishing shared context

An early ARM workshop provided the first opportunity to build shared understanding with all research partners. Facilitated and interpreted by Aqqiumavvik leadership, the workshop focused on clarifying roles, expectations, and the purpose of the research within the ARM framework. During this session, Elder Mike Gibbons (Tunaala),

an experienced mechanic, shared an analogy that Inuit and Western knowledge systems are like gears of different sizes operating at different speeds, which need careful alignment to function together. Open discussion, he explained, acts as the "oil" allowing these systems to work together, while minimizing friction. This analogy helped establish a shared understanding of collaboration, and mutual respect across the research team.

3.3.2.2 Establishing shared terminology

Building shared understanding relied on outlining a shared language. This is particularly important when working between languages and with interpreters. Terminology workshops created space to share context, meaning, and language across knowledge systems. A week-long workshop on goose anatomy and ecology terminology with the RAC and Aqqiumavvik staff involved the dissection of a goose. This supported hands-on discussion and helped anchor terms in shared observation and experience.

Shared terminology was also strengthened through iterative work on posters, infographics, and pamphlets (Figure 3.6). During another week-long workshop with the RAC, visual materials to be used by Aqqiumavvik for the larger goose project were reviewed and adjusted in real time. This allowed for immediate and iterative feedback. Through this process, the language used in the infographics was shifted toward terms and phrasing that could be translated more easily into Inuktitut, strengthening clarity and cultural relevance for Arviarmiut. Images were also refined to emphasize the benefits of goose consumption, rather than centering the negative history of legislation. These in-person workshops created space for collective decision-making and strengthening shared understanding between Elders and Western-trained researchers.



Figure 3.6. Discussion during a terminology workshop
(From left to right: Joe Karetak, Gita Ljubicic, and Arden Nibgoarsi)
(Photo by Rowan Harris, April 2024)

3.3.2.3 Reinforcing shared understanding

Shared understanding was reinforced through project development meetings with Aqqiumavvik staff. Research direction and priorities were discussed and refined. A community open house held for Arviarmiut also created space to share project context more widely and supported broader understanding within the community. Shared understanding was also strengthened through in-person learning on the land with Aqqiumavvik hunters. There, discussion and shared experience supported ongoing clarification of concepts in place.

Establishing shared understanding also meant providing updates for the CIHR team along the way. Project progress was shared with the full CIHR team at the Ottawa meetings, followed by a progress presentation with Elder Dorothy Aglukark at ArcticNet 2024 in Ottawa. The terminology work was also presented at ArcticNet 2024 with Elder Dorothy Aglukark and Emily Wong (Table 3.1).

Throughout these activities, I worked collaboratively with contributors to refine terminology, clarify meaning, and remain open to guidance. Sessions were conducted in both Inuktitut and English, with interpretation to support full participation. Notes were captured through audio recordings, written documentation, and annotated visual materials (Figure 3.7).

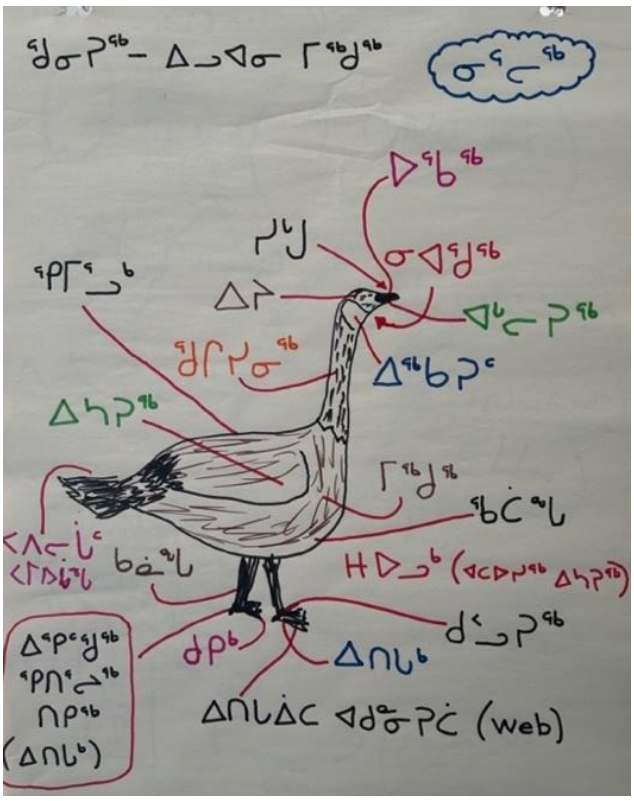


Figure 3.7. Anatomy of a goose identified during terminology workshops (Drawn by Elder Arden Nibgoarsi, April 2024)

3.3.3 Stage three - Knowledge sharing

Knowledge sharing creates space for contributors to share lived experience and observations in ways that reflect Inuit values (Carter, Tagalik, et al., 2025). Following guidance from project co-lead Shirley Tagalik, a triangulated approach of focus groups, interviews, and on-the-land trips was selected as the primary method for knowledge sharing in this project. This improved research rigour (Baxter & Eyles, 1997).

I began with focus groups to give contributors the opportunity to become familiar with me as a facilitator, and with the purpose of the research (Cameron, 2021). This approach supported relationship-building and trust. It strengthened the interviews that followed and prevented misunderstandings (Leduc, 2007). On-the-land trips were incorporated to support direct observation of goose health indicators and to ensure knowledge sharing occurred in contexts that were meaningful to contributors and grounded in practice.

3.3.3.1 Recruitment

Recruitment was facilitated by Aqqiumavvik staff using purposive sampling guided by project co-leads Shirley Tagalik and Kukik Baker. They ensured representation across gender, age, and experience, and prioritizing individuals with extensive goose knowledge. Aqqiumavvik IQ expert Darryl Baker recommended additional contributors based on their expertise hunting geese. Contributors were invited through phone and radio calls and occasionally, in-person visits to contributors' homes. A letter of information was provided to participants (Appendix 1). This process was used for focus groups,

interviews, and on-the-land activities, ensuring that recruitment was grounded in local relationships.

3.3.3.2 Knowledge sharing approaches

3.3.3.2.1 Focus groups

During the August 2024 visit, I facilitated three focus groups: an Elders' Focus Group, a Men's Focus Group, and a Hunters' Focus Group (Table 3.4, Figure 3.2; Appendix 2). The Elders' session was supported by interpreter Janet Akat, the Men's session by an interpreter and co-facilitator Shelton Nipisar, and I co-facilitated the Hunters' session with contributor and project partner Darryl Baker. Each session lasted between 1.5 and 2.5 hours. The May 2025 visit included one additional 1.5-hour focus group with hunters co-facilitated by Darryl Baker. The objective of these focus groups was to document Inuit assessments and indicators of goose health through collaborative discussion among contributors with experience harvesting and preparing geese.

Focus groups were intentionally structured to bring together contributors who were familiar with one another and who shared similar levels of harvesting experience. Building relationships is a foundational component of the ARM, and focus groups were therefore conducted early in the research process following guidance from project partner Shirley Tagalik. Organizing contributors into familiar groups helped create a comfortable environment where participants could share experiences openly, build upon each other's knowledge, and discuss goose health indicators in depth (Ferrazzi et al., 2019). Separate groups were also used to ensure that contributors with less harvesting experience would

not feel hesitant to share perspectives in the presence of Elders or highly experienced hunters.

In total, 31 contributors participated across the four focus groups: 9 Elders in the Elders' Focus Group, 10 contributors in the Men's Focus Group, 5 hunters in the first Hunters' Focus Group, and 7 hunters in the second Hunters' Focus Group (Figure 3.8). Participants were identified through conversations with Aqqiumavvik staff and selected for their experience and knowledge related to goose harvesting, preparation, and consumption. Recruitment followed the purposive sampling approach described above, with Aqqiumavvik staff identifying individuals with relevant expertise and inviting them to participate through phone calls, radio announcements, or in-person visits.

Sessions were conducted at the Aqqiumavvik Society office or other familiar community spaces and were held in English or Inuktitut with interpretation. Audio recordings were supported by handwritten notes. Poster paper or a tablet was used to record key points and present notes back to contributors during the discussion.



Figure 3.8. Focus group with goose hunters
(From left to right: Joe Karetak Jr. (Napayok), Darryl Baker, Dudley Copland, Donny Baker, Jimmy Napayok , Léna Bureau)
(Photo by Rowan Harris, May 2025)

3.3.3.2.2 Interviews

Semi-structured individual and group interviews complemented the focus groups by allowing contributors to share more personal, detailed reflections and to tell stories (Figures 3.2 and 3.9; Appendix 3; Henri, Carter, et al., 2018; J. T. Johnson & Madge, 2021; Rothe et al., 2009; Schmidt, 2012). Interviews focused on documenting contributors' observations of goose health indicators, including physical condition, behaviour, abnormalities, and factors that influence decisions about hunting, preparing,

and consuming geese. I encouraged contributors to share personal stories and experiences so that these indicators could be discussed in context.

In total I conducted 13 interviews across two field visits. I conducted six interviews in August 2024, each lasting between 30 minutes and 1.5 hours. Seven additional interviews were completed during the May 2025 visit, lasting between 1 and 2 hours Table 3.4). Of the 31 contributors who participated in focus groups, 7 also participated in interviews, and 6 additional contributors were recruited specifically for the interview stage.

Interview participants were selected in collaboration with Aqqiumavvik staff based on their experience harvesting, preparing, or sharing geese, as well as their knowledge of goose health indicators. As described above, recruitment followed a purposive sampling approach guided by project partners Shirley Tagalik, Kukik Baker, and Darryl Baker, who identified contributors with relevant expertise and invited them to participate through phone calls, radio announcements, or in-person visits. Interviews took place either in contributors' homes or at the Aqqiumavvik office. They were conducted in Inuktitut or English depending on contributor preference, with interpretation support when needed. Interviews were audio-recorded with consent and supported by field notes. Poster paper or a tablet was used to record key points and present notes back to contributors during the discussion.

On one occasion, we brought a plucked goose to the interview, enabling direct discussion of physical indicators such as fatness, feather condition, and abnormalities. In two instances, interviews were conducted with paired contributors to support comfort and

conversation. In one case, two young hunters were interviewed together to help them feel more at ease. In another, two sisters (both Elders) participated together, with their niece serving as interpreter. In both cases, the familiarity between contributors supported richer storytelling and offered an opportunity for knowledge sharing and clarification between peers.



Figure 3.9. Elder Dorothy Aglukark (left), and Rowan Harris (right) during an interview (Photo by Léna Bureau, May 2025)

3.3.3.2.3 Land trips

Observation during land trips was a central component of knowledge documentation (Figure 3.2). During the May 2025 visit, four land trips were taken with Aqqiumavvik hunters during the spring goose hunt (Table 3.4). These full-day trips outside Arviat provided insight into retrieval practices and the assessment of goose health indicators (Figure 3.10). Observations made on the land informed the structure of the results, shaped infographic design, and reinforced themes raised during interviews and

focus groups. Land trips helped ensure that the final outputs accurately reflected lived harvesting practices and culturally-grounded understandings of goose health.



Figure 3.10. Three Ujjiqsuiniq Young Hunters seated (left) around instructor Darryl Baker (right) as he demonstrates plucking and gutting a goose
(Photo by Anne Bergeron, May 2025)

Table 3.4. Project contributors
(see Appendix 4 for full list of contributors per activity; FG = focus group, I = interview, LT = land trip)

Experience	**August 2024 Trip**			**May 2025 Trip**		
Name	**FG**	**I**	**LT**	**FG**	**I**	**LT**
Community Knowledge User						
Janet Akat	✓				✓	
Kukik Baker	✓					
Shirley Tagalik					✓	
Winona Gibbons		✓				
Community Members						
Andy Anowtalik	✓					
Elizabeth Irkok	✓					
Jake Oruluk	✓					
Lydia Mukyungnik		✓				

Experience	August 2024 Trip			May 2025 Trip		
Name	**FG**	**I**	**LT**	**FG**	**I**	**LT**
Lyta Josephine	✓					
Peter Mamgark	✓					
Raymond Aggark	✓					
Timothy Issumatarjuak	✓					
Timoty Kookeyuk	✓					
Elders						
Andrew Panigoniak	✓					
Arden Nibgoarsi	✓				✓	
Catherine Manik		✓			✓	
David Alagalak	✓					
Dorothy Aglukark	✓				✓	
Lisa Gibbons	✓				✓	
Mike Gibbons	✓					
Hunters						
Alex Muckpah				✓		✓
Aupaa Irkok	✓				✓	
Darryl Baker	✓			✓		✓
Donny Baker				✓		
Dudley Copland	✓			✓		
Hunter Tattiunee	✓					
Jimmy Main	✓					
Jimmy Muckpah						✓
Jimmy Napayok				✓		
Joe Karetak Jr				✓		
Lucas Owlijoot		✓				✓
Ramon Kaviok				✓		✓
Interpreters						
Angelina Suluk					✓	
Janet Akat	✓				✓	
Shelton Nipisar	✓					
Young hunters						
Leo Kigusiutnak	✓					
Ukulutuuq Nipisaq		✓				

3.3.3.3 Facilitation

Focus group and interview facilitation was guided by the ARM principles and supported by interpreters who ensured clarity of purpose and mutual understanding. Coffee or tea was offered at the start of each session to create a welcoming environment. My role as facilitator or co-facilitator was to guide conversation while allowing contributors to speak freely and adapting formats based on contributor feedback. Adjustments to discussion format and questions from feedback of Aqqiumavvik staff helped to ensure facilitation was appropriate and clear for contributors.

3.3.3.4 Ethics

Ethical considerations for this stage were shaped by both institutional and community requirements. The project received approval from the McMaster Research Ethics Board (MREB) prior to any data collection (# 6280), and all activities were conducted in accordance with university guidelines for research involving human contributors (Appendix 5). In addition, a Nunavut Research Institute (NRI) research license was obtained (# 03 022 24R-M), which ensured compliance with territorial standards for conducting research in Nunavut, including expectations related to community consultation, benefit, and culturally appropriate methods (Appendix 6).

At the community level, ethical practices followed Aqqiumavvik Society's guidance on consent and data stewardship. Oral consent was obtained in each contributor's preferred language before any recording began, and written consent was provided to Aqqiumavvik through their media release form (Appendix 7), which were photocopied. Copies of all audio recordings, transcripts, and notes were stored by

Aqqiumavvik in accordance with their data governance principles, which emphasize community ownership and control over research materials, clear agreements about who can access and use data, and community oversight of what information is shared publicly and how it is represented.

3.3.4 Stage four - Collaborative analysis

Stage Four focused on collaborative analysis, where interpretations of goose health indicators were discussed and verified with contributors, Aqqiumavvik staff, and researchers (Table 3.4, Figure 3.2). Guided by relational and consensus-based approaches central to the ARM, this stage ensured that interpretations reflected Inuit knowledge. Analysis occurred through on-the-land activities, workshops, and follow-up conversations, supporting iterative collaboration, consensus-building, and co-analysis.

3.3.4.1 Land trips

Land trips, for on-the-land verification, was central to stage four as they provided the context necessary to deepen interpretation of goose health indicators and ensure that findings reflected harvesting practices (Figure 3.2). During the May 2025 visit, four day-trips were undertaken with Aqqiumavvik hunters as part of the spring goose hunt (Table 3.4). These trips allowed for direct observation of indicators across the various stages of the hunting process, and showed how assessments of fatness, behaviour, and abnormalities connect to real-time decisions about goose health and edibility.

Several clarifications emerged through these land activities. For example, observing differences between geese retrieved near town versus farther away helped

clarify why some abnormalities may or may not be concerning depending on context. Other indicators, such as fatness, were described in much greater detail, as hunters pointed out specific locations on the goose and demonstrated their assessments in real time. By grounding indicators through lived experience, on-the-land verification ensured that interpretations were both contextually accurate and relevant for community use.

3.3.4.2 CIHR team collaborative analysis

The CIHR team meeting, held in December 2024, supported collaborative analysis by bringing together all research partners (Tables 3.1 and 3.3, Figure 3.11). This was the first time preliminary findings were shared with the broader research team. Draft goose health indicator categories, quotes, and early infographic materials were displayed on a screen for group review. Elders and hunters clarified terminology and emphasized indicators most relevant to harvesting. Researchers contributed ecological knowledge and current monitoring context to shape results presentation. By the end of the session, several indicators had been clarified and gaps identified for further investigation, while keeping Inuit knowledge and Western sciences aligned, as described by Elder Mike Gibbons' gear analogy (Section 3.3.2.2).



Figure 3.11. Collaborative analysis workshop in Ottawa with CIHR team
(From left to right: Shirley Tagalik, Emily Wong, Natalie Carter, Jennifer Provencher, Kukik Baker, Karoo Muckpah, and Lucas Owljioot)
(Photo by Rowan Harris, December 2025)

3.3.4.3 Follow-up interviews and focus groups

Follow-up interviews and focus groups were conducted during the May 2025 visit to share and discuss preliminary findings with contributors (Table 3.4). Draft goose health indicator categories, themes, and visual materials were presented using an iPad, allowing contributors to review and provide feedback. This process supported *aajiiqatigiingniq* by creating space for clarification, correction, and collective refinement.

Contributors offered new examples, and highlighted contextual factors that had not been fully captured in earlier stages of the project. Hunters elaborated on distinctions

between normal variation and signs of illness, while Elders emphasized cultural considerations, seasonal differences, and circumstances in which certain indicators should or should not be viewed as concerning. These follow-up conversations helped confirm the indicators and revealed areas where definitions or categories required adjustment. Through this iterative process, the findings were strengthened and aligned with community knowledge and context.

3.3.4.4 Verification with Aqqiumavvik

Verification with Aqqiumavvik was a central component of Stage Four, ensuring that the findings reflected community knowledge accurately and respectfully (Table 3.4). During the May 2025 visit, preliminary indicators, themes, and draft visual materials were presented to Aqqiumavvik staff for confirmation and refinement. These sessions provided an opportunity to check interpretations, clarify terminology, and ensure that the structure and emphasis of the indicators aligned with local understandings of goose health.

Aqqiumavvik staff offered feedback on the overall structure and added specific details to ensure all material was culturally appropriate. Their input was essential for determining which indicators were most relevant for community use. This collaborative process also initiated the co-development of knowledge mobilization outputs, including bilingual infographics and posters intended to be distributed widely for use in community programs. Through this co-analysis with Aqqiumavvik, the research findings were strengthened and contextualized to reflect community priorities and support ongoing food sovereignty efforts in Arviat.

3.4 Limitations

One limitation of this research relates to my positionality as a *Qablunaat* (non-Inuit) researcher working in an Inuit community. Although the project was conducted in collaboration with the Aqqiumavvik Society and guided by Inuit-led research approaches, I remain an outsider to the cultural and linguistic context in which the knowledge shared in this study is situated. Some interviews and focus group discussions were facilitated with the support of an interpreter. While interpretation helped ensure that participants were able to express their knowledge in the language most comfortable to them, there remains the possibility that nuances of meaning, context, or terminology were not fully captured through translation. Concepts related to harvesting practices and Inuit knowledge systems may carry meanings that are difficult to translate directly into English. To address this limitation, opportunities for clarification were incorporated through group discussions and collaborative review of findings with community partners. However, it is important to recognize that interpretations presented in this thesis reflect both the knowledge shared by participants and my own interpretation as a researcher.

4 Inuit Indicators of Goose Health

4.1 Overview of goose health indicators

Across interviews, focus groups, and land trips, contributors described assessing goose health through a set of indicators observed through five stages of the goose hunting process: preparation, hunting, retrieving, plucking and gutting, and cooking and eating (Figure 4.1). Four categories of indicators were consistently identified: behaviour, fatness, injuries, and abnormalities (Figure 4.2). While all five stages are part of the goose hunting process, indicators of goose health are assessed across stages two through five. Assessments are cumulative with observations made during earlier stages informing how geese health indicators are interpreted at later stages. These assessments guide hunting and consumption decisions to ensure that geese are safe to eat. Many experienced hunters reported that they had never encountered a goose that was visibly sick. As a result, they generally felt confident that the geese around Arviat were healthy and safe to eat.

Contributors described goose health assessment as part of the *maligarjuat* of planning and preparing for the future, where careful attention to the condition of geese supports sustenance for individuals, families, and the community. This reflects IQ through care and respectful relationships among people, geese, and the land.

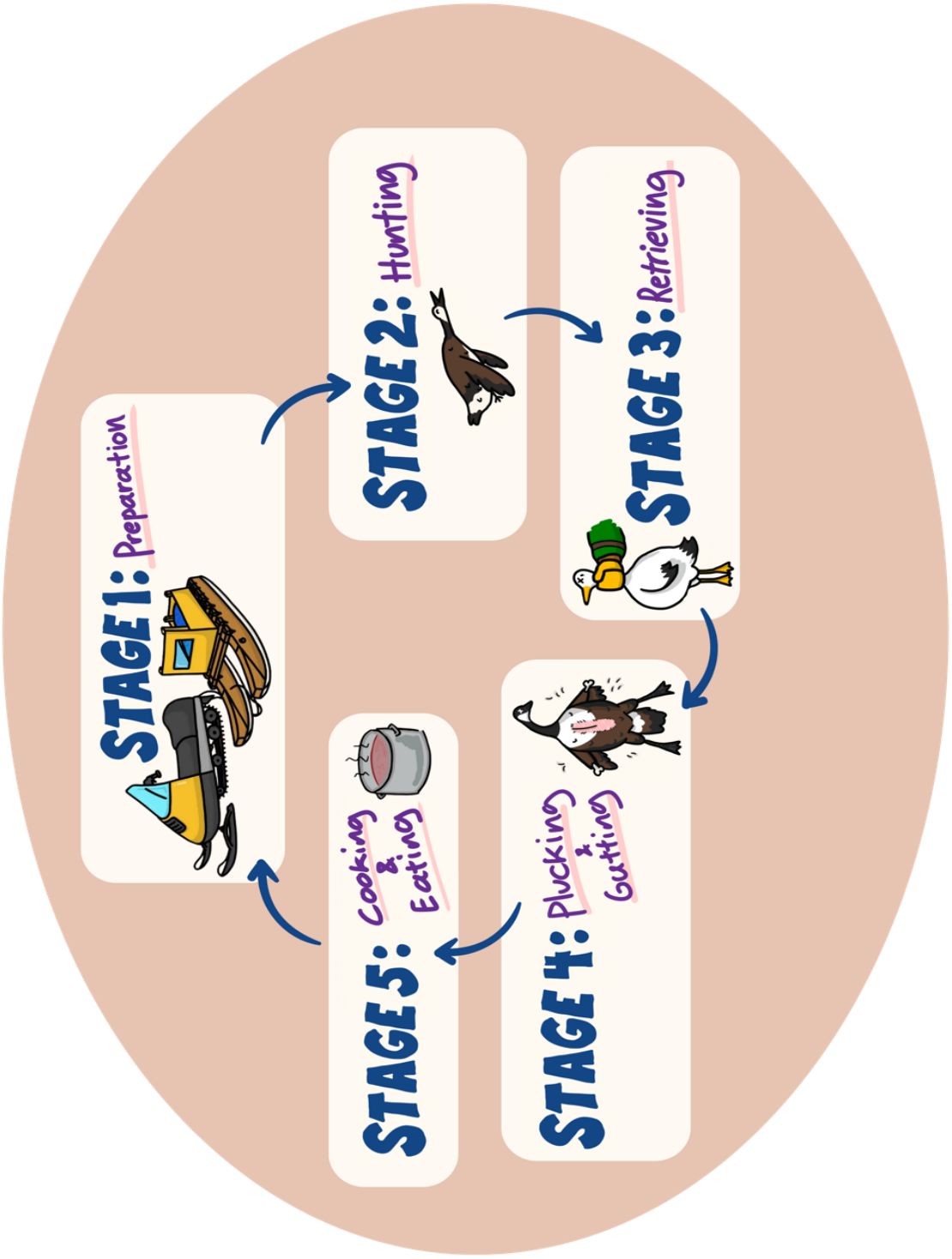


Figure 4.1. Five stages of the goose hunting process according to Arviarmiut

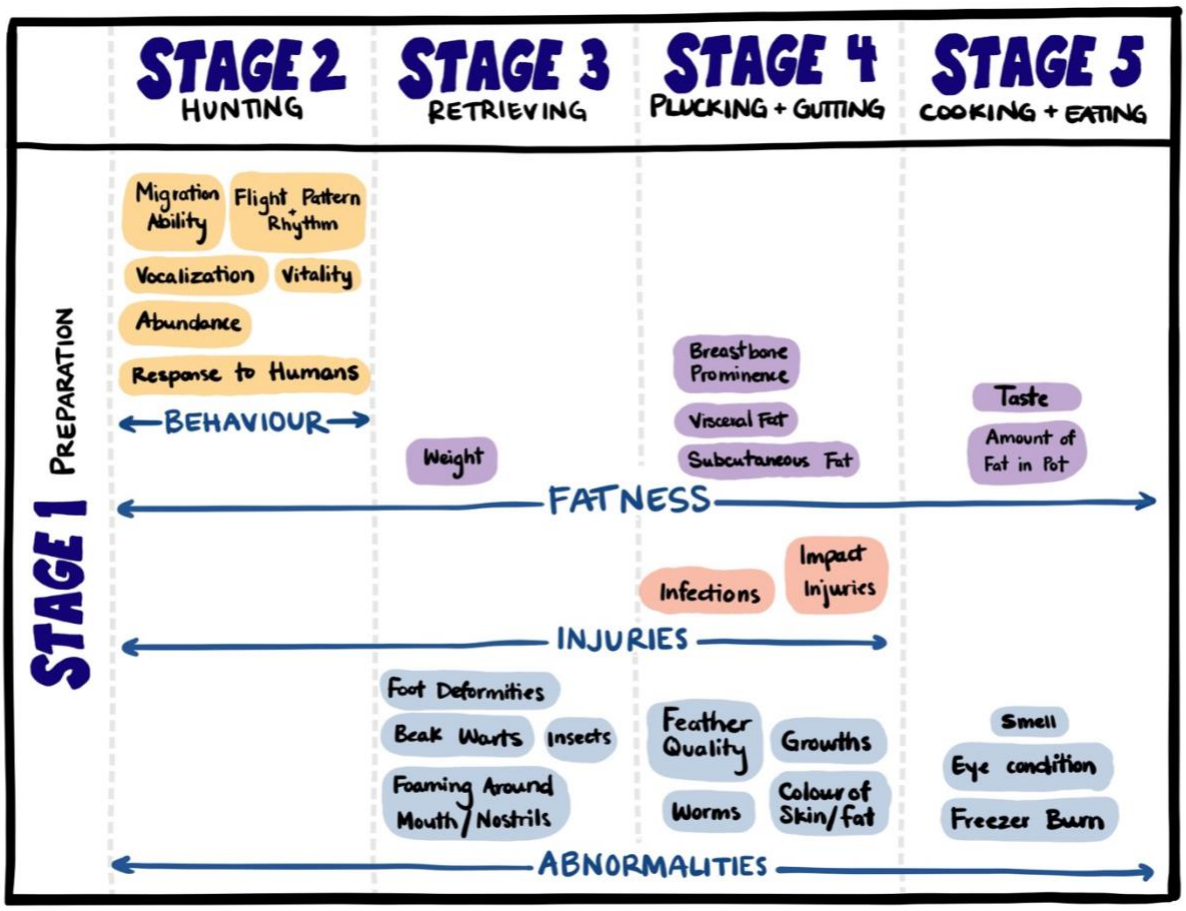


Figure 4.2. Goose health indicators used by Arviarmiut in stages two to five of the goose hunting process

4.1.1 Behaviour

Contributors shared that goose health can be assessed according to behaviour, using a range of indicators observed during stage two: hunting. Behavioural indicators described by contributors include vitality, flight pattern and rhythm, vocalization, abundance, migration ability, and response to humans (Figure 4.2). Behavioural observations made by hunters constitute early cues that help determine whether geese are likely to be healthy and worth harvesting.

4.1.2 Fatness

Contributors consistently recognized fatness as the most important indicator of goose health, with assessments across stages two, three, four, and five of the hunting process (Figure 4.2). Contributors identified several indicators that assess fatness including weight, breastbone prominence, visceral fat, subcutaneous fat, taste, and amount of fat in pot. Fatness is described as indicating excellent overall health and is closely linked to energy and vitality. When there was uncertainty around other indicators, fatness often informed final decisions about goose health. As Hunter Jimmy Muckpah explained, a sick goose "was probably skinny. You can't get fat with sickness."

4.1.3 Injuries

Contributors described injuries as secondary indicators of goose health that provide important context in assessments. Injuries are primarily assessed in stage four: plucking and gutting, when geese can be closely observed (Figure 4.2). Contributors identified two main types of injuries: infections and impact injuries. Injuries are among the few clear signs of unhealthiness, with hunters considering the type, age, and likely origin of an injury when interpreting its implications for goose health. Injuries are typically assessed in relation to other indicators, particularly fatness and overall condition, rather than in isolation.

4.1.4 Abnormalities

Abnormalities like injuries were described by contributors as secondary indicators that provide important context in assessing goose health. Contributors noted several types

of abnormalities such as foot deformities, beak warts, insects (bugs), foaming around the mouth and nostrils, feather quality, growths, worms, colour of skin and fat, eye condition, and freezer burn (Figure 4.2). Abnormalities are assessed through stages two to five of the goose hunting process. These indicators are assessed in relation to a goose's overall condition and fatness, to determine their relevance to goose health.

4.1.5 Factors influencing indicators

4.1.5.1 Seasonal changes in goose body condition

Each spring, geese arrive in Arviat for nesting and breeding, migrating north from their southern wintering grounds. They arrive with large fat reserves, which is critical for reproductive success. Hunters typically monitor body condition closely at this time of year, as early-season fatness provides an important baseline for assessing and evaluating goose health. Fat reserves will decrease with time through the nesting season as energy is used for egg production. Hunter observations offer valuable contextual information for assessing the health of individual geese and they allow consideration of broader seasonal conditions affecting geese migration, nesting and body condition.

4.1.5.2 Sex differences

Contributors shared that female geese generally have more fat on them and, as such, constitute a more desirable catch than males. Elder David Alagalak shared:

> With IQ, people would rather [hunt] female geese because they are fatter. Males are thinner and get thin faster than the females. The female geese start to lose their fat when they start to lay their eggs.

Higher fat content means greater ease of processing, better taste, and softer meat. Elder Arden Nibgoarsi shared: “Males always have tougher meat and are harder to pluck. Females are easy to pluck. And the males are very hard to pluck.”

4.1.5.3 Life stage differences

Contributors noted that goose life stages will impact body condition. Adult geese have more fat on them in preparation for egg-laying, whereas juveniles – defined in Arviat as birds that have not yet reached sexual maturity – allocate more energy to growth and therefore have less fat. Because fat is the primary indicator to influence decision to hunt or not, adult geese are a more desirable catch than juveniles.

4.2 Assessing goose health in practice

Based on insights shared by Arviarmiut contributors, goose health is assessed to guide hunting and consumption decisions through a holistic five stage process (Figure 4.1). Rather than being evaluated at a single point, goose health is interpreted through ongoing observations and decisions that occur as harvesting activities progress. Contributors described considering different indicators at different stages (Figure 4.2), depending on what can be observed through distance, handling, preparation, and consumption. Organizing assessment by stages reflects the practice of harvesting as it is carried out on the land and in the home, and aligns with how contributors described making sense of goose health in real time. This stage-based organization emerged through on-the-land verification and discussions with contributors, and provides a practical way of presenting how indicators are applied throughout the harvesting process.

4.2.1 Stage one – Preparation

Contributors emphasized that hunting begins well before leaving home (Figure 4.3). Hunters are taught from a young age that careful preparation and observation are essential for safe travel on the land. Through careful preparation, hunters show respect for the land, the animals, and the people who will share in the harvest. This reflects the IQ principle of *avatimik kamattiarniq*, and *maligarjuat* of continually planning and preparing for the future.

Preparation involves gathering essentials for travel: transportation (snowmobile, all-terrain vehicle, sled), fuel (gas), global positioning systems (GPS), firearms (gun), bullets, binoculars (bino's), knives, extra clothing, a stove, kitchen tools, *taquaq* or "grub" (food) and hot water (Figure 4.3). Hunters discuss environmental conditions with friends or family and ensure that someone knows of their trip plan. At this stage, they consider how the harvested geese will be used and cooked to best provide for their families. Hunter Aupaa Irkok shared a lesson from her dad about the importance of preparation:

> My dad said, "If you want to become a hunter, it starts where you start with packing, getting all the useful things together". That's what I learned from him. It's not just go out and get *tingmiaq* (Canada Geese) [without observation and planning].

With careful observation, hunters monitor weather conditions (temperature, wind, and visibility) and listen for geese flying overhead. This guides decisions about when and where to travel. Checking the condition of equipment and vehicles is part of this process.

Observation continues throughout all subsequent stages, showing that attentiveness and readiness are a constant part of goose harvesting and consumption. Hunter Aupaa Irkok explains the importance of observation:

> When I first started following my dad [when he went goose hunting], he told me, even before we left home… to observe, from home to wherever we're going. Because he said, that's going to be so useful in case something happens.

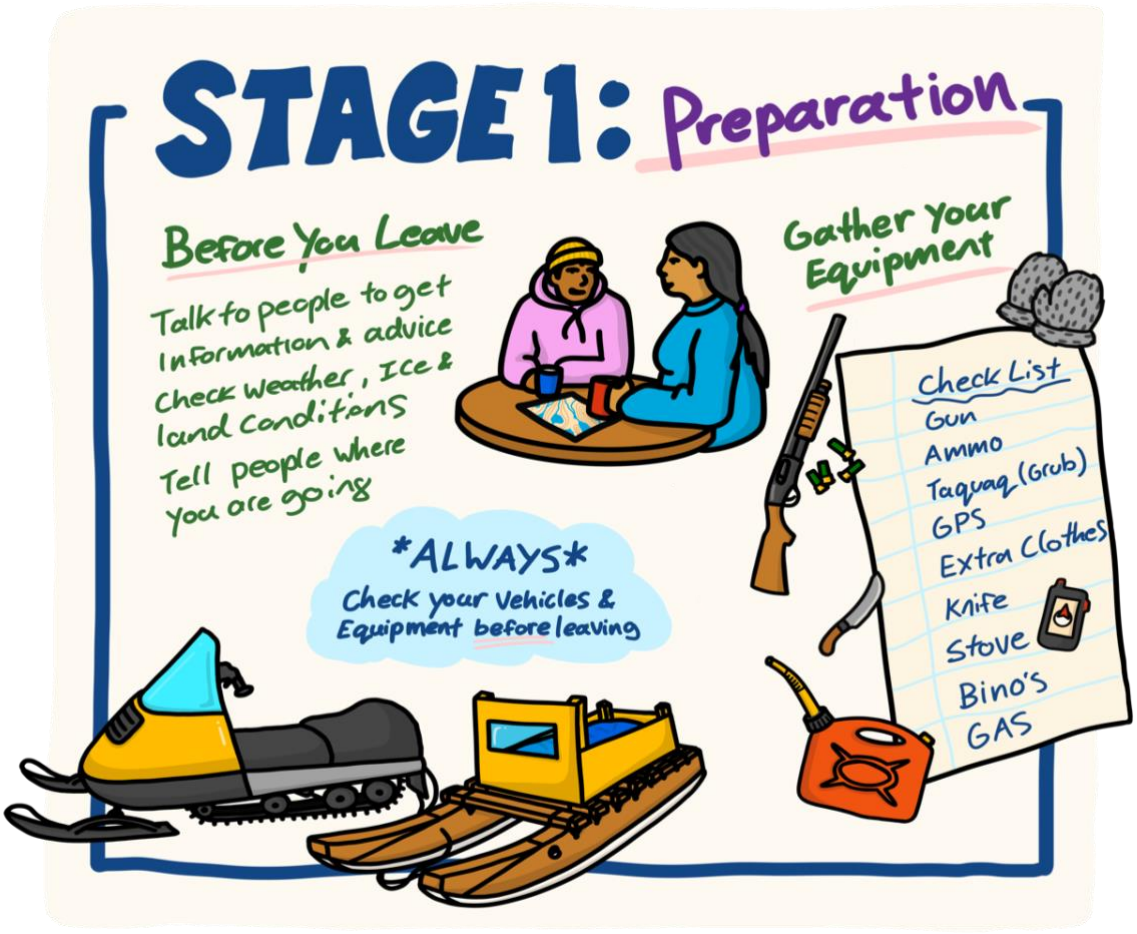


Figure 4.3. Stage one of the goose hunting process: preparation
(Illustration by Nooks Lindell)

4.2.2 Stage two – Hunting

Contributors shared that goose hunting is an important cultural and seasonal practice. Hunters travel outside of town – sometimes walking to nearby areas, other times travelling farther away by all-terrain vehicle (ATV) or snowmobile and *qamutik* (sled) on long trips often to a favourite hunting spot. Hunting geese is often opportunistic, sometimes taking place during travel or alongside other land-based activities such as *tuktu* (caribou) hunting or fishing trips.

At this stage, hunters – including men, women, elders and youth – observe and decide whether geese are suitable to hunt (Figures 4.2 and 4.4). The IQ principle *avatimik kamattiarniq* is reflected in this stage as hunters are taught to only catch what they need and never to waste food. In doing so, they must follow the *maligarjuat* of always planning and preparing for the future, to know what they are going to do with the geese after they are caught.



Figure 4.4. Ujjiqsuiniq Young Hunter instructor and IQ specialist Darryl Baker taking aim at geese
(Photo by Anne Bergeron, May 2025)



Figure 4.5. Stage two of the goose hunting process: hunting
(Illustration by Nooks Lindell)

4.2.2.1 Behaviour

4.2.2.1.1 Vitality

Contributors shared that vitality is an important indicator of assessing goose health, representing energy and strength and is observed through movement, feeding, and vocalization (Figure 4.2). Active geese are considered healthy while those sitting still – especially when alone and before nesting – are seen as weak or sick. As fat and energy are closely connected, a goose with greater vitality is expected to be fatter and better to eat. Elder Dorothy Aglukark explained:

> We know geese are good to eat when they are fat and when they are lively. If you shoot it, even if you missed, and it goes down and then it runs away. The way that it moves around [and still has energy to run away]. Then you know it is healthy.

Vitality of the geese is strongly connected to the feeling of vitality for hunters. Elder Arden Nibgoarsi talked about this feeling:

> I heard someone say before that it is very great to hear birds out there. It feels alive. And if birds are making noise and honking that is a great day to be out [on the land]. It's a great day to hunt, it's a great day for the birds. In the springtime, it's fun. They're honking, and we know that they are coming.

4.2.2.1.2 Flight pattern and rhythm

Contributors emphasized that flight patterns and wingbeat rhythm are key indicators of goose vitality and fatness (Figures 4.2 and 4.5). Slow, steady flight and low altitude often signal heavier, fatter birds, while erratic or uneven movement suggests

weakness or injury. Elder Dorothy Aglukark shared: “Only one thing that my grandmother told me. That’s how I know [a goose is fat]. Listen to the sky. Geese [that are] coming low, very low, and slow, those are fat ones.”

As Elder Andrew Panigoniak described, a goose that takes off and lands repeatedly, walks instead of flying, or “just doesn’t look right,” is recognized as unwell. “When [hunters] see a goose, they notice right away if it’s limping or wounded and unable to fly,” explained Elder Lisa Manik.

4.2.2.1.3 Vocalization

Contributors shared that vocalizations can identify vitality or abnormal behaviour (Figure 4.2). Frequent honking is associated with strength and energy. Elder Andrew Panigoniak shared: “[Some geese] don’t really honk. [Hunters] assume that those geese don’t have much fat on their body.” Some hunters noted that a broken, quiet, or uneven goose call may indicate poor health. Ujjiqsuiniq Young Hunter Ukulutuuq Nipisaq shared:

> When they’re sick, they’re usually skinny. They have a hard time trying to fly away. They usually have some sort of bubbles or white spots on the side of their beak. And their voices aren’t good when they’re doing the goose call. They don’t make a good goose call when they’re sick.

However, other hunters considered vocalizations unreliable because it is difficult to identify which bird made the call. Hunter Aupaa Irkok mentioned avoiding geese with broken calls, but noted they could be safe to eat.

4.2.2.1.4 Response to humans

Contributors shared that geese that do not fly away when approached are considered abnormal and potentially unhealthy (Figures 4.2 and 4.5). This behaviour differs near town or on the land; geese in Arviat and southern cities such as Winnipeg, are accustomed to people and often do not flee. Timing also matters; during nesting, geese stay on their nests to protect their eggs and may not fly immediately when approached by humans. This story from Elder Arden Nibgoarsi describes geese response to humans well.

> Out on the land is a different story. [Geese] are more wild and I know that wild birds fly away. My mom used to tell me to avoid some birds or animals that get too close and told me to avoid shooting them or catching them because it's unusual for an animal or bird just to come where we know they have to flee from us. She said, if they're not scared, if they come to you, just avoid them because usually animals will like to flee or run away [...] so avoid those ones.

4.2.2.1.5 Migration ability

Hunters emphasized that geese ability to migrate long distances to reach Arviat is itself an indicator of health (Figure 4.2). Geese that arrive are understood to be strong and resilient, since sick birds would not be able to complete the journey. This was compared to how people are unable to run long distances when ill. Hunter Jimmy Main explained:

> I think it's the same for people and birds. Like when we're sick, we can't run far. We can't run for long. I think geese can't come up here when they have [avian influenza].

4.2.2.1.6 Abundance

Abundance of geese is not a primary indicator, but contributors shared that it provided important context to understanding the overall population health. Elders emphasized that geese, like other animals, will experience die-offs when populations get too large. Community members recalled a goose cholera outbreak as an example of overpopulation leading to widespread mortality. While geese are still considered safe to eat when abundance is high, hunters emphasized the importance of watching for signs of disease when populations are large. Elder Dorothy Aglukark shared this story that illustrates how abundance is understood as part of broader cycles of animal health and population change:

> Our Elders talk about when there are too many of any animal, caribou, rats [lemmings], geese, it's not good sign because anytime soon they're going to die off. Something happens to them. One thing Arviarmiut, all people from Arviat, talk about once in a while. One-time lots, and lots of rats [lemmings] – there were so many of them, they [lemmings] walked to the sea, all together and died down there. That's how I heard it before […] That's how they used to talk. Like there are too many geese now. Someday very soon they're going to die off, most of them, and start all over again. That's the story.

4.2.3 Stage three – Retrieving

Contributors shared that retrieving a goose that has been shot is an important way for family to participate in the hunting process. Retrieving geese takes place on the land, immediately following hunting (Figures 4.1 and 4.7). During this stage, health

assessments are made by the hunter, as well as by youth, family members or friends who are helping – often by someone who is learning (Figure 4.6). Retrieval is a first responsibility given to children and an opportunity to develop skills reflecting the IQ principle of *pilimmaksarniq*.

This stage also reflects *avatimik kamattiarniq*. Contributor Shirley Tagalik emphasized that retrieving a goose is part of caring for the land, as leaving a dead or injured bird can attract scavengers and increase the risk of disease transmission. Retrieval, including bringing the goose to the Wildlife Officer when showing signs of sickness, was described as "good conservation" and a way of paying attention to what is happening on the land. She linked this practice to the *maligarjuat* of respect for all living things, explaining that just as people care for community members who are sick or ailing, a goose that has fallen on the land should also be cared for by killing it, or bringing it to a Wildlife Officer to protect the wider environment.



Figure 4.6. Three Ujjiqsuiniq Young Hunters holding their catch while on a spring goose hunt
(Photo by Anne Bergeron, May 2025)

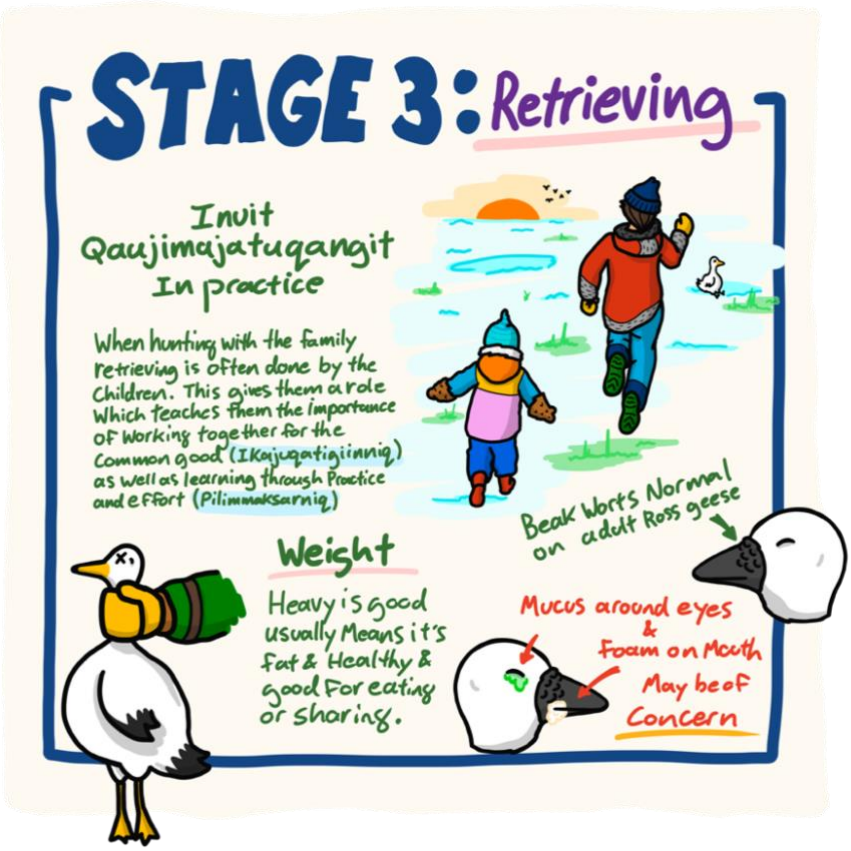


Figure 4.7. Stage three of the goose hunting process: retrieving (Illustration by Nooks Lindell)

4.2.3.1 Fatness

4.2.3.1.1 Weight

As family members retrieve geese, they get a first opportunity to assess fatness based on goose weight (Figures 4.2 and 4.7). Weight is a primary measure of goose body condition, as emphasized by Elders in interviews and by experienced hunters during land trips (Figure 4.8). Heavier geese are considered healthier and more desirable for cooking as they have more fat, while lighter birds, though safe to eat, will have less fat and are not usually gifted to Elders. Hunters typically assess weight by lifting the goose or through visual cues. As Elder Dorothy Aglukark shared, this skill becomes more accurate with

experience: “Even you can know by lifting it up... We’ve been handling since we were a child.”

Elder Arden Nibgoarsi described how this practice is often shared with family:

> It’s fun to hunt geese as it is family time out there, and [my wife and grandchildren are] all walking around, and grandchildren are the ones who are picking up the catches. They’re happy to retrieve them and they say something like, "Heavy, it’s very heavy, it’s very nice, but heavy!" It’s a good thing.



Figure 4.8. Ross’s Geese and a Specklebelly Goose being retrieved by McGill MSc student Nicole Stafiej
(Photo by Léna Bureau, May 2025)

4.2.3.2 Abnormalities

4.2.3.2.1 Foot deformities

Foot deformities are occasionally observed in geese (Figure 4.2), usually linked to past injuries or natural abnormalities, and are most common in Snow Geese. These irregularities, such as growths or misshapen toes, are not viewed as indicators of poor health as feet are usually cut off and discarded during butchering, though sometimes kept to make goose foot jelly. When geese are plentiful, those with deformities were more likely given to dogs: "We're not starving – if a goose has a bad foot, it would just go to the dogs."

4.2.3.2.2 Beak warts

Warts on the upper bridge near the base of the beak were noted frequently by contributors (Figures 4.2, 4.7, and 4.9). Hunters shared this is common and normal for Ross's Geese around Arviat. Beak warts on Snow or Canada Geese are uncommon and would prompt hunters to look for other indicators of health, but generally, are not viewed as affecting overall health.



Figure 4.9. ‘Normal’ beak warts on a Ross’s Goose (indicated by the arrow)
(Photo by Rowan Harris, May 2025)

4.2.3.2.3 Foaming around mouth and nostrils

Only some hunters noted that there can be foaming around the mouth or nostrils indicating sickness in geese. However, when discussed during focus groups with experienced hunters, the consensus was that they had not observed this in geese they had harvested. Hunter Jimmy Muckpah explained that he had seen this “Just on social media. No, not when we’re out there”. Hunter Darryl Baker added that he had “never seen any”.

4.2.3.2.4 Insects

During nesting, geese often carry small insects on their feathers due to prolonged time in nests and limited movement (Figure 4.2). This is considered normal during

nesting. Elder Andrew Panigoniak noted that such insects are harmless, humorously recalling that he too had bugs on him while living on the land.



Figure 4.10. Ujjiqsuiniq Young Hunter instructor and hunter Karoo Muckpah retrieving a Canada Goose while on a land trip
(Photo by Léna Bureau, May 2025)

4.2.4 Stage four – Plucking and gutting

Contributors shared that plucking and gutting, is critical to ensure that no food is wasted (Figures 4.2 and 4.11). A goose may be plucked immediately or left with feathers on, depending on its use and how easily it can be plucked. Feathers are often left on when the goose will be stored in the freezer to prevent freezer burn or when the skin will be used to make a bag.

How plucking and gutting are carried out also depends on who is involved in the hunt. When alone, hunters will carry out all stages of goose harvesting themselves. When hunting as a family, roles and responsibilities are divided for learning and efficiency. Plucking and gutting becomes a responsibility of women, youth, or Elders reflecting the

IQ principle of *piliriqatigiinniq*. Project co-lead and contributor Shirley Tagalik again emphasized the importance of *avatimik kamattiarniq* by planning and preparing a harvest with purpose. Knowing how a goose will be used guides processing decisions, such as whether it is plucked, skinned, frozen, or shared, and helps ensure that the animal is respected and not wasted.

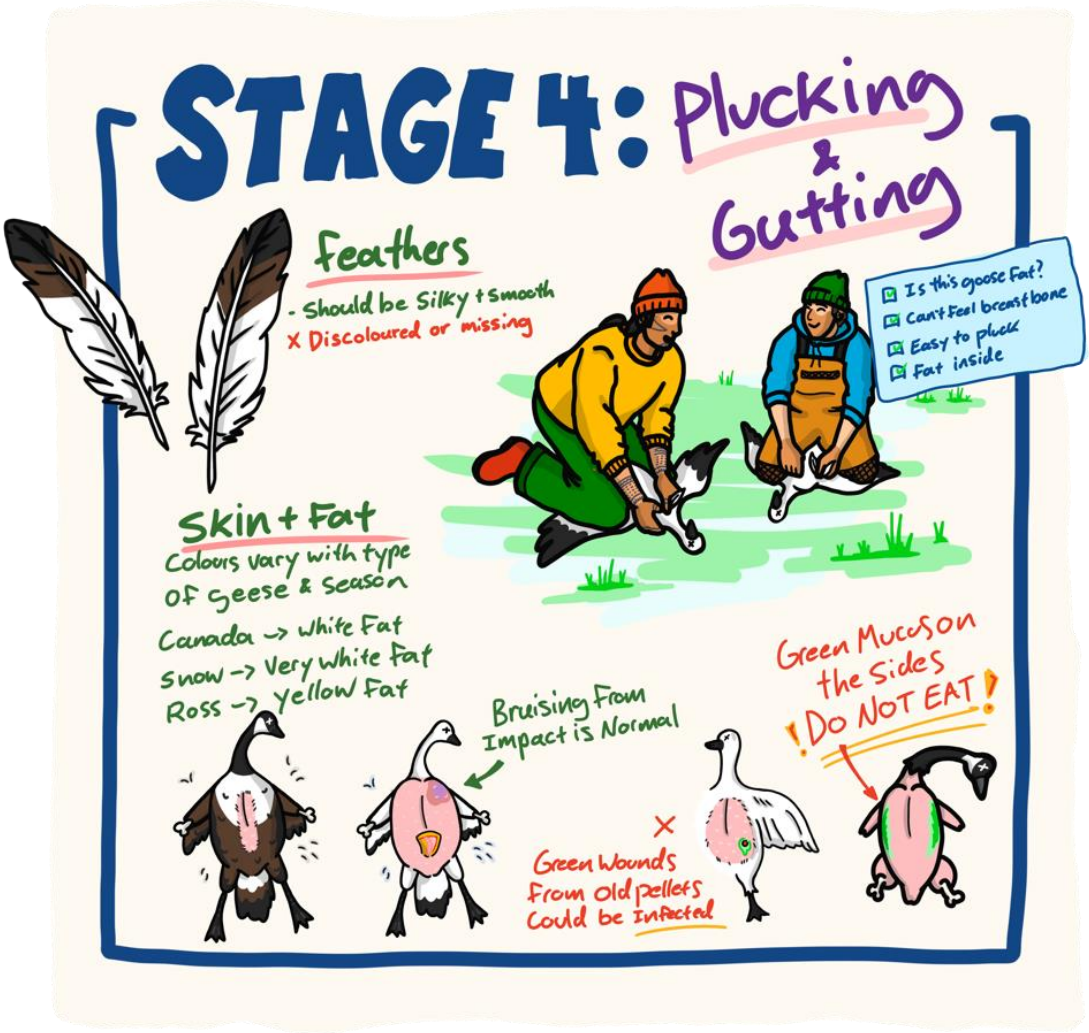


Figure 4.11. Stage four of the goose hunting process: plucking and gutting (Illustration by Nooks Lindell)



Figure 4.12. Canada Goose being plucked by Winona Gibbons during a community kitchen
(Photo by Léna Bureau, May 2025)



Figure 4.13. Ujjiqsuiniq Young Hunter Nanauq Baker plucking his catch on the tundra
(Photo by Anne Bergeron, May 2025)

4.2.4.1 Fatness

4.2.4.1.1 Breastbone prominence

Once hunters begin plucking and gutting, they can more directly assess fatness. Contributors shared breastbone prominence as a metric used to assess goose health once the bird has been plucked (Figure 4.2). Hunters feel the chest with their hands to check for fat under the skin – a sharp, prominent breastbone signals little meat and fat, while rounded breast meat and a hidden breastbone suggests a fattier, healthier goose (Figure 4.14). Hunter Darryl Baker demonstrated this technique by pressing four fingers on the chest, a practice often illustrated by participants pointing to their own chests. Even a lean goose, they noted, is still safe to eat.

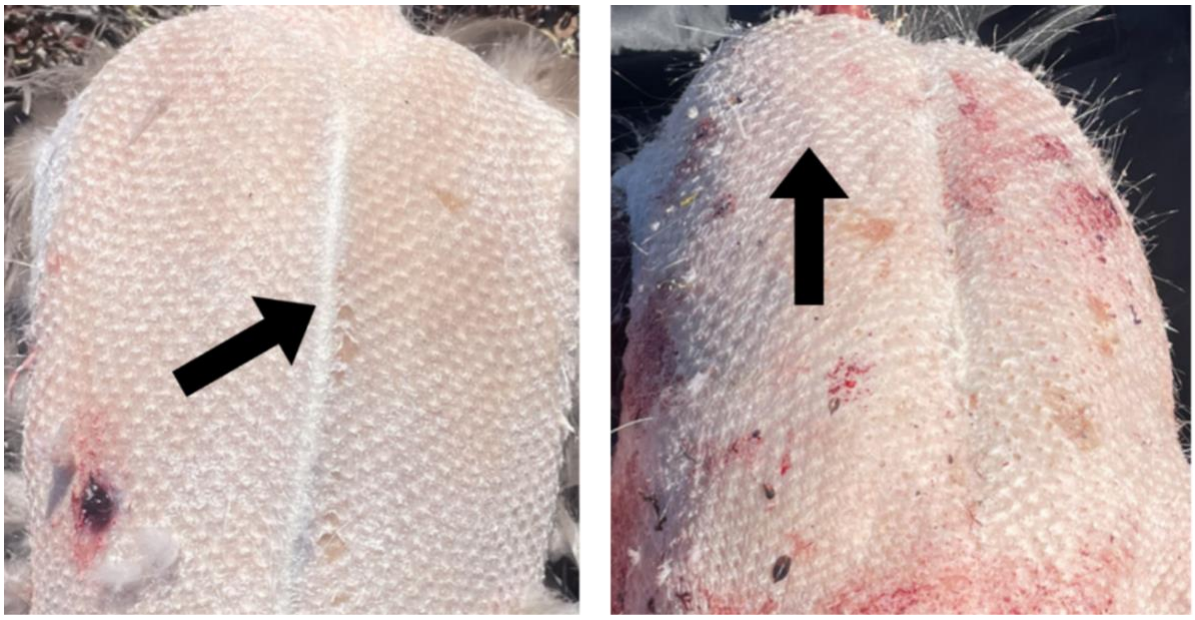


Figure 4.14. Goose breastbone is more prominent in the left photo (arrow) while photo on the right has much more breast meat (arrow)
(Photos by Rowan Harris, May 2025)

4.2.4.1.2 Subcutaneous fat

Subcutaneous fat is assessed through plucking, by how easily feathers come out (Figures 4.2 and 4.15). A goose that plucks easily is highly valued because this signals abundant fat under the skin, indicating a healthy bird and good taste. Project collaborator and contributor Kukik Baker noted that "when [geese] are too fat the whole skin [tears] too when you are plucking." Hunters also recalled that very fat geese, especially Ross's Geese, would fall very hard on the ground when shot and could tear in half under their own weight when picked up.



Figure 4.15. Canada Goose being plucked by Ujjiqsuiniq Young Hunter instructor and hunter Karoo Muckpah
(Photo by Rowan Harris, May 2025)

4.2.4.1.3 Visceral fat

Visceral fat is assessed through two clear metrics of goose condition: the presence of a thick abdominal fat pad near the tail and fat deposits between the intestines (Figure 4.16). Both are visible during gutting and signal excellent body condition (Figure 4.2).

Elder Arden Nibgoarsi explains fat is found: “Inside and outside [the goose]. Even the innards. Fat shows. You will see it.” This indicator was discussed during the Elders focus group, and during land-based trips, but it was not mentioned by most contributors.

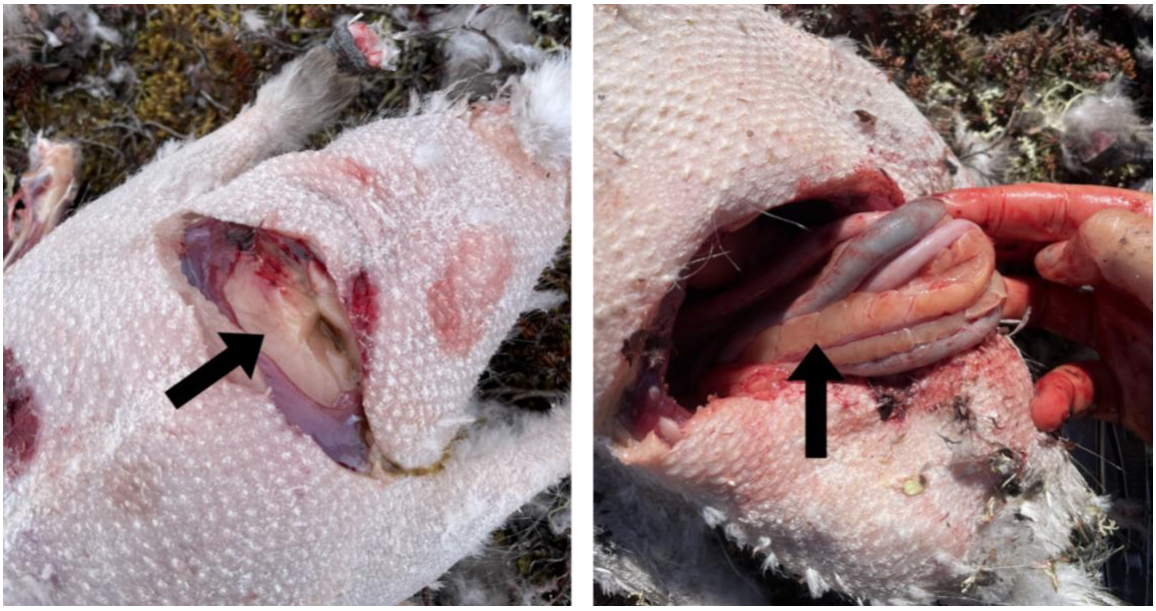


Figure 4.16. Visceral fat in the abdominal fat pad (left) and fat in the innards (right) (Photos by Rowan Harris, May 2025)

4.2.4.2 Abnormalities

4.2.4.2.1 Feather quality

Feather quality was identified by contributors as an important visual indicator of holistic goose health (Figures 4.2 and 4.7). Healthy geese were described as having clean, full, and silky feathers, “like a raven”, as Winona Gibbons explains. In contrast, unhealthy geese might have missing, mottled, discoloured, or stained feathers. These traits alone did not confirm sickness but served as cues for a holistic assessment.

A few exceptions of missing feathers were noted by contributors. Missing feathers near the shoulder and wing joints are not interpreted as an indicator of sickness. Instead,

Elder Arden Nibgoarsi suggested this could be related to the age of the bird or natural differences among individuals. Additionally, through the nesting period, breeding females pull feathers from their chests to line their nests creating a bare patch on the abdomen called the brood patch. During the molting period, adults and sub-adults lose their primary flight feathers and lose the ability to fly.

4.2.4.2.2 Colour of skin and fat

Contributors described natural variation in goose fat colour and texture based on species, feather colour, and diet. Elder David Alagalak explained, "each type of geese has a different [fat and skin] colour," reflecting feather colour. Canada Geese generally have white fat, Snow Geese very white fat and lighter skin, and Ross's Geese have yellowish fat. Blue or black phase Ross's Geese tend to have darker skin, meat, and fat. These differences are linked to species traits, seasonal molts, and time spent in marine environments. Elder Mike Gibbons noted that bruising or blood clots can also change skin and fat colour, appearing after a heavy fall or being shot. Despite these variations, hunters agreed all fat is good with fat presence indicating a healthy goose.

4.2.4.2.3 Growths

Internal growths are described as extremely rare but memorable. Hunter Darryl Baker recalled finding a large lump among the intestines of a Canada Goose, which unsettled him and his family enough to avoid eating geese for the rest of that year. He returned to hunting the following season, emphasizing that such findings are unusual and do not permanently affect hunting practices.

4.2.4.2.4 Worms

Participants often cautioned that worms in goose meat indicates poor health and means it would be unsuitable to eat, although there were no reports of worms in goose meat (Figure 4.2). Hunters explained that this understanding comes from experience with *tuktu* (caribou), where the presence of worms is recognized as a clear sign of sickness. Drawing on this knowledge, Arviat hunters apply a holistic approach to health assessment across species. The presence of worms is a definite sign that a goose is not safe to eat.

4.2.4.3 Injuries

4.2.4.3.1 Impact injuries

Impact injuries may occur when a goose falls awkwardly after being shot, striking the ground, ice, or other birds (Figures 4.2 and 4.11). These impacts can cause bruising, blood clots, or internal damage that may not be visible until plucking or gutting. Elder Mike Gibbons explained that "if the heart is shot right away the skin will be different. When [geese] fall really hard on the ground it also changes the skin colour – it's like they have blood clots if they fall too hard." Hunters noted that while bruising can affect the skin or meat's appearance, the rest of the goose is safe to eat unless the injury appears old or the bird seems unhealthy or skinny.

4.2.4.3.2 Infections

Infected wounds are occasionally observed and considered a clear sign that a goose was unsuitable to eat (Figures 4.2 and 4.11). Hunters described festering wounds and greenish discoloration visible during plucking. Contributors reports that infections are often caused by old injuries from bullets or lead pellets, sometimes leaving green marks,

and, occasionally, by predator attacks such as foxes. All participants who discussed this indicator agreed that geese with infected wounds should not be eaten.

4.2.5 Stage five – Cooking and eating

Contributors emphasized that eating geese brings a positive sense of well-being. This takes place on the land at camp, or at home, where meals are prepared and shared more broadly with the family and community. As a collective activity, families and friends gather to prepare meals, and everyone takes part in assessing goose health at the cooking and eating stage by noticing the taste and fat quality.

This stage reflects *avatimik kamattiarniq*, as careful preparation and storage help prevent waste, including freezer burn, and ensure that harvested food is treated with respect. This stage also reflects the IQ principle of *pijitsirniq*, as harvesting and sharing geese are oriented toward providing for others and responding to community needs. Project co-lead and contributor Shirley Tagalik shared the importance of sharing food within a community:

> Even if it's just a tiny piece of meat with some nice fat on it, you take it to someone who is sick. That gesture is healing. It's good for their body, but it also heals their spirit. Even if that's their last breath, that act leaves them in a good way.



Figure 4.17. Stage five of goose hunting: cooking and eating
(Illustration by Nooks Lindell)

4.2.5.1 Fatness

4.2.5.1.1 Taste

Taste was described as a key reason geese are highly valued, especially when cooked in traditional ways such as boiled in a pot. A good-tasting goose is usually associated with a fat, healthy bird, with hunters in three focus groups agreeing "the more fat the better." Fat was consistently described as delicious, reinforcing its role as both an indicator of health and a source of flavour. When asked if fat ever looked unappealing, Hunter Darryl Baker replied: "[It] always looks delicious!" Hunter Dudley Copland added: "Always tasty. The more fat the better." While poor taste is not considered to be

an indicator of sickness, hunters use fatness to guide harvesting decisions, preferring to consume geese with higher amounts of fat.

4.2.5.1.2 Amount of fat in the pot

One participant explained that the amount of fat floating to the top of the pot when a goose is boiled is another way to assess its condition. More fat in the pot indicates a fatter, healthier goose. Fat can also be saved and used for later cooking. The amount of fat was mentioned as a confirmation of quality and flavour rather than a determinant of whether the goose was suitable to eat.

4.2.5.2 Abnormalities

4.2.5.2.1 Freezer burn

Contributors identified freezer burns as a concern when plucked geese were stored in freezers for extended periods of time – months or years, depending on storage method (Figure 4.2). In this case, the meat becomes pale and white, making it unsuitable to eat. Hunter Donny Baker explained that this "happens over quite a long time – it takes months to get to that pale color with frost on it." He added that when this happens, "you end up not even giving it to the dogs," and the goose is discarded. Hunter Joe Karetak Jr. (Napayok) noted freezer burn occurs most with large, unsealed bags. Unlike caribou, where damaged sections are trimmed, the smaller size of geese means freezer burn often makes the entire bird unusable.

4.2.5.2.2 Eye condition

One contributor, Winona Gibbons, emphasized eye condition as an important indicator of goose health (Figure 4.2). She had been taught by her parents to check the eyes: “The color of the eye will change to red, kind of dark color, and kind of foggy […] and that’s when the bird is not healthy, it is sick, or something is wrong with it.” She added that if a bird seemed too skinny, she would take the head and look at the eyes to confirm her concern. No other hunters reported using eye colour as an indicator, but for Winona it was significant and would lead her to avoid eating geese that showed this sign.

4.2.5.2.3 Smell

Smell was identified as a decisive indicator, particularly during preparation and cooking, because it helped determine whether a goose was suitable to eat. Elder Catherine Manik explained that an unusual or bad smell was a clear sign that the bird should be discarded rather than consumed: “Sometimes when you open it up, the smell is different. If it smells bad, I don’t eat it”.

4.3 Factors influencing goose health assessments

Through focus groups, interviews and land-based trips, contributors shared that goose health assessments are influenced by an individual’s experience and social networks. Together, these influences determine which indicators are used in health assessments, their relative importance, and when in the hunting process those indicators are recognized.

4.3.1 Influence of experience

Interviews, focus groups and land trips clearly illustrate that experience plays a key role in shaping assessment of goose health. Elders and experienced hunters rely primarily on indicators of fatness and behaviour, assessing goose health early in the hunting process (Figures 4.2, 4.5 and 4.7). In contrast, young or less experienced hunters focus more on obvious signs, such as injuries or abnormalities, in later stages of plucking and gutting, when visual cues are more obvious (Figure 4.2). There are two key ways in which experience influences decision about whether a goose is safe to eat: first, by enabling hunters to interpret subtle, context-dependent indicators earlier in the hunt, and second, by building confidence to assess variation and respond to abnormalities without discarding consumable geese.

4.3.1.1 Experience facilitates context-based decisions

Experience enables individuals to make context-based decisions and assess indicators early in the hunting process. For example, experienced hunters distinguish between geese near town that are accustomed to people and may not flee, and those in remote areas, where failing to fly away signals abnormal behaviour (Section 4.2.2.1.4). In contrast, a group of less experienced hunters confirmed that they would always shoot geese that do not fly away, viewing them as an “easy target”, without discussing the broader situational context described by more experienced hunters.

Another example shared by hunters involves how injury is interpreted in relation to place, something learned through experience on the land. Contributors explained an injured goose found near town or other hunters is not necessarily a concern, as injuries

may result from hunting pressure or interactions with people, but an injured goose found far from human activity would raise suspicion of sickness. Less experienced contributors spoke less about this distinction, reflecting a limited familiarity with these subtleties rather than a different understanding of injury itself. Knowledge of common hunting grounds and patterns of hunting activity is essential for making these assessments.

4.3.1.2 Confidence comes with experience

Experience gives hunters greater confidence in assessing abnormalities and variations. Elders use careful observation to recognize subtle variations and remove or discard affected parts rather than rejecting the whole goose. This reflects both practical skill and the cultural value placed on avoiding waste, shaped by experiences of growing up on the land, where careful use of harvested food was essential within a historically nomadic way of life.

This confidence is important because different species of geese have distinct 'normal' characteristics. For example, one community member shared that she used to discard geese with yellowish fat and darker skin and was "scared to eat them", before learning during a focus group discussion that variation is normal between Ross's, Snow, and Canada Geese. As Elders explained, fat and skin colour can vary depending on the species of goose and how it was harvested (Section 4.2.4.2.2). Understanding normal variations can help Arviarmiut to prepare geese with more confidence.

Factors that influence indicators – namely seasonal changes, sex differences and life stage differences (Section 4.1.5), and particularly fatness, are also knowledge gained through experience and play a role in shaping goose health assessments. Through

consensus in focus groups, it was clear that only the most experienced hunters would be able to notice these subtle differences.

4.3.2 Influence of social networks

Social, familial, and media networks influence how Arviarmiut assess and interpret information about goose health. Experienced hunters emphasized family and social connections, while less experienced hunters more frequently referenced information shared through radio or social media. These differences shape how indicators are interpreted and how confidence is built around goose health assessment, harvesting decisions, and ultimately food safety.

4.3.2.1 Family networks

Many hunters described learning primarily through time on the land with family. Direct instruction from parents or mentors was considered the most effective way to build skills. Elders Lisa Gibbons and Catherine Manik both shared that experienced hunters should bring someone who is learning hunting with them to share knowledge and reinforce intergenerational knowledge transfer. Through repeated practice, this approach builds deep familiarity with place and species, forming strong foundations for confident and context dependent decision-making.

Hunter Jimmy Main shared about growing up hunting geese with his father, returning to the same esker (a long, narrow ridge of sand and gravel formed by glacial meltwater) year after year, and learning through observation and practice:

I grew up hunting geese. Used to go with my father all the time. Used to be a weekend thing. We used to go to this same place every year. My dad calls it goose esker. It's a name he just gave it because that's where you go to hunt geese all the time. My earliest memory is probably [at age] six or seven sleeping in the tent, waking up early in the morning and hearing the geese. You just jump over there and, you go wait. And early on, just sitting beside my dad watching him shoot. Picking up geese and stuff, but then eventually starting to shoot myself.

4.3.2.2 Social networks

Peer relationships also play an important role in goose health assessments, particularly by experienced hunters. One focus group was made up of a close-knit group of Darryl Baker's hunting partners, whose long-standing relationships shape how information is shared and interpreted. During the discussion, hunters asked each other about specific observations – such as unusual behaviour or injuries – and worked through assessments together, building consensus around health assessments.

Their reliance on one another was demonstrated when Hunter Darryl Baker joked about waiting to see whether Hunter Jimmy Muckpah got sick before eating something themselves: "I wait for him (points to Jimmy). He eats it and I wait, because he can eat anything." Although light-hearted, this exchange shows how trust and experience within social networks build collective confidence in food safety. Such interactions demonstrate how knowledge is reinforced through observation and consensus, aligning with Inuit approaches to decision-making and the collaborative principles of the ARM.

4.3.2.3 Media networks

Contributors with less experience shared more often about accessing information about goose health on social media and the community radio. In one focus group, contributors described posts from southern Canada of abnormalities such as worms in goose meat or warnings about avian influenza. Although these issues were not observed locally, they raised concern in Arviat and, at times, discouraged hunting. For example, it was shared in one focus group that an announcement on the local radio about avian influenza led to a temporary decline in goose hunting among some hunters, while experienced hunters continued harvesting as usual.

This highlights how external information can circulate quickly, sometimes leading to unnecessary concern when the issues are not locally relevant. Ensuring that information shared through community networks is contextualized and grounded in local experience is essential for supporting confident decision-making around goose health assessment.

5 Discussion

5.1 Inuit and Western science indicators

This section brings Inuit and Western science indicators into conversation. It provides a starting point for identifying related approaches and methods to goose health assessment (Table 5.1). Placing Inuit and Western scientific knowledge systems side-by-side helps to build shared context as part of the ARM and supports dialogue across knowledge systems (Carter, Tagalik, et al., 2025). The purpose is not to suggest a direct one-to-one correspondence between Inuit and Western scientific indicators, but rather to begin with the Inuit indicators documented in this study and identify related indicators within Western science, including: (a) those discussed in the literature; and (b) those currently employed through community-led monitoring of the Arviat goose project, which is supported by ECCC.

At the same time, there are important challenges in trying to identify, categorize, and compare Inuit indicators in a tabular format. IQ is relational and context dependent, grounded not only in observation but also in interpretation and experience. Inuit assessments of goose health are shaped by the social and relational contexts in which decisions about harvesting and consumption are made. Presenting Inuit indicators as discrete categories in a table format risks separating observations from the contexts that give them meaning. It also risks implying a level of equivalency that does not fully reflect how these indicators are understood and used.

Table 5.1. Parallels across Inuit indicators of goose health and related Western scientific indicators

	Inuit knowledge		**Western science**		
			Literature	**CBM of Arviat goose project (ECCC supported)**	
Indicator category	***Indicator***	***Method***	***Indicator***	***Indicator***	***Method***
Behaviour*	Abundance	*Sight*	(see Population health)	(see Population health)	*N/A*
	Response to humans	*Sight*	Flight initiation distance	N/A	*N/A*
	Vocalizations	*Hearing*	Vocalization	N/A	*N/A*
	Flight pattern & rhythm	*Sight*	Wingbeat frequency	N/A	*N/A*
	Vitality	*Sight & hearing*	Energetics	N/A	*N/A*
Body condition*	Weight (fatness proxy)	*Touch*	Size adjusted body mass	Body Mass (g)	*Weight*
	Breastbone prominence	*Touch & sight*	Protein reserve index (gizzard, leg, pectoral muscles)	Pectoral muscle condition	*Visual 0-3 rating*
	Subcutaneous fat	*Touch & sight*	Fat scoring	Subcutaneous fat	*Visual 0-3 rating*
	Visceral fat	*Sight*	Abdominal fat	Intestinal Fat	*Visual 0-3 rating*
	Amount of fat in pot	*Sight*	Total body lipids	N/A	*N/A*
	Taste	*Taste*	Amino acid profiles	N/A	*N/A*
Injuries*	Impact injuries	*Sight (Y/N)*	Impact mortality	Fracture Presence	*Visual (Y/N)*
	Infected wounds	*Sight (Y/N)*	Lacerations	Wound Presence	*Visual (Y/N)*
Abnormalities*	Foot deformities	*Sight (Y/N)*	Morphological deformities	Morphological deformities	*Visual*
	Beak warts	*Sight (Y/N)*	(see Classification)	N/A	*N/A*
	Insects	*Sight (Y/N)*	Insects	N/A	*N/A*
	Foaming (beak)	*Sight (Y/N)*	N/A	N/A	*N/A*
	Feather quality	*Sight (Y/N)*	Molt and feather wear	N/A	*N/A*
	Worms	*Sight (Y/N)*	Parasite presence	N/A	*N/A*

	Inuit knowledge		Western science		
			Literature	CBM of Arviat goose project (ECCC supported)	
Indicator category	***Indicator***	***Method***	***Indicator***	***Indicator***	***Method***
	Colour of skin/fat	*Sight (Y/N)*	N/A	N/A	*N/A*
	Growths	*Sight (Y/N)*	Masses	Gastro-intestinal tract exam	*Visual*
	Eye clarity	*Sight (Y/N)*	Conjunctivitis	N/A	*N/A*
	Freezer burn	*Sight (Y/N)*	Freezer burn	Nutrient analysis	*Lab analysis*
	Smell	*Smell*	Sensory parameters	N/A	*N/A*
Population health	(see Behaviour)		Abundance	Abundance	*Banding*
			Harvest rate	Harvest rate	*Banding*
			Survival rate	Survival rate	*Banding*
			Colony survey	Colony survey	*Visual count*
Toxicology	N/A	*N/A*	Pathogens: avian influenza, cholera	Pathogens: avian influenza, cholera	*Lab analysis*
	N/A	*N/A*	Contaminants: plastic pollutants, heavy metals	Contaminants: plastic pollutants, heavy metals	*Lab analysis*
Other physiological indicators	N/A	*N/A*	Tarsus (mm), wing (cm), head (mm), culmen (mm)	Tarsus (mm), wing (cm), head (mm), culmen (mm)	*Measure*
Classification	Age: size, behaviour	*Sight*	Age: brood patch presence, gonad maturity, bursa of fabricius, beak warts (caruncle presence), feather characteristics	Age: brood patch presence, gonad maturity	*Visual (index)*
	Sex: feathers, size	*Sight & touch*	Sex: cloacal examination	Sex: cloacal examination	*Visual*

Note. The central column presents Inuit indicators of goose health, organized by four main categories (identified by asterisk): behaviour, body condition, injuries and abnormalities. The right column introduces associated Western scientific indicators discussed in the literature (left) and those employed as part of the ECCC-supported community-based goose monitoring program in Arviat (right). The two main columns are

separated to highlight that Inuit and Western indicators remain distinct, but parallels can be drawn across them. Methods used to assess indicators are presented for both Inuit knowledge and Western science. References for indicators discussed are provided in the literature review (Sections 2.2, 2.3.; Tables 2.1 and 2.2).

Despite these limitations, placing the indicators side by side remains valuable. It helps identify areas of complementarity, clarifies where the strengths of each knowledge system lie, and creates a foundation for more informed dialogue across monitoring approaches. Taken together, Inuit and Western scientific indicators can contribute to a more holistic understanding of goose health and its associated ecological and societal implications. This table should therefore be understood as a tool for comparison and conversation, rather than a full representation of Inuit knowledge or a direct translation of Inuit indicators into Western scientific terms.

Table 5.2. Comparison between Inuit and ECCC-supported community-based monitoring approaches to goose health assessment in Arviat goose project

		Inuit	**CBM of Arviat goose project (ECCC supported)**
Objective		Inform harvest, consumption and stewardship decisions	Assess goose population health to ensure harvest sustainability and support Inuit food sovereignty
Method		Sensory	Sensory, population monitoring, laboratory analysis, physical measurements
Scale	**Spatial**	Local to regional	Local to continental
	Temporal	Generational knowledge assessed repeatedly within a year	Long-term records assessed through shorter, more discrete field periods
	Physical	Individual bird	Microscopic and molecular to individual bird

5.1.1 Objectives of the two knowledge systems

This section discusses the respective objectives of Inuit knowledge and Western science as they relate to goose harvesting and monitoring in Arviat. In this thesis, the term 'knowledge systems' refers to systems made up of agents, practices and institutions that organize the production, transfer and use of knowledge (Cornell et al., 2013). Goose health assessment in Arviat is examined through two such systems: Inuit knowledge and Western science. These different knowledge systems shape the questions each system is trying to answer.

The Inuit knowledge system can be defined as grounded in IQ, where environmental health, social wellbeing and cultural practices are interconnected through relationships (Karetak et al., 2017). Inuit assessments of goose health, within the Inuit knowledge system, support harvest and consumption decisions about whether a bird is suitable to hunt and eat, as well as broader stewardship practices that ensure geese remain available for future generations. For example, if a sick goose is found it can be brought to the community Wildlife Officer.

The Western science system is constructed through Western scientific practices where ecological and biological research and monitoring produce knowledge which can then inform management decisions. Within the Western science system, literature looks to advance scientific understanding while the ECCC-supported CBM asks whether goose populations are healthy to ensure harvest sustainability and to support Inuit food sovereignty, drawing on Western science indicators to support monitoring and management decisions.

The concept of knowledge system is useful, but carries limitations. Boundaries between knowledge systems are often blurred and porous as knowledge can be held by individuals whose knowledge is not limited to a single system, and more increasingly, 'woven' together (Henri et al., 2021). Even so, placing these objectives, systems, and methods side-by-side, we can highlight their unique aspects and shared approaches. Together this can inform a holistic CBM program. This approach aligns with the IQ principle of *piliriqatigiingniq*, or working together for a common purpose, to ensure goose populations remain healthy for future generations.

Table 5.2 highlights the intersections and complementarity in methods of goose health assessment. Read side by side, it shows that Inuit indicators and the ECCC-supported Arviat CBM assess similar aspects of goose health, but do so through different methods. Inuit indicators are assessed primarily through the senses, while the CBM combines sensory observations with banding and population monitoring, laboratory analyses, and physical measurements. Considered together, these approaches provide complementary ways of assessing and understanding goose health.

5.1.1.1 Qualitative and quantitative dimensions of health assessment

Both Inuit knowledge and Western science rely on qualitative assessments of goose health, but Western science extends these assessments through quantitative measurement (Table 5.1). In Western science, body condition is often evaluated using relative scales such as body condition indices or abdominal profile indexes (Haramis et al., 1986; Hupp et al., 2017). These assessments assign a score (0-3) to represent the apparent fatness of a goose. The values are not absolute measurements but relative

judgments that allow comparisons across individuals and populations. Their main purpose is to make qualitative observations more consistent and to provide a framework for monitoring population-level trends.

Inuit hunters also use relative scales of body condition, but their evaluations are descriptive rather than numerical. Terms such as “very skinny,” “skinny,” “normal,” “fat,” and “very fat” are used to describe a goose’s condition, based on the feel of the breastbone, the amount of fat under the skin, and the ease of plucking (Table 5.1). These categories capture the same attribute as Western condition indices but are applied in practical terms that matter for harvesting and consumption. For example, a goose described as “fat” is not only recognized as being in good condition but is also considered the most desirable to eat. While the two systems frame and record assessments differently, both rely on relative scales to evaluate goose health.

The key difference lies in the additional quantitative measurements of Western science (Table 5.1). In addition to relative scoring, Western scientific protocols use standardized measurements of body size and morphology, such as body mass and wing length, to calculate size-adjusted body mass (Alisauskas et al., 2022; Owen, 1981). Western science also uses laboratory analyses to generate numerical values for viral load, antibody counts, and contaminant concentrations in tissues. Inuit assessments, by contrast, rely on descriptive, sensory, and experience-based evaluations that are immediately relevant to harvesting, food safety, and consumption decisions. Within the broader Arviat goose project, the ECCC-supported CBM component is therefore valuable

because it contributes quantitative and laboratory-based methods that complement Inuit sensory and experience-based assessments.

5.1.1.2 Binary dimensions of health assessment

Both Western science and Inuit knowledge use binary assessment (yes/no) methods of goose health (Table 5.1). Western science, binary assessments are commonly recorded during necropsies or field surveys, where features such as lesions or fractures are marked as either present or absent. For Inuit harvesters, binaries are also used and have an immediate impact in decision-making. The presence or absence of an injury or infection, can determine whether a goose is considered good to eat, or whether certain parts are discarded or given to dogs, or rejected altogether (Table 5.1; Section 4.2.4.2.1). In this context, yes/no judgments are tied directly to harvesting decisions and food safety.

5.2 Intersections and divergences of goose health indictors across knowledge systems

5.2.1 Body condition indicators

In both Inuit knowledge and Western science, body condition is the most important and commonly used indicator of goose health (Table 5.1). Inuit hunters assess body condition (fatness) by feeling for breastbone prominence, weighing the goose by hand, and checking for fat under the skin and in the innards (Section 4.2.4.1). A pointy breastbone signals little fat or meat, while a breastbone covered by fat and muscle indicates a healthy and desirable goose. Ease of plucking and the taste of fat, especially

when cooked, are also considered final indicators of quality (Section 4.2.4.1.2). These assessments are made with the immediate goal of preparing, consuming, and sharing the goose. More broadly, fatness reflects overall goose health and long-term species health.

In Western science, fatness is also a primary indicator of health but is assessed for different purposes. The API (Féret et al., 2005; Owen, 1981), body mass and fat scoring (Labocha & Hayes, 2012; Madsen & Klaassen, 2006), and analyses of total lipids and proteins (Fowler et al., 2018, 2020) all measure fatness to assess goose health. These methods allow researchers to determine energetics, survival potential, and reproductive success. The reliance on body condition as a key indicator across both systems shows how assessments grounded in fatness are fundamental to understanding goose health.

5.2.2 Behavioural assessments

While both Inuit knowledge and Western science examine behavioural indicators, the ECCC-supported CBM in Arviat implements only a limited number. Inuit hunters use many more behavioural observations, such as flight patterns and vocalizations to guide harvesting decisions (Table 5.1; Section 4.2.2.1.3). Western science, recognizes the value of behavioural indicators, though it was not used in the ECCC-supported CBM in Arviat due to logistical constraints. For example, accelerometers, satellite telemetry, or wingbeat frequency analysis may be used to study energetics and migration patterns (Ward et al., 2002). While Western science uses these tools to model the physiological costs of migration, Inuit hunters use direct observation to assess the immediate health of individual birds for the community.

5.2.3 Other indicators

Beyond body condition and behavioural assessment, several other indicators are also common to both Inuit knowledge and Western science (Table 5.2). Both systems recognize injuries such as broken wings or infected wounds as signs of compromised health, although Inuit use these indicators to decide whether a goose can be eaten, while Western science records them for population health surveys. Abnormalities and deformities, including foot malformations, cloudy eyes, or unusual feathering, are likewise noted in both approaches. Feather condition, in particular, is a point of overlap. Inuit hunters described how uneven, missing, or dull feathers could signal a problem, while smooth, full plumage indicated health (Section 4.2.4.2.1). Similarly, Western science monitors feather quality through molt and plumage surveys, where wear, damage, or irregularities are recorded as markers of condition. The presence of worms is also assessed in both systems, whether through inspection of the innards by hunters or through quantified parasite loads in laboratory studies.

5.2.4 Scale of assessments

The intersections and unique contributions of Inuit knowledge and Western science can be understood, in large part, through consideration of the temporal and spatial scales at which goose health assessments are performed by Inuit harvesters and Western scientists. Each knowledge system contributes observations from different spatial and temporal perspectives that may be complementary depending on the species and monitoring context (Gagnon & Berteaux, 2009). In this study, these intersections and

distinct strengths are evident in the spatial, temporal, and physical scales at which goose health is assessed.

5.2.4.1 Spatial scale

The spatial scales of goose health assessment differ between Inuit knowledge and Western science. Inuit assessments span local to regional scales, whereas Western scientific assessments span from local to continental scales.

Inuit assessments span local to regional scales rooted in everyday harvesting practices and mobility across the land. Rather than extending across the continental range of geese, these assessments are grounded in the places hunters can directly access and observe by sled, boat, or ATV (Carter, Martinez-Levasseur, et al., 2025). In Arviat, the Nunavut Wildlife Harvest Study recorded 305 hunters interviewed at least once between 1996/97 and 2000/01 (Nunavut Wildlife Management Board, 2004). Estimated annual harvest during this period averaged 1,602 Snow Geese, 699 Canada Geese, and 14 Ross's Geese per year (Nunavut Wildlife Management Board, 2004: p. 615-629). Arviat community feedback, however, suggested that Snow Goose harvest was likely underestimated in the harvest study and likely closer to 1,800 to 2,000 Snow Geese annually. Together, this data and the sharing of knowledge across families, harvesting networks, and community communication systems produce detailed and continuous knowledge across a community's local and regional harvesting areas. Inuit assessments do not operate at the continental scale of Western monitoring, but neither are they limited to individual birds. Instead, they generate a place-based understanding of goose health across local and regional scales.

In Western science, goose health assessments span local to continental scales (Table 5.2). At the local scale, researchers assess individual birds through measures such as banding, body condition, disease testing, and morphometrics. These observations are then combined with aerial surveys, harvest data, and satellite tracking in regional monitoring programs such as the AGJV and CWS surveys to evaluate survival, reproduction, distribution, and harvest rates across North America (Alisauskas et al., 2011). Banding contributes data on goose survival and movement, aerial surveys estimate abundance and distribution, and satellite tracking documents migration pathways, timing, and habitat use, together supporting models that scale from individual observations to broader population trends (Gagnon & Berteaux, 2009). Yet these approaches are strongest at the local and continental ends of monitoring and often provide less continuous understanding at the regional scale of everyday harvesting landscapes. Inuit knowledge is therefore uniquely positioned to contribute detailed, place-based assessments at this regional scale (Carter, Martinez-Levasseur, et al., 2025).

This regional scale is central to Inuit environmental stewardship because it is grounded in ongoing relationships with geese, harvesting areas, and seasonal change. Through repeated encounters and shared observations, Inuit knowledge provides detailed, continuous insight at a scale that scientific monitoring often cannot sustain. At the same time, because Inuit observations are grounded in local and regional harvesting areas, apparent changes in abundance may at times reflect shifts in distribution or migratory routes rather than broader population change, underscoring the importance of monitoring across multiple spatial scales. Framing these scales together shows that Western science

is well suited to monitoring goose populations across their migratory range, while Inuit knowledge monitors the specific health of birds in their summer range according to place-based relationships. Together, these two knowledge systems can support a more robust monitoring approach by combining Inuit place-based assessments with Western science's broader population-level monitoring.

5.2.4.2 Temporal scale

Temporal scale can be understood in two ways: the length of time over which knowledge develops and evolves, and the duration and frequency of observation within a given year. Inuit knowledge operates across both. It is built through oral histories, intergenerational learning, and lived experience over generations, while also assessing goose health repeatedly throughout the harvesting season (Table 5.2). In this way, temporal scale shapes what Inuit knowledge can reveal: ongoing observations make it well suited to identifying changes in timing, behaviour, body condition, abundance, and distribution as they unfold over time (Gagnon & Berteaux, 2009; Henri, Jean-Gagnon, et al., 2018). Direct Inuit observations in the Kivalliq extend scientific records of light goose phenology to the 1940s and provide continuous local observations from late spring through September (Carter, Martinez-Levasseur, et al., 2025). Western science contributes to long-term records of goose monitoring through annual monitoring conducted in shorter, more discrete field windows (Carter, Martinez-Levasseur, et al., 2025; Table 5.2). In the Kivalliq region, this record extends back to research initiated in 1958 (MacInnes, 1962). However, annual monitoring is typically concentrated into brief periods. Goose banding usually occurs in late summer during moult, when adults are

flightless and young have not yet fledged, with program documents indicating field windows of roughly one to two weeks, including a 15-day summer banding period used in Nunavut (Cadieux et al., 2023). Nesting-colony aerial surveys are similarly concentrated in June or early July rather than conducted continuously across the season (Kerbes et al., 2014). These approaches are therefore especially strong at building standardized long-term datasets from repeated snapshots, but they often provide less continuous observation within a single harvesting season.

Together, these temporal scales shape what each system can know about goose health. Inuit knowledge is especially well positioned to detect seasonal and regional change as it happens, while Western science is better suited to tracking broader trends over time through standardized methods. Bringing these perspectives together can strengthen understanding of both abundance and distribution by linking continuous local observations with broader-scale monitoring (Carter, Martinez-Levasseur, et al., 2025). This shows that temporal and spatial scales are closely connected: what can be observed over time is shaped by where observations are made.

5.2.4.3 Physical scale

The physical scales of goose health assessment differ between Inuit knowledge and Western science: Inuit indicators rely on direct sensory assessment of the individual bird, whereas Western science can extend from the visible bird to microscopic and molecular scales.

Inuit indicators operate at the scale of the individual bird through direct sensory experience. Hunters and knowledge holders in Arviat rely on their five senses (touch,

sight, smell, sound, and taste) to evaluate a goose's condition. These senses reveal the sharpness of the breastbone, the fat beneath the skin, the ease of plucking, and the texture and taste of meat and fat (Section 4.2.4.1). Hunter Darryl Baker described the tactile method used immediately after harvest: "You can feel it when you pluck – if there's fat under the skin, it comes off easy". Elder Arden Nibgoarsi similarly emphasized the value of touch: "I check the breastbone right away with my hand, to see how sharp it feels. That tells you if it's skinny or healthy".

Western science also assesses goose health at the scale of the individual bird, using standardized measures such as body mass, wing length, fat scoring, and checks for injuries, deformities, or parasites (D. H. Johnson et al., 1985). However, Western scientific assessments can also extend below the scale of the visible bird to microscopic and molecular levels. Laboratory techniques make it possible to detect pathogens, viral loads, microplastics, and chemical residues that are not observable through direct sensory assessment (Alisauskas et al., 2022). These methods support broader ecological questions, including contaminant effects, disease surveillance, and population health across flyways (Fry, 1995; Henri, Jean-Gagnon, et al., 2018). Despite differences in application, both systems share the fundamental scale of assessment at the level of the individual bird, creating a common foundation for understanding goose health.

5.3 Towards a holistic approach to assessing goose health

5.3.1 Community-based monitoring as a foundation for goose health assessment

This CIHR goose project exemplifies CBM where community members lead or co-lead the collection, interpretation, and sharing of environmental information in ways that align with local priorities and governance (N. Johnson et al., 2015). In Inuit Nunangat, CBM is not only a method for data collection (Section 2.5). It is an enactment of Inuit self-determination in research and governance that shapes whose priorities guide monitoring, how knowledge is interpreted, and how findings are used in decision-making (K. J. Wilson et al., 2020; N. J. Wilson, 2025). CBM is most effective when it is implemented according to mutual trust, shared decision-making, and governance processes that genuinely value Indigenous knowledge alongside scientific methods (Berkes et al., 2007).

For goose monitoring around Arviat, this governance foundation is essential because goose health assessments are closely tied to harvesting, food sharing practices, and community wellbeing (Carter, Martinez-Levasseur, et al., 2025; Henri, Carter, et al., 2020). Questions about goose health are not only questions about wildlife condition. They are also questions about whether geese are safe to eat, appropriate to share, and suitable to support renewed harvesting practices in the community. The Inuit-led structure of this CIHR project, guided by the Aqqiumavvik Society, ensured that these priorities led the

research and the question of whether geese are safe to eat and whether an increased harvest could be sustainable.

This project also reflects a particularly integrated form of CBM, bringing together Inuit community leadership, government monitoring expertise, and academic research within a shared monitoring framework. This integration is important not only because it supports a more holistic understanding of goose health, but also because it strengthens the consistency and longevity of monitoring. By linking community-based observations with government and academic partnerships, the project supports broader seasonal coverage, more continuous observation, and stronger feedback between harvesting experiences and ECCC monitoring efforts. In this way, the partnership supports a monitoring approach that is more practical, adaptive, and sustainable over time.

The monitoring activities documented in this thesis are therefore situated within the broader CBM literature while also addressing a key gap identified in the literature review. Goose health monitoring has largely been shaped through Western scientific indicators and management priorities, while Inuit assessments of goose health, particularly those used in harvesting, food preparation, and decisions about whether geese are suitable to eat, share, or discard, remain under-documented. By documenting Inuit-defined indicators of goose health alongside Western scientific approaches, and by showing how these can operate together in an Inuit-led CBM program, this thesis contributes to more holistic and locally grounded monitoring frameworks.

5.3.2 Braiding knowledge systems strengthens monitoring and interpretation

Knowledge co-production and braiding approaches create space for different forms of expertise to work alongside one another while maintaining the strengths and integrity of each system (Bartlett et al., 2012; Bowles et al., 2026; Ellam Yua et al., 2022; Henri et al., 2021; Rathwell et al., 2025; Reid et al., 2021). This thesis provides a case study of how braiding can work within an Inuit-led CBM program. In this project, Inuit knowledge holders and Western scientists contributed different forms of knowledge, interpretation, and practical expertise that, when brought into relationship, strengthened both the interpretation of observations and the implementation of monitoring activities.

One example of the value of this braided approach is the work of Frank Baldwin (biologist with the CWS) in monitoring goose populations and sharing results with the community. Through broader population surveys, he was able to inform hunters in Arviat that a higher proportion of juvenile geese were expected to arrive that season, and that juvenile birds would likely have less fat (personal notes, Ottawa 2024 workshop). Because fatness is a core indicator in Inuit assessments of goose health and suitability to eat, this context supported community interpretation. Without it, leaner birds might have been interpreted by Inuit hunters as evidence of widespread illness. Instead, hunters who were directly involved in the project were able to share this information quickly through community networks. In a context where oral transmission is central and where experienced hunters are highly connected and trusted, this kind of rapid interpretation support is one of the practical strengths of an Inuit-led CBM.

The benefits of braiding also flowed in the opposite direction. Western monitoring efforts benefited from Inuit land-based expertise during banding activities. Hunters' ability to navigate wet and boggy terrain supported a joint team that included the CWS, Aqqiumavvik hunters, and the Ujjiqsuiniq Young Hunters. This enabled successful field operations in conditions that would otherwise limit access to geese, including fog that would typically reduce helicopter use. Hunters also directed the team to areas where geese had shifted their distribution north of the McConnell Bird Sanctuary. This land-based expertise was critical to locating flocks and contributed to the success of banding operations, including the banding of over 2,000 geese in the 2024 season. This banding season facilitated with Aqqiumavvik was reported as one of the highest number of geese banded at a single location during CWS banding work that year. Together, these examples show that braiding knowledge systems within Inuit-led CBM does not simply improve communication between partners but also supports a stronger and more adaptive monitoring system.

5.3.3 Capacity sharing within Inuit-led monitoring programs

Rather than framing this project as a one-way process of capacity building flowing from researchers to community members, it is more accurate to understand it as involving 'capacity sharing', which recognizes that substantial capacity already existed within Arviat and among Inuit project partners before the project began (Mercer & Ovitz, 2023). Framing this work as supporting capacity sharing is important because it emphasizes reciprocity and highlights that the project supported, mobilized, and extended existing capacity within both the Arviat and research community.

First, the project strengthened the existing capacity of Inuit organizations, particularly the Aqqiumavvik Society, by directing funding and coordination through a community-led structure. Aqqiumavvik already held strong relationships, governance experience, and knowledge of local priorities. The project strengthened this capacity by supporting staff time and community-based positions needed to organize and facilitate activities such as project team workshops, goose bag and terminology workshop, as well as community kitchen activities. In this way, the project did not create organizational capacity from scratch, but reinforced local infrastructure that can continue to support research, monitoring, and knowledge mobilization over time (K. J. Wilson et al., 2020).

Second, capacity sharing occurred through the strengthening of knowledge systems within the community itself. Research activities created opportunities for stories, observations, and harvesting knowledge to be shared across generations and among community members. In some cases, this happened directly through interviews and focus groups, such as when family members were able to reflect together and build on one another's memories and experiences. In others, it occurred more informally, including when focus groups were held in the Aqqiumavvik office and staff or others present in the space could listen to the conversations as they unfolded. Sharing photographs from earlier banding work in the Kuugaarjuk Bird Sanctuary created opportunities for discussion, memory, and reflection. These moments mattered because they allowed knowledge to circulate within the community, not only between participants and researchers. Capacity sharing in this sense was not only about producing findings, but also about creating time and conditions for Inuit knowledge to be shared and strengthened in community contexts.

Third, the project created opportunities for youth to strengthen research and monitoring capacity through direct participation in land-based and monitoring activities. Youth already held important relationships to the land and to harvesting practices, but involvement in project activities provided additional opportunities to develop practical skills in observation, monitoring, and working with birds. Participation in banding activities was one example of how youth could gain experience in research settings while also strengthening their familiarity with geese, land-based work, and the indicators used to assess bird health. This kind of involvement is important because it helps build a base of community members who can continue to participate in and lead monitoring activities (Gilchrist et al., 2005).

Finally, capacity sharing also strengthened the capacity of southern-based students, researchers, and government partners. Because the project was Inuit-led and guided by Inuit priorities, non-Inuit collaborators were required to work within a research process grounded in community relationships, local governance, and iterative dialogue. This created opportunities to build stronger skills in collaborative research, cross-cultural engagement, and community-accountable monitoring. It also strengthened the ability of southern-based partners to contribute to research in ways that are more rigorous, better aligned with community priorities, and more responsive to Inuit approaches to knowledge and decision-making (Carter, Tagalik, et al., 2025; Ellam Yua et al., 2022). In this sense, capacity sharing was reciprocal: it strengthened community-led monitoring in Arviat while also reshaping how outside collaborators understood and participated in the research process.

5.3.4 Inuit leadership and implications for holistic monitoring

Inuit leadership was present across all stages of my project. Workshops with Elders and Aqqiumavvik's earlier conversations with the Research Advisory Council helped shape the research questions to reflect Inuit priorities, which ensured the monitoring focus remained relevant to the community (Aqqiumavvik Society, n.d.; Carter, Martinez-Levasseur, et al., 2025; Ferrazzi et al., 2019). Inuit leadership also guided participant recruitment, focus group design, interpretation of results, and decisions about how findings should be shared. This reflects a CBM approach where community authority shapes the full research process, not only data collection (K. J. Wilson et al., 2020; N. J. Wilson, 2025).

By combining Inuit leadership with CBM practices and complementary indicators from Inuit knowledge and Western science, this project supports a more holistic approach to goose health assessment and most importantly, contributes to answering the initial question asked by the community: are geese safe to eat and can a sustainable goose harvest be supported? Rather than focusing only on biological measures, the monitoring framework documented in this thesis includes behavioural, environmental, and culturally grounded observations that reflect Inuit understandings of health and wellbeing. This strengthens community decision-making related to food safety and food sovereignty while also contributing to broader wildlife monitoring efforts (Inuit Tapiriit Kanatami, 2021; Naylor et al., 2023; Slack et al., 2025; Tsuji et al., 2020).

5.3.5 Informing community-based monitoring and goose health assessment

My role in this broader Inuit-led project was to document Inuit approaches to assessing goose health and identify intersections and complementarity between Inuit and Western health indicators. Undertaking an analysis of approaches to goose health assessment, this thesis creates a foundation of shared understanding in both Inuit and Western science monitoring networks. Both my approach to research, and the community-based goose monitoring run out of Arviat, reflects a knowledge co-production approach that emphasizes shared purpose and mutual respect in how knowledge is interpreted and mobilized (Ellam Yua et al., 2022; Hayward et al., 2021). It aligns with the aim of CBM to link knowledge generation directly to local priorities and decision-making (Berkes et al., 2007; Henri, 2012). This work was guided by the ARM, which grounded the research in Inuit priorities through relationship-building, shared understanding, and collaborative analysis (Carter, Tagalik, et al., 2025; Ferrazzi et al., 2019; Tagalik, 2012).

Rather than focusing on how Inuit knowledge can be incorporated into Western monitoring, this thesis begins with IQ as a foundation for conceptualizing goose health and monitoring priorities (Karetak et al., 2017; Reid et al., 2021). From this foundation, it becomes clear how Inuit knowledge and Western science can contribute complementary forms of evidence toward shared questions posed by Aqqiumavvik: are geese safe to eat and are harvest levels sustainable. By documenting Inuit-defined indicators, clarifying assessment processes, and identifying opportunities for knowledge systems to come together in a more holistic approach to goose monitoring, this thesis demonstrates the

value of Inuit-led CBM. CBM programs grounded in Inuit knowledge, priorities, and governance support more robust and responsive environmental and wildlife monitoring programs (K. J. Wilson et al., 2020; N. J. Wilson, 2025).

5.3.6 Shared foundation for collaboration

Comparison of Inuit and Western science systems demonstrate shared points of overlap in goose health assessment, while also differing in objectives, methods, and scales of assessment. Both systems identify body condition as a central indicator of goose health. Both also recognize injuries, abnormalities, parasites, and, to some extent, behaviour as signs of overall goose condition and health. Each system relies on qualitative judgments, relative assessments, and binary decisions.

The differences lie in what each system is designed to do with those observations. Inuit assessments are grounded in harvesting, food safety, consumption, and stewardship. Objectives are immediately practical and relational, supporting decisions about whether a goose is suitable to eat and how it should be prepared or distributed within the community. Western science, by contrast, uses many of the same kinds of observations to answer broader questions about population health, energetics, disease, contaminants, and management. It also extends assessment through standardized measurements, indices, and laboratory analyses that can generate comparable data across birds, populations, and years. These differences do not make one system more rigorous than the other. Rather, they show each system has a different but related purposes.

The complementarity of the two systems is most evident in relation to methods and scales. Inuit knowledge provides detailed, sensory, place-based, and continuous

assessments of geese within harvesting contexts. It is especially strong at the local and regional scale of everyday land use and at the seasonal scale of repeated observation. Western science contributes standardized long-term datasets, broader population-level perspectives, and laboratory and quantitative tools that can detect processes not visible through direct sensory assessment alone. Both systems therefore contribute knowledge that the other cannot fully replace. Inuit knowledge is uniquely positioned to assess the immediate condition and suitability of geese in local harvesting contexts, while Western science is better suited to tracking broader trends across space, and physical scales. Together, these approaches create a more complete understanding of goose health than either could provide alone.

This finding reinforces the value of Inuit-led CBM. Because Inuit knowledge and Western science share several core indicators while also differing in purpose, methods, and scale, they can be brought into relationship in ways that strengthen monitoring without requiring them to be merged into a single framework. In this thesis, the discussion of Inuit and Western scientific goose health indicators shows that a more holistic monitoring approach emerges not from replacing one system with the other, but from recognizing their intersections, respecting their differences, and building from their complementarities. This is what allows Inuit-led goose health monitoring in Arviat to be both locally meaningful and more broadly informative.

6 Conclusion

Working collaboratively with the Aqqiumavvik Society and community members in Arviat, this thesis documented Inuit-identified indicators used to assess goose health. The research was co-developed by Aqqiumavvik's priority to revitalize the community goose harvest. Their broad project questions ask: are geese around Arviat are safe to consume, and what level of increased community harvest of geese and eggs is sustainable. To contribute to the priority of revitalizing the goose harvest I asked: 1) How is goose health assessed by Inuit around Arviat? and 2) How could this knowledge support more holistic approaches to CBM?

The findings support a clearer understanding Inuit goose health assessments throughout the harvest process. An increased understanding builds confidence in harvesting decisions, and supports food security in Arviat. Learning from Arviarmiut addressed a gap in existing literature whereby Inuit-identified indicators of goose health and harvesting-based assessment processes have received limited attention. The thesis described these indicators alongside Western scientific monitoring conducted by ECCC within the broader project. A side-by-side analysis showed that Inuit knowledge and Western science share important areas of convergence and uniqueness in their primary objectives, methods, and scales of assessment. Guided by the Inuit-designed ARM, this Inuit-led research centered Inuit knowledge while identifying how different forms of monitoring relate to one another.

6.1 Summary of key findings

6.1.1 Goose health assessment is embedded in the harvesting process

A central finding of this study was that Inuit around Arviat, Nunavut, assess goose health through a set of indicators observed through five stages of the goose hunting process: preparation, hunting, retrieving, plucking and gutting, and cooking and eating (Figures 4.1 and 6.1). Four categories of indicators were consistently identified: behaviour, fatness, injuries, and abnormalities (Figure 4.2). Indicators of goose health are assessed across stages two through five.

Goose health evaluations begin during the hunt through observations of goose behaviour and flight pattern assessments. Additional observations are made during retrieval, where injuries, parasites, or other abnormalities can be identified. Through plucking and butchering, further indicators are assessed, including body condition, fat distribution, and the appearance of internal organs. Assessment continues during cooking and eating, when taste, texture, and smell provide additional confirmation of the goose's quality and suitability for consumption.

These findings show that goose health is not understood just at one point in time, or through one primary indicator. Instead, goose health is assessed iteratively and cumulatively across the harvesting process, with each stage contributing different types of information. Together, these observations interconnected with different stages of harvest and interactions with geese, inform broader decisions about whether a goose is healthy and appropriate to harvest, prepare, share, and eat (Figure 6.1).



Figure 6.1. Five stages of Inuit goose health assessment
(Illustrations by Nooks Lindell)

6.1.2 Indicators reflect holistic goose health assessment

The indicators identified in this research contribute to holistic understanding of goose health by Arviarmiut. Contributors described a range of observations related to behaviour, body condition, and physical appearance. Considered together through interrelated and iterative assessments, these observations form a holistic understanding of goose health.

The indicator of fatness emerged as the most important indicator in goose health assessments. Fatness also demonstrates the holistic approach of Inuit to goose health assessments through iterative observations throughout the harvest process. For example, behavioural indicators such as energy, alertness, and normal movement during flight often suggest that a bird is fat, so strong and well-fed. Body condition indicators, including the presence and distribution of fat, provided additional confirmation of this assessment. Due to this integrated nature during assessments, fatness emerged as the most important indicator of holistic goose health assessments.

Fatness is closely connected to the value of the goose as food. Hunters frequently described fatness as a desirable characteristic because it reflects a goose that has been eating well and is in good condition. Geese with good fat deposits were described as tasting better and providing more satisfying and nourishing meals for hunters, families, and the wider community. In this way, fatness functioned not only as an indicator of the bird's health but also as a marker of positive wellbeing for Arviarmiut (Boulet & Chouinard, 2014; Caughey et al., 2024; Skogli et al., 2017). Within Inuit food systems,

these qualities are important because harvesting healthy animals supports both individual nourishment and the sharing of country food within the community.

6.1.3 Social and relational processes shape health assessment

Another key finding is that goose health assessment is not made in isolation but embedded within social and relational contexts. Knowledge about indicators is often shared through conversations among hunters, within families, and through learning from Elders and experienced harvesters. During focus group discussions, participants frequently built on each other's observations, clarified terminology, and shared experiences that helped refine their understanding of indicators. This is not surprising as IQ is developed through both observation and sense-making.

The interpretation of goose health assessments shaped by social and relational context reflects broader Inuit approaches to knowledge sharing and decision-making, where understanding is developed collectively through experience, storytelling, and building consensus (Carter, Tagalik, et al., 2025; Fernández-Llamazares & Cabeza, 2018; J. T. Johnson & Madge, 2021; Karetak et al., 2017; Rothe et al., 2009). This relational dimension highlights that goose health assessments are part of a broader knowledge system grounded in experience, community relationships, and learning over time.

6.2 Contributions to goose health monitoring

6.2.1 Documenting Inuit goose health assessment

One of the primary contributions of this research is the documentation of the goose health assessment process and the indicators of goose health employed by Arviarmiut. While previous studies have demonstrated the importance of Inuit knowledge in bird monitoring (Carter, Henri, Johnston, Irkok, et al., 2018, 2018; Gilchrist et al., 2005; Henri, Carter, et al., 2020; Henri, Jean-Gagnon, et al., 2018; Mallory et al., 2003), detailed documentation of how hunters assess the health of harvested birds has been limited. This study helps to address this gap by identifying indicators used throughout the harvesting process and organizing them in a way that can support further discussion and monitoring initiatives for and by the Arviat community.

6.2.2 Identifying strengths of a braided approach

Braiding Inuit knowledge and Western science strengthened goose health monitoring in Arviat. Bringing these knowledge systems into relationship improved not only how observations were interpreted, but also how monitoring activities were carried out in practice framework (Bartlett et al., 2012; Bowles et al., 2026; Reid et al., 2021). The strengths of this approach were especially clear where one system provided context or capacity that the other could not provide on its own.

Western science approaches to goose population monitoring helped explain why leaner birds were expected in a season with more juvenile geese, which supported community interpretation of body condition and reduced the risk of misreading low

fatness as illness. The benefits of braiding also moved in the other direction. Inuit land-based expertise strengthened Western monitoring by helping teams navigate difficult terrain, locate geese, and carry out successful banding activities in changing conditions. Together, these examples show that braiding did more than support communication between partners. It strengthened monitoring by making it more responsive, locally grounded and better able to respond to both community priorities and research needs (Henri, 2012; Ndeloh Etiendem et al., 2020).

6.2.3 Supporting collaboration in community-based monitoring

This thesis contributes to ongoing discussions about how Inuit knowledge and Western science together can inform a comprehensive understanding of wildlife health (Reid et al., 2021; Tomaselli, 2018). By examining both Inuit knowledge and Western science side by side, we can see that they share important points of overlap while also differing in their primary objectives, methods, and scales of assessment. Both systems recognize indicators such as body condition, injuries, abnormalities, parasites, and some aspects of behaviour as meaningful signs of goose health, which creates a shared foundation for collaboration.

At the same time, the two systems use these observations in different ways. Inuit knowledge is answers questions of harvesting, consumption, and stewardship, while Western science is directed toward population health to ensure harvest sustainability and to support Inuit food sovereignty. These differences are complementary rather than conflicting. Inuit knowledge contributes detailed, sensory, and place-based assessments within harvesting contexts, while Western science contributes broader population-level,

longer-term, and laboratory-based forms of evidence. The thesis shows that Inuit-led goose health monitoring in Arviat is strengthened not by merging knowledge systems, but by recognizing where they intersect, where they differ, and how each contributes to a more holistic understanding of goose health.

6.3 Policy implications for goose harvest

The findings of this thesis also have important policy implications for goose harvest in Arviat and Nunavut. These implications relate to the role of IQ in wildlife co-management, the importance of sustaining Inuit knowledge, and the potential to support future decisions about harvest sustainability.

In Nunavut, co-management is rooted in the Nunavut Agreement and implemented through territorial legislation and co-management structures that guide wildlife decision-making (Government of Canada, 2016). The Nunavut Agreement (1993) makes this especially clear by stating that the guiding principles and concepts of IQ apply under the Act and must inform its interpretation and administration (Government of Canada & Tungavik Federation of Nunavut, 1993). This thesis therefore contributes to the body of IQ available for goose management in Nunavut by documenting Inuit knowledge of goose health and the harvesting-based processes through which that knowledge is applied. In this way, the thesis is not only locally important, but also relevant to the broader policy context in which wildlife decisions are made.

A second policy implication of this thesis is that it contributes to strengthening knowledge transmission within the community. IQ is rooted in relationships to land,

animals, harvesting, and intergenerational learning, and it is sustained through practice, observation, and teaching. By documenting Inuit indicators of goose health and creating materials that can support learning for young hunters, this work helps reinforce those systems of knowledge transmission. This is policy-relevant at the local level because sustaining Inuit knowledge is essential to ensuring that the body of knowledge used to guide harvesting decisions remains strong over time (White, 2020). In this way, the thesis supports not only the documentation of IQ, but also its continuation and use in future community-based decision-making (Berkes, 2009; Berkes & Armitage, 2011; Natcher et al., 2005).

A third policy implication relates to harvest management at the territorial and federal levels. Arviarmiut have expressed interest in expanded goose harvest opportunities, and any future changes would require evidence that harvest levels are sustainable. In this context, CBM can play an important role by generating locally grounded evidence to inform broader regulatory and policy discussions (Government of Canada, 2014). This thesis helps provide a foundation for that approach by documenting Inuit indicators of goose health and showing how they can contribute to monitoring harvest sustainability. In this way, the work supports a future harvest framework that is informed not only by Western scientific evidence, but also by Inuit knowledge, priorities, and assessment practices.

6.4 Future directions

6.4.1 Applying indicators in community-based monitoring

An important future direction is the application of these indicators within CBM initiatives. Some of the shared assessments in this thesis, such as body condition indicators, are common in everyday harvesting practices. Future work could explore the documentation of Inuit body condition indicators through web-based monitoring programs such as SIKU (Segal et al., 2025). Exploring ways to document these observations during harvesting activities, may help generate information about goose health over time while remaining grounded in local knowledge and practices.

6.4.2 Expanding Indigenous monitoring across the Arctic goose flyway

Future work should encourage the CWS to strengthen partnerships with Arviat and other communities along the Arctic goose flyway in order to better include Inuit indicators of goose health in monitoring programs. While large-scale monitoring currently focuses mainly on population trends and ecological indicators, Inuit hunters observe many aspects of goose condition during harvesting and preparation that could complement these approaches. Tools such as SIKU and Goose Watch could help coordinate and share Inuit observations across communities, creating opportunities to document goose health at multiple points along the migratory route. This would support a more holistic monitoring approach that links flyway-scale movement with Inuit assessments of goose condition and harvest suitability.

6.4.3 Training and knowledge transmission for Ujjiqsuiniq Young Hunters

Future work may also explore how this research can contribute to youth training and knowledge-sharing initiatives already underway in Arviat. With funding from the Knowledge Sharing grant (2026), one component of the broader project involves developing educational materials for the Ujjiqsuiniq Young Hunters. The indicators documented in this thesis could contribute directly to those materials by helping structure how goose health is discussed across the harvesting process, including what to look for during hunting, retrieving, plucking, gutting, cooking, and eating. In this way, the work could support training that is grounded in Inuit knowledge and focused on practical assessment skills relevant to both harvesting and monitoring.

This research may also contribute to other community-based initiatives, including cookbook development and community kitchen programs. For example, the indicators related to fatness, meat quality, abnormalities, smell, and taste could help shape educational content that connects harvesting decisions with food preparation and consumption. Used in these settings, the findings could support intergenerational learning by creating materials that help youth and other community members discuss not only how to prepare geese, but also how to assess whether they are healthy and suitable to eat.

6.5 Final reflection

Understanding goose health requires attention to the knowledge and experiences of the people who harvest, prepare and consume geese. Inuit hunters in Arviat observe many aspects of goose condition throughout the harvesting process, drawing on

knowledge developed through generations of experience and connection with the land and wildlife. By documenting these observations and organizing them as indicators that can inform monitoring, this research contributes to a clearer understanding of how Inuit knowledge can support wildlife health assessment. The findings highlight the value of Inuit-led research and collaborative monitoring approaches that center community priorities and knowledge systems. Continued partnerships between Inuit knowledge holders, community organizations, government scientists, and academic researchers will be essential to strengthen migratory bird monitoring in respect for Inuit knowledge and rights. and supporting food sovereignty across Inuit Nunangat.

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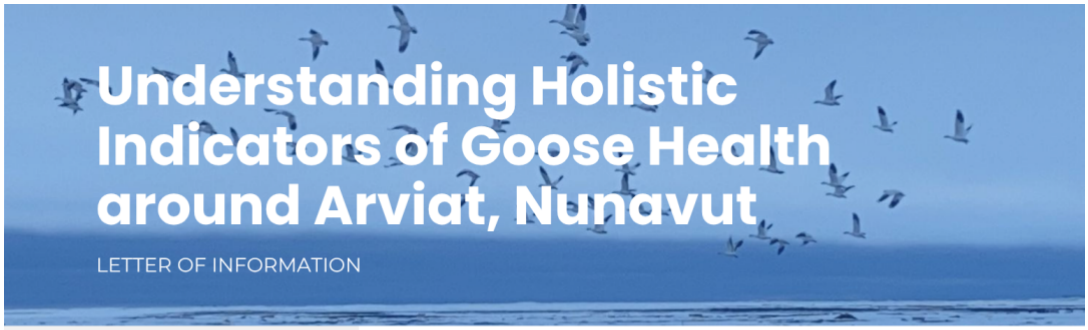
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Appendix 1: Letters of information for recruitment



Understanding Holistic Indicators of Goose Health around Arviat, Nunavut

LETTER OF INFORMATION

Project Overview

Through conversations with Elders, Aqqiumavvik Society has identified that it is important for young people to learn how to determine if geese are healthy. Identifying which geese are good to hunt helps young people gain skills, avoid wasting meat, feel more confident in their hunting and be encouraged to hunt more. The positive outcomes of this project will be more sustainable goose harvests and better nutritional outcomes for youth and the community more generally.

Project Goals

The goal of this project is to learn from Arviarmiut about the indicators used to identify if a goose is healthy.

Documenting Inuit ways of understanding goose health will help Aqqiumavvik to develop better training programs for young hunters, and to more effectively monitor goose populations over time.

How to Participate

Join a Focus Group discussion

- A focus group involves 3-5 people with similar interests and experiences getting together to talk about how they understand goose health.
- Focus group will be 2-3 hours long, and participants can share their experiences, observations, memories, stories, and lessons learned about goose health.
- For each focus group session, you participate in you will be compensated for your time through a **gift card to a local store with a value of $175.**

Host a Kitchen Table Talk

- Aqqiummavvik will invite some knowledgeable community members to host a kitchen table talk.
- If you are hosting this event, you are welcome to invite family members and friends to join in an evening of discussion about goose health around your kitchen table (or living room).
- This could involve 5 or more people (however many you want and are able to accommodate), with similar interests and experiences to get together to talk about how they understand goose health.
- The discussion could be 1-3 hours long, it is up to you and how it goes.
- Together we would plan discussion topics before the event.
- Aqqiumavvik Society staff, an interpreter, and I (Rowan Harris) will join that evening to help keep the discussion going and to record what is shared.
- The host family will be compensated through a gift card to a local store with a **value of $400.**

Participate in an Interview

- An interview is an opportunity for knowledgeable community members
- to share more details on their individual experiences with goose hunting, egg collecting, food preparation, and ways of understanding goose health.
- Interviews will be 1-2 hours long.
- You will be compensated for your time through a gift card to a local store with a **value of $175 for your participation.**

Coffee, tea and snacks will be provided at all project activities

For more information:

Kukik Baker, *Community Lead*
Aqqiumavvik Society
867 857 2037 // 4255

Risks to Participating

It is possible that feelings of anxiety and stress may come up for you while talking about the historic hunting ban on geese and its enforcement. You do not need to answer questions that you do not want to answer or that make you feel uncomfortable. If you do feel uncomfortable, even after the fact, and wish to speak with someone about it, **Joe Karetak (Aqqiumavvik Elder Counsellor – 867 857 2499)** is available to support you.

Benefits to Participating

We hope to learn more about **what young people need to know to determine if a goose is healthy** and what Arviarmiut look for to decide if a goose is healthy or not. By participating in this project, you will be contributing to community understanding of this topic. This information will be used by the community when making decisions about goose health monitoring and training. Project goals also aim to **benefit Arviarmiut by encouraging goose hunting, eating more geese and eggs, and improving food security in the community**. By participating in this project, you will also benefit through opportunities for shared learning with knowledgeable community members.

This study has been reviewed by the McMaster Research Ethics Board and received ethics clearance under project 6280. The number for the Nunavut Scientific Research license for this CIHR project is #03 022 24R-M. If you have concerns or questions about your rights as a participant or about the way the study is conducted, please contact:

FAQs

Who will know what I said or did in this project?

If you have already worked with Aqqiumavvik on other projects, you have already agreed to sharing your knowledge and being recorded. In that case you will not need to sign any new forms. If you have not worked with Aqqiumavvik before, Aqqiumavvik staff will go over their consent and media release forms with you. Aqqiumavvik can then make decisions about using recordings in various presentations, educational videos, social media, training programs, etc.
For this specific goose health project, you will have the option to be recorded or not, as well as how you would like to be identified in project results and acknowledgements.

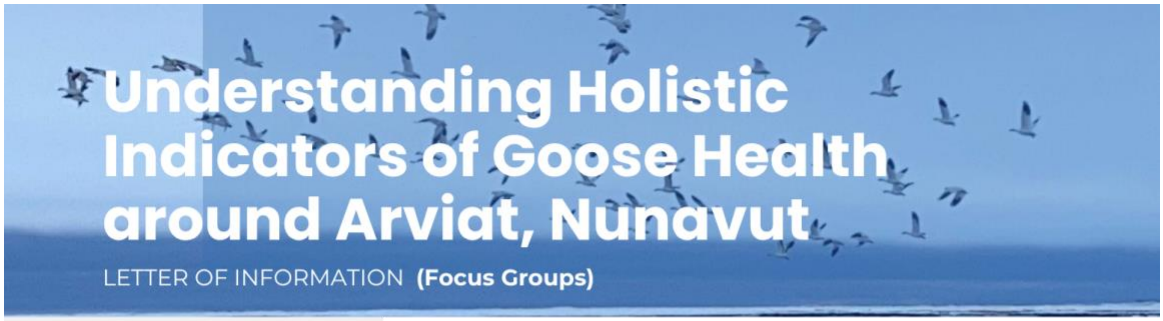
What if I change my mind about being in the project?

Your participation in this project is voluntary. If you decide to participate, you can stop the interview or leave the focus group/kitchen table talk at any time, for any reason. If you want to stop being part of a group discussion you can also stay and listen to group discussions, without participating.
If you wish to change any of your responses, or withdraw from this project, you have until 2 months from your most recent participation in a project activity (focus group, interview, kitchen table talk) to let me (or any project contacts) know. There are no consequences for withdrawal, and you keep any compensation you have already received.

How do I find out the results of this project?

We will be sharing the results of this project in a number of ways, such as: a summary report, website, publications, social media posts, infographics, community radio shows, open house presentations, among others. If you would like a copy of the summary report, you can request this in your consent responses.

For more information: **Kukik Baker**, *Community Lead* Aqqiumavvik Society 867 857 2037 // 4255



Understanding Holistic Indicators of Goose Health around Arviat, Nunavut

LETTER OF INFORMATION **(Focus Groups)**

Benefits to Participating

We hope to learn more about **what young people need to know to determine if a goose is healthy** and what Arviarmiut look for to decide if a goose is healthy or not. By participating in this project, you will be contributing to community understanding of this topic. This information will be used by the community when making decisions about goose health monitoring and training.

Project goals aim to **benefit Arviarmiut by encouraging goose hunting, eating more geese and eggs, and improving food security in the community**. By participating in this project, you will also gain opportunities for shared learning with knowledgeable community members.

Project Overview

Through conversations with Elders, Aqqiumavvik Society has identified that it is **important for young people to learn how to determine if geese are healthy and good to hunt.** This helps Inuit youth gain land skills, avoid wasting meat, feel more confident in their hunting, and be encouraged to hunt more. The positive outcomes of this project will be more sustainable goose harvests and better nutritional outcomes for youth and the community more generally.

Project Goals

The goal of this project is to learn from Arviarmiut about the indicators used to identify if a goose is healthy. Documenting Inuit ways of understanding goose health will help Aqqiumavvik to develop better training programs for young hunters, and to more effectively monitor goose populations over time.

How to Participate

Join a Focus Group discussion

- Involves 3-5 people with similar experiences getting together to talk about how they understand goose health.
- Will be 2-3 hours long, and participants can share their experiences, observations, memories, stories, and lessons learned about goose health.
- For each focus group session you participate in, you will be compensated for your time through a **gift card to a local store with a value of $175.**

Coffee, tea and snacks will be provided at all project activities

For more information:

Kukik Baker, *Arviat Project Lead*
Aqqiumavvik Society
867 857 2037 // 4255
arviatwellness@gmail.com

Rowan Harris, *Student Researcher*
McMaster University
613 315 5665
harrir44@mcmaster.ca

Risks to Participating

It is possible that feelings of anxiety and stress may come up for you while talking about the historic hunting ban on geese and its enforcement. You do not need to answer questions that you do not want to answer or that make you feel uncomfortable. If you do feel uncomfortable, even after the fact, and wish to speak with someone about it, **Joe Karetak (Aqqiumavvik Elder Counsellor – 867 857 2499)** is available to support you.



This study has been reviewed and approved by the McMaster Research Ethics Board (Project 6280). The Nunavut Scientific Research license number for this CIHR project is #03 022 24R-M. If you have concerns or questions about your rights as a participant or about the way the study is conducted, please contact:

McMaster Research Ethics Office
E-mail: mreb@mcmaster.ca
Telephone: (905) 525-9140 ext. 23142

Nunavut Research Institute
Telephone: (867) 979-7290
E-mail: mosha.cote@arcticcollege.ca

FAQs

Who will know what I said or did in this project?

If you have already worked with Aqqiumavvik on other projects, you have already agreed to sharing your knowledge and being recorded. In that case you will not need to sign any new forms. **If you have not worked with Aqqiumavvik before**, Aqqiumavvik staff will go over their consent and media release forms with you. Aqqiumavvik can then make decisions about using recordings in various presentations, educational videos, social media, training programs, etc. For this specific project, you will have the option to be recorded or not, as well as how you would like to be identified in project results and acknowledgements.

What if I change my mind?

Your participation in this project is voluntary. If you decide to participate, you can leave the focus group at any time, for any reason. If you want to stop being part of a group discussion you can also stay and listen to group discussions, without participating.

If you wish to change any of your responses, or withdraw from this project, you have until 2 months from your most recent participation in a focus group to let me (or any project contacts) know. There are no consequences for withdrawal, and you keep any compensation you have already received.

How do I find out the results of this project?

We will be sharing the results of this project in a number of ways, such as: a summary report, website, publications, social media posts, infographics, community radio shows, open house presentations, among others. If you would like a copy of the summary report, you can request this in your consent responses.

NSTP PFSN
Northern Scientific Training Program | Programme de formation scientifique dans le Nord

CIHR IRSC

McMaster University

Appendix 2. Focus group guide

Guiding Questions for discussing goose health indicators in FOCUS GROUPS

in Arviat in August 2024

Preamble:

Through conversations with Elders, Aqqiumavvik Society has identified that it is important for young people to learn how to determine if geese are healthy. Identifying which geese are good to hunt helps young people gain skills, avoid wasting meat, feel more confident in their hunting and be encouraged to hunt more. The positive outcomes will be more sustainable goose harvests and better nutritional outcomes for youth and the community more generally. Through this conversation we hope to learn about the indicators used to identify if a goose is healthy. Documenting Inuit ways of understanding goose health will help Aqqiumavvik to develop better training programs for young hunters, and to more effectively monitor goose populations over time.

[For participants who have <u>already signed</u> Aqqiumavvik consent forms]

I understand that you have already worked with Aqqiumavvik on other projects, so you have already agreed to sharing your knowledge and being recorded. Aqqiumavvik can then make decisions about using recordings in various presentations, educational videos, social media, training programs, etc. You do not need to sign a new form, but I do want to confirm a few things with you so you understand in relation to this specific project.

- What I learn through our conversations will be shared with Aqqiumavvik to help them expand their training and monitoring programs for Ujjiqsuiniq Young Hunters.
- What I learn through our conversations will also inform my Master's research as a student at McMaster University.
- This focus group will take 2-3 hours, and we can take a break or stop at any time.
- At the end of the focus group we will talk about different ways your knowledge can be shared, and how you want to be identified.
- You have previously agreed to being recorded (with audio/photos/video based on their earlier form completion) for Aqqiumavvik projects, are you ok if we record

for this goose project as well? (*proceed with recording, or not, according to response*)

[For new participants who have <u>not already signed</u> an Aqqiumavvik consent form]

Aqqiumavvik collaborator will explain the project goals (using project overview brochure) and Aqqiumavvik consent/release forms. Then, go through the bullets above in relation to this specific project.

[<u>At the start of recording</u>, say out loud what the participant confirmed in terms of prior or new consent, and comfort level with recording. Then ask the participant to state their name for the recording, before getting into questions.]

Introduction:

You have been invited to this focus group because you were recommended as having a lot of experience with goose hunting, egg/down collecting, and/or preparing and cooking goose meat, or use of other goose products. As mentioned at the start, we are mostly interested in learning about Inuit ways of identifying if geese are healthy or sick.

[If they have not already been part of Aqqiumavvik focus groups or surveys around goose hunting, it would be good to get a bit of personal context such as:]

- Can you share some of your experiences with hunting geese?
  - When did you start hunting geese/collecting eggs?
  - In what seasons?
  - How would you describe the importance of goose hunting for yourself/your family?
  - Do you still hunt geese/collect eggs?
  - What are the main ways you use geese or eggs (food or other products)?

General Questions to get discussion going:

As geese start arriving near Arviat in the spring, how do you decide which geese to hunt? (what do you look for to tell if the geese are healthy or not?)

- We want to learn what helps you to decide which geese are good to hunt…
  - When they are alive
  - After they are hunted (dead)

- When preparing and eating goose meat, eggs, and other products

Follow Up Prompts:

- Environmental conditions (goose habitat, seasonal weather, migration timing etc.)
- Normal/expected behaviour (posture, movement, group dynamics, aggression, fear of humans, etc. and differences that indicate sickness)
- Body condition (feathers, skin, fat, signs of infection, deformities, etc.)
- Sensory assessments: taste, sounds, smell, texture
- Differences in stage of development (nesting, laying eggs, goslings, links to age/gender)
- Best time to hunt geese? (Changes to body condition? Taste?)
- Differences by season (are they hunting geese in other seasons? If yes, continue through similar questions as spring and identify what is different/similar? If no, don't need to go through more questions)

General Questions to wrap up:

- As part of Ujjiqsuiniq, the Young Hunters are doing goose monitoring as they hunt each year. What do you think are the most important indicators to include in a community monitoring program?
- Is there anything else you want to share that we didn't talk about yet?

[At the end of recording, review consent options to record oral consent, and to complete the consent log.]

Thank you very much for taking the time to share your knowledge and experiences in this focus group. If you have any questions after the focus group, there is something more you want to share, or you want to change/remove some of the points you made, all our contact information is on the Project Overview flyer you received.

Recordings from today will be stored securely at the Aqqiumavvik Society Office, as well as with the McMaster research team. Aqqiumavvik Society will make decisions about any future uses of your responses and recordings outside this project. Contact them any time with questions or suggestions.

We would like to acknowledge your important contributions. Please confirm how or if you would like your name used.

- **YES** – Use my name in association with this focus group and any quotes from my contributions (please confirm spelling of your name):
  _____

- **NO** – Do not include my name in association with this focus group, use a general identifier (e.g. Hunter, Elder, Member of HTA, etc.)

Would you like to receive updates on our project and a summary report of the final results?

- **YES** (Confirm contact preference, all that apply)
- Email (provide address): _____
- Canada Post mail (provide address): _____
- Facebook (provide account name): _____
- **NO**

If you wish to change any of your responses, or withdraw from this project, <u>you have 2 months from the date you completed this focus group</u> to let me (or any project contacts) know.

Appendix 3. Interview guide

Interview Guide

The following will be used as a guide for semi-structured interviews when I conduct one-on-one with Arviat community members knowledgeable about migratory arctic nesting geese (with a main focus on light geese). This is a preliminary template that includes potential themes for the interviews. Specific topics and appropriate wording will be further refined with input from Aqqiumavvik Society research partners. The interviews will be recorded (with consent) and transcribed.

ORAL CONSENT

Introduction: The purpose of this interview is to learn from you about light geese. I am interested in understanding your experiences observing, hunting, and eating/using geese. I am especially interested to learn what you look for to determine if a goose is healthy. Your responses will be used to help inform community-based monitoring and goose harvesting to help manage a healthy goose population.

Data:

Disclaimer: This interview is voluntary and will take approximately 1-2 hours. You do not need to answer all questions, you can skip any question, and you can stop at any time.

Consent:

1. Would you like to continue with this interview?

☐ _Yes_ _

☐ _No_

3. Are you okay with being audio or video recorded? This will help to make sure I do not miss anything in my notes.

☐ _Yes this interview can be audio recorded.

☐ _Yes this interview can be audio and video recorded.

☐ _No this interview cannot be recorded, only notes.

1. Do you want your name to be used, so that information shared is credited to you?

☐ _Yes_ _

☐ _No_

1. Do you have any questions before we start?

Introduction

- Can you please tell me your full name for the recording?
- Can you share with me your earliest memory of snow geese (kangut) or Ross' Geese (kangunnaaq)? I'll call these "light geese" throughout the interview, but please be specific if you are referring to only one of the species.
- What is your experience hunting geese? (what times of year, how often, do you eat them/share them?)

Topic 1: Spring Migration

- Do you know of any stories/legends about geese arriving to the area around Arviat?
- What are weather or land conditions that tell you that it will be a good year for geese before they arrive? Can you predict how many geese there will be? Can you tell if the geese will be tasty to eat?
-
- How do you predict that geese will be arriving soon?
- Does the timing of arrival indicate health in any way?
- What changes in the environment tell you that the geese are going to arrive soon? Are any of these changes associated with how healthy the geese are?
- What kind of behaviours do you expect see from the migrating geese (i.e. what you consider to be normal)_? Are they flying all together?
- Are they isolated?
- Do you look at how they are flying together?
- Have you ever noticed a change in how much energy the geese have when they arrive? What do you think this would tell us about how the geese are doing?
-
- Are the geese loud when they arrive? What do they sound like? What is normal? What would be considered not normal behaviour?
- What do geese sound like if they are sick? Do they still make noise?

Topic 2: Nesting/Brooding

- Can you share anything about nesting geese that you think is important to consider when we are thinking about a healthy goose?
- Does the location of the nests tell us about whether the geese are going to have many eggs? Are they building nests in the way that they always have?
- Are the areas that they usually choose to make nests suitable?
- What are things that you notice in the interactions between geese?
- Are they finding mates?
- Are they cooperatively parenting?
- Is there aggressive behaviour? Would that tell us anything different about how healthy the geese are?
- Is there enough food?
- Are they eating the same food?
- Is the food in the same place?

- Does the food that geese eat tell us anything about how healthy they are?

Topic 3: Eggs

- Do the number of eggs that are in the nest tell us anything about how healthy the geese are?
- Can you describe what a good goose egg looks like? Have you ever seen an egg that doesn't look like one you would want to eat?
- What do you consider to be normal nest spacing? Have you noticed anything different?
- Does this tell us about if the geese are healthy?
- Can you tell me about how long geese sit on their eggs? Does the length of time they spend change?
- Does it indicate anything about goose health if it is different?

Topic 4: Hunting

- Does the number of geese you get tell us anything about how healthy goose are?
- Does the length of time you are out hunting tell us anything about how the geese are doing?

Topic 5: Preparing/Eating

- Do you look at the condition of the goose's feathers to see how healthy it is? Are they shiny?
- Are they in good condition?
- Are they missing any feathers?
- Do all geese smell the same when cooking them?
- Can you tell me about plucking a goose that is healthy? Do the feathers come out easily?
- What do you notice about how much fat a healthy goose would have? (*having a diagram or other visual at this point will help).* What is the colour of the fat?
- Where is the fat?
- Does the fat ever smell different?
- What is it like to touch? Is it slippery? Is it smooth?
- How do you know if it will be tasty?
- Does the meat ever look different to you?
- Does the fat change how the goose tastes?
- Can you tell me about the tastiest goose that you've ever eaten?
- What parts of the goose are most important for knowing if the goose will be healthy?
- When you are preparing a goose, what would make you decide not to eat it?

Topic 6: Diseases

- Can you tell me about any sickness or disease that you have seen in geese? Have there been geese that look funny?
- Have they had lesions?

- Do any of the diseases get passed on to other animals or to other people?
- What are things that would make you concerned about the health of a goose? Is the goose acting weird?
- Is the goose isolated?
- If you thought a goose was sick, would you still eat it? Would you feed it to dogs?

Conclusion

- What would be the most important things to monitor about these geese (or their habitat) in a community-based monitoring program?
- Do you have anything that you would like to add to your previous answers? _ _
- Is there anything else that we haven't covered about goose health that you would like to share?
- Do you have any questions for me?

Appendix 4. Contributors to research activities during August 2024 and May 2025 trips

Trip	Research activity	Contributors
August 2024	Hunters Focus Group 1	Dudley Copland Aupaa Irkok Darryl Baker Jimmy Main Leo Kigusiutnak
	Men's Focus Group	Lyta Josephine Andy Anowtalik Peter Mamgark Raymond Aggark Jake Oruluk Timoty Kookeyuk Timothy Issumatarjuak Andrew Panigoniak Hunter Tattiunee Shelton Nipisar - interpreter
	Elders Focus Group	Lisa Gibbons Dorothy Aglukark Andrew Panigoniak Arden Nibgoarsi David Alagalak Mike Gibbons Janet Akat - interpreter Kukik Baker Elizabeth Irkok
	Interviews	Winona Gibbons Catherine Manik Ukulutuuq Nipisaq (Lawrence) Lucas Owlijoot Dorothy Aglukark Janet Akat
May 2025	Hunters Focus Group 2	Dudley Copland Darryl Baker Jimmy Napayok Joe Karetak Jr (Napayok)

		Donny Baker Alex Muckpah (Karoo) Ramon Kaviok
	Interviews	Catherine Manik Lisa Gibbons Janet Akat Arden Nibgoarsi Aupaa Irkok Dorothy Aglukark Shirley Tagalik
	On-the-land verification trips	Darryl Baker Alex Muckpah (Karoo) Ramon Kaviok Jimmy Muckpah

Note: Some contributors participated in more than one activity.

Appendix 5. McMaster research ethics board approval letter

McMaster University Research Ethics Board (MREB)
c/o Research Office for Administrative Development and Support
MREB Secretariat, GH-305
1280 Main St. W.
Hamilton, Ontario, L8W 4L8
email: ethicsoffice@mcmaster.ca
Phone: 905-525-9140 ext. 23142

CERTIFICATE OF ETHICS CLEARANCE TO INVOLVE HUMAN PARTICIPANTS IN RESEARCH

Today's Date: Jun/28/2024

Co-Investigator: Dr. Dominique Henri, NA Shirley Tagalik
Research Assistant/Coordinator: Dr. Natalie Carter
Supervisor: Dr. Gita Ljubicic
Student Investigator: Ms. Rowan Harris
Applicant: Dr. Gita Ljubicic
Project Title: Understanding Holistic Indicators of Goose Health around Arviat, Nunavut

MREB#: 6280

Dear Researcher(s)

The ethics application and supporting documents for MREB# 6280 entitled "Understanding Holistic Indicators of Goose Health around Arviat, Nunavut " have been reviewed and cleared by the MREB to ensure compliance with the Tri-Council Policy Statement and the McMaster Policies and Guidelines for Research Involving Human Participants.

The application protocol is cleared as revised without questions or requests for modification. The above namedstudy is to be conducted in accordance with the most recent approved versions of the application and supporting documents.

Ongoing clearance is contingent on completing the Annual Report in advance of the yearly anniversary of the original ethics clearance date: Jun/28/2025. If the Annual Report is not submitted, then ethics clearance will lapse on the expiry date and Research Finance will be notified that ethics clearance is no longer valid (TCPS, Art. 6.14).

An Amendment form must be submitted and cleared before any substantive alterations are made to the approved research protocol and documents (TCPS, Art. 6.16).

Researchers are required to report Adverse Events (i.e. an unanticipated negative consequence or result affecting participants) to the MREB secretariat and the MREB Chair as soon as possible, and no more than 3 days after the event occurs (TCPS, Art. 6.15). A privacy breach affecting participant information should also be reported to the MREB secretariat and the MREB Chair as soon as possible. The Reportable Events form is used to document adverse events, privacy breaches, protocol deviations and participant complaints.

Document Type	File Name	Date	Version
Community Engagement	Ljubicic-Tagalik_CIHR-Team_FINAL-SUBMISSION (002)	Jun/15/2024	1
Community Engagement	Hunters_Trappers	Jun/15/2024	1
Community Engagement	Aqqiumavvik Media Release Form	Jun/15/2024	1
Letters of Support	Community Counselling Document	Jun/15/2024	1
Consent Forms	Consent Log	Jun/15/2024	1
Community Engagement	Tagalik	Jun/22/2024	1
Recruiting Materials	Project Overview	Jun/22/2024	1
Test Instruments	Guiding Questions - Kitchen Table Talk	Jun/22/2024	1
Interviews	Guiding Questions - Interview	Jun/22/2024	2
Interviews	Guiding Questions - Focus Groups	Jun/22/2024	2
Response Documents	Response to MREB - Received April 29	Jun/22/2024	1
Consent Forms	Letter of Information_V3	Jun/27/2024	2

Dr. Brian Detlor



Dr. Tara La Rose, MREB Chair Dr. Brian Detlor, MREB Vice-Chair Dr. Niko Yiannakoulias, MREB Vice-Chair

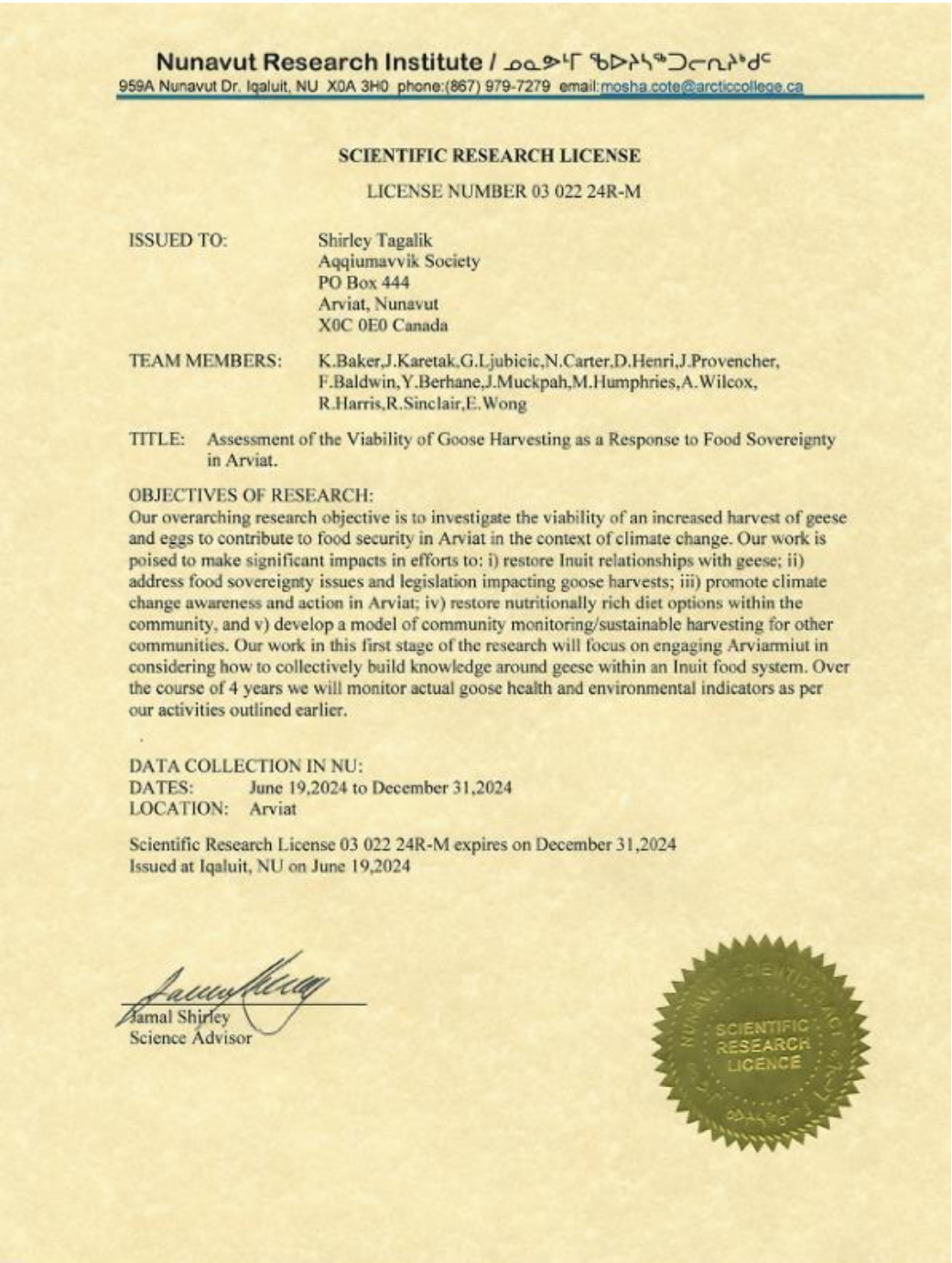
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Appendix 6. Nunavut Research Institute licence approval letter



Nunavut Research Institute / ᓄᓇᕗᑦ ᖃᐅᔨᓴᓂᖅᓯᓂᖅ
959A Nunavut Dr. Iqaluit, NU X0A 3H0 phone:(867) 979-7279 email:mosha.cote@arcticcollege.ca

SCIENTIFIC RESEARCH LICENSE

LICENSE NUMBER 03 022 24R-M

ISSUED TO: Shirley Tagalik
Aqqiumavvik Society
PO Box 444
Arviat, Nunavut
X0C 0E0 Canada

TEAM MEMBERS: K.Baker,J.Karetak,G.Ljubicic,N.Carter,D.Henri,J.Provencher, F.Baldwin,Y.Berhane,J.Muckpah,M.Humphries,A.Wilcox, R.Harris,R.Sinclair,E.Wong

TITLE: Assessment of the Viability of Goose Harvesting as a Response to Food Sovereignty in Arviat.

OBJECTIVES OF RESEARCH:
Our overarching research objective is to investigate the viability of an increased harvest of geese and eggs to contribute to food security in Arviat in the context of climate change. Our work is poised to make significant impacts in efforts to: i) restore Inuit relationships with geese; ii) address food sovereignty issues and legislation impacting goose harvests; iii) promote climate change awareness and action in Arviat; iv) restore nutritionally rich diet options within the community, and v) develop a model of community monitoring/sustainable harvesting for other communities. Our work in this first stage of the research will focus on engaging Arviarmiut in considering how to collectively build knowledge around geese within an Inuit food system. Over the course of 4 years we will monitor actual goose health and environmental indicators as per our activities outlined earlier.

DATA COLLECTION IN NU:
DATES: June 19,2024 to December 31,2024
LOCATION: Arviat

Scientific Research License 03 022 24R-M expires on December 31,2024
Issued at Iqaluit, NU on June 19,2024

Jamal Shirley
Science Advisor

SCIENTIFIC RESEARCH LICENCE

Appendix 7. Aqqiumavvik Society media release form

Aqqiumavvik Society
Arviat, Nunavut

Website and Media Release Form

I hereby consent to and authorize the use and reproduction by the Aqqiumavvik Society (Arviat Wellness Centre) of any and all photographs, video recordings or audio recordings taken of

_____
Name of Participant

for use on Aqqiumavvik and co-partners websites, in print and other media for the purposes of promotion, illustration, advertising, education, exhibition or publication, without compensation. All recorded media, prints and created media from the content shall constitute the property of the Aqqiumavvik Society and co-partners.

_____ _____
Participant Signature Date

_____
Mailing Address City, Prov/Terr, Postal Code

( )_____-_____
Phone Number

I hereby certify that I am the Parent or Legal Guardian of

_____,
and I do give my consent on his/her behalf.

_____ _____
Signature of Parent or Guardian Date