



**HAL**  
open science

**Addressing epistemic injustices in species at risk  
assessments through improved credibility and  
legitimacy: case study of narwhal management in  
Ittoqqortoormiit**

Tanguy Sandré, Jean-Paul Vanderlinden, Jeanne-Marie Gherardi, Zhiwei Zhu,  
Fern Wickson

► **To cite this version:**

Tanguy Sandré, Jean-Paul Vanderlinden, Jeanne-Marie Gherardi, Zhiwei Zhu, Fern Wickson. Addressing epistemic injustices in species at risk assessments through improved credibility and legitimacy: case study of narwhal management in Ittoqqortoormiit. NAMMCO Scientific Publications, 2024, 13, 10.7557/3.7371 . hal-04613729

**HAL Id: hal-04613729**

**<https://uvsq.hal.science/hal-04613729v1>**

Submitted on 17 Jun 2024

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# ADDRESSING EPISTEMIC INJUSTICES IN SPECIES AT RISK ASSESSMENTS THROUGH IMPROVED CREDIBILITY AND LEGITIMACY: CASE STUDY OF NARWHAL MANAGEMENT IN ITTOQQORTOORMIIT

Tanguy Sandré<sup>1,2</sup>, Jean-Paul Vanderlinden<sup>1,2</sup>, Jeanne-Marie Gherardi<sup>3</sup>, Fern Wickson<sup>4,2</sup>, & Zhiwei Zhu<sup>1</sup>

<sup>1</sup> CEARC, UVSQ, Université Paris Saclay, Guyancourt, France. Corresponding author: [tanguy.sandre@uvsq.fr](mailto:tanguy.sandre@uvsq.fr)

<sup>2</sup> SVT, University of Bergen, Bergen, Norway

<sup>3</sup> LSCE, UVSQ, Université Paris Saclay, Gif-sur-Yvette, France

<sup>4</sup> UiT, The Arctic University of Norway, Tromsø, Norway

## ABSTRACT

The regulation of seal and whale hunting in Kalaallit Nunaat (Greenland) belongs to the *Naalakkersuisut* (National Government), which is notably informed by the work of the Scientific Committee (SC) of the North Atlantic Marine Mammal Commission (NAMMCO). Since 2004, quotas were set in Kalaallit Nunaat to regulate hunting practices and promote ecologically sustainable harvesting. In South East Greenland, the SC's recommendations for the closure of the narwhal (*Monodon monoceros* or *qialuar*) hunt since 2019 has met both national disagreement and local resistance due to a desire to preserve the long-standing relation with narwhals organised around hunting, which is strongly intertwined within place-based communities' experiences. The situation requires further attention to deploy an informed dialogue in the light of both available literature and local narratives capturing knowledge and values which are underrepresented within scientific discussions, as are social sciences. Grounded in repetitive and long-standing research fieldwork in Ittoqqortoormiit, and extensive qualitative data collection from 2019 to 2023, the article shows that community members express strong attachment and concern towards narwhal hunting together with the social, economic and cultural importance of *mattak* (narwhal skin). Local narratives also suggest that the resistance against limitations on narwhal hunting is not to be understood only as a conservatism that aims to preserve traditional hunting practices or about sustaining economic incomes for hunters, but in a significant way as protest against epistemic injustices, resulting from a feeling of being systematically unheard, distrusted and uninvolved in decision-making processes. Together with the expression of concern and attachment for narwhal hunting, the tensions between scientific knowledge and local value and knowledge were reiterated while shared concern for the preservation of the species is affirmed. We show that legitimacy and credibility of the scientific evidence and species management are contested. Ultimately, we ascertain the situation of epistemic injustices and raise the need to shift towards decolonial practices to open the possibility for the emergence of a fair and respectful dialogue that would support narwhal preservation, through securing hunters' material living conditions, community food security, and ensuring consideration and respect is given to individual and collective immaterial dimensions associated with narwhal.

*Keywords: epistemic injustices, narwhals, quotas, hunting, narratives, species management, decoloniality*

## INTRODUCTION

Narwhals (*Monodon monoceros*) are medium-sized whales and one of the two living species of *Monodontidae*, along with the beluga whale (*Delphinapterus leucas*). Narwhals are mainly distributed in the North Atlantic Arctic, especially around Inuit Nunaat (Arctic Canada and Kalaallit Nunaat/Greenland) (Hamilton et al., 2022). They are also crucial hunting prey for many communities among Inuit Nunaat. Narwhals are especially important in the small towns of Kalaallit Nunaat where subsistence hunting is sustained. For instance, on the East Coast, in the Tasiilaq area and Ittoqqortoormiit, the long-standing relation with narwhals (or *qialuar* in Tunumisut, i.e., East Greenlandic) is organised around subsistence hunting. Subsistence hunting is also strongly intertwined within the lives of place-based communities. Cultural food, e.g., *mattak* (narwhals' skin), plays a pivotal role not only for meat supply but also as a fundamental source of community solidarity, shared identity and place attachment (Freeman, 1998; Nuttall, 2016; Sowa, 2015). Nevertheless, the sustainability of narwhal hunting on the south eastern management units of Kalaallit Nunaat is currently a subject of high controversy. Globally, narwhals are classified as "least concern" by the IUCN (Lowry et al., 2017) while the Greenland red list considers them "nearly threatened" in West Kalaallit Nunaat and "moderately endangered" in East Kalaallit Nunaat (Boertmann & Bay, 2018). Yet, in 2017, the NAMMCO-JCNB Joint Scientific Working Group (JWG) on Narwhal and Beluga (NAMMCO, 2017b) reported a severe decline in abundance of the subpopulation of narwhals in South East (SE) Greenland. The latter covers the subpopulation of narwhals living in the three management units: 1 - Ittoqqortoormiit/Scoresby Sund; 2 - Kangerlussuaq; 3 - Tasiilaq.

### **Controversy towards narwhal management in East Kalaallit Nunaat**

Following the distinction established between *piniartoaq* (professional hunters who derive at least 50% of their annual income from hunting/hunting-related activities) and *pinaluttartoaq* (leisure hunters), quotas were introduced in 2004 by the Home Rule Government to administer hunting catches in West Kalaallit Nunaat, while East Kalaallit Nunaat was explicitly excluded at that time (Exec. Order No. 2, 12, 2004). Despite local resistance and "without the required legal basis in a new executive order on protection and hunting of beluga and narwhal" (Nielsen & Meilby, 2013, p. 188), the Government imposed quotas in 2008 on the East Coast. The regulation in the East Coast entered into force with the Government Executive Order on the protection and hunting of belugas and narwhals (Exec. Order No. 7, 29, 2011). Accordingly, quotas are set with consideration given to international agreements, biological advice, user knowledge and consultation of fishing and hunting organisation as well as municipalities (Exec. Order No. 3, 27, 2017). Since then, the *Naalakkersuisut* (Kalaaleq/Greenlandic National Government) is in charge of the regulation of seal and whale hunts, which is notably informed by the work of the Scientific Committee (SC) of the North Atlantic Marine Mammal

Commission (NAMMCO) and the Canada–Greenland Joint Commission of the Conservation and Management of Narwhals and Belugas (JCNB).

In 2017, the SC suggested that the level of removals was unsustainable and recommended dropping the quota to 10 narwhals a year for Ittoqqortoormiit and Kangerlussuaq (NAMMCO, 2017a). Since 2019, the SC has been prescribing a "moratorium" on narwhal hunting in SE Greenland (Garde et al., 2022). In October 2021, NAMMCO's "Ad hoc Working Group on Narwhal in East Greenland" called unequivocally for an immediate reduction of quotas for narwhals in all three management areas in SE Greenland. It was argued that this was important "to avoid extinction of these stocks in the near future" (NAMMCO, 2021, p. 31). Although supported and reiterated by the SC, the recommendations were not endorsed by NAMMCO's Management Committee for Cetaceans (MCC), which is made up of appointed representatives from each of the member states (NAMMCO, 2023b). The recommendation of the SC for narwhals in SE Greenland has been "strongly reiterated" every year since and in 2023, "The SC underlined that an immediate reduction to zero catches is required and cannot wait for further economic/social assessment" (NAMMCO, 2023a, p. 52). Indeed, according to NAMMCO (2024), there is 90% risk that the stock will be nearly extirpated by 2030 (at 2024 quota-level), while a zero-catches policy will decrease this risk to 24%.

Despite this clear call from the SC for a reduction to zero quota in the narwhal hunt in SE Greenland, the MCC has continued to withhold its endorsement of the advice and quotas have continued to be given by the *Naalakkersuisut* (e.g., 17 landed narwhals allocated in 2024). One important argument put forward by the MCC and by the *Naalakkersuisut* for continuing to allocate quota despite the scientific advice has been linked to food security, framed in terms of fresh meat supply and self-sufficiency (NAMMCO, 2023b). The SC seemed to reject the latter argument in its latest report, stating:

Acknowledging caveats surrounding nutritional value and cultural/traditional preferences, the calculations of raw meat quantity available from different large mammals hunted in East Greenland show that narwhal meat is only a small fraction of total meat supply and could be replaced by other sources. (NAMMCO, 2024, p. 44)

### **The 2021 low catches' year as a revealer of the cultural importance of the narwhal**

In 2021, the narwhal quotas allocated in SE Greenland were 29 for the Ittoqqortoormiit unit, but only two narwhals were caught in this area, which was expressed as very unusual by community members.

Despite this low catch, hunters and community members in east Kalaallit Nunaat disagree that the level of narwhal hunting is

unsustainable and regularly express a clear dissatisfaction with narwhal abundance surveys. This stems from disagreement regarding the survey results themselves and strong concerns regarding the aerial methods employed for estimating cetacean abundance (i.e., international standard aerial method). The way in which abundance surveys are carried out over a period of a couple of days every few years is perceived as weaker than local and hunters' knowledge and long-term observations resulting from their daily interrelation with the place. Despite some consultation of hunters during scientific research, especially for their geographical knowledge or assistance given with tracking, catching or tagging, the involvement of hunter and local knowledge remains limited in the "official" knowledge production process, and particularly in the knowledge synthesis process that leads to policy advice.

In 2021, explanations for the year's unusually low catches that were not associated to (over) hunting, were suggested by local inhabitants. This included for instance, the potential impacts of seismic airguns, an increase in the presence of killer whales (*Orcinus orca*), climate change impacts, as well as underwater noises emanating from cruise ships (interviews conducted in 2023). Although research was carried out recently to explore the level and potential impact of such threats (see NAMMCO, 2023b), Hobbs et al. (2019) noted that "in the case of monodontids, management advice has historically focused on hunting, although it is increasingly recognised that these whales face multiple threats and that various threats in addition to hunting must be considered and addressed" (p. 48). Threats associated with hunting can therefore seem overrepresented in official assessments, supporting a feeling of unfairness by local communities and hunters towards the way management advice, and quota setting, is enacted.

### **Credibility and legitimacy at stake**

The intention of this article is neither to decipher the precise status of narwhal stocks in SE Greenland, nor to support or discredit official narwhal stock assessments. Rather, it deals with how hunters and local communities experience their relationships with narwhal and their involvement in decision-making processes that affect this relationship. We are also endorsing two concerns raised by NAMMCO's SC: "The SC was both concerned about the survival of the stock and about the credibility of NAMMCO as a responsible management organisation" (NAMMCO, 2023a, p. vi).

We mobilise ethnographic materials from long-standing qualitative research in Ittoqqortoormiit from 2019 to 2023. We put a focus on fieldwork associated with 2021's quasi absence of narwhals. We provide an account of values and meaning associated with narwhals' hunting in Ittoqqortoormiit. We acknowledge the underrepresentation of the cultural importance of narwhals in the current literature on narwhals. We also suggest that this cultural importance is silenced when the discussion frames marine mammals only as "an important part of the local economy" or "a fundamental part of their diet" (Ugarte et al., 2020, p. 5). We argue that the current controversy is enflamed by both a deficit in integrating knowledge from social sciences and recognising the legitimacy of local hunters and community members to engage with knowledge production processes leading to management advice, as well as the management of narwhal hunting. Local narratives also show that narwhal hunting is entangled with larger resistance to political marginalisation detrimental to local

knowledge and values. Such a situation requires further attention to support informed dialogues and new processes in the light of both available literature and place-based narratives.

In this paper, taking stock of discourses on decoloniality (see Mignolo & Walsh, 2018), we emphasise the production of Eurocentric knowledge in a way that tends to delegitimise, render invisible and subaltern all non-Western knowledge, such as the local knowledge of hunting communities. Although narwhal management belongs to the Naalakkersuisut, which does not currently follow scientific recommendations in the case of narwhal quota in SE Greenland, we show that coloniality is still present in the way scientific knowledge is built on the disregard for local knowledge and instrumental use of hunter knowledge. We therefore argue for a fair and informed dialogue in order to increase the credibility and legitimacy both of scientific and local knowledge.

We also assert, and ground empirically, that tensions arising from narwhal management can be understood as a reproduction of epistemic injustices (see Fricker, 2007). As such, the feeling of unfairness around narwhal management can be understood in terms of testimonial justice - is the credibility of community members acknowledged? - and hermeneutical justice - are resources fairly distributed in the processes of interpreting existing information?

### **Epistemic injustice, a short synthesis**

Epistemic injustice, i.e., "a distinctive class of wrongs, namely those in which someone is ingenuously downgraded and/or disadvantaged in respect of their status as an epistemic subject" (Fricker, 2017, p.53), was first delineated in 2007 by Miranda Fricker. In her foundational work, Fricker focused on situations where credibility deficits could be attributed to various categories of prejudices. Her analysis focused on dialectal situations involving an utterer and a prejudiced hearer. Fricker identifies two types of epistemic injustice.

First, testimonial injustice refers to "identity-prejudicial credibility deficit" (Fricker, 2007, p. 28). Testimonial injustice situations refer thus to situations where prejudice associated with one's identity leads to a discounted credibility of his or her knowledge.

Secondly, hermeneutic injustice refers to "the injustice of having some significant area of one's social experience obscured from collective understanding owing to a structural identity prejudice in the collective hermeneutical resource" (Fricker, 2007, p. 155). Hermeneutical injustice thus refers to situations where the interpretation of one's experience is rendered difficult/impossible as a consequence of prejudice.

Moving beyond dialectal situations, in order to embed the concept of epistemic injustice into political struggles, Doan (2018) underscores the importance of (a) acknowledging the agency of the victims of epistemic injustices, (b) conceptualising the injustice at hand relationally, and (c) "explaining epistemic injustice as rooted in the oppressive and dysfunctional epistemic norms undergirding actual communities and institutions, rather than focusing exclusively on the distorting influence of prejudice" (p. 20).

In terms of diagnosis of situations of epistemic injustices, Byskov (2021) proposes a set of five conditions. The first two conditions stem from Fricker's (2007) original work: disadvantage (i.e., existence of a credibility deficit) and

prejudice (i.e., the credibility deficit is a consequence of structural identity prejudice). Byskov (2021) adds three conditions. First, the stakeholder condition states that the party whose knowledge is discounted must have a stake in the decision that they (i.e., the stakeholder) is excluded from influencing. Secondly, the epistemic condition states that the stakeholders, in order to be epistemically wronged must possess relevant knowledge about the subject matter being discussed. Finally, the social justice condition states that the epistemic injustice is connected to larger structural injustice.

In science, and science-based decision making, epistemic injustice takes on a fundamental dimension as the hierarchisation of ways of knowing becomes visible. The dominant nature of western science as a powerful mode of knowledge production entails the marginalisation of other ways of knowing. In poorly led knowledge co-production processes, such dominance of western science leads to the loss of the epistemic agency of non-scientific knowledge holders (Grasswick, 2017). Situations where the knowledge of natural resources is disqualified when it comes to natural resource governance are exemplary of such manifestations of epistemic injustices (e.g., Baker & Constant, 2020).

## MATERIALS AND METHODS

### **Case Study: Ittoqqortoormiit, East Kalaallit Nunaat**

Ittoqqortoormiit is the northernmost community on the east coast of Kalaallit Nunaat (70°30' N 22° W), located at the mouth of the Kangerittivaq fjord (Scoresby Sound). Ittoqqortoormiit (formerly known as Scoresbysund and Illoqqortoormiut) was founded as a colony in 1924-1925 by Ejnar Mikkelsen and the Scoresbysund Committee. The purpose was twofold. On one hand, it was aimed at creating better hunting opportunities for the people in the Tasiilaq area (formerly Ammassalik), which was believed to have become overpopulated. On the other hand, the foundation was a piece in the escalating conflict between Denmark and Norway over sovereignty in Northeast Kalaallit Nunaat (Madsen, 2009; Mikkelsen, 1934; Rud, 2017). Seasonally covered by sea ice, the Kangerittivaq fjord is influenced by cold polar air from the north, oceanic air from the south and cold, dry air from the west. An area of permanent open water, a polynya, has long been identified at its mouth.

The community of Ittoqqortoormiit has long relied on subsistence hunting as its main source of income and it remains an important aspect of the local food supply (e.g., muskox, narwhals, seals, polar bears) but is also, and very importantly, deeply anchored in local identity. In 2023, among the 352 inhabitants of the town (Statistics Greenland, 2023), 11 were professional hunters. In recent years, the Ittoqqortoormiit, the inhabitants of Ittoqqortoormiit, have been faced with multidimensional transformations. Since the 2009 Self-Government Act, Ittoqqortoormiit municipality was incorporated into the much larger Kommuneqarfik Sermersooq, i.e., a large municipality which is made up of five former smaller municipalities (including Ittoqqortoormiit) and is now governed from the capital city of Nuuk, on the West coast. Since then, the town is experiencing a significant population decline driven by the mobility of educated community members to Nuuk - from 509 inhabitants in 2008 to 352 in 2023. Notably this has led to an increased feeling of institutional marginalisation and a decline of local services. Together with the aforementioned

challenges, the community is also dealing with larger ecological restrictions, i.e., quota for hunting, restrictions on the exportation of hunting products (Sandré et al., 2023), rapid and non-linear sea ice changes (Sandré et al., 2024) and changing periodicity of extreme weather events (Wardekker et al., 2022). The town is also characterised by its remoteness as the nearest kalaaleq town is Tasiilaq (800 kilometres south). Access to the community is highly weather-dependent. Ittoqqortoormiit is only connected by air to Iceland and only two cargo ships deliver food supplies in July-August and September.

## **Methodology**

### **Approach to data collection**

In Ittoqqortoormiit, a preliminary one-week of fieldwork and seven longer periods of fieldwork of three to nine weeks were implemented by co-authors. Building strong trust was crucial for our research team to develop both an interview-based method and critical ethnographic work (Madison, 2020). Formal interviews, participant observations and informal discussions were sustained remotely and locally from 2019. The core data mobilised are qualitative materials (n=31) collected locally in 2019 (n=3), 2021 (n=12), 2022 (n=13) and 2023 (n=3) in Ittoqqortoormiit. From 2019 to 2023, 22 community members were interviewed (five were interviewed twice and one three times along the research process). The data consists of two distinct interview sets collected by co-authors. The principal set of 28 interviews (collected in 2019, 2021 and 2022) contains narratives of changes, where the issue of narwhals was present already in 2019 and the quasi-absence of narwhals in 2021 emerged as a salient concern in 2021 and 2022. In 2023, a second set of interviews was collected, three in-depth interviews (including a duo interview) were conducted with an explicit focus on narwhals and on the experience of 2021 to grasp material and immaterial dimensions associated with narwhal hunting. This also led to the production of a short documentary (see Sandré et al., 2023). We applied an extended case method (Burawoy, 1998; Small, 2009) where research participants were recruited through snowball sampling. The sample is representative of the diversity of experiences within the community. Interviews were conducted in English, Danish or Tunumisut (with an interpreter). According to ethical standards, especially in the context of working with small groups, the interviewees are anonymised and pseudonymised. The corpus is further summarised in Table 1.

Unlike previous research on narwhal quota and hunting (e.g., Keenan et al., 2018; Tejsner, 2014), the corpus is widely extended beyond full-time hunters (i.e., 2 of 22 interviewees are professional hunters, 1 of 22 is a hunter's wife). Therefore, interviews were also conducted with teachers, local politicians, tourist officers, office workers, students, retired people, etc. whose common features were to live in the community for no less than five years. Notably, the wide coverage of the inquiry provides unique materials to understand the role of narwhals and narwhal hunting within the community life in the intertwining of social, economic and cultural dimensions aiming at understanding a "particular social situation in relation to the broader social forces shaping it" (Small, 2009, p. 19). To do so, we develop a narrative-based approach in order to decipher how people make sense of their experiences as "people express, develop, and model their identity, and even their future actions, through narration" (Moezzi et al., 2017, p. 6). Narratives also elicit knowledge, beliefs and experiences that

Table 1. Interviewees' list. \* Names are pseudonymised, occupations are categorised and ages are scaled in order to reinforce interviewee anonymity.

Code	Name*	Year	Occupation*	Age*	Gender
ITT2019-JPV101; ITT2021-TS106	Hans	2019, 2021	Ex-local politician	60-65	Male
ITT2019-JPV102; ITT2022-JG202	Peter	2019, 2021	Employed (education)	40-45	Male
ITT2019-JPV103; ITT2021-JG102; ITT2023-TSJGZZ403	Alan	2019, 2021, 2023	Piniartoq	50-55	Male
ITT2021-JG101; ITT2022-TS201	Aaju	2021, 2022	Employed (administration)	40-45	Man
ITT2021-JG103; ITT2023-TSJGZZ401	Inuk	2021, 2023	Piniartoq	40-45	Man
ITT2021-TS101	Ivalu	2021	Employed (public services)	40-45	Man
ITT2021-TS102	Regina	2021	Employed (tourism)	20-25	Female
ITT2021-TS103	Nuka	2021	Employed (public services)	25-30	Male
ITT2021-TS104	Ane	2021	Student, unemployed	20-25	Female
ITT2021-TS105	Ivaana	2021	Employed (public services)	45-50	Female
ITT2021-TS107; ITT2023-TSJGZZ402	Paninnguaq	2021, 2023	Self-employed (tourism)	40-45	Female
ITT2021-TS108	Pipaluk	2021	Employed (business)	35-40	Female
ITT2021-TS109	Nuuni	2021	Employed (public services)	30-35	Male
ITT2022-TS202	Paalu	2022	Self-employed, local politician	25-30	Male
ITT2022-TS203	Aka	2022	Employed (education)	30-35	Female
ITT2022-TS204	Mika	2022	Employed (artisan)	35-40	Male
ITT2022-TS205	Kristen	2022	Employed (education)	25-30	Female
ITT2022-TS206	Pele	2022	Employed (public services)	20-25	Male
ITT2022-TS207	Ivalu	2022	Employed (education)	45-50	Male
ITT2022-TS208	Lise	2022	Local politician	35-40	Female
ITT2022-TS209	Henrik	2022	Retired	65-70	Male
ITT2022-JG201	Aviaq	2022	Employed (public services)	40-45	Female
ITT2022-JG203	Vivi	2022	Part-time employed	40-45	Female
ITT2022-JG206	Lars	2022	Employed (services)	20-25	Male
ITT2023-TSJGZZ403	Ulunnguaq	2023	Piniartoq's wife	50-55	Female

are mobilised by community members and local communities to make sense of changes (Vanderlinden et al., 2020). In addition, narratives are critical in situations of epistemic or environmental injustice as they support people's own ability to speak (Ottinger, 2017) and contribute to the recentring of knowledge from the margins (Dutta et al., 2022) and the process of empowerment (Datta, 2018).

#### Data Analysis

Following a grounded theory approach (see Charmaz, 2014), open-ended interviews were analysed and coded in the lights of salient categories emerging from the corpus and from participant observation. We isolated excerpts that directly connected with (narwhal) hunting and associated practices and meaning (e.g., cultural food, mattak) as well as excerpts

referring to tensions towards quotas or with scientists. Twenty-four out of 31 interviews contained one or more associated excerpts. The 31 core interviews were, secondly, analysed and coded against categories (e.g., the more recurrent: institutional marginalisation, community solidarity, place attachment, remoteness) that provides broader understanding of the social situation that we try to decipher.

#### Local Saliency

The present research was designed accordingly to salient research concern (see Cash et al., 2003) as expressed by the local community from 2019 to 2023. Unfocused on narwhal hunting at first, our research practices were, however, attentive to emergence and concerned with epistemological sovereignty (see Kovach, 2017). Soon in the context of the research, in 2019,

the tensions towards the way hunting practices are regulated were visible. For instance, quotas were depicted as a threat and as a control driven from outside and on which local actors expressed limited agency, capacity to act on and to shape their world. Hunters and community members often disagreed that the current levels of narwhal hunting were unsustainable and some were questioning the relevance of narwhal abundance surveys and scientific information was often criticised for the methods in use (e.g., not spotting the right place) as well as deafness to hunters' knowledge and long-term observations. In our view, this is constitutive of saliency for community members while the focus of this research also meets, as underlined before, the high concerns expressed by scientists through management recommendations.

## RESULTS

### On unusuality and how it elicits centrality of narwhals

The 2021 narwhal crisis - when historically low narwhal catches were recorded - is revealing of the importance occupied by narwhal hunting, and more broadly cultural food, in Ittoqqortoormiit. In 2021, only two narwhals were caught in Ittoqqortoormiit, while a quota of 29 was allocated for the Ittoqqortoormiit management unit. This quasi-absence of narwhals was expressed as very unusual by the community members in 2021. This is consistent with available catch data that shows that the last occurrence of a lower catch level is 1979 (n=1) (Dietz et al., 1994). For instance, 36 narwhals were hunted in 2020 and 45 in 2022. Late 2021, community members expressed it as such:

[Referring precisely to 2021] It is different from before ( ... ) no narwhals. Usually we see narwhals every year, but not this summer. (Alan, piniartoq, September 2021)

[Referring precisely to 2021] It will always change. Except for narwhals, it's the first time. It's the first season ever that we have tried in many years, and we don't catch anything at all. I think they have caught one narwhal total. And then it was yesterday. And that's it, nothing else. So, it's the first time that I've seen that in my lifetime that we don't have any narwhal catch, and that probably has to do with climate change or hunting patterns. (Nuka, full-time employed, October 2021)

[Referring precisely to 2021] During 4–5 days, we tried to sail in a place we know there are some narwhals, and then we went back home, and then we went to another place, we tried and we waited for some time. And no narwhal. So, we tried this back-and-forth, back-and-forth in many places. Some people said that narwhals would be back. (Inuk, piniartoq, June 2023)

The year's low catch and its unusual nature were supported by coping strategies implemented by hunters as well as by other community members. Strategies were initially set by the local hunters, who hold precise knowledge on narwhals' habitat, migration and hunting areas. Afterwards, some community members adopted strategies to face the absence of narwhal meat, such as ordering mattak from the West Coast (Upernavik, Qaanaaq) or Tasiilaq area, through extended networks, e.g., asking relatives and family or sending out a call on social media

(e.g., Facebook). This extended network is usually mobilised to send cultural food to relatives that live elsewhere (e.g., Nuuk or Denmark). The latter adaptation to the quasi-absence of narwhals also relates to the expression often employed between 2021 and 2022 by community members: "a big thing missing". Their narratives towards those strategies tend to suggest that narwhal meat is considered less as a food resource than as a strong marker of place attachment and identity that was, in 2021, challenged by adversity:

[Referring precisely to 2021] It was difficult for us not to have mattak that year but we manage to live with others, like polar bears, seals, muskoxen. But we grow up with mattak, we are used to eating mattak. So, it was a big thing missing. (Ulunnguaq, piniartoq's wife, June 2023)

[Referring precisely to 2021] It's been very difficult for many locals because you cannot get any mattak. So, for the next year, before the supply ship comes, we bought some mattak from Qaanaaq, shipping to Nuuk, shipping to here with the supply ship ( ... ) It was important to have mattak because this is what we are grown up. And this is what is important for us as a family and traditionally. (Paninnguaq, self-employed, June 2023)

The year 2021 there was no narwhal, all of us got anything from our freezer, and we have to eat minke whale, some of us they have to buy from West Kalaallit Nunaat because they wanted to have meat and mattak. And others, they just wait until there are narwhals again here. (Inuk, piniartoq, June 2023, referring precisely to 2021)

### On identity and how it shapes solidarity, self-identification and resistance

The shared understanding of the unusual nature of 2021 led community members to express their attachment to narwhals (hunting) and to position cultural food as a pivotal marker of individual and collective identity formed over time. It involves relations of solidarity and sharing, expression of belonging together with resistance to outside threats:

We just divide in five, the first one is the one who catches it, he gets the head and the back. The first one that touches it, get this side [the right part of the narwhal's ventral surface]. And the third will take the other part, the tail. The fourth will get the fins. The last one gets the ribs. (Alan, piniartoq, June 2023)

Narwhal is important for us as a family because we use it for Christmas, holidays, big events, we always have it on the table. You make it just as it is, you can eat with dry narwhal meat, you can make it with sushi, you can make a salad out of it. So, it's different how you use it. It's expanded with the skin of the narwhal, so it's quite important, especially with the vitamins. (Paninnguaq, self-employed, June 2023)

If I shoot some animal and the other hunter shot some, we are happy inside here, because I got it, other people can have it, we are happy that day because it is here ( ... ) It is very important to all of us in town, we eat it all of us, since we were children, it's with our culture. Since it came, we like it all of us, and it is going to be part of us all the time, and we can't remove it from us. (Inuk, piniartoq, June 2023)

In 2022, near Qinngaajiva/Walrus Bay, we witnessed the collective effervescence associated with an important narwhal hunt. When we were advised of the hunt by locals and we arrived at the site, almost all the hunters were gathered together with several dozen locals; people began to pull a rope in rhythm to bring the cetaceans onto the land. The children were dazzled by the scene, the spectators, some of them very moved and definitely happy, were already eager to fill their freezers for the winter. The atmosphere of the community changed and became adorned with a collective joy. The animals were butchered, shared among the people helping and we were offered to take a piece of mattak. The centrality of cultural food appeared even more clearly as the cement of the community. As narwhal hunting is deeply entangled in the community identity, community members also deeply share their concern for hunters' ability to subsist, as narwhal (skin, meat and tusks) provides one of the main economic incomes for professional hunters. The economic importance of narwhals has been highlighted in several arctic hunting communities (e.g., Dahl, 2000; Hoover et al., 2013). In Ittoqqortoormiit, the 2021's quasi-absence of narwhals was also narrated through economic difficulties encountered by professional hunters:

[Referring precisely to 2021] This year we didn't have any narwhals. Which is the primary. Primary animals, the hunters hunt to get income. You know, they sell the meat and the skin to have their income. We didn't have any this year. (Nuka, full-time employed, October 2021)

As a hunter, the main income is to sell seals' skin in the winter. During the summer it's not possible to sell the skin because it will not be beautiful, beautifully dried as winter. So, it's possible to sell them during the summer. So, our main income would be from narwhals, selling the meat and skin during the summer. It's important for us. (Alan, piniartog, June 2023)

The economic importance is also consistent with the repeated feeling that East Kalaallit Nunaat is more closed than the rest of the country, especially in relation to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Narwhals are listed in Appendix II of CITES, which means that while they are not threatened with extinction (Appendix I includes species with the highest level of protection), they do require some protection, including international trade regulations. In Ittoqqortoormiit, narwhal domestic trade and exchange with relatives located outside of the community is uniquely allowed through supply ships. There are only the two supply ships reaching the town in July-August and September.

However, the importance of the economic income associated with narwhal hunting is inextricably tied up with local identity. Being a hunter, a hunters' relative, or an ex-hunter is also pivotal in people's self-identification:

Here people help each other. It's easy for families that have hunters. It depends, it's easy for me, because I have a hunter family, it's easy to hunt some food for them to eat. (Pele, employed, June 2022)

Even though I didn't catch any narwhal, but I will then get mattak meat from other hunters' family. (Alan, piniartog, June 2023)

It's important to share the mattak with our kids because it's important to know what we are hunting and what we get. And they know it because they are growing up with it. Even they say, biologists, it's a lot of pollution. So, we still eat it because it's traditional. (Paninnguaq, self-employed, June 2023)

Community's self-description as a hunting community has recently been challenged by the drastic decrease in piniartog (i.e., professional hunters). Since 2001, when a record high number of hunters were registered (153 hunters, including 32 piniartog), there has been a decline in the number of hunters in the area. The number of piniartog (i.e., leisure hunters) licenses increased from 74 in 1996 to 121 in 2001, and then decreased to 59 in 2022. The total number of hunters in Ittoqqortoormiit in 2022 was 70, including 11 piniartog. The latter was almost divided by two in the last 10 years (Statistics Greenland, 2023). In the context of declining population numbers, it represents a slightly faster decline of piniartog than the population (Figure 1). Together with the important decrease of dogs, this has huge impacts on the way of living and creates a form of cultural anxiety towards the capacity to sustain their self-identification as a "hunting community":

There are fewer and fewer hunters, there were many, many hunters back then and now it's not so many. Because it's difficult now for hunting seals and polar bears. And it's because it's limited with the quota. Back then there were not limited, now for narwhals year to year it's less and less, every year. Same in polar bears, narwhals, muskoxen. (Aka, employed, June 2022).

The big change is the hunting quota. Before the quota came to here, everybody has dogs. But, when the government started implementing quotas, fewer people had dogs (. ... ) When I was young, I experienced all that to go hunting, because there's no quota. But now, we have the quota imposed from the West Coast [government] (. ... ) If the quota didn't exist, there would be dogs. (Peter, employed, May 2022)

But that's why basically it made sense to live here. Because there is something you can live off. But even 16 years ago it was still really a hunting community. There were more than 500 dogs. You would have seen hunters going out every day, all day in Summer. Of course, there were also all those institutions, like the school and the hospital, and lots of people. But I think the biggest change is that it got more and more difficult to live off the hunting, in part because of all the regulations about the quota and also, you cannot really export many things to other countries like the polar bear skin. So, to make a living of the resources that we have here has got more and more difficult throughout the years (. ... ) It has got more difficult to live off the land here. That's that, and that's what made it sense to have this community. (Vivi, part-time employed, May 2022)

Additionally, local foods (*kalaalimernit*), especially mattak is voiced in daily interaction as an affirmation of way-of-being and a tangible expression of the radical meaning of what it means to live in Ittoqqortoormiit. As part of our ethnographic work, we experienced many times being invited for meals, and being



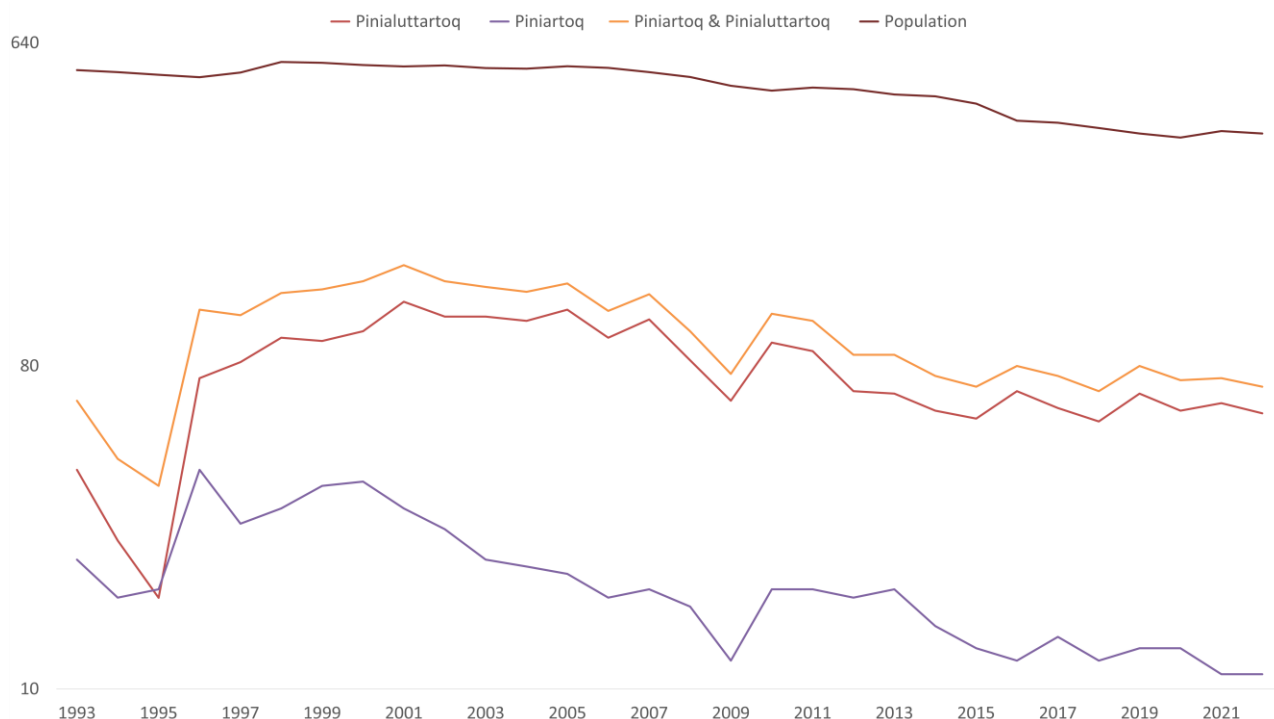


Figure 1. Comparative evolution (logarithmic scale) of *piniartooq* (professional hunters), *piniartooq & piniartooq* (leisure hunters) and population in Ittoqqortoormiit (district), 1993-2022 (Statistics Greenland, 2023).

offered mattak. Usually, people were attentive to our reactions and willing to decipher our impressions. People were generally surprised that we took part with willingness, often mentioning that outsiders or Danes are usually reluctant. Following Sowa (2015), we see the centrality of cultural food as an expression of resistance in the face of globalisation, as the following quote illustrates:

Hunting here is very important for locals here, because we have to maintain our tradition of food. And it's very difficult sometimes to explain the foreigners because we are basically growing up with that tradition, and it's difficult only to live by chicken and fish from the store. It's important for us to maintain our culture, you don't have to be adapted to the modern world, you need to have your own culture here. You need to survive on your own as a family, you need to supply yourself that the word supply. You really need to supply your family with kalaallit [Greenlandic, plural] delicacies in the freezer (. ...) It's important for us to have this circle, to make sure you have everything all year around. (Paninnguaq, self-employed, November 2021)

The local identity associated with the narwhal hunt is therefore found in the intertwining of economic and cultural values that are constantly reiterated through narratives and practices. They are expressions of a desirable state that allows for solidarity, self-identification as a hunting community, and resistance to maintain the role of self-sufficiency. Both economic and cultural values are also associated with the expression of threat. In 2021, for example, the former travel officer explained to us how his own role was as a gatekeeper to ensure that outsiders did not threaten the integrity of the community as a hunting community. There are also significant instances in our interviews where outsiders are associated with a potential

threat to the community. In this context, the discussion of narwhal conservation is potentially constitutive of a threat, especially when local actors express that they have limited agency while not being entitled as knowledge holders.

#### **On causalities in times of crisis**

Community members are also taking part in the discussion around narwhals' preservation and are suggesting multiple causalities. The latter are consistent with recent scientific literature which identifies together with unsustainable hunting, warming temperatures caused by climate change and disturbance from increased boat traffic as stressors and threats for narwhals (NAMMCO, 2021, 2022). Although narwhals are known to have a high degree of site fidelity and return to the same areas every summer (Heide-Jørgensen et al., 2015), they are being widely impacted by large-scale changes in their habitats and are rapidly following new migration strategies (Shuert et al., 2022).

Tensions around the scientific evidence supporting claims of unsustainable levels of hunting highlights discrepancies between scientific and local knowledge systems. While reduction to zero quota for narwhal hunting in the south east is prescribed from 2019 by the NAMMCO SC, threats associated with hunting are contested by Ittoqqortoormiit, who suggests diverse hypotheses as offering more accurate explanations for the 2021's low catches. Interviews conducted in 2023 underlined these. For instance (1) an increased presence of killer whales, (2) the impacts of cruise ships, or (3) the impacts of seismic airguns.

#### **(1) an increased presence of killer whales**

The increasing presence of killer whales underlined by local observations in Ittoqqortoormiit is also observed in different Arctic regions (Breed et al., 2017; Lefort et al., 2020; Remili et

al., 2022). Breed et al. (2017) shows that "given current reductions in sea ice and increases in Arctic killer whale sightings, killer whales have the potential to reshape Arctic marine mammal distributions and behaviour". They sustain that surveys on narwhal distributions, behaviour and abundance are increasingly affected by the presence and behaviour of predators (e.g., killer whales). In Arctic Canada, local communities are concerned with increasing predation pressure on narwhal since killer whales have been observed killing and consuming marine mammals, including narwhals (Ferguson et al., 2010, 2012; Laidre et al., 2006). In Kangertittivaq fjord systems, this is also consistent with local observations of increased presence of killer whales:

Well, I do fear that there might be some invasive killer whales. Killer whales are known to play on the prey (. . . ) And the hunters saw many killer whales last year. So, I fear that the narwhals would be decreasing in numbers. (Aaju, employed, June 2022)

We got a killer whale that was over here, we opened it up, and we saw minke whale and narwhal meat in the stomach. (Inuk, piniartoq, September 2021)

## (2) the impacts of cruise ships

Narwhals have lived in relative isolation from human activities (Williams et al., 2022) and are known to be very sensitive to noise disturbances, which has impacts on behaviour, physiological responses and impacts in terms of energetic costs (NAMMCO, 2022). For instance, the increase in the presence of cruise ships in Arctic regions, especially on East Kalaallit Nunaat, is identified as a major disturbance. According to the Report of the Joint Disturbance Workshop (NAMMCO, 2022, p. 32) "disturbance of narwhals causes displacement and significant energetic impacts which may lead to stress and reduced fecundity and survival. In addition, displaced animals may compete with resident animals in other areas." Impacts of cruise ships on population distribution is increasingly documented (NAMMCO, 2022; Tervo et al., 2021, 2023), and was suggested by community members in Ittoqqortoormiit:

[Referring to 2021] The cruise ship can also affect the narwhal, and can be a reason why the narwhals stayed away from the fjord. Because recently there were more and more ships into the fjord. (Alan, piniartoq, May 2022)

[Referring to 2021] It's because of the big cruise ships that are sailing back-and-forth in the fjord, also in the places where the narwhals get their food. Especially in Hjørnedal around the Immikkoordor Aappalaardor (Red Island). This place is very popular, because it's very beautiful. (Alan, piniartoq, June 2023)

In 2024, the SC acknowledged the potential impact on narwhals from ship traffic and recommended to establish "buffer zones around narwhal summer aggregations and establish traffic corridors to protect migration routes and winter foraging grounds" (NAMMCO, 2024, p. 75).

## (3) the impacts of seismic airguns

Seismic airguns are used in a range of marine activities, such as oil and gas explorations, geophysical research, environmental hazards, and risk analysis. They are also increasingly known to generate disturbances for marine mammals (Affatati & Camerlenghi, 2023). In Ittoqqortoormiit, the *Pinngortitaleriffik*

(Greenland Institute of Natural Resources, GINR) conducted research with small airguns (3.4 l) in 2017 and a larger one (17.0 l) in 2018. The aim was to understand narwhals' reactions to noise disturbances (NAMMCO, 2022): "Changes in behaviour were observed with very low noise levels, confirming previous findings regarding narwhal sensitivity to sound disturbance" (p. 5). As part of the explanation of the quasi absence of narwhals in 2021, local hunters pointed out the possible consequences of the research itself on the disturbance of narwhals:

In the Inner fjord, in Hjørnedal, two years ago, scientists did some seismic shots, that's not good for narwhals, after that, they are gone. That's the reason. (Alan, piniartoq, May 2022, referring to 2021)

I disagree that the sound of the bomb didn't have consequences to narwhals because [showing] in the land there was a river going to the ocean, and we avoid making sounds in the ocean, near the land, because the narwhals can hear it. [Showing] There are narwhals, there is land with a river. If we walk the river, on the land, the sound of the "splash" on the river can travel to the river, to the ocean, where it can be heard by narwhals. Only that sound can scare narwhals. (Alan, piniartoq, June 2023)

While such surveys scrutinise short-term impacts (e.g., Heide-Jørgensen et al., 2021; Williams et al., 2022), to our knowledge, there is no evidence supporting long-term impacts on individual or collective behaviour of narwhals from seismic surveys. However, Affatati & Camerlenghi (2023) pointed out the need to further "assess disturbance generated by sources used for seismic surveys, specifically those planned for academic research, through field observations that include long-term consequences, ecosystem-level implications, and indirect effects over diverse animal classes" (p. 18).

Reference to climate change was also recurrent amongst informants from the local community but was not directly mobilised to explain the low catches' season. Scientific literature does however indicate that marine mammals are being highly impacted by sea ice changes and oceanographic changes (Heide-Jørgensen et al., 2023), especially in the Greenland Sea (Ugarte et al., 2020) where a "shift northwards following their preferred temperature ranges and available sea ice habitat" (p. 1) is expected.

### On knowledge systems' discrepancies

Nweeia (2024, p. 190) notes several difficulties with narwhal population estimates: discontinuous surveys, use of a fixed reference point, ice conditions, killer whales dispersing narwhal groups, population mixing or philopatry (narwhals returning to the same area), or inaccuracy due to the limitations of aerial surveys. In Ittoqqortoormiit, scientific results are often criticised by community members for their methods. For instance, hunters often acknowledge that scientists are not flying their surveys over the right places or that the presence of polar bears has influenced in recent years the area of live-capture of narwhals, whose tracking data are used to obtain corrected abundance estimates (see Heide-Jørgensen & Lage, 2022; Tervo et al., 2021). Enhanced practices for consulting hunters in recent years since the controversy have potentially improved this situation, as underlined in NAMMCO (2023b): "Scientists from GINR and hunters more or less agreed on the area of interest" (pp. 24-25). Although, many hunters have

taken part in scientific research, and space for hearing hunters' knowledge has enhanced within NAMMCO due to the heightened controversy (e.g., their invitation to present at the meeting of the MCC in 2021 and the establishment of a new working group on enhancing user involvement in decision making in 2022), our results show a regular critique of the deafness to local knowledge of scientific investigation and processes of synthesising science to generate management advice. In this context, local observations are also mobilised to address extinction patterns supported by science-based knowledge:

The scientists are saying that the narwhals are in extinction but we are experiencing seeing a lot of narwhals. So, I disagree with the idea that narwhals are in extinction. (Alan, piniartoq, June 2023)

I don't expect that the narwhals will extinct because many have been seen throughout the years. Few years ago, we just looked at them because the quota was used and there were so many narwhals. The cruises have told us that they saw many narwhals in Nuna Eqqitsisimalilar (National Park). Therefore, I'm not worried that the narwhals will go extinct. (Paninguaq, self-employed, June 2023)

Last year, we saw a pack of hundred narwhals. This is a lot for a pack at once. That is the way we see it (. ... ) Many, many that we saw, year after year, so I think, in 10 years from now, we would still have enough narwhals. (Inuk, piniartoq, June 2023)

In a response to published comments from Nuttall et al. (2020) to Heide-Jørgensen et al. (2020), Heide-Jørgensen et al. (2021a) minimised the cultural embeddedness of narwhals and mattak, and disqualified the value of local involvement in knowledge production by affirming that "individual hunters may have a short-term interest in a high income" and, therefore, cannot contribute to an objective discussion. In this context, the resistance against the limitations on narwhal hunting is understood in a conservative way aiming at preserving traditional hunting practices or sustaining economic incomes for hunter, while our research reveals a more complex picture in which the resistance is also an expression of being systematically unheard, distrusted and uninformed for their expertise, as the following quote underlines:

They keep pushing down the quota even though we are so few, and we are one of the few towns in Kalaallit Nunaat where we really live on hunting. It should be publicised more that we're struggling with keeping this way of living. Because we are getting so limited to what we can do as hunter (. ... ) The biologists are here for maximum two to three months and then leave the rest of the year, while the hunter is living here permanently. It's the difference, because the hunters don't have any paper works to be a hunter at all, it's just a way of living (. ... ) And we're stuck in a situation where people will look at the one who has the paper rather than the one who lives here. It's paper versus experience. And they would rather look at the person who has the paper. (Lise, local politician, June 2022)

## DISCUSSION AND CONCLUSIONS

### Contested credibility and legitimacy: pragmatic and ethical stances

The contestation arising around narwhal management and management advice emerges both, as we have presented, from the underrepresentation of the cultural values associated with (narwhal) hunting and the local way of living, and an underrepresentation of local knowledge that challenges the sufficiency of scientific methods and articulates the possibility of multiple causalities, which also has available support within scientific literature. Overcoming the aforementioned tensions requires addressing, potentially together, two stances: 1) A pragmatic stance, where saliency, credibility and legitimacy are to be met to support a sustainable narwhal preservation; 2) An ethical stance, where narwhal preservation has to be achieved through processes fostering fairness, especially with respect for the expression of diverse values and knowledge.

On one hand, Cash et al. (2003) point out that tensions in the production of actionable knowledge arise from discrepancies towards "what constitutes reliable evidence, convincing argument, procedural fairness, and appropriate characterisation of uncertainty" (p. 8086). They identified three criteria that need to be met for the scientific production to be sustainable: *saliency* (the conduct of an assessment is relevant), *credibility* (the results are adequate) and *legitimacy* (the diverging values and beliefs were respectfully treated). The preservation of narwhals is shared as a salient concern both by the advisory scientists and by the local community, although there might be divergent views which are not equally displayed in processes of decision-making. That said, the credibility-legitimacy couple remains under high contestation in this case, and seems intertwined not only in the local contestation but also in the way local expertise is under-considered.

Secondly, this approach is undetachable to a practice of epistemic humility, which requires a "genuinely open and open-ended dialogue with colonised or subaltern subjects" (Allen, 2016, p. 210). In the context of narwhal management and management advice, this critical reflection on knowledge production is deficient, and points to the existence of epistemic injustices.

### Are we in presence of epistemic injustice?

The results of our research indicate that Ittoqqortoormiit residents, be they hunters or not, express that their knowledge and experience are not being adequately considered and taken into account. Although management decision-making on narwhal quota has gone against scientific advice and arguably done so due to (political) considerations of how a zero quota would affect local communities, it is clear that the existing processes to synthesise available knowledge and generate management advice have no clear avenues available for considering cultural values and there is very little evidence that local knowledge and experiences are given any significant weight. In order to ascertain whether we are therefore in presence of epistemic injustice, we assessed our results against Byskov (2021) five conditions: disadvantage (1), prejudice (2), stakeholder (3), epistemic (4) and social justice (5).

We argue that we are certainly in presence of a credibility deficit, as an indication of the disadvantage condition (1). Indeed, the governance structure of NAMMCO is split into a

knowledge centred structure, the SC, and management centred structure, the Management Committee (for narwhals, the MCC specifically). While national delegations in the MCC can and do include hunters (and thus their knowledge), the SC is composed solely of holders of scientific knowledge—and this is further limited to the natural sciences. The work of the SC is the MCC's primary information source when it comes to stock assessment. When knowledge is produced on narwhal stocks, the hunters' knowledge is not given the same weight or level of legitimacy as scientific information. While there have been instances of hunters providing assistance to scientists by locating and capturing narwhals, such an instrumental use of hunter's knowledge does not qualify as a way to correct the epistemic injustice at hand, and particularly not those present within the advisory body.

We further argue that the prejudice (2) and social justice (5) conditions are met through the history and persistence of coloniality, i.e., the delegitimisation, and rendering invisible and subaltern of ways of knowing (see Mignolo & Walsh, 2018), of Ittoqqortoormiit residents' current situation which was expressed by Ittoqqortoormiit in our corpus. This coloniality is found within Kalaallit Nunaat as east coast dwellers (through local framing such as us vs. them), and within Denmark as Kalaallit (see Petersen, 1995). As convincingly argued by decolonial scholars: colonisation serves as the back bone of the prejudice against the colonised, and prejudices against the colonised is consubstantial to the legitimisation of the colonial catastrophe (see Maldonado-Torres, 2007).

Our corpus indicates that stakeholder (3) and epistemic (4) conditions are met as well. Ittoqqortoormiit residents are knowledge holders when it comes to narwhals and they express this status with conviction. Furthermore, our corpus indicates that indeed all residents in Ittoqqortoormiit hold a significant and multifaceted stake in narwhal hunting. As said in the interviews, narwhal is about who and what they are as individuals and as a community.

#### **Overcoming epistemic injustice through decolonised management and a pressing shift for local community involvement**

Resistance to science-based recommendations for the regulation, and for instance closure of the narwhal hunt, is often framed as a conservative and material gesture to save important economic incomes (e.g., Heide-Jørgensen et al., 2020, 2021a). We argued, in this article, that this assumption is both failing to acknowledge the cultural value associated with hunting and food-sharing and blind to the unfairness of the scientific process which is highly dismissive of and detrimental to local knowledge and the value of hunting communities. For instance, the idea that narwhal meat would be substitutable (see NAMMCO, 2024) is sustained when the problem is framed simply as food supply or hunters' income.

In June 2023, a Working Group on enhancing user involvement in NAMMCO decision making (UIWG) was formally established with an aim to "best address the imbalance that seems to be between how purely scientific information and information derived from various stakeholders are used in assessment and management approaches for marine mammals in the NAMMCO context" (NAMMCO, 2023d, p. 1). A shift was suggested to replace the term "user" with "stakeholder": "A stakeholder is anyone involved with marine mammals and thus having an

interest in the management of the resources, be it scientists, hunters, fishermen, managers, business operators (tourism, sellers, buyers), organisations and institutions" (NAMMCO, 2023d, p. 1). In our opinion, this shift can potentially support the adoption of a situated-knowledge approach, that recognises the intertwined dimension of knowledge and value, which is a central step to foster knowledge legitimacy. However, this acknowledgement should not be limited to decision making but must also be extended to "official" knowledge production, e.g., NAMMCO's SC. Furthermore, one of the eight principles listed by NAMMCO's SC is that "management decisions should be based on the best available science, which may include hunter and user data and observations" (NAMMCO, 2023a, p. viii). We consider that in addition to the shift from "user" to "stakeholder", a "may" to "must" gesture is required and for epistemic justice, also a rewording from "best available science" to "best available knowledge".

Natural scientists engaged in management advice have acknowledged that narwhals in South East Greenland are experiencing increasing hunting but also non-hunting related pressures. Taking serious account of the multiple potential causalities in narwhal declines as expressed by local actors is needed, especially as these tend, as we illustrated in the results section, to be supported by available scientific literature, e.g., regarding impacts from climate change, shipping or increased underwater noises. We would also argue that the lack of engagement with social scientists in the generation of management advice means that it remains limited, inefficient and unembedded in the reality of cultural contexts. Furthermore, management advice in East Kalaallit Nunaat fails to apply high-quality decolonial research in the Arctic (Herrmann et al., 2023; Inuit Circumpolar Council, 2021) and tends to further disempower Arctic local communities through the scientific process (Sandré & Gherardi, in press). In other words, species preservation has to be pursued in ways that do not reproduce colonial processes (Chang, 2020). If we acknowledge the recent developments and progresses implemented since 2021 for research on narwhal abundance in East Kalaallit Nunaat where respectful dialogue and knowledge exchanges was pursued, albeit with divergent opinions on the results (NAMMCO, 2023c, 2024), the mobilisation of "user knowledge" is restricted to instrumental processes where "incorporation" of local knowledge is often used to reinforce the discursive legitimacy of natural science-based argument and approaches rather than to introduce a genuine shift in practices. According to ICC's Ethical Protocol (Inuit Circumpolar Council, 2022), "indigenous Knowledge must not be translated, integrated into, or validated by science" (p. 18) but recognised for its own value.

That said, this does not support a *status quo* but suggests, if urgent decisions are to be made as it is argued and supported by scientific evidence, that the terms of the dialogue have to be further shifted to embrace decolonised practices that are equally respectful of both knowledge systems, for instance scientific and indigenous knowledge systems (Singer et al., 2023), through the use of Inuit-derived epistemologies and values, while recognising "past colonial efforts to abolish Inuit culture, language, and wisdom" (Nweeia, 2024, p. 188). This would both strengthen the species at risk assessment process, support its legitimacy and credibility, restore epistemic justice and, therefore, allow for the design of improved management practices for narwhal preservation through securing hunters'

material living conditions, community food security and ensuring individual and collective immaterial dimensions associated with narwhal.

## ADHERENCE TO ANIMAL WELFARE PROTOCOLS

**T. Sandré:** Conceptualisation, Formal Analysis, Funding acquisition, Investigation, Methodology, Writing—original draft, Writing—review & editing. **J-P. Vanderlinden:** Conceptualisation, Funding acquisition, Investigation, Methodology, Supervision, Writing—review & editing. **J-M. Gherardi:** Funding acquisition, Investigation, Writing—review & editing. **F. Wickson:** Writing—review & editing. **Z. Zhu:** Investigation, Project administration.

## ACKNOWLEDGEMENTS

The authors want to acknowledge the engagement of Ittoqqortoormiit, inhabitants of Ittoqqortoormiit, in the design (crafting of the research question), the conduct (participation, translation) and the associated care of the research from 2019 to 2023. The authors were funded by the SeMPER—Arctic project (Belmont Forum—ANR, France) and PREFER project (ERC Advanced Grant, European Union). Special thanks to CEARC and SVT colleagues who provided valuable questions, comments and recommendations.

## NOTE

We have used South East (SE) Greenland when referring specifically to narwhal management and more specifically to the three management units: 1 - Ittoqqortoormiit/Scoresby Sund; 2 - Kangerlussuaq; 3 - Tasiilaq. We have used East Kalaallit Nunaat when referring to the Kalaallit/Greenlandic communities in the Ittoqqortoormiit and Tasiilaq area.

## DATA AVAILABILITY STATEMENT

Qualitative data collected and used by the authors are listed in the Table 1. The Data Availability Protocol includes issues pertaining to the protection of vulnerable individuals/communities, incidental findings, templates and associated GDPR issues, securitisation of data, anonymisation, risk to participant and risk of misuse of findings. Data may be accessible upon request to the main author (and after concertation with community members, e.g., interviewees). Corresponding author: Tanguy Sandré (he/him) – [tanguy.sandre@uvsq.fr](mailto:tanguy.sandre@uvsq.fr)

## REFERENCES

- Affatati, A., & Camerlenghi, A. (2023). Effects of marine seismic surveys on free-ranging fauna: A systematic literature review. *Frontiers in Marine Science*, 10. <https://doi.org/10.3389/fmars.2023.1222523>
- Allen, A. (2016). *The end of progress: Decolonizing the normative foundations of critical theory*. Columbia University Press.
- Baker, S., & Constant, N. L. (2020). Epistemic justice and the integration of local ecological knowledge for marine conservation: Lessons from the Seychelles. *Marine Policy*, 117, 103921. <https://doi.org/10.1016/j.marpol.2020.103921>
- Boertmann, D., & Bay, C. (2018). *Grønlands Røddliste 2018 – Fortegnelse over grønlandske dyr og planter trusselstatus* [Greenland's Red

- List 2018 - List of Greenlandic animals and plants' threat status]. Aarhus Universitet, Nationalt Center for Energi og Miljø (DCE) og Grønlands Naturinstitut.
- Breed, G. A., Matthews, C. J. D., Marcoux, M., Higdon, J. W., LeBlanc, B., Petersen, S. D., Orr, J., Reinhart, N. R., & Ferguson, S. H. (2017). Sustained disruption of narwhal habitat use and behavior in the presence of Arctic killer whales. *Proceedings of the National Academy of Sciences of the United States of America*, 114(10), 2628–2633. <https://doi.org/10.1073/pnas.1611707114>
- Burawoy, M. (1998). The Extended Case Method. *Sociological Theory*, 16(1), 4–33. <https://doi.org/10.1111/0735-2751.00040>
- Byskov, M. F. (2021). What Makes Epistemic Injustice an “Injustice”? *Journal of Social Philosophy*, 52(1), 114–131. <https://doi.org/10.1111/josp.12348>
- Cash, D. W., Clark, W. C., Alcock, F., Dickson, N. M., Eckley, N., Guston, D. H., Jäger, J., & Mitchell, R. B. (2003). Knowledge systems for sustainable development. *Proceedings of the National Academy of Sciences*, 100(14), 8086–8091. <https://doi.org/10.1073/pnas.1231332100>
- Chang, D. (2020). Tensions in contemporary Indigenous and animal advocacy struggles: The commercial seal hunt as a case study. In K. S. Montford & C. Taylor (Eds.), *Colonialism and animality: Anti-colonial perspectives in critical animal studies*. Routledge, Taylor and Francis Group.
- Charmaz, K. (2014). *Constructing grounded theory* (2nd ed). SAGE.
- Dahl, J. (2000). *Saqqaaq: An Inuit hunting community in the modern world*. University of Toronto Press.
- Datta, R. (2018). Traditional storytelling: An effective Indigenous research methodology and its implications for environmental research. *AlterNative: An International Journal of Indigenous Peoples*, 14(1), 35–44. <https://doi.org/10.1177/1177180117741351>
- Dietz, R., Heide-Jørgensen, M. P., Born, E. W., & Glahder, C. M. (1994). Occurrence of narwhals (*Monodon monoceros*) and white whales (*Delphinapterus leucas*) in East Greenland. *Notices on Greenland*, 39, 69–86.
- Doan, M. (2018). Resisting Structural Epistemic Injustice. *Feminist Philosophy Quarterly*, 4(4). <https://doi.org/10.5206/fpq/2018.4.6230>
- Dutta, U., Azad, A. K., & Hussain, S. M. (2022). Counterstorytelling as Epistemic Justice: Decolonial Community-based Praxis from the Global South. *American Journal of Community Psychology*, 69(1–2), 59–70. <https://doi.org/10.1002/ajcp.12545>
- Exec. Order No. 2, 12, Allaffissornikkut najoqqutassiat, Nalunaarutit [Administrative regulation, Home Rule Government of Greenland] (2004). [https://nalunaarutit.gl/Groenlandsk-lovgivning/2004/bkg-02-2004?sc\\_lang=kl-Gl](https://nalunaarutit.gl/Groenlandsk-lovgivning/2004/bkg-02-2004?sc_lang=kl-Gl)
- Exec. Order No. 7, 29, Allaffissornikkut najoqqutassiat, Nalunaarutit [Administrative regulation, Self-government of Greenland] (2011). [https://nalunaarutit.gl/Groenlandsk-lovgivning/2011/bkg-07-2011?sc\\_lang=kl-Gl](https://nalunaarutit.gl/Groenlandsk-lovgivning/2011/bkg-07-2011?sc_lang=kl-Gl)
- Exec. Order No. 3, 27, Allaffissornikkut najoqqutassiat, Nalunaarutit [Administrative regulation, Self-government of Greenland] (2017). [https://nalunaarutit.gl/Groenlandsk-lovgivning/2017/bkg-03-2017?sc\\_lang=kl-Gl](https://nalunaarutit.gl/Groenlandsk-lovgivning/2017/bkg-03-2017?sc_lang=kl-Gl)
- Ferguson, S. H., Higdon, J. W., & Chmelnitsky, E. G. (2010). The Rise of Killer Whales as a Major Arctic Predator. In S. H. Ferguson, L. L. Loseto, & M. L. Mallory (Eds.), *A Little Less Arctic: Top Predators in the World's Largest Northern Inland Sea, Hudson Bay*. Springer Netherlands. [https://doi.org/10.1007/978-90-481-9121-5\\_6](https://doi.org/10.1007/978-90-481-9121-5_6)
- Ferguson, S. H., Higdon, J. W., & Westdal, K. H. (2012). Prey items and predation behavior of killer whales (*Orcinus orca*) in Nunavut, Canada based on Inuit hunter interviews. *Aquatic Biosystems*, 8(1), 3. <https://doi.org/10.1186/2046-9063-8-3>
- Freeman, M. M. R. (1998). *Inuit, Whaling, and Sustainability*. Rowman Altamira.
- Fricke, M. (2007). *Epistemic injustice: Power and the ethics of knowing*. Oxford University Press.
- Fricke, M. (2017). Evolving Concepts of Epistemic Injustice. In I. J. Kidd, J. Medina & G. Pohlhaus Jr. (Eds.), *The Routledge Handbook of Epistemic Injustice*. Routledge.

- Garde, E., Tervo, O. M., Sinding, M.-H. S., Nielsen, N. H., Cornett, C., & Heide-Jørgensen, M. P. (2022). Biological parameters in a declining population of narwhals (Monodon monoceros) in Scoresby Sound, Southeast Greenland. *Arctic Science*, 1–20. <https://doi.org/10.1139/as-2021-0009>
- Grasswick, H. (2017). Epistemic Injustice in Science. In I. J. Kidd, J. Medina & G. Pohlhaus Jr. (Eds.), *The Routledge Handbook of Epistemic Injustice*. Routledge.
- Hamilton, C. D., Lydersen, C., Aars, J., Acquarone, M., Atwood, T., Baylis, A., Biuw, M., Boltunov, A. N., Born, E. W., Boveng, P., Brown, T. M., Cameron, M., Citta, J., Crawford, J., Dietz, R., Elias, J., Ferguson, S. H., Fisk, A., Folkow, L. P., ... Kovacs, K. M. (2022). Marine mammal hotspots across the circumpolar Arctic. *Diversity and Distributions*, 28(12), 2729–2753. <https://doi.org/10.1111/ddi.13543>
- Heide-Jørgensen, M. P., Garde, E., Hansen, R. G., Tervo, O. M., Sinding, M.-H. S., Witting, L., Marcoux, M., Watt, C., Kovacs, K. M., Reeves, R. (2021a, February 2). Reply to Nuttall et al.'s suggestion for community based narwhal conservation [Reply in eLetters section to Nuttall et al. (2020) on the article "Narwhals require targeted conservation"]. *Science*, 370(6515), 1. <https://doi.org/10.1126/science.abe7105>
- Heide-Jørgensen, M. P., Blackwell, S. B., Tervo, O. M., Samson, A. L., Garde, E., Hansen, R. G., Ngô, M. C., Conrad, A. S., Trinhammer, P., Schmidt, H. C., Sinding, M.-H. S., Williams, T. M., & Ditlevsen, S. (2021b). Behavioral Response Study on Seismic Airgun and Vessel Exposures in Narwhals. *Frontiers in Marine Science*, 8, 658173. <https://doi.org/10.3389/fmars.2021.658173>
- Heide-Jørgensen, M. P., Chambault, P., Jansen, T., Gjelstrup, C. V. B., Rosing-Asvid, A., Macrander, A., Vikingsson, G., Zhang, X., Andresen, C. S., & MacKenzie, B. R. (2023). A regime shift in the Southeast Greenland marine ecosystem. *Global Change Biology*, 29(3), 668–685. <https://doi.org/10.1111/gcb.16494>
- Heide-Jørgensen, M. P., Garde, E., Hansen, R. G., Tervo, O. M., Sinding, M.-H. S., Witting, L., Marcoux, M., Watt, C., Kovacs, K. M., & Reeves, R. R. (2020). Narwhals require targeted conservation. *Science*, 370(6515), 416–416. <https://doi.org/10.1126/science.abe7105>
- Heide-Jørgensen, M. P., & Lage, J. (2022). On the availability bias in narwhal abundance estimates. *NAMMCO Scientific Publications*, 12. <https://doi.org/10.7557/3.6518>
- Heide-Jørgensen, M. P., Nielsen, N. H., Hansen, R. G., Schmidt, H. C., Blackwell, S. B., & Jørgensen, O. A. (2015). The predictable narwhal: Satellite tracking shows behavioural similarities between isolated subpopulations. *Journal of Zoology*, 297(1), 54–65. <https://doi.org/10.1111/jzo.12257>
- Herrmann, T. M., Brunner Alfani, F., Chahine, A., Doering, N., Dudeck, S., Elster, J., Fjellheim, E., Henriksen, J. E., Hermansen, N., Holmberg, A., Kramvig, B., Nystø Keskitalo, A. M., Omma, E. M., Saxinger, G., Scheepstra, A., & van der Schot, J. (2023). CO-CREATE Comprehensive Policy-Brief to the EU Commission. Roadmap to Decolonial Arctic Research [Policy Brief]. 10100916 b. <https://doi.org/10.25365/PHAIIDRA.400>
- Hobbs, R. C., Reeves, R. R., Prewitt, J. S., Desportes, G., Breton-Honeyman, K., Christensen, T., Citta, J. J., Ferguson, S. H., Frost, K. J., Garde, E., Gavrilov, M., Ghazal, M., Glazov, D. M., Gosselin, J.-F., Hammill, M., Hansen, R. G., Harwood, L., Heide-Jørgensen, M. P., Inglangasuk, G., ... Watt, C. A. (2019). Global Review of the Conservation Status of Monodontid Stocks. *Marine Fisheries Reviews*, 81(3-4). <https://doi.org/10.7755/MFR.81.3-4.1>
- Hoover, C., Bailey, M., Higdon, J., Ferguson, S. H., & Sumaila, R. (2013). Estimating the Economic Value of Narwhal and Beluga Hunts in Hudson Bay, Nunavut. *Arctic*, 66(1), 1–16. <https://www.ijstor.org/stable/23594602>
- Inuit Circumpolar Council. (2021). *Ethical and Equitable Engagement Synthesis Report: A collection of Inuit rules, guidelines, protocols, and values for the engagement of Inuit Communities and Indigenous Knowledge from Across Inuit Nunaat* [Synthesis Report]. <https://www.inuitcircumpolar.com/project/icc-ethical-and-equitable-engagement-synthesis-report/>
- Inuit Circumpolar Council. (2022). *Circumpolar Inuit Protocols for Equitable and Ethical Engagement*. <https://www.inuitcircumpolar.com/project/circumpolar-inuit-protocols-for-equitable-and-ethical-engagement/>
- Keenan, E., Fanning, L. M., & Milley, C. (2018). Mobilizing Inuit Qaujimagatuqangit in Narwhal Management through Community Empowerment: A Case Study in Nauyasat, Nunavut. *Arctic*, 71(1), 27–39. <https://www.ijstor.org/stable/26387328>
- Kovach, M. (2017). Doing indigenous methodologies—a letter to a research class. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE Handbook of Qualitative Research*. SAGE.
- Laidre, K. L., Heide-Jørgensen, M. P., & Orr, J. R. (2006). Reactions of Narwhals, *Monodon monoceros*, to Killer Whale, *Orcinus orca*, Attacks in the Eastern Canadian Arctic. *The Canadian Field-Naturalist*, 120(4), Article 4. <https://doi.org/10.22621/cfn.v120i4.355>
- Lefort, K. J., Garroway, C. J., & Ferguson, S. H. (2020). *Killer whale abundance and predicted narwhal consumption in the Canadian Arctic*. *Global Change Biology*, 26(8), 4276–4283. <https://doi.org/10.1111/gcb.15152>
- Lowry, L., Laidre, K., & Reeves, R. (2017). *Monodon monoceros* (e.T13704A50367651) [dataset]. The IUCN Red List of Threatened Species. <https://doi.org/10.2305/IUCN.UK.2017-3.RLTS.T13704A50367651.en>
- Madison, D. S. (2020). *Critical ethnography: Method, ethics, and performance* (3rd ed.). SAGE.
- Madsen, J. C. (2009). *Udsteder og bopladser i Grønland 1901-2000* [Issuer and residences in Greenland 1901-2000]. Atuagkat.
- Maldonado-Torres, N. (2007). On the Coloniality of Being. *Cultural Studies*, 21(2–3), 240–270. <https://doi.org/10.1080/09502380601162548>
- Mignolo, W. D., & Walsh, C. E. (2018). *On Decoloniality: Concepts, Analytics, Praxis*. Duke University Press. <https://doi.org/10.1215/9780822371779>
- Mikkelsen, E. (1934). *De Østgrønlandske Eskimoers Historie* [The East Greenlandic Inuit's History]. SAGA Egmont.
- Moezzi, M., Janda, K. B., & Rotmann, S. (2017). Using stories, narratives, and storytelling in energy and climate change research. *Energy Research & Social Science*, 31, 1–10. <https://doi.org/10.1016/j.erss.2017.06.034>
- NAMMCO. (2017a). *Report of the 24th meeting of the NAMMCO Scientific Committee*. NAMMCO. <https://nammco.no/wp-content/uploads/2017/01/24th-scientific-committee-meeting-report.pdf>
- NAMMCO. (2017b). *Report of the NAMMCO-JCNB Joint Scientific Working Group on Narwhal and Beluga*. NAMMCO & JCNB. <https://nammco.no/wp-content/uploads/2022/09/jcnb-ijwg-report-march-2017-final-for-webs.pdf>
- NAMMCO. (2021). *Report of the Ad hoc Working Group on Narwhal in East Greenland*. NAMMCO. <https://nammco.no/wp-content/uploads/2021/12/final-report-negwg-2021.pdf>
- NAMMCO. (2022). *Report of the Joint Disturbance Workshop of the NAMMCO Scientific Committee Working Group on the population status of narwhal and beluga, and the Canada/Greenland Joint Commission on narwhal and beluga Scientific Working Group*. NAMMCO. <https://nammco.no/wp-content/uploads/2023/07/nammco-jcnb-disturbance-workshop-dec2022-final-report-exsum-rev-feb-2023.pdf>
- NAMMCO. (2023a). *Report of the 29th meeting of the NAMMCO Scientific Committee*. NAMMCO. <https://nammco.no/wp-content/uploads/2023/03/report-sc29-15032023-rev.pdf>
- NAMMCO. (2023b). *Report of the Meeting of the Management Committee for Cetaceans*. NAMMCO. <https://nammco.no/wp-content/uploads/2023/03/nammco30-mcc-report-17032023.pdf>
- NAMMCO. (2023c). *Report of the Scientific Committee Ad hoc Working Group on Narwhal in East Greenland*. NAMMCO. <https://nammco.no/wp-content/uploads/2024/01/report-negwg-2023.pdf>
- NAMMCO. (2023d). *Minutes—Working Group on enhancing user involvement in NAMMCO decision making (UIWG)*. NAMMCO.

- [https://nammco.no/wp-content/uploads/2023/07/minutes\\_june2023.pdf](https://nammco.no/wp-content/uploads/2023/07/minutes_june2023.pdf)
- NAMMCO. (2024). *Report of the 30th meeting of the NAMMCO Scientific Committee*. NAMMCO. [https://nammco.no/wp-content/uploads/2024/02/report\\_sc30\\_final.pdf](https://nammco.no/wp-content/uploads/2024/02/report_sc30_final.pdf)
- Nielsen, M. R., & Meilby, H. (2013). Quotas on Narwhal (*Monodon monoceros*) Hunting in East Greenland: Trends in Narwhal Killed per Hunter and Potential Impacts of Regulations on Inuit Communities. *Human Ecology*, 41(2), 187–203. <https://doi.org/10.1007/s10745-012-9558-4>
- Nuttall, M. (2016). Narwhal Hunters, Seismic Surveys, and the Middle Ice: Monitoring Environmental Change in Greenland's Melville Bay. In S. A. Crate & M. Nuttall (Eds.), *Anthropology and Climate Change* (2nd ed.). Routledge.
- Nuttall, M., Flora, J., & Andersen, A. O. (2020, December 21). Towards Community-Based Narwhal Conservation in Greenland. [Reply in eLetters section to Heide-Jørgensen et al. (2020) on the article "Narwhals require targeted conservation"]. *Science*, 370(6515), 1. <https://doi.org/10.1126/science.abe7105>
- Nweeia, M. T. (2024). Biology and Cultural Importance of the Narwhal. *Annual Review of Animal Biosciences*, 12(1), 187–208. <https://doi.org/10.1146/annurev-animal-021122-112307>
- Ottinger, G. (2017). Making sense of citizen science: Stories as a hermeneutic resource. *Energy Research & Social Science*, 31, 41–49. <https://doi.org/10.1016/j.erss.2017.06.014>
- Petersen, R. (1995). Colonialism as Seen from a Former Colonized Area. *Arctic Anthropology*, 32(2), 118–126. <https://www.jstor.org/stable/40316390>
- Remili, A., Dietz, R., Sonne, C., Iverson, S. J., Roy, D., Rosing-Asvid, A., Land-Miller, H., Pedersen, A. F., & McKinney, M. A. (2022). Validation of quantitative fatty acid signature analysis for estimating the diet composition of free-ranging killer whales. *Scientific Reports*, 12(1), Article 1. <https://doi.org/10.1038/s41598-022-11660-4>
- Rud, S. (2017). Kapitel 5: Grønland til Debat 1905-1939 [Chapter 5: Greenland for debate 1905-1939]. In H. C. Gulløv (Ed.), *Grønland: Den arktiske koloni* [Greenland: the Arctic colony]. Gad.
- Sandré, T., & Gherardi, J.-M. (in press). An Arctic Bounded by Whiteness: Ethics of Amplification. In J. Schmidt & S. Meisch (Eds.), *Ethics of Planetary Boundaries* (provisory).
- Sandré, T., Gherardi, J.-M., Madsen, O., Zhu, Z., & Vanderlinden, J.-P. (Directors). (2023). *Inuuniddinni Ilaaralaaor* [Part of us] [Short Documentary]. CEARC Research Center. <https://vimeo.com/843981469>
- Sandré, T., Wardekker, A., & Gherardi, J. (2024). While waiting for the sea ice: Stories of changes from Ittoqqortoormiit. In S. Bremer & A. Wardekker (Eds.), *Changing seasonality: How Communities are Revising their Seasons*. De Gruyter. <https://doi.org/10.1515/9783111245591>
- Shuert, C. R., Marcoux, M., Hussey, N. E., Heide-Jørgensen, M. P., Dietz, R., & Auger-Méthé, M. (2022). Decadal migration phenology of a long-lived Arctic icon keeps pace with climate change. *Proceedings of the National Academy of Sciences*, 119(45), e2121092119. <https://doi.org/10.1073/pnas.2121092119>
- Singer, C. L., Routh, M. R., Grabke, M. J., Andrew, L., Carrière, S., Guile, A., Andre, A., Thompson, A., Simmons, D., Cooper, K., Yonge, L., Rabesca, M., Larter, N. C., Jacobsen, P., Nathoo, R., Winbourne, J., & Bathe, A. (2023). Equal use of Indigenous and scientific knowledge in species assessments: A case study from the Northwest Territories, Canada. *Biological Conservation*, 281, 109995. <https://doi.org/10.1016/j.biocon.2023.109995>
- Small, M. L. (2009). 'How many cases do I need?': On science and the logic of case selection in field-based research. *Ethnography*, 10(1), 5–38. <https://doi.org/10.1177/1466138108099586>
- Sowa, F. (2015). Kalaalimernit: The Greenlandic taste for local foods in a globalised world. *Polar Record*, 51(3), 290–300. <https://doi.org/10.1017/S0032247414000187>
- Tejsner, P. (2014). Quota disputes and subsistence whaling in Qeqertarsuaq, Greenland. *Polar Record*, 50(4), 430–439. <https://doi.org/10.1017/S0032247414000242>
- Tervo, O. M., Blackwell, S. B., Ditlevsen, S., Garde, E., Hansen, R. G., Samson, A. L., Conrad, A. S., & Heide-Jørgensen, M. P. (2023). Stuck in a corner: Anthropogenic noise threatens narwhals in their once pristine Arctic habitat. *Science Advances*, 9(30), eade0440. <https://doi.org/10.1126/sciadv.ade0440>
- Tervo, O. M., Ditlevsen, S., Ngô, M. C., Nielsen, N. H., Blackwell, S. B., Williams, T. M., & Heide-Jørgensen, M. P. (2021). Hunting by the Stroke: How Foraging Drives Diving Behavior and Locomotion of East-Greenland Narwhals (*Monodon monoceros*). *Frontiers in Marine Science*, 7, 596469. <https://doi.org/10.3389/fmars.2020.596469>
- Ugarte, F., Rosing-Asvid, A., Heide-Jørgensen, M. P., & Laidre, K. L. (2020). Marine Mammals of the Greenland Seas. In M. I. Goldstein & D. A. DellaSala, *Encyclopedia of the World's Biomes*. Elsevier. <https://doi.org/10.1016/B978-0-12-409548-9.12485-6>
- Vanderlinden, J.-P., Baztan, J., Chouinard, O., Cordier, M., Da Cunha, C., Huctin, J.-M., Kane, A., Kennedy, G., Nikulkina, I., Shadrin, V., Surette, C., Thiaw, D., & Thomson, K. T. (2020). Meaning in the face of changing climate risks: Connecting agency, sensemaking and narratives of change through transdisciplinary research. *Climate Risk Management*, 29, 100224. <https://doi.org/10.1016/j.crm.2020.100224>
- Wardekker, A., Doloisio, B. N., Sandré, T., & Huctin, J.-M. (2022). *Framework for analyzing resilience narratives* (report no.: SeMPER-Arctic D5.1) [Technical report]. Arjan Wardekker's Lab, University of Bergen. <https://doi.org/10.13140/RG.2.2.23323.13603>
- Williams, T. M., Blackwell, S. B., Tervo, O., Garde, E., Sinding, M. S., Richter, B., & Heide-Jørgensen, M. P. (2022). Physiological responses of narwhals to anthropogenic noise: A case study with seismic airguns and vessel traffic in the Arctic. *Functional Ecology*, 36(9), 2251–2266. <https://doi.org/10.1111/1365-2435.14119>