



REVIEW ARTICLE



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'My appetite and mind would go': Inuit perceptions of (im)mobility and wellbeing loss under climate change across Inuit Nunangat in the Canadian Arctic

The academic literature on personal experiences of climate-induced wellbeing erosion (often conceptualised as 'non-economic losses and damages') is still limited. This represents a serious climate policy gap that hinders support for marginalised people across the world including Indigenous People. Lately, we have seen a rapid growth in empirical studies exploring linkages between climate change and mental health among Indigenous Inuit in Canada. However, its association with human (im)mobility remains unexplored. This review article brings together the empirical evidence of Inuit experiences and perceptions of climate-related wellbeing loss and (im)mobility while providing climate policy with guidance for appropriate action. The systematic review investigates how Inuit in Arctic Canada felt that climatic changes impacted their (im)mobility and mental health while putting these feelings into a wider context of colonial violence, forced child removal, the residential schools, and other systematic human rights abuses. Twelve electronic databases (four specific to Arctic research) were searched for English and French, peer reviewed, qualitative studies published between 2000 and 2021. Fifteen selected articles were analysed using NVivo and thematic narrative analysis from a climate-violence-health nexus systems approach. Three overarching climate-related wellbeing loss themes, all strongly intertwined with feelings of immobility, emerged from the literature namely 'identity and cultural loss', 'land connection as a source of healing', and 'changing environment triggering emotional distress'. The narratives circled around Inuit land connection and how climate-induced temporary (im)mobility interrupted this relationship. Climatic changes isolated Inuit away from the land and cut off their ability to partake in land activities. This strongly eroded Inuit wellbeing, expressed through distress, anxiety, depression, social tension, suicide ideation and deep feelings of cultural loss. The findings showed how Inuit mental health strongly depend on a sustained connection to the land. Further empirical research among other Indigenous People or nomadic groups on wellbeing loss and climate-induced involuntary immobility is urgently needed. Future research should particularly explore how such mental health impacts tie into past and present (post)colonial traumas and current suicide occurrences. This will help climate policy, research, and adaptation planning better prepare and propose more contextually and culturally appropriate health actions in the future.

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Introduction: Understanding Inuit mental health in a changing climate from a climate-violence-health nexus systems approach

The Arctic region is one of the world's hotspots for climate change (warming two to three times faster than the global annual average) and home to the Indigenous Inuit in Canada who live across 'Inuit Nunangat' or '*Inuit homeland*'¹ (Bunce et al., 2016; IPCC, 2018; Watts et al., 2021; Condon et al., 1995). Climate change may pose great health challenges upon people including impacts on mental health (Costello et al., 2009; Hayes et al., 2018; Manning and Clayton, 2018; RCPsych, 2021). Despite this, there is limited evidence on the extent of climate-related wellbeing consequences as most literature focuses on physical health (Fritze et al., 2008; Berry et al., 2010, 2018). Reviews emerging in the area of climate change and wellbeing include those on small island developing states (SIDS), those reporting insights from Bangladesh and Australia, or upon Indigenous populations globally (Kelman et al., 2021; McNamara et al., 2021; Hayward and Ayeb-Karlsson, 2021; Albrecht et al., 2007; Berry et al., 2010; Hueffer et al., 2019; Henrique et al., 2022; Middleton et al., 2020a). Recently, a growing number of empirical studies in the Arctic have begun to capture descriptions of climate-induced wellbeing or wellness² erosion as perceived by the Inuit (Bourque and Cunsolo Willox, 2014; Robertson and Ljubicic, 2019; Hayward et al., 2020; Middleton et al., 2020b). No literature review compiling these insights in the context of human (im)mobility was however found. This review, analysing climate-related (im)mobility and wellbeing loss among Inuit in Canada, is therefore an important addition to the existing literature body.

Climatic changes in the Arctic range from temperature increases, thawing permafrost, reduced sea ice and snow, to sea level rise, coastal erosion, and storms, resulting in temporary immobility, land damages, relocation, and unsafe travelling on the melting ice (Ford et al., 2006; Prowse and Furgal, 2009; Chanteloup et al., 2018; IPCC, 2018). Environmental changes and climate-induced involuntary immobility, often referred to as 'trapped' populations³, have the potential to increase distress, anxiety and feelings of despair and hopelessness (Cunsolo and Ellis, 2018; Tschakert et al., 2019; Ayeb-Karlsson, 2021). Inuit report a decline in their ability to partake in land-based activities (e.g., hunting, foraging, trapping) and in their ability to visit culturally significant sites due to the climate-related immobility. This subsequently impairs intergenerational transfer of Indigenous Traditional Knowledge (ITK) ('*Inuit Qaujimagatuqangit*')⁴ (Cunsolo Willox et al., 2012; Ford, 2012).

Associating climate change to mental health impacts is complex and challenging for a variety of reasons such as lacking data, stigma and underreporting, or differences in health systems and subjective understandings of wellbeing (Berry et al., 2018; Hayward and Ayeb-Karlsson, 2021; Kelman et al., 2021). Historically, the existing research has focussed on extreme heat such as increased temperatures, heatwaves, humidity and the risk of psychological distress, violence, self-harm, and suicide (Berry et al., 2010, 2018; Hayes et al., 2018; Florido Ngu et al., 2021). Other literature streams investigating climate-induced mental health impacts include that of '*ecological grief*' (Cunsolo and Ellis, 2018; Cunsolo et al., 2020), '*solastalgia*' (Albrecht et al., 2007; Hayes et al., 2018) and '*eco-anxiety*' (Hayes et al., 2018; Ojala et al., 2021), or '*eco-distress* and '*eco-anger*' (Stanley et al., 2021). Meanwhile, within *United Nations Framework Convention on Climate Change (UNFCCC)* policy circles, climate-induced wellbeing erosion is often conceptualised as climate-driven '*Non-Economic Losses and Damages*' (Barnett et al., 2016; Cunsolo and Ellis, 2018; Tschakert et al., 2019; Ayeb-Karlsson, 2020a; McNamara et al., 2021; Henrique et al., 2022; Ayeb-Karlsson et al., 2023).

Inuit in Canada are reported to experience disproportionate levels of physical and mental health issues (Kral et al., 2011; Nelson and Wilson, 2017; Hayward et al., 2020). The prevailing intergenerational trauma from the harrowing 'Indian' Residential School (IRS) system must be recognised as a key contributing health risk factor (Harper et al., 2012; MacDonald and Hudson, 2012; Cunsolo Willox et al., 2013b; Crawford, 2016; McQuaid et al., 2017). The IRS system in Canada (and beyond)⁵ was a network of so-called residential or boarding 'schools' run primarily by the Catholic Church that are estimated to have forcefully removed more than 150,000 First Nation and Indigenous children in Canada from their families over their hundred years of existence (1876–1996). By the 1930s, 30% of children are thought to have been removed from their families, raising from 10% to 63% between 1951 and 1961 (Smith, 2004, 2008; Feir, 2016).

The system severely traumatised and harmed Indigenous People through the deprivation of a family life, language, identity, and traditions as the IRS system aimed to forcefully 'assimilate' them into 'Canadian' values which is why it in 2015 was deemed a 'cultural genocide' (or an ethnocide). The Canadian residential schools became hotspots for physical and sexual abuse, malnutrition, medical experiments, and other inhumane child mistreatment and neglect that further added to the intergenerational trauma. Children were beaten for speaking in their native language and serial rapists were left to roam free in the schools naturally resulting in the increased prevalence of post-traumatic stress, substance use and suicide (ideation) that until today persist among Indigenous People in Canada and across the world (Pollock et al., 2016, 2018; Crawford, 2016; McQuaid et al., 2017).

By 2001, 16,000 Indigenous People (17% of residential school attendants) had brought legal action against the Canadian Government or the Church. Reports indicate that up to 100% of children in some IRS were sexually abused and approximately 40% died before returning home or soon after returning as they were sent home in critical health conditions. The Canadian Government issued an official apology for the residential school abuses in the House of Commons as part of the Truth and Reconciliation Commission work in 2008. Over 1300 unmarked graves were discovered around the IRS locations in 2021. The exact number of dead children remains unknown (Smith, 2008; MacDonald and Hudson, 2012). The bodies of the children were seldom returned to their parents who rarely even learnt of their child's death or the circumstances related to their passing.⁶

The IRS system must be understood as a form of state-led colonial and structural violence through forced assimilation, 'adoptions' and child removals that also can be observed among other Indigenous People in Commonwealth countries such as New Zealand, Australia, Kenya, Malaysia, India and regions and countries beyond such as in the US, China, former USSR, Scandinavia, and the Middle East (Fournier and Crey, 1998; Kuokkanen, 2003; Smith, 2008; Swain, 2013; Reyhner, 2018). Other similar child removal systems include those of the so-called 'Mother and Baby Homes' or 'Magdalene Laundries' in Ireland and the UK in the context of unmarried mothers, also affiliated with the Catholic Church (Swain, 2013; Sinclair, 2016; Garrett, 2017). These structural child removal systems are in a way still active today as Indigenous and Black children are overrepresented in most 'Out-of-Home' care systems (Ramsay, 2016; O'Donnell et al., 2019). The practise of state-led child removal continues to leave a long trail of intergenerational trauma behind it and particularly among marginalised groups including Indigenous Inuit in Canada (Chase and Ullrich, 2022; Dalton et al., 2022).⁷

It is important to make clear that the IRS system extended from Canadian day schools in many areas of the Arctic where Inuit families were coerced into coming from the land to send

their children to school by withholding governmental benefits or even imprison parents in case they resisted the mandatory schooling (Tester and Irniq, 2008; Shackleton, 2012; Feir, 2016; Smith, 2004, 2008). However, building from racial ideologies in the US, the day school system was abandoned as it was seen as 'insufficient'. A situation where children returned to see their families by the end of the day, lived close to, or visited them, was argued to 'undo' the assimilation work. First Nation and Indigenous children were therefore systematically removed permanently and moved far away from their family networks to break the social connections with their peers (Smith, 2008; Reyhner, 2018).

As a result of Inuit being forced to abandon their continuous connection to the land, the sled dog population collapsed due to the changes in movements, but also due to aggregation of the dogs including them being put down by the RCMP (Laugrand and Oosten, 2002; Shackleton, 2012; McHugh, 2013). The travel system, as well as an important part of Inuit identity, was replaced by snowmobiles which contributed to monetary dependence and a disruption to the ecosystem and environment including through sound, air, and snow pollution (Condon et al., 1995; Tester, 2010a, 2010b). Initially, hunters would earn money by selling seal skins, but this was rapidly put to an end by the European seal ban (Wenzel, 1987; Damas, 1988; Tester and Irniq, 2008).⁸

The processes over the past century all contributed to the root problems of the current substance use among Inuit. The helplessness and immobility that hunters felt when they lost their dogs and their ability to hunt for seal are socio-political factors deeply interlinked with any potential climate-related wellbeing loss. Inuit immobility and wellbeing loss can clearly not be attributed to the environment alone (Cameron, 2012; Haalboom and Natcher, 2012; Pfeifer, 2020; Ready and Collings, 2021). This is why we choose to investigate Inuit climate-related immobility and its consequences through a systems approach that understands that any potential wellbeing losses are pathways in a wider climate-violence-health nexus of interrelated social, political, financial, historical, cultural, psychological, and environmental factors (Berry et al., 2010, 2018; Longman et al., 2019; Hayward and Ayeb-Karlsson, 2021; Orievulu et al., 2022; Ayeb-Karlsson et al., 2023). Exploring Inuit experiences of immobility in the context of climate change must be understood as influenced by long-term events and diverse factors. All these historical and contemporary complex processes, including the targeted colonial and structural violence, must be considered to appropriately appreciate Inuit experiences of immobility and wellbeing loss in the context of climate change.

The suicide rate among Inuit in the Nunavut region is one of the highest in the world, ten times higher than Canada's average, and among young male Inuit (aged 15 to 29) it is a shocking 40 times greater (Pollock et al., 2016; Nelson and Wilson, 2017; Hayward et al., 2020). Higher than average suicide rates among Indigenous Peoples is a globally registered phenomenon tracing back to the structural violence and marginalisation of colonial and post-colonial dynamics (Gray et al., 2016; Pollock et al., 2018; McQuaid et al., 2017). This review will compile the existing empirical findings of climate-related wellbeing loss in the context of human (im)mobility as perceived by the Inuit in the Canadian Arctic. The review study clearly acknowledges that such wellbeing impacts are deeply rooted in an Indigenous historical and societal context. Climate-induced wellbeing stress is understood to exacerbate the existing network of other health risks (Berry et al., 2018; Ready and Collings, 2021; Hayward and Ayeb-Karlsson, 2021). These empirical insights will help inform contextually and culturally appropriate health actions, and guide UNFCCC climate policy on how to best avert, minimise and address climate-

induced mental health loss among Indigenous People in Canada and beyond.

Methods and material

The 'Preferred Reporting Items for Systematic Reviews and Meta-Analyses' (PRISMA) guided the review process (Moher et al., 2009; Thompson et al., 2018): (1) Rationale and objective, (2) Search strategy and eligibility criteria, (3) Data extraction and quality appraisal, (4) Data synthesis, and (5) Analysis and reporting of findings. Twelve electronic databases, including four specific to Arctic research, were systematically searched for English and French peer reviewed literature, in June 2018 and then again in July 2021 (see Fig. 1, Table 1). The databases were chosen to encompass broad coverage and representation of climate and mental health research. The searches included studies published between 2000 and 2021. The justification for the cut-off year relates to the peak of literature generated by the 2000 UNFCCC COP6 appearance and the Arctic Climate Impact Assessment (ACIA). From the initial search result of 1367 publications, 678 were identified for screening and 71 articles and their reference lists were assessed in detail in hope to identify further eligible articles. In the end, 15 English peer reviewed journal articles published between 2009 and 2020 were selected in the final study sample (see Fig. 2, Table 2). The identified and screened French peer reviewed journal articles were excluded based on the exclusion criteria (see Table 1).

The exclusion of articles in other languages than English and French may be a study limitation. Relevant empirical insights could have been missed as publications in Inuktitut or Inuinnaqtun were not included. We also acknowledge that as with all secondary data analyses there may be researcher biases introduced with how the interviews were designed, conducted, or through the selection of data and analysis, that may be difficult for us to detect at this stage. The primary data studies selected for this review analysis offered the participants a choice to conduct the interviews in Inuktitut, Inuinnaqtun, or English. Most participants were reported to prefer conducting their interview in English rather than in Inuktitut or Inuinnaqtun and with an interpreter. This is possibly because most of the interviews were conducted in Nunatsiavut. All studies include ethical reflections regarding empirical conduction, triangulation, Inuit participatory research engagement and translation. Twelve articles explicitly stated having an approved research ethics license. All 15 articles were quality screened as 'high' using the National Institute for Health and Care Excellence (NICE) and CASP quality assessment tools (see Table 3).

Qualitative data (personal narratives, experiences, and perceptions) were prioritised over quantitative data as the analysis sought to study the values, perceptions and local understandings in the captured narratives surrounding climate change, human (im)mobility and mental health (Thomas and Harden, 2008; Ayeb-Karlsson et al., 2023; McMichael et al., 2023). Relevant quantitative studies were however incorporated into the study's contextual setting and research background. In accordance with the exclusion criteria, non-Inuit qualitative responses and quantitative data, publications in languages other than English or French, and grey literature were omitted. As with all research designs, sampling and study selection may introduce risks of bias. It is important to acknowledge the unequal geographical distribution of the literature sample across the Inuit Nunangat region. Ten studies were conducted in the Nunatsiavut region while only three were from the Nunavut region and one each from Inuvialuit and Nunavik. The presented findings may therefore not be fully representative of all Inuit living in the Inuit

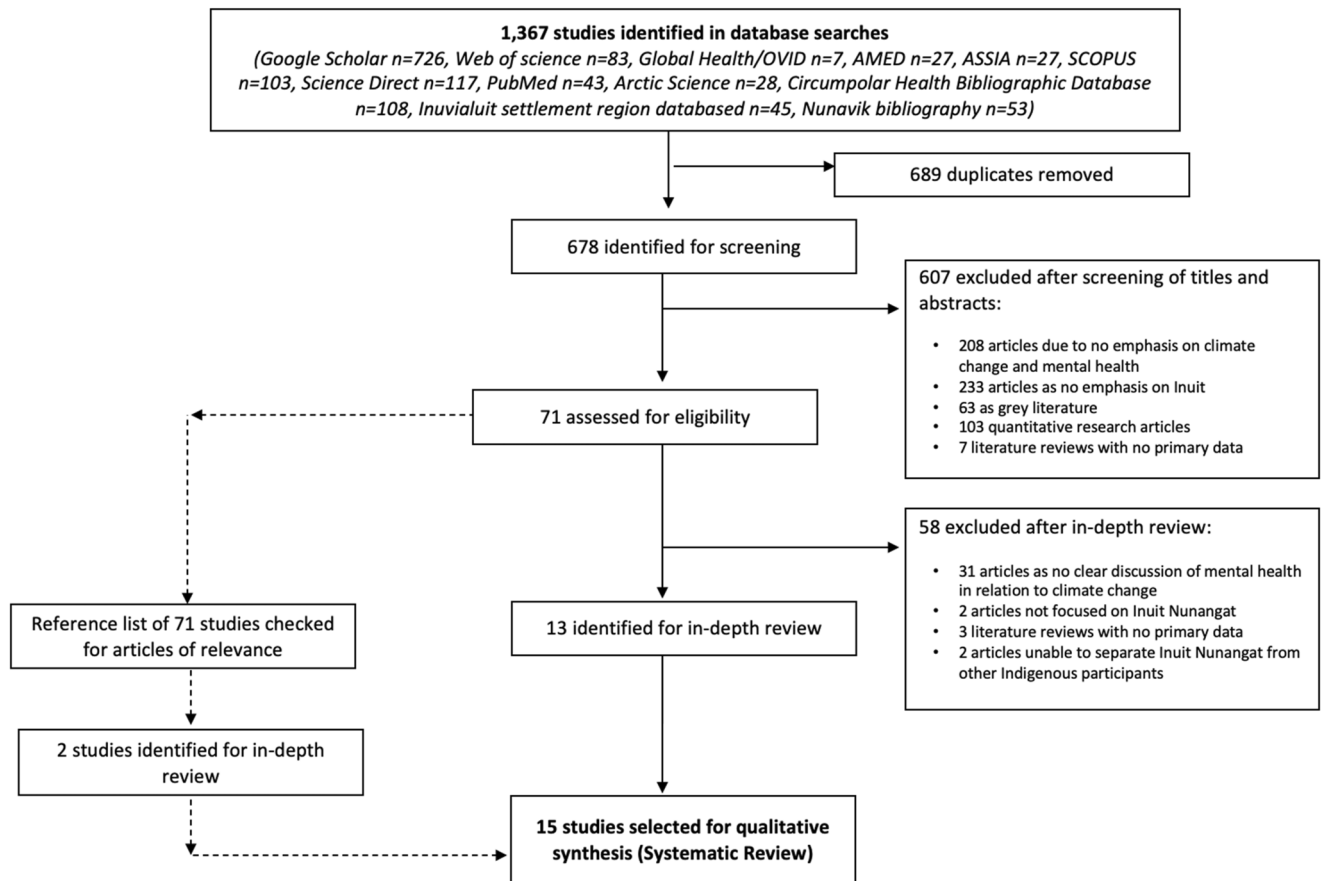


Fig. 1 Study selection process. The figure illustrates the flowchart selection process leading up to the final study sample and reasoning behind excluded material.

Table 1 Inclusion and exclusion criteria.		
	Include	Exclude
Population	<ul style="list-style-type: none"> • Inuit of all ages • All feasible partakers 	<ul style="list-style-type: none"> • Non-Inuit participants
Interest	<ul style="list-style-type: none"> • Mental health and wellbeing in relation to climate change and environmental changes • Perceptions and experiences, observations, insights and reflections 	<ul style="list-style-type: none"> • Sole focus on climate change in relation to physical health, nutrition, policy.
Context	<ul style="list-style-type: none"> • Residents of Inuit Nunangat; global hotspot for climate change 	<ul style="list-style-type: none"> • Inuit who do not live in Inuit Nunangat were excluded as impact of climate change is likely felt differently outside of the Arctic region.
Study design	<ul style="list-style-type: none"> • Peer reviewed • Primary studies • Qualitative data (qualitative included from mixed method studies) • Published in English or French 	<ul style="list-style-type: none"> • Secondary studies or reviews • Quantitative data • Unpublished and grey literature • Other languages than English or French
Publication details	<ul style="list-style-type: none"> • Studies published between January 2000 and July 2021. 	<ul style="list-style-type: none"> • Studies published prior to the year 2000 and after July 2021.
Search terms	The search terms used were: (climate OR climate change OR warming OR global warming OR weather) AND inuit AND (canada OR Nunangat OR Inuvialuit OR Nunavut OR Nunavik OR Nunatsiavut) AND arctic AND (mental health OR mental illness OR mental wellbeing OR mental wellness OR psychological) AND environment* AND (land OR ice OR snow OR sea ice) AND adapt*.	
Databases	Web of Science, Global Health, Applied Social Sciences Index and Abstracts (ASSIA), the Allied and Complementary Medicine Database (AMED), Scopus, Science Direct, PubMed. Arctic Science, Circumpolar Health Bibliographic Database, the Inuvialuit Settlement Region Database and Nunavik Bibliography, Google Scholar.	

The table shows the inclusion and exclusion criteria that guided the article selection process as well as search terms and databases searched for peer reviewed journal articles.

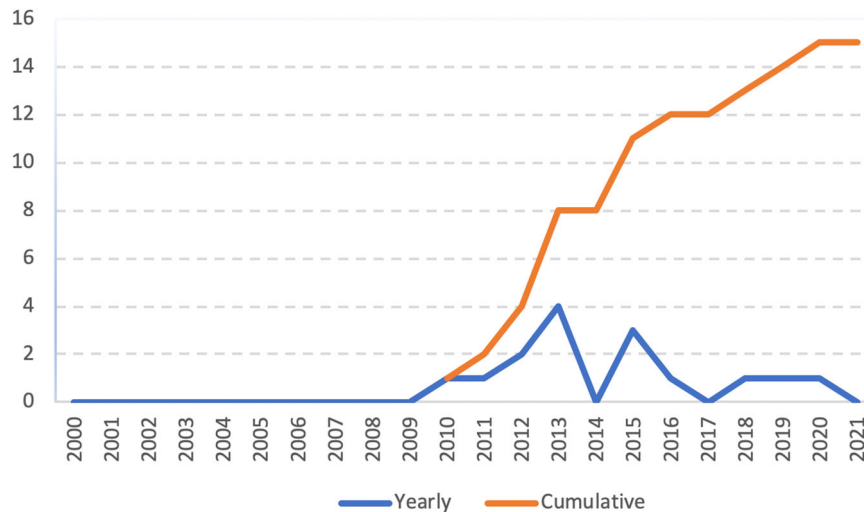


Fig. 2 Yearly and cumulative growth in number of publications. The figure gives an overview of the peer reviewed publishing trends in the research area of Inuit mental health and climate change.

Nunangat region as Nunatsiavut has a lower population than Nunavut.

We worked from a position of caution around our own potential researcher bias as well as the many ways that the sample study researchers' positionalities may have influenced the qualitative and thematic narrative analysis. We followed a qualitative and discursive thematic narrative analysis where rather than identifying quantitative repetitions of codes, or words, we aimed to analyse the described values, narratives and perceptions associated with the thematic areas (Overcash, 2003; Popay et al., 2005; Guest et al., 2011; Bailey et al., 2017; Ayeb-Karlsson et al., 2018; Lee et al., 2020). This type of exploratory thematic narrative analysis is common within cultural, linguistic, storytelling, sociological, health and psychological studies that aim to analyse decision-making responses, behaviours, values, and meanings associated with collective descriptions of norms and codes of conduct (Hodge et al., 2002; Overcash, 2003; Leamy et al., 2011; Tschakert et al., 2019; Ayeb-Karlsson, 2020b, 2021; Ojala et al., 2021; Harasym et al., 2022).

On a practical level, we first conducted the narrative analysis separately by analysing the values and perceptions presented in the individual informant elaborations from the 15 articles (see supplementary material). Following the analytical steps of (1) individually developing a primary detailed thematic narrative synthesis, (2) individually exploring relationships within and between the narratives, and finally (3) collectively and externally assessing the robustness of the final thematic narrative synthesis (Popay et al., 2005; Thomas and Harden, 2008; Leamy et al., 2011). In this way, we conducted the initial analysis independently from one another during which approximately ten thematic areas and their interrelations to one another were identified.

A methodological approach of seeking to explore thematic narrative relationships and values within the extracted individual quotes, between quotes in the same study, as well as in between studies guided the analysis (Hodge et al., 2002; Overcash, 2003; Ayeb-Karlsson et al., 2018, 2023; Lee et al., 2020; Kelman et al., 2021; McMichael et al., 2023). We collectively discussed the separate thematic narrative synthesis findings and how we understood that the thematic areas interrelated. The smaller thematic areas were structured into the final three overarching narrative themes which robustness were further evaluated and incorporated with comments through external assessment.

The practical analytical steps involved the studies first being transferred in electronic form to the qualitative analysis software

NVivo 12. Inductive 'open coding' was applied to the text of each study, allowing relevant and recurring narrative themes to be identified (Popay et al., 2005; Thomas and Harden, 2008; Lee et al., 2020). In the onset joint analytical conversations, approximately ten identified thematic narrative areas were discussed to avoid misrepresentation of their interrelations. The original identified thematic areas included, but were not limited to, traditional food, connection to land, identity creation, weather related impacts, traditional knowledge, healing strategies, coping, feelings of entrapment, perceptions of mobility and freedom, resilience, and adaptive capacity. No original thematic area was omitted from the results, but all structured into the three overarching thematic narratives. The result section presents the smaller narrative themes as interrelated within the three identified overarching narrative themes; (1) identity and cultural loss, (2) land connection as a source for healing, and (3) changing environment triggering emotional distress.

To avoid researcher bias, the manuscript draft was circulated for external feedback from scholars including Indigenous scholars and researchers currently carrying out empirical work in the study area. A final layer of transparency included that of incorporating as many text extracts as possible in the result section, and a further set of text extracts in the supplementary material, to exemplify the overarching final key thematic areas. Each presented narrative theme in the result section includes text extracts from three to four different articles. Further to this, the supplementary material transparently shows how additional text extracts from most studies feed into the three overarching narratives. All in all, over 80 text extracts are presented in the result section, while another 150 text extracts appear in the supplementary material.⁹ This goes beyond the transparency of many similar qualitative studies which tend to limit their text extracts inclusion to approximately ten to fifteen quotes.

Thematic narrative analysis is an effective tool to detect contextual values, meaning and socio-cultural storylines. A narrative synthesis tends to be an appropriate approach to present findings that maintains the research participants' storylines (Ali, 2013; Leamy et al., 2011). Qualitative interviews often allow interviewing space for participants to elaborate around local and subjective perceptions, values, and life experiences (Overcash, 2003; Ayeb-Karlsson, 2020b). Narrative approaches have also been embraced for their empowering aftereffects, particularly in the context of vulnerable and marginalised groups, as people get to voice their truth, in their own words, which humanises people

Table 2 Overview of study selection.

Authors / Year of Publication	Methods of qualitative data collection	Language (conduction/ publication)	Study Location	Informant age	Informant gender	Number of informants	Perceived environmental changes	Experienced impacts on everyday life	Mental health impacts as described by participants
1 Bunce et al. (2016)	Interviews focus groups participant observation	Inuktitut and English / English	Iqaluit, (Nunavut)	24-80	Women	>56	Unpredictable weather Decreased ice-cover Increased rainfall Increased temperatures Reduced wildlife & berries	Food insecurity Economic uncertainty Decreased contact with land Decreased gatherings & traditional activities Decreased ability to travel/ immobility	Frustration Sadness Concern Stress
2 Chanteloup et al. (2018)	Photovoice videos interviews group discussions	English (with Inuktitut interpreter available)/ English (abstract in French and English)	Kuujuarapik, Umiujaq, & Kangiqsujaq (Nunavik)	12-80	Mixed	150	Decreased snow Reduced wildlife & berries	Food insecurity Livelihood insecurity Decreased contact with land Decreased gatherings & traditional activities	Identity loss Loneliness Concern
3 Cunsolo Willox et al. (2012)	Interviews	English selected by all (Inuktitut interpreter available)/ English	Rigolet (Nunatsiavut)	9-85	Mixed	72	Unpredictable weather Increased storms Decreased wildlife & vegetation Land changes Unpredictable weather Decreased ice-cover Decreased wildlife	Decreased sense of community Food insecurity Livelihood insecurity Decreased gatherings & traditional activities Decreased community cohesion Decreased ability to travel/ immobility	Identity Loss Loss of spirituality Stress & Anger Sadness & Concern Frustration Helplessness Depression Decreased self-worth
4 Cunsolo Willox et al. (2013a)	Interviews	English selected by all (Inuktitut interpreter available)/ English	Rigolet (Nunatsiavut)	9-90	Mixed	57	Unpredictable weather Decreased ice-cover Decreased wildlife	Food insecurity Livelihood insecurity Economic uncertainty Decreased social connections Increased local conflict	Anxiety Sadness Depression Emotional distress Fear & Anger Decreased self-worth
5 Cunsolo Willox et al. (2013b)	Interviews	English selected by all (Inuktitut interpreter available)/ English	Rigolet (Nunatsiavut)	9-80	Mixed	67	Unpredictable weather Decreased ice-cover Extreme weather events Wildlife changes	Decreased ability to travel/ immobility Food insecurity Livelihood insecurity Economic uncertainty Decreased gatherings & traditional activities Increased local conflict & violence Decreased physical activity Decreased contact with land Decreased ability to travel/ immobility	Cultural Identity loss Stress Depression Alcohol abuse Suicide ideation Anxiety Mood disorders Spiritual loss Emotional distress Fear
6 Durkalec et al. (2015)	Focus groups interviews participant observation	Unclear (states reflexive translation approach in English and Inuktitut)/ English	Nain (Nunatsiavut)	unknown	Mixed	31	Unpredictable weather Decreased ice-cover	Food insecurity Economic uncertainty Decreased gatherings & traditional activities Loss of traditional knowledge Decreased ability to travel/ immobility	Cultural identity loss Stress Concern Emotional distress Lack of confidence Unhappiness Lack of motivation
7 Harper et al. (2015)	Photovoice interviews	Unclear (states culturally appropriate conduction)/ English	Nain, Hopedale, Postville, Makkovik & Rigolet (Nunatsiavut)	15-50>	Mixed	22	Unpredictable weather Decreased ice-cover Increased temperatures Unpredictable storms Wildlife changes	Food insecurity Livelihood insecurity Economic uncertainty Decreased gatherings & traditional activities Decreased community cohesion Decreased physical activity Decreased access to the land Decreased ability to travel/ immobility	Cultural Identity loss Depression Unease Emotional distress Grief Substance abuse Loss of self-worth
8 Healey et al. (2011)	Photovoice participatory action inquiry	English and Inuktitut (participants engaged in translation of findings)/ English (abstract in French and English)	Iqaluit, Gjoa Haven & Chesterfield Inlet (Nunavut)	unknown	unknown	6	Unpredictable weather Decreased ice-cover	Food insecurity Livelihood insecurity Economic uncertainty Loss of traditional knowledge Decreased gatherings & traditional activities Decreased contact with land Decreased ability to travel/ immobility	Identity loss Stress Emotional distress Feeling vulnerable and exposed Feeling trapped Loneliness & Feeling isolated

Table 2 (continued)

Authors / Year of Publication	Methods of qualitative data collection	Language (conduction/ publication)	Study Location	Informant age	Informant gender	Number of informants	Perceived environmental changes	Experienced impacts on everyday life	Mental health impacts as described by participants
9 Middleton et al. (2020b)	Interviews	English (despite offered Inuititit interpreter)/ English	Nain, Hopedale, Postville, Makkovik & Rigolet (Nunatsiavut)	15>	Mixed	116	Unpredictable weather & seasons Increased ice & snow Increased temperatures Increased wind Unpredictable storms Wildlife and vegetation changes	Decreased contact with land Interrupted social life Loss of traditional knowledge Decreased gatherings & traditional activities Livelihood insecurity Food insecurity Decreased ability to travel/ immobility	Identity loss Stress Emotional distress Feeling trapped Fear Anger Anxiety Frustration Sadness Isolation Boredom
10 Ostapchuk et al. (2012)	Interviews	Inuititit and English offered (English selected by all)/ English (abstract in Inuititit and English)	Rigolet (Nunatsiavut)	>50	Mixed	22	Increased temperatures Unpredictable weather Decreased ice-cover Changes in wildlife	Food insecurity Livelihood insecurity Economic insecurity Loss of traditional knowledge Decreased gatherings & traditional activities Reduced physical activity Decreased ability to travel/ immobility	Identity loss Feelings isolated Depression Feeling stuck Worry & Stress
11 Pearce et al. (2010)	Interviews participant information	Inuinnaqtun and English/ English	Uluqhaktok, (Inuvialuit)	18-80	Mixed	62	Increased temperatures Unpredictable weather Decreased ice-cover Increased winds & storms Decreased wildlife	Food insecurity Livelihood insecurity Economic insecurity Decreased gatherings & traditional activities Loss of traditional knowledge Decreased community cohesion Decreased ability to travel/ immobility	Depression Substance abuse Stress Feeling vulnerable Emotional Distress
12 Petrasek MacDonald et al. (2013)	Interviews	Inuititit and English offered (English selected by all)/ English	Rigolet (Nunatsiavut)	12-25	Mixed	13	Unpredictable weather Reduced ice-cover Abundant rain	Food uncertainty Livelihood insecurity Economic uncertainty Decreased socio-cultural activities and gatherings Loss of traditional knowledge	Identity loss Anger & Frustration Worry & Helplessness Emotional distress Exhaustion Anxiety Feeling isolated
13 Petrasek MacDonald et al. (2015)	Interviews	Inuititit and English offered (English selected by all)/ English	Nain, Hopedale, Postville, Makkovik, & Rigolet (Nunatsiavut)	15-25	Mixed	17	Unpredictable weather Decreased ice-cover Reduced wildlife & vegetation	Decreased ability to travel/ immobility Food insecurity Livelihood insecurity Economic uncertainty Decreased socio-cultural activities and gatherings Loss of values Loss of community cohesion Loss of contact with land Decreased ability to travel/ immobility	Identity loss Feelings of boredom & isolation Concern Emotional distress Loss of confidence Depression Stress
14 Robertson and Ljubicic, (2019)	Interviews Focus groups	Unclear (states translation support as needed)/ English	Uqsuqtuuq (Nunavut)	Unknown (states elders)	Mixed	39>	Unpredictable weather & seasons Reduced wildlife & vegetation Wildlife disease Decreased snow & ice-cover Increased rain Reduced wildlife & vegetation	Loss of traditional values Livelihood insecurity Food insecurity Decreased contact with land Decreased ability to travel/ immobility	Identity loss Stress Worries Depression Suicide
15 Wolf et al. (2013)	Interviews	English (as requested by participants)/ English	Rigolet & St Lewis (Nunatsiavut)	15-75>	Mixed	53	Decreased snow & ice-cover Increased rain Reduced wildlife & vegetation	Loss of traditional values Loss of community cohesion Decreased contact with land Decreased ability to travel/ immobility	Depression Feeling unsafe Feeling trapped Concern Fear

The table gives an overview of the final secondary data sample such as research method, participant background and numbers, the reported environmental stressors and experienced impacts and wellbeing losses.

Table 3 Quality Assessment (PRISMA and NICE^a).

	Authors/Year of Publication	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Overall Quality Rating
1	Bunce et al. 2016	3	3	3	3	3	3	3	3	3	2	2	31-High
2	Chanteloup et al. 2018	3	3	3	3	3	2	3	3	3	2	2	30-High
3	Cunsolo Willox et al. 2012	3	3	3	3	3	3	3	3	2	3	3	32-High
4	Cunsolo Willox et al. 2013a	3	3	3	3	2	3	3	3	3	2	3	31-High
5	Cunsolo Willox et al. 2013b	3	3	3	3	3	3	3	3	3	3	3	33-High
6	Durkalec et al. 2015	3	3	3	3	2	3	3	3	3	3	3	32-High
7	Harper et al. 2015	3	3	3	3	3	3	3	3	3	3	2	32-High
8	Healey et al. 2011	3	3	3	3	3	3	3	2	3	3	3	32-High
9	Middleton et al. 2020b	3	3	3	3	3	3	3	3	3	3	3	33-High
10	Ostapchuk et al. 2012	3	3	3	3	3	3	3	3	3	3	3	33-High
11	Pearce et al. 2010	3	3	3	3	3	3	3	3	3	2	3	32-High
12	Petrasek MacDonald et al. 2013	3	3	3	3	3	3	3	3	3	3	3	33-High
13	Petrasek MacDonald et al. 2015	3	3	3	2	3	3	3	3	3	2	1	29-High
14	Robertson and Ljubicic 2019	3	3	3	2	3	3	2	3	3	2	3	30-High
15	Wolf et al. 2013	3	3	3	3	3	2	3	3	3	3	3	32-High
	Quality Assessment Checklist												
	Overall quality rating:												
	Quality Scoring System:												
	Good (3 points)												
	High quality 28–33 points												

Table 3 (continued)

Authors/Year of Publication	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Overall Quality Rating
Fair (2 points) Moderate quality 23-27 points												
Poor (1 point) Low quality 18-22 points												
<p>This quality assessment is a combination of the National Institute for Health and Care Excellence (NICE) and CASP quality assessment tool. The quality assessment carried out in this study combines the National Institute for Health and Care Excellence (NICE) and the CASP quality assessment tools. For further details see the quality assessment checklist which details quality scoring system, rating, and evolution questions.</p> <ol style="list-style-type: none"> 1. Is the qualitative approach appropriate for addressing the research goal? <ol style="list-style-type: none"> i. Does the research question seek to interpret actions and/or subjective experiences of research participants? 2. Is the study clear what it seeks to do? <ol style="list-style-type: none"> i. Is the purpose of the study clearly identified and discussed? ii. Is the importance of the topic discussed? iii. Is there adequate/appropriate reference to the literature? 3. How rigorous is the methodology? <ol style="list-style-type: none"> i. Has the sampling strategy been discussed and justified? ii. Are the data collection methods clearly described? iii. Is the form of data clear and justified? (e.g., audio recordings, photography, notes) iv. Was data collected by more than 1 method (triangulation)? 4. Is the role of the researcher clear? <ol style="list-style-type: none"> i. How the research was explained and presented to the participants? ii. Who undertook the research? iii. Has the researcher considered potential bias and influence? 5. Is the context clearly described? <ol style="list-style-type: none"> i. Have the characteristics of the participants and settings been clearly defined? ii. Were observations made in a sufficient variety of circumstances/ settings? 6. Is the data analysis sufficiently rigorous and reliable? <ol style="list-style-type: none"> i. Does the paper clearly document an in-depth data analysis process? ii. Is it clear how the themes/categories and concepts were derived from the data? iii. Did more than 1 researcher theme and code transcripts/data? iv. Did participants feedback on the data and validate findings? 7. Is the data rich? (e.g., in terms of perspective, diversity, comparison) <ol style="list-style-type: none"> i. Has the diversity of perspective and content been explored? ii. How well has the detail and depth been demonstrated? iii. Are responses compared and contrasted across groups/sites? 8. Are the findings convincing and relevant to the aims of the study? <ol style="list-style-type: none"> i. Are the findings clearly presented? ii. Are extracts from the original data are included? iii. Is the data appropriately referenced? iv. Are the findings discussed in relation to the original research question? 9. Are the conclusions plausible and coherent? <ol style="list-style-type: none"> i. Does the paper enhance understanding of the research topic? ii. Can findings be transferred to other populations or can research be used going forward? 10. Does the study identify new areas where research is necessary/ recommendations? <ol style="list-style-type: none"> i. Does the study identify new areas where research is necessary/ recommendations? ii. Is there adequate discussion of any limitations encountered? iii. Is the reporting of ethics clear and coherent? 11. Was the study approved by an ethics committee? <ol style="list-style-type: none"> i. Has consent and anonymity been discussed adequately? ii. Is the research process participatory / include Inuit engagement? 												

who are often oppressed, stigmatised, and misrepresented (Hodge et al., 2002; Ali, 2013; Harasym et al., 2022). The method delicately helps us approach sensitive topics, experiences, and values that may have gotten pushed aside due to socio-normative boundaries (Tschakert et al., 2019; Ayeb-Karlsson et al., 2023).

Careful ethical considerations must be incorporated into all research relating to Indigenous People, ethnic minorities, and other marginalised populations. The review authors have experience working with and researching Indigenous and First Nation people globally and recognise the empowering element of ensuring space for research participants to voice their concerns and tell their own stories in their own words (Hodge et al., 2002; Harper et al., 2012; Harasym et al., 2022). Critical scholars have raised apprehension about how reviews and secondary data analysis may be misrepresentative as Indigenous People often do not engage in the analysis in the same way as with participatory empirical research.

All research is a fine balance between ensuring that data collection is inclusive, non-extractive and non-exhaustive to avoid unnecessary stress upon participants. We must acknowledge the value of reanalysing existing data rather than recreating the same data sets repeatedly with expectations upon research participants to continuously put time and livelihoods aside to engage with another study. In the context of climate change, migration and health in small island developing states (SIDS), the Pacific for example, has been identified as one such study area where people are experiencing research fatigue and reviews can help alleviate unnecessary research pressures (Kelman et al., 2021; McNamara et al., 2021). Other critical scholars have raised concerns about how separating, differentiating, and objectifying Indigenous research as 'exotic' and 'distinct' from other research in itself can be disempowering. Active attempts to decolonise Indigenous research may therefore end up feeding into the unhealthy post-colonial power relations that participatory research scholars were attempting to avoid first place (Haalboom and Natcher, 2012; Cameron, 2012; Wolf et al., 2013; Titz et al., 2018; Pfeifer, 2020; Ayeb-Karlsson et al., 2022).¹⁰

The article is an attempt to enhance the further use of people's local descriptions and narratives to better understand mental health impacts through more inclusive and representative tools within clinical psychology such as 'Cultural Concepts of Distress' (Overcash, 2003; Kral et al., 2011; Harasym et al., 2022). The identified storylines help us describe how Inuit felt and perceived climatic impacts and their interrelation with (im)mobility and wellbeing loss. Climatic changes are likely to affect them more disproportionately than, for example, a white wealthy middle-aged Canadian man, due to pre-existing health vulnerabilities and societal inequalities (Berry et al., 2018; Hayward and Ayeb-Karlsson, 2021). This narrative approach captures the nuances in wellbeing losses that may be difficult to identify, register and quantify in, for example, a survey questionnaire. These nuances are important as mental ill-health often builds on longer causal psychosocial relations. The hope is that similar study designs in the future can help inform climate change policy with locally led global experiences and solutions to non-economic wellbeing losses and damages.

Results

The narrative analysis revealed three overarching themes at the core of climate-related health loss and (im)mobility. The wellbeing loss as perceived by Inuit was strongly intertwined with climate-induced immobility and structured into; (1) identity and cultural loss, (2) land connection as a source of healing, and (3) environmentally-triggered emotional distress.

Identity and cultural loss. The factors linking climatic stress to wellbeing erosion through identity and cultural loss varied among

the studies but overall fed into the connection to the land as a fundamental part of being Inuit:

.../the land .../ defines who we are [as Inuit]. It's part of us. .../we have this connection to the land that makes you feel good. It makes you, you (Cunsolo Willox et al., 2012:542).

.../we are in our land and that the land means so much to us .../ we are very connected to the land (Chanteloup et al., 2018:376).

If the land changes, then everything else will change. The land affects people just as much as the people affect the land (Petrasek MacDonald et al., 2015:137).

.../besides my family, I would die for my land (Cunsolo Willox et al., 2013b:19).

Many described '*being one with the land*', meaning that the climate-induced changes to the land were embodied as individual loss of Inuit culture and identity:

.../ this is the beginning .../ of what global warming is gonna do to us? .../ the Inuit thrive on ice. I mean they're people of the ice (Cunsolo Willox et al., 2013b:20).

[unusual seasons] that to me is taking away our culture, it's taking away our traditional lifestyle, it's taking away our heritage, it's nipping into who we are, ice people .../ people of the snow (Wolf et al., 2013:557).

.../the environment supports the culture that was strong and in order to get the culture stronger, we still need that [cold] weather (Harper et al., 2015:7).

.../we're winter people.../ we're people of the snow; we want the snow, we want the ice (Middleton et al., 2020b:5).

Adverse weather conditions, rain, storm, fog, lack of snow and thin sea ice were reported across the studies as constraining elements to spending time on the land and partaking in traditional practices such as hunting, trapping, foraging, and fishing. The relationship between climate-induced involuntary immobility (or 'trapped' populations) and wellbeing loss is an upcoming research area among climate change and human (im)mobility scholars (Ayeb-Karlsson, 2020a, 2021; Kelman et al., 2021; McNamara et al., 2021; Harasym et al., 2022; McMichael et al., 2023). The lack of snow and weak sea ice, that otherwise facilitated travelling to the cabins and land-based activities, immobilised Inuit and induced strong emotions such as feeling '*handicapped*' or as having an '*arm cut off*'. The immobility severely impacted people's mental health as it resulted in the loss of engagement with land-based or traditional practices that are fundamental to Inuit identity:

[not going out on the land] feels almost like a handicap (Cunsolo Willox et al., 2013b:20).

.../for the Inuit, going out on the land is just as much a part of our life as breathing. Really, we are so close to the land. We are land people. So if we don't get out then, for our mental well-being, it's like taking part of your arm away (Cunsolo Willox et al., 2013a:261).

It's my identity and it's land based activity what keeps me grounded (Wolf et al., 2013:555).

.../ it helps me stay balanced. .../ people without the access.../they're losing a key part of their culture that helps

them to maintain balance and connection. Not just with each other, but with their environment and everything else (Cunsolo Willox et al., 2013a:265).

It can be hard on your mental capabilities. It can be hard to keep your sanity when you can't get out (Middleton et al., 2020b:6).

The identity loss that Inuit experienced from the immobility and inability to partake in land-based activities extended into a loss of pride and self-worth through the perceived unproductivity:

.../that is my first thought [about climate change] .../ look at what has happened with people losing that sense of identify and pride and people feel proud of bringing that fish home and that caribou home and they share it with people (Harper et al., 2015:11).

Seal was considered to be the main (before caribou) source of food. They sustain my people so that they can live up there (as a cow does for you, white people). We only take what we need, and leave the others in peace .../. To be considered as a good hunter, a man needs to hunt one of every animal (Chanteloup et al., 2018:370).

These narratives included current climate-induced losses as well as anticipated cultural, social and identity losses in the future:

.../a common denominator of outdoor-based activities, cultural based activities, it's sort of somewhat fragmented [because of climate change]. The cohesiveness that now bonds the community could be jeopardised because what else are you bonding on? (Harper et al., 2015:12)

I can't imagine not being Inuit.../if I wasn't Inuit what am I? Like you belongs with them .../when you does your cultural things like going out to the cabin and hunting and stuff it makes you feel more Inuit and you feels like you belongs (Petrasek MacDonald et al., 2013:366).

it feels like everyone's going to lose their culture.../and I really don't want that to happen (Petrasek MacDonald et al., 2013:365).

I guess it's all the pieces, like dominoes, all touches each other. I mean everything you do, [our] Inuit way of life and our way of thinking is all intertwined and interconnected [to the environment]. So, something as significant as changes in the temperature, and in snow and rain and that kind of thing, it's all going to have a ripple effect (Harper et al., 2015:6).

The climate-induced constraints to land-based activities and the changes in the environment also implied losses of food and changes in Inuit diet that strongly shaped Inuit identity. The inability to hunt and gather 'native', 'land' or 'Inuit food' implied an identity loss:

Your cultural identity [is partly] what you eat .../when you stop eating the land foods .../ I mean, part of identifying with being Inuit is eating what I call 'Inuit food' (Ostapchuk et al., 2012:17).

The conditions were horrible. People didn't get what they normally get for caribou and then you rely on store food junk.../the foods sources that you usually get to, you can't reach. There is not enough snow, there is not enough ice. It's alarming that we are just seeing the beginning of climate change (Harper et al., 2015:10).

The loss of 'Inuit food' also came with cascading losses of cultural traditions such as not being able to share food, or not being able to eat specific 'country food' that would energise body and spirit:

.../community is all about, sharing. .../when they catch something they share it .../ bring food to elders and people who can't get out .../people share, with their family or the elders (Pearce et al., 2010:166).

.../within climate change, there's all these other things changing – lifestyles changing, your food, your diet's changing, the way you interact with people (Petrasek MacDonald et al., 2015:137).

Well, I mean you're not getting so much berries or hunts/ .../ It's the loss of food, loss of the way we live (Wolf et al., 2013:557).

if we got good sea ice we can go and get the proper wild [food] .../ like fish, you can go fishing, or caribou hunting, go seal hunting, get partridges, get your geese, your ducks, your eggs. .../ I love that food .../and it's also good for your body and your spirit (Durkalec et al., 2015:23).

When people want to travel and weather patterns change/ .../ it affects their emotions, their mentality. They live on country food. It is good for their soul (Pearce et al., 2010:167).

Seals are very skinny through the spring, they are pitiful .../ we can't eat them.../They are only good for dog food (Pearce et al., 2010:164).

.../we have a lot of native food and once you don't have a certain type of food, it's like you're always hungry even though you eat, and once you finally have that certain type of food it's like your body is satisfied.../ I could see that happening more and more in the future if the weather keeps changing.../ I could see us craving for more and more native food (Pearce et al., 2010:167).

Land-based activities and food traditions also upheld cultural identity through the transfer of ITK. This intergenerational transfer of knowledge and wisdom depended on Inuit mobility, safe sea ice, and snow-filled accessible land. The sourcing and consumption of country foods to Inuit identity, unity, satisfaction, and preservation of culture strongly influenced the narratives. Climate-induced food insecurity thus eroded people's mental health (Beaumier et al., 2015; Rosol et al., 2016; Robertson and Ljubicic, 2019). The constrained trapping and fishing, hunting healthy and desirable species, gathering berries that were disappearing, or the interruption of historical practices and food sharing, fragmented social cohesion, and collective wellbeing (Pearce et al., 2010; Wolf et al., 2013; Bunce et al., 2016). These are clear examples of what has been described in climate policy circles as 'non-economic losses and damages' or losses that cannot be measured in monetary terms (Cunsolo and Ellis, 2018; McNamara et al., 2021; Ayeb-Karlsson et al., 2023). To further explore the relationship between the environment and Inuit wellbeing, we continue to the thematic area of the land as a source of healing and health.

Land connection as a source of healing. The narratives expanded further on Inuit connection to the land, and the erosion of Inuit cultural identity through climate-induced immobility and

interrupted access to the land. The land served as a healing, therapeutic and protective source for Inuit wellbeing. It was a source for health and wellbeing, seen as medicine, or as fundamental to Inuit life as oxygen:

.../going on the land/.../is the healthiest thing you'll ever get. .../That's where your health is, out there (Cunsolo Willox et al., 2012:543).

This is where I used to go to breath and hear myself (Chanteloup et al., 2018:371).

.../we take great pride in being able to go on the land and just feel that energy when you get out on the land. For some people, it's just like taking medicine (Cunsolo Willox et al., 2013a:261).

You have to know what the land does to a person, *.../it just gives you that sense of freedom, identity. .../it's the best therapy that anybody could have in the world (Ostapchuk et al., 2012:18).*

.../for some people going out on the land is just as good as sitting down in a counselling session, no need for words/.../the air and the land takes a lot of your feelings away and replaces the negative energy with the positive energy, nature (Cunsolo Willox et al., 2013a:262).

[the land] provides you with a sense of capability and *.../peace within yourself/.../you are probably better able to deal with things that are troubling you/.../you are able to come to some conclusion with yourself, because you feel in a better place to do that. If you take away that peace and that capability and that sense of self-value, then those [troubling] things seem to be more to the forefront (Cunsolo Willox et al., 2013b:20).*

Sea ice, cold temperature and snow were central to the healing experiences of being out and engaging with the land. The psychological, emotional, and spiritual benefits of being outdoors and tending to land-based activities were described as fulfilling and refreshing the spirit and unifying Inuit physical and mental health:

You're so at the mercy of the elements that you appreciate those elements/*.../so when the first snowfall comes/.../and the snowflakes are falling on your face/.../you'll stop and enjoy that/.../you really feel like you're so attuned like you feel closer to the land/.../they are really small moments, but they add to your mental health (Middleton et al., 2020b:6).*

I can practice my traditional lifestyle, that I can live healthy/*.../that I can use the land to refresh me. .../We use the land to replenish our spirit/.../to go out there and get rid of all the stress (Cunsolo Willox et al., 2012:543).*

We know that hunting and fishing is one the best means of being healthy, and going out on the land *.../The old people always said that your body has to continually move all the time/.../Your body and your muscles and your blood have to constantly move, that's the only way you'll be healthy (Robertson and Ljubicic, 2019:552).*

For some reason, we just need to be out on the land. *.../the more I am learning in mental health and wellness/.../the more I understand that I think it has a lot to do with the energy that you feel when you are outdoors, when you are out on land (Cunsolo Willox et al., 2013a:261).*

I don't see anything positive about it [climatic change] here. It is meant to be cold, and snowy, and icy, and crisp, and fresh, and bright here. For the most part, that's what is natural and normal here. And that is what people expect and love about this weather here, that is why [Inuit] stay here—it is in their bones and in their blood (Harper et al., 2015:6).

Time spent on the land was described as healing, as a progressive way of dealing with stress and coping with social frustrations and difficulties, similar to the way that people tend to religion, meditation, and faith:

Being out on the land/*.../it gives me some form of peace with myself. .../that's where I feel mostly connected/.../I'm not a church-going person/.../but it's there that I can find the peace that I need so it brings me comfort (Cunsolo Willox et al., 2013b:19).*

.../when I was standing there, I used to hear my voice coming back to me. It was as if it was talking to me. .../It was a good healing place for me (Chanteloup et al., 2018:372).

I think it does a lot for my health because it means I can get away from the everyday things that's going on here/*.../get away by myself and meditate/.../When you're going out on a snow machine, your mind is not worried about what's happening in town or who's going to kill themselves/.../There's no phone and there's nobody bugging you (Durkalec et al., 2015:22).*

[the land] can help you. It can soothe you and help you take things off your mind. You can go off wooding *.../take your frustrations out on a junk of wood. Or you can go out hunting and fishing/.../I would rather be out on the land any day rather than being in the community. It makes me feel as good as I ever feel (Petrasek MacDonald et al., 2015:136).*

The land was narrated as synonymous to freedom: as in being able to independently spend time outdoors and having the knowledge to live on and off the land without relying on others (Ostapchuk et al., 2012; Wolf et al., 2013; Durkalec et al., 2015). Many drew associations between feeling immobile and the lack of freedom or social dependence. Ultimately, ending up trapped and involuntary immobile in town brought up intergenerational traumas from the residential schools and the forced 'assimilation':

.../when people are unable to spend time on the land, they have more time to dwell on the negative, to remember things like residential schools experiences when they felt really trapped and unable to leave. Those kinds of feelings certainly come back, or that's what I've been told by lots of people. So yeah, I have no doubt that if these [climate change] trends continue, there will certainly be a large impact on mental health (Cunsolo Willox et al., 2013a:264).

.../people feel less capable, less able to provide, and less healthy about themselves then those [assimilation] impacts will either come more to the forefront and have to be dealt with, or they may just be built upon (Harper et al., 2015:12).

.../you lose a sense of well-being in the community/.../but when you go out on the land, you feel a sense of freedom and the worries/.../seem to disappear/.../knowing that your children have a freedom being out on the land/.../you feel a sense of/...the healing, mentally/.../life is more calm because you are not worrying about anybody (Robertson and Ljubicic, 2019:553).

The freedom experienced out on the land was associated with ‘*Ippigusutsianik*’, referring to ‘*consciousness of surroundings*’¹¹ and being prepared for all outcomes (Healey et al., 2011; Harper et al., 2015; Durkalec et al., 2015). However, the climatic changes also introduce new and unfamiliar risks that created concerns, fear and anxiety about being out on the land. People reflected upon near miss accidents or people having died after falling through the ice:

There is a lot of change. /.../years ago/.../you could pretty much tell when [the ice] was going to /.../break-up in the spring/.../and freeze-up in the fall. /.../but it seems like you can’t do that anymore (Ostapchuk et al., 2012:11).

/.../when I was younger, the sea ice was safer, it was not in the condition that it is today (Durkalec et al., 2015:23).

/.../suddenly the places that you can go for generations in the past, you can’t because the snow has melted or the ice is melting, or they get caught somewhere. /.../someone might have to go and search for people that are missing (Harper et al., 2015:8).

Nobody wants to beat their machines up to go get some caribou. There is no snow covering the rocks. Some people like sink in the skidoo. It is dangerous (Petrasek MacDonald et al., 2013:365).

It affects everyone because you can’t travel like you could before. It affects you in that way. You don’t know if the ice is going to be safe anymore (Ostapchuk et al., 2012:16).

Every conversation was around the ice was thin, it was unsafe to go, then they added some worry to that because people were still craving to get out on their skidoos on thin ice, with people going through the ice, and then there were family members that was off and didn’t come back. So, a lot of extra anxiety and disappointment, and unfulfilled needs (Harper et al., 2015:12).

The strong connection that Inuit have with the land can be understood as an emotional hypersensitivity around the ecological- and environmental changes felt by the land. In many ways, these narratives of upset, further analysed in the upcoming section that explores the distress that the environmental changes triggered, are delicate empirical witness statements of solastalgia, eco-anxiety and ecological grief e.g., distress, anxiety and grief relating to environmentally-induced losses and changes of beloved places or ecosystems (Albrecht et al., 2007; Hayes et al., 2018; Cunsolo et al., 2020; Stanley et al., 2021; Ojala et al., 2021).

Changing environment triggering emotional distress. The climate-associated immobility and collective confinement were reported to increase societal and domestic stress. Erosive coping strategies such as alcohol and drug use or gambling were captured in the narratives:

When we used to go out in boat from morning to night, there was no drinking, but as soon as you get back to [town], you started drinking. /.../we don’t take beer out there (Petrasek MacDonald et al., 2015:136).

I mean you are stuck here on this point of land in the community and you want to get out and you cannot go. People get bored and people turn to drinking and drugging and social problems. /.../I mean people, day after day after day look out the window and it’s this old depressing fog

and rain and windy. I mean it got to play on people’s minds (Cunsolo Willox et al., 2012:543).

People get bored and/.../turn to drinking and drugging and social problems/.../(Ostapchuk et al., 2012:17).

That’s what everyone who’s drinking says – they drink ‘cause there’s nothing else to do /.../One of my friends always says that he smokes dope so that the day don’t seem so long (Petrasek MacDonald et al., 2015:138).

Right now there is so much drug and alcohol problems/.../[It is] probably the biggest problem that we have/.../kids [are] going hungry because their parents spend their money on drugs and alcohol, there are more fights, more stress in families (Pearce et al., 2010:169).

People felt that the changing environment and the loss of snow and ice impacted their wellbeing through the constrained mobility and freedom. The inaccessible land instigated boredom, sadness, and isolation, all attributed to descriptions of feeling ‘*trapped*’, ‘*stuck*’ or ‘*imprisoned*’ similar to a ‘*caged animal*’:

/.../this year we were very isolated, I mean we’re an isolated community but this year was just like living on an island (Wolf et al., 2013:557).

Everything was about the weather. /.../how awful this was/.../It was always conversations about the weather and not being able to go out. /.../It really consumed us (Cunsolo Willox et al., 2013b:20).

You’ll probably see more people being stressed. /.../If you can’t go out and everyone is kind of just stuck here, after a while I think it’s going to kind of get to people (Ostapchuk et al., 2012:17).

It’s just tiring, it’s really tiring waiting for snow when it’s not coming, or a freeze-up when it’s really long to wait for (Petrasek MacDonald et al., 2013:366).

[the changes] will have the impact maybe on mental health, because it’s a depressing feeling when you’re stuck (Cunsolo Willox et al., 2012:543).

This entrapment triggered collective feelings of self-pity, powerlessness, and reduced self-worth where women in particular reported feeling depressed:

I think that [the changes] will have the impact maybe on mental health, because it’s a depressing feeling when you’re stuck. /.../part of your life is gone, and I think that’s very depressing. It could be a depressing thing for a lot of people, and it could have an impact on your health (Cunsolo Willox et al., 2012:543).

/.../every day [last winter] you get up and look out at the thermometer /.../it would rain and day after day, it was, it really was depressing. /.../you just sit and dwell/.../it can really affect you (Cunsolo Willox et al., 2013b:20).

Changes in weather hurts people because they feel helpless about something they care about, which makes them feel sad (Petrasek MacDonald et al., 2015:137).

It kind of depresses me sometimes/.../ There’s times when you want to go off [on the land] (Middleton et al., 2020b:6).

I mean people, day after day after day look out the window and it's this old, depressing fog and rain and wind. I mean it's got to play on people's minds (Ostapchuk et al., 2012:17).

Part of the helplessness was reminiscent of the powerlessness Inuit felt in relation to the ethnocide and the state-led child removals with the residential schools. People explained how the immobility, unproductiveness and dependency on a 'Southern' lifestyle amplified difficult memories and emotional trauma:

I think the trauma of being forced to assimilate/.../will be felt further if climate change affects [land] activity/.../some of those effects will seem to be a bit stronger to you and then the southern dependency needs to be more so (Harper et al., 2015:12).

A lot of trauma that you face-whether it be rape or residential schools or child abuse/.../usually if you are able to find some sense of worth in yourself and value you are able to start unconsciously healing from those wounds. /.../If you take away an internal capability and what makes you feel productive, then those tragedies or that past is still there/.../magnified because they come more to the surface/.../people feel less capable, less able to provide, and less healthy/.../those impacts will either come more to the forefront/.../be dealt with or they may just be built upon. /.../those [IRS] effects will be felt further if climate change affects [land] activity (Cunsolo Willox et al., 2013a:264).

/.../there's definitely depression [due to the changes], and you know a lot of things come about when everything that you know is taken away from you. /.../you're in no place to control that yourself/.../you're going to feel very helpless (Cunsolo Willox et al., 2012:543).

The emotional distress of living with a changing home-environment and the constraints it posed on people's mobility, identity and culture were identified as cumulative risks for suicide ideation and fatal intentional self-harm. In particular, for those with distressing memories of IRS traumas and mental health conditions:

[periods of bad weather, fall freeze-up and spring thaw] are always the most vulnerable time in our communities for suicides, for violent statistics going up (Cunsolo Willox et al., 2013a:263).

/.../teach the youth girls how to sew, or cook, or prepare/.../and the mens could learn how to make tools and go hunting/.../it could be a good way for the youth to understand that life is special/.../like way back when, they never really used to do that [suicide], and today it's kinda hard (Robertson and Ljubicic, 2019:554-555).

/.../people tend to not drink at all when they're out on the land /.../I think that certainly being stuck in the community, and the climate changes, impacts on the amount of alcohol consumed. And then it just snowballs from there into more violent incidents and spousal abuse and suicides (Cunsolo Willox et al., 2013a:263).

Others described the interrupted land connection from lacking snow and ice as a constant reminder of the colonisation and Government imposed surveillance and control. When contemplating a future without sea ice, some felt as if they would 'get sick', 'not be able to breathe' or that their 'appetite and mind

would go' (Durkalec et al., 2015; Cunsolo Willox et al., 2013b). People explained how seeing their environment change was deeply upsetting, terrifying, and disorienting:

I'm scared that there's not going to be any winter! I'm scared that you're not going to be able to go to your cabins/.../ You can't go trapping, like my dad will just lose that altogether. /.../it scares me that /.../you're going to lose your culture even more (Wolf et al., 2013:557).

/.../as the time went on, I was just getting more frustrated/.../ You see [the changes] every day, and it's not something that I could accept/.../ I'm very fearful of what this winter [2010-2011] is going to be (Cunsolo Willox et al., 2013b:19).

[this past winter] everyone was always talking about the weather/.../everyone's worried [about] next winter, wondering what it'll be like/.../[When I go out on skidoo I wonder will I] go out on the bay on skidoo ever again for the rest of my life? Was that the last time? (Petrasek MacDonald et al., 2013:367).

/.../people are starting to worry about/.../what's going to happen in a few years down the road (Ostapchuk et al., 2012:18).

Others expressed being angry, mad, and anxious about a climate changed future and what it will mean to Inuit as a people and to their children:

/.../that's so sad to think about it. It do make you angry, but what can you do? It makes you feel so helpless (Cunsolo Willox et al., 2012:543).

It kind of worries me how fast it is going to happen. Are my kids going to be able to go off to the cabin in the wintertime on skidoo? I love travelling on skidoo/.../It seems that might not happen when I get old. It seems like it is happening so fast (Petrasek MacDonald et al., 2013:367).

/.../if I believe that it was going to get as drastic as they say I think I would go insane, even though I will not live that long to see it. But if I dwell on it (Cunsolo Willox et al., 2013b:21).

/.../Our children will be stuck in the future, too. They are stuck with what we leave for them. /.../they will be stuck with our mess (Healey et al., 2011:93).

/.../when people think of the [Canadian] Inuit: snow and going hunting on the ice. That is not going to be anymore. Definitely, like the Inuit people and people who live in the North, that is their life. There is going to be big changes (Petrasek MacDonald et al., 2013:366).

It's going to change people's lives. /.../you wouldn't be able to trap, you wouldn't be able to hunt, so it's going to take away a part of your life (Wolf et al., 2013:558).

Despite the predominant feelings of grief, loss, and anxiety around the experienced and anticipated environmental changes of Inuit land, aligning with the conceptual understanding of eco-anxiety (Hayes et al., 2018; Stanley et al., 2021; Ojala et al., 2021) and ecological grief (Cunsolo and Ellis, 2018; Cunsolo et al., 2020) it is worth mentioning that some felt that Inuit would transform and adapt with the changes. They felt this way as they trusted that

Inuit strength, determination, and resilience would guide them through the challenges:

.../we have kind of like a reputation for being a people that can adjust to whatever happens. .../whatever happens, we just learn to deal with it (Petrasek MacDonald et al., 2015:138).

If it keeps getting warmer, I guess we're just going to have to adapt to the climate, because we have no plans of leaving (Ostapchuk et al., 2012:17).

I don't know, I guess I might sell my skidoo, no point in having a skidoo down here if it's going to be warm. Buy a four-wheeler, I suppose (Wolf et al., 2013:558).

This can also be noted in the ways that Inuit have adapted their mobility customs and means of transport from traditional ways of moving on the land with dog sleds, kayaks, and snowshoes to incorporating modern technology to support their movement with the use of snow machines, motorboats, or even considering the possibility of selling the skidoo to purchase a four-wheeler (Laugrand and Oosten, 2002; Tester, 2010a, 2010b). It can be seen as a way that Inuit described adapting with the climate conditions that offered increased mobility options while maintaining a feeling of being connected with the land once being out hunting on a skidoo or in a motorboat.

At the same time, other people associated these new modes of mobility with colonial traumas, such as the sled dog massacre (Shackleton, 2012; McHugh, 2013). People also described erosive elements of these coping mechanisms such as how the high fuel costs increased 'Southern' dependence through the need for cash, the use of fossil fuel, and the damage from the machines on the environment such as through ruts in the tundra, oil, and noise pollution. This kind of movements also reinforced a pattern of year-round village residence rather than seasonal camping on the land at outlying fishing and hunting camps (Wenzel, 1987; Damas, 1988; Tester and Irniq, 2008). Others fundamentally struggled to cope with the idea of change, were in denial, or explained remaining positive for the sake of their emotional wellbeing.

Discussion

It is interesting that climate-related *immobility* streamed through the empirical storylines as the search and review data extracted primarily focussed on understanding climate-induced *wellbeing loss* as perceived by Inuit. This should serve as key insights for the UNFCCC Loss and Damage work on human mobility and its close connections to non-economic losses and damages (NELs and NELDs). The human mobility and NELs expert groups are currently planned as separate work streams in the Executive Committee. Adding to that, insights of experienced losses and damages among immobile and trapped populations remain alarmingly scarce (McNamara et al., 2021; Jackson et al., 2023; Ayeb-Karlsson et al., 2022).

To the authors knowledge, very limited research has explored climate-induced immobility and wellbeing loss in the context of the Inuit in Canada (or other Indigenous People globally). It is crucial that open-ended and locally led storytelling empirical research in the future builds on and further explores the review's findings. This is because we must acknowledge the limitations of this review study surrounding potential researcher bias and the research context in which the sample studies were conducted. The study designs primarily explored climate change impacts, adaptation measures and responses to climatic changes where mental health loss in some ways were found to be associated with Inuit

(im)mobility. It will be important to learn more about *how*, *why* and to *what* level different Inuit individuals subjectively feel and self-identify as 'trapped' as well as to what extent such entrapment is perceived to be associated with the changing environment.

Climate-induced wellbeing loss in the sampled articles were narrated by the Inuit in Canada as longer pathways channelled through snow and ice dependant mobility, and as interlinked with interruptions in the land connection. These findings will be crucial to the understanding of various Indigenous People worldwide whose identity, cultural essence, and mental health are deeply interweaved with traditional customs, a nomadic life, or stable and noninterrupted connection with the land. Overall, wellbeing losses due to climate-induced immobility, or the links between involuntary experiences of feeling 'trapped' and climatic changes, represent research and policy areas that require further attention (Ayeb-Karlsson et al., 2018, 2022, 2023; Gavonel et al., 2021; Cundill et al., 2021; Kelman et al., 2021; Tschakert and Neef, 2022; McMichael et al., 2023; Jackson et al., 2023).

The loss and decline of traditional food sources (such as seal, caribou, and berries) impacted Inuit mental health. The cultural, medicinal, and nutritional value of these food sources for Inuit wellness is well-reported (Takano, 2005; Beaumier et al., 2015; Rosol et al., 2016; Robertson and Ljubicic, 2019; Boulanger-Lapointe et al., 2019; Cunsolo et al., 2020; Borish et al., 2021). Climatic changes can contribute to shifts in animals' migration routes or decline due diseases and competition for prey (Beaumier et al., 2015; Cunsolo et al., 2020). Subsistence data also demonstrate reduced harvests of seal and caribou, food insecurity as well as food adjustments to greater reliance on moose (Rosol et al., 2016; Borish et al., 2021). The change in food custom towards a greater mix of species must in some ways be understood as successful adaptive strategies around a fluctuating climate. At the same time, the food decline and unsafe ice also increased the risk of injuries and accidents for hunters who entered new hunting areas. Many felt stuck between the impossible choice of undesired immobility or precarious mobility on weak and dangerous ice that elevated fear and anxiety. However, the warmer temperatures also supported and improved marine and river travel or movements, hunting, and fishing from boats on rivers, lakes, and sea. Nonetheless, storms, floods, and unpredictable weather while out on the sea as well as seals and walrus moving further out with the moving ice packs posed new risks that served to immobilise those fearing injuries, accidents, and damage to their motorboats.

The interruption of a collective history, practise and traditions through the immobility and disrupted hunting, food gathering and sharing, severely impacted Inuit wellbeing (Wolf et al., 2013; Harper et al., 2015; Robertson and Ljubicic, 2019). The grief and loss expressed extended far beyond material losses. Inuit did not simply grieve the loss of caribou, seals, berries, declining ice, or even the hunting, food gathering and traditional practices. They grieved the anticipated losses and changes for future generations. In this way, the climate-induced non-economic losses and damages cascaded into extended mental health losses (Cunsolo and Ellis, 2018; Tschakert et al., 2019; Cunsolo et al., 2020; McNamara et al., 2021; Henrique et al., 2022; Ayeb-Karlsson et al., 2023).

The importance and feelings surrounding these *anticipated* non-economic losses and grief also need to be better channelled into the UNFCCC's overall work on (Non-Economic) Loss and Damage. Research in the area of climate-induced non-economic losses and damages (NELs and NELDs) represents a key opportunity to appropriately avert, minimise and address climate-related mental health loss. We encourage the established 'UNFCCC WIM ExCom Expert Group on Non-Economic Losses'

to support future research and financial investments around climate-related wellbeing loss and (im)mobility, particularly among Inuit and other Indigenous People globally.

The anticipated losses, uncertainties, and changes in collective Inuit wellbeing among future generations, triggered feelings of anxiety, distress, and anger. Some felt that the extensive discussions and the constant reminders of the changing weather and climate were upsetting. Erosive coping mechanisms (including substance use and gambling) sometimes constrained people's ability to grieve, heal and adapt (Berry et al., 2018; Ayeb-Karlsson et al., 2023; Vergunst et al., 2023). This aligns with previous reports describing how Inuit with pre-existing social vulnerabilities are more susceptible to mental health issues including those that are climate-induced (Prowse and Furgal, 2009; Ford, 2009). The association between the trauma, powerlessness, control, and dependence related to the human rights abuses of the IRS system will have aggravated distress among people in regard to the climate uncertainty. It will be important to further investigate the diversity among pre-existing mental health conditions to find solutions to climate-induced wellbeing loss. The under-reporting, stigmatisation and lacking access to healthcare services will pose challenges to these investigations.

Deterioration in Inuit wellbeing has been attributed to the cultural genocide and (post)colonisation resulting in the suppression of traditional Inuit lifestyles. The effects of historical (and current) mistreatment and discrimination remain. Inuit continue to experience intergenerational trauma. Many children who faced forced 'adoptions' remain unaware of their family ties and are kept up at night haunted by the residential school abuses; many parents who lost children still do not know what happened to them or whether they are even alive. These traumas continue to cause a breakdown in cultural identity, and a decline in ITK sharing. The many ways that Inuit have resisted and overcome decades of structural violence have also fostered a survivor identity that some felt will sustain them through any forthcoming climate-related wellbeing degradation. Inuit history increased their resilience, adaptive capacity, and determination to carry on and thrive, despite of the stress, changes, and challenges (Kral et al., 2011; Haalboom and Natcher, 2012; Bunce et al., 2016; Ready and Collings, 2021).

Recently, a growing literature body is investigating potential relations between increased temperatures, heat and humidity, and self-harm or suicide i.e., fatal intentional self-harm (Berry et al., 2010, 2018; Thompson et al., 2018; Watts et al., 2021; Florido Ngu et al., 2021). This represents another key area of examination going forward, keeping in mind the increased suicide risk globally among Indigenous People (Gray et al., 2016; Pollock et al., 2018; Middleton et al., 2020a). It raises immediate concerns as depressive thoughts and distress can spread rapidly from individuals to the extended collectives especially among immobile and isolated societies (Pollock et al., 2016; Crawford, 2016; McQuaid et al., 2017; Harasym et al., 2022). The isolation, immobility, hopelessness, and cascading wellbeing losses, described by the Inuit in this study, are all potential indicators for increased suicide ideation that will need further attention.

Conclusion

The key findings of this Inuit climate-related wellbeing loss review are valuable for broader UNFCCC climate policy, academia, and adaptation planning. However, more research on how Indigenous People worldwide perceive climate-induced immobility and wellbeing loss is needed. Inuit land acts as a protective factor for physical and mental health in a way that even temporary disruption in the mobility and land connection had devastating wellbeing impacts on people. Displacement and migration have until date served as main research areas bridging climate change-related human mobility and health. Conceptually,

a person cannot be displaced at home. Nonetheless, the grief, anxiety and distress felt about the changing home-environment, and the immobility it caused, may in similar ways to displacement erode people's wellbeing. We call for more research and for a greater policy focus on the climate-violence-health nexus of Indigenous immobile people. Considering the past and present traumas of Inuit due to (post)colonial and structural violence, the strong emotional ties of Inuit to the land, and its mechanisms for healing and therapy, it is likely that other Indigenous People, with similar traumatic life histories and whose identity is reproduced as part of the land, are also experiencing climate-related mental health impacts that will be felt even deeper over the coming years.

Data availability

The secondary data analysed in this study is openly available and has been published as peer reviewed journal articles.

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Notes

- 1 Indigenous Inuit live across Canada, US Alaska, Chukotka (Russia) and Greenland, with approximately 65,000 of the 180,000 Circumpolar Inuit residing in Canada according to the Inuit Circumpolar Council (ICC). As of 2016, Inuit represented 65,025 of Canada's total 36.29 million citizens, with 73% of Inuit in Canada living across 'Inuit Nunangat'. 27% of Inuit are believed to live outside of this region (Boksa et al., 2015). The term 'Inuit Nunangat' (Inuit homeland) comprises Nunavik (Northern Quebec), Inuvialuit (North West Territories and Yukon), Nunatsiavut (Newfoundland and Labrador) and Nunavut. The *Inuit Tapirit Kanatami's* understanding of 'Inuit land' includes references to 'sea ice, oceanic, or terrestrial environments' (Condon et al., 1995; Bunce et al., 2016).
- 2 In this article, we understand wellbeing '*as a subjective and dynamic state of feeling healthy and happy that ties into life satisfaction and influences a person's (or a collective's) psychological and social function*' (Ayeb-Karlsson, 2020b:2). This acknowledges the social, cultural and subjective diversity and flexibility of wellbeing and mental health where we align Inuit mental wellness with the 2016 *Inuit Tapirit Kanatami's* definition of '*physical, emotional, mental and spiritual wellness, as well as strong cultural identity*' (Kral et al., 2011; Crawford, 2016). In this way, references to 'mental health' includes mental and emotional wellness, while mental health and wellbeing challenges also include erosive coping mechanisms and substance abuse (Hayes and Poland, 2018; Hueffer et al., 2019; Berry et al., 2018; Vergunst et al., 2023).
- 3 For literature reviews on the conceptual and discursive development of 'trapped' populations, see Ayeb-Karlsson et al. 2018 and 2022.
- 4 In this article, we will use ITK as a synonym for 'Inuit Qaujimajatuqangit' (IQ) as we acknowledge that this is the term used to describe Inuit epistemology or the *Indigenous* knowledge of the Inuit.
- 5 The so-called 'Indian' Residential School system in Canada traces back to the colonial days and ideologies coming out of the Catholic Church such as values that extended from the United Kingdom's perception of a hierarchical world order (also incorporated into the British Boarding School system). The Residential School system (or Boarding School system in the US) was put in place in several Commonwealth countries such as in Australia, New Zealand, India, Malaysia, and Kenya, but also in other continents and countries (Kuokkanen, 2003; Smith, 2004, 2008; Swain, 2013; Feir, 2016; Reyhner, 2018). The thing that unified them all was the structural violence through forced assimilation of Indigenous People which preserved a racial class hierarchy elevating the white elite.
- 6 For further description of the abuse, torture and mistreatment of Indigenous and First Nations children in the Canadian residential schools see <https://www.scientificamerican.com/article/canadas-residential-schools-were-a-horror/> and <https://ottawacitizen.com/news/canada/how-canada-forgot-about-more-than-1308-graves-at-former-residential-schools/wcm/18d376d7-7abc-42b6-a459-d964dc7ca844>.
- 7 For further illustrations related to the health and wellbeing impacts of forced adoption, child removals and family separation among Indigenous and First Nation children in Canada, see newly released TV Drama Series 'Little Bird' (2023) available at <https://www.imdb.com/title/tt22750834/> and 'Bones of Crows' (2023) available at <https://www.imdb.com/title/tt21342838/>.
- 8 For further illustrations related to the health and wellbeing impacts of Inuit in the context of seal hunting restrictions, bans and so-called animal rights activists, see

- 'Angry Inuk' (2016) available at <https://www.imdb.com/title/tt5709536/> and elaborations on hunting, mental health loss and suicide ideation among Inuit youth in 'The Grizzlies' (2018) available at <https://www.imdb.com/title/tt6365796>.
- 9 For transparency, the 150+ text extracts included in the narrative sampling have been added to the supplementary material. This transparently showcases the overall quote balance between the three overarching themes and indicates the age and gender of each empirical interviewing text extract as well as the article in which it was originally presented.
- 10 We acknowledge the recent debate and agree that words such as 'communities' and 'participatory' research approaches, and more so when linked to Indigenous People (e.g., Indigenous communities), may reproduce misrepresentative romantic, classless and spiritual notions or stereotypes (Haalboom and Natcher, 2012; Cameron, 2012; Titz et al., 2018; Pfeifer, 2020; Ayeb-Karlsson, 2020b). However, as the word 'community' was brought up in the interviews by the participants alone we feel it is only fair to include it in this article.
- 11 We note that there are differences in Inuktitut dialects depending on location, so this may not be a consistent term across Inuit Nunangat.

References

- Albrecht G, Sartore G-M, Connor L et al. (2007) Solastalgia: the distress caused by environmental change. *Australas Psychiatry* 15(sup1):S95–S98. <https://doi.org/10.1080/10398560701701288>
- Ali MI (2013) Stories/storytelling for women's empowerment/empowering stories. *Women's Stud Int Forum* 45:98–104. <https://doi.org/10.1016/j.wsif.2013.10.005>
- Ayeb-Karlsson S (2020) 'I do not like her going to the shelter': stories on gendered disaster (im)mobility and wellbeing loss in coastal Bangladesh *Int J Disaster Risk Reduct* 50:101904. <https://doi.org/10.1016/j.ijdrr.2020.101904>
- Ayeb-Karlsson S (2020) No power without knowledge: a discursive subjectivities approach to investigate climate-induced (Im)mobility and wellbeing *Soc Sci* 9(6):103. <https://doi.org/10.3390/socsci9060103>
- Ayeb-Karlsson S (2021) 'When we were children we had dreams, then we came to Dhaka to survive': urban stories connecting loss of wellbeing, displacement and (im)mobility. *Clim Dev* 13(4):348–359. <https://doi.org/10.1080/17565529.2020.1777078>
- Ayeb-Karlsson S, Baldwin AW, Kniveton D (2022) Who is the climate-induced trapped figure? *WIREs Clim Change* 13(6):e803. <https://doi.org/10.1002/wcc.803>
- Ayeb-Karlsson S, McNamara KE, Chandra A (2023) Stories of loss and healing: connecting non-economic loss and damage, gender-based violence and wellbeing erosion in the Asia-Pacific region. *Clim Change* 157:1–34. <https://doi.org/10.1007/s10584-023-03624-y>
- Ayeb-Karlsson S, Smith CD, Kniveton D (2018) A discursive review of the textual use of 'trapped' in environmental migration studies: the conceptual birth and troubled teenage years of trapped populations. *Ambio* 47(5):557–573. <https://doi.org/10.1007/s13280-017-1007-6>
- Bailey C, Madden A, Alfes K, Fletcher L (2017) The meaning, antecedents and outcomes of employee engagement: a narrative synthesis. *Int J Manag Rev* 19:31–53. <https://doi.org/10.1111/ijmr.12077>
- Barnett J, Tschakert P, Head L et al. (2016) A science of loss. *Nat Clim Change* 6(Oct):976–978. <https://doi.org/10.1038/nclimate3140>
- Beaumier MC, Ford JD, Tagalik S (2015) The food security of Inuit women in Arviat, Nunavut: the role of socio-economic factors and climate change. *Polar Rec* 51(5):550–559. <https://doi.org/10.1017/S0032247414000618>
- Berry HL, Bowen K, Kjellstrom T (2010) Climate change and mental health: a causal pathways framework. *Int J Public Health* 55(2):123–132. <https://doi.org/10.1007/s00038-009-0112-0>
- Berry HL, Waite TD, Dear KBG et al. (2018) The case for systems thinking about climate change and mental health. *Nat Clim Chang* 8(4):282–290. <https://doi.org/10.1038/s41558-018-0102-4>
- Boksa P, Joobar R, Kirmayer LJ (2015) Mental wellness in Canada's Aboriginal communities: striving toward reconciliation. *J Psychiatry Neurosci* 40(6):363. <https://doi.org/10.1503/jpn.150309>
- Borish D, Cunsolo A, Snook J, Shiwak I, Wood M, Mauro I, HERD Caribou Project Steering Committee (2021) "Caribou was the reason, and everything else happened after": effects of caribou declines on Inuit in Labrador, Canada. *Glob Environ Change* 68:102268. <https://doi.org/10.1016/j.gloenvcha.2021.102268>
- Boulanger-Lapointe N, Gérin-Lajoie J, Siegwart Collier L et al (2019) Berry plants and berry picking in inuit nunangat: traditions in a changing socio-ecological landscape. *Hum Ecol: Interdiscip J* 47(1):81–93. <https://doi.org/10.1007/s10745-018-0044-5>
- Bourque F, Cunsolo Willox A (2014) Climate change: the next challenge for public mental health? *Int Rev Psychiatry* 26(4):415–422. <https://doi.org/10.3109/09540261.2014.925851>
- Bunce A, Ford J, Harper S, Edge V, IHACC Research Team (2016) Vulnerability and adaptive capacity of Inuit women to climate change: a case study from Iqaluit, Nunavut. *Nat Hazards* 83(3):1419–1441. <https://doi.org/10.1007/s11069-016-2398-6>
- Cameron ES (2012) Securing indigenous politics: a critique of the vulnerability and adaptation approach to the human dimensions of climate change in the Canadian Arctic. *Glob Environ Change* 22:103–114. <https://doi.org/10.1016/j.gloenvcha.2011.11.004>
- Chase YE, Ullrich JS (2022) A connectedness framework: breaking the cycle of child removal for black and indigenous children. *Int J Child Malt* 5:181–195. <https://doi.org/10.1007/s42448-021-00105-6>
- Chanteloup L, Joliet F, Herrmann TM (2018) The environment of the Nunavimmiut as seen through their own eyes. *Écoscience* 25(4):359–379. <https://doi.org/10.1080/11956860.2018.1517631>
- Condon RG, Collings P, Wenzel G (1995) The best part of life: subsistence hunting, ethnicity, and economic adaptation among young adult Inuit males. *Arctic* 48(1):31–46
- Costello A, Abbas M, Allen A, Ball S, Bell S, Bellamy R, Friel S, Groce N, Johnson A, Kett M, Lee M (2009) Managing the health effects of climate change: lancet and University College London Institute for Global Health Commission. *Lancet* 373(9676):1693–1733. [https://doi.org/10.1016/S0140-6736\(09\)60935-1](https://doi.org/10.1016/S0140-6736(09)60935-1)
- Crawford A (2016) Inuit take action towards suicide prevention. *Lancet* 388(10049):1036–1038. [https://doi.org/10.1016/S0140-6736\(16\)31463-5](https://doi.org/10.1016/S0140-6736(16)31463-5)
- Cundill G, Singh C, Adger WN, De Campos RS, Vincent K, Tebboth M, Maharjan A (2021) Toward a climate mobilities research agenda: intersectionality, immobility, and policy responses. *Glob Environ Change* 69:102315. <https://doi.org/10.1016/j.gloenvcha.2021.102315>
- Cunsolo A, Ellis NR (2018) Ecological grief as a mental health response to climate change-related loss. *Nat Clim Change* 8(4):275–281. <https://doi.org/10.1038/s41558-018-0092-2>
- Cunsolo A, Borish D, Harper SL et al. (2020) "You can never replace the caribou": Inuit experiences of ecological grief from caribou declines. *Am Imago* 77(1):31–59. <https://doi.org/10.1353/aim.2020.0002>
- Cunsolo Willox A, Harper SL, Ford JD, Edge VL, Landman K, Houle K et al. (2013a) Climate change and mental health: an exploratory case study from Rigolet, Nunatsiavut, Canada. *Clim Change* 121(2):255–270. <https://doi.org/10.1007/s10584-013-0875-4>
- Cunsolo Willox AC, Harper SL, Edge VL, Landman K, Houle K, Ford JD (2013b) The land enriches the soul: on climatic and environmental change, affect, and emotional health and wellbeing in Rigolet, Nunatsiavut, Canada. *Emot, Space Soc* 6:14–24. <https://doi.org/10.1016/j.emospa.2011.08.005>
- Cunsolo Willox A, Harper SL, Ford JD, Landman K, Houle K, Edge VL (2012) "From this place and of this place": Climate change, sense of place, and health in Nunatsiavut, Canada. *Soc Sci Med* 75(3):538–547. <https://doi.org/10.1016/j.socscimed.2012.03.043>
- Dalton N, McLaughlin M, Cassidy T (2022) Attachment state of mind and trauma in mother and baby home adoptees. *Adopt Foster* 46(1):73–87. <https://doi.org/10.1177/03085759221080211>
- Damas D (1988) The contact-traditional horizon of the Central Arctic: reassessment of a concept and reexamination of an era. *Arct Anthropol* 25(2):101–138. <http://www.jstor.org/stable/40316170>
- Durkalec A, Furgal C, Skinner MW, Sheldon T (2015) Climate change influences on environment as a determinant of Indigenous health: relationships to place, sea ice, and health in an Inuit community. *Soc Sci Med* 136:17–26. <https://doi.org/10.1016/j.socscimed.2015.04.026>
- Feir DL (2016) The long-term effects of forcible assimilation policy: the case of Indian boarding schools. *Can J Econ/Rev Can d'Econ* 49(2):433–480. <http://www.jstor.org/stable/24915852>
- Florida Ngu F, Kelman I, Chambers J, Ayeb-Karlsson S (2021) Correlating heat-waves and relative humidity with suicide (fatal intentional self-harm). *Sci Rep*. 11(1):1–9. <https://doi.org/10.1038/s41598-021-01448-3>
- Ford JD (2009) Dangerous climate change and the importance of adaptation for the Arctic's Inuit population. *Environ Res Lett* 4(2):024006. <https://doi.org/10.1088/1748-9326/4/2/024006>
- Ford JD (2012) Indigenous health and climate change. *Am J Public Health* 102(7):1260–1266. <https://doi.org/10.2105/AJPH.2012.300752>
- Ford JD, Smit B, Wandel J (2006) Vulnerability to climate change in the Arctic: a case study from Arctic Bay, Canada. *Glob Environ Change* 16(2):145–160. <https://doi.org/10.1016/j.gloenvcha.2005.11.007>
- Fournier S and Crey E (1998) Stolen from our Embrace: The Abduction of First Nation Children and the Restoration of Aboriginal Communities. *British Columbia, Douglas & McIntyre*
- Fritze JG, Blashki GA, Burke S, Wiseman J (2008) Hope, despair and transformation: climate change and the promotion of mental health and wellbeing. *Int J Ment Health Syst* 2(1):13. <https://doi.org/10.1186/1752-4458-2-13>
- Garrett PM (2017) Excavating the past: mother and baby homes in the republic of Ireland. *Br J Soc Work* 47(2):358–374. <https://doi.org/10.1093/bjsw/bcv116>
- Gavonel MF, Adger WN, de Campos RS, Boyd E, Carr ER, Fabos, A, ... and Siddiqui, T (2021) The migration-sustainability paradox: transformations in mobile worlds. *Curr Opin Environ Sustain* 49:98–109. <https://doi.org/10.1016/j.cosust.2021.03.013>

- Gray AP, Richer F, Harper S (2016) Individual- and community-level determinants of Inuit youth mental wellness. *Can J Public Health* 107(3):e251–e257. <https://doi.org/10.17269/CJPH.107.5342>
- Guest G, MacQueen KM, Namey EE (2011) *Applied Thematic Analysis*. Sage Publications, Thousand Oaks
- Haalboom B, Natcher DC (2012) The power and peril of “vulnerability”: approaching community labels with caution in climate change research. *Arctic* 65:319–327. <https://www.jstor.org/stable/41758938>
- Harasym MC, Raju E and Ayeb-Karlsson, S (2022) A global mental health opportunity: how can cultural concepts of distress broaden the construct of immobility? *Glob Environ Change*, 77(102594). <https://doi.org/10.1016/j.gloenvcha.2022.102594>
- Harper SL, Edge VL, Cunsolo Willox A et al. (2012) ‘Changing climate, changing health, changing stories’ profile: using an ecohealth approach to explore impacts of climate change on Inuit health. *EcoHealth* 9(1):89–101. <https://doi.org/10.1007/s10393-012-0762-x>
- Harper SL, Edge VL, Ford J, Cunsolo Willox A, Wood M, McEwen SA, IHACC Research Team (2015) Climate-sensitive health priorities in Nunatsiavut, Canada. *BMC Public Health* 15(1):605. <https://doi.org/10.1186/s12889-015-1874-3>
- Hayes K, Blashki G, Wiseman J et al. (2018) Climate change and mental health: risks, impacts and priority actions. *Int J Ment Health Syst* 12(1):28. <https://doi.org/10.1186/s13033-018-0210-6>
- Hayes K, Poland B (2018) Addressing mental health in a changing climate: Incorporating mental health indicators into climate change and health vulnerability and adaptation assessments. *Int J Environ Res public health* 15(9):1806.1806. <https://doi.org/10.3390/ijerph15091806>
- Hayward G, Ayeb-Karlsson S (2021) ‘Seeing with empty eyes’: a systems approach to understand climate change and mental health in Bangladesh. *Clim Change* 165(29):1–30. <https://doi.org/10.1007/s10584-021-03053-9>
- Hayward A, Cidro J, Dutton R et al. (2020) A review of health and wellness studies involving Inuit of Manitoba and Nunavut. *Int J Circumpolar Health* 79:(1). <https://doi.org/10.1080/22423982.2020.1779524>
- Healey GK, Magner KM, Ritter R, Kamookak R, Aningmiuq A, Issaluk B, Mackenzie K, Allardyce L, Stockdale A, Moffit P (2011) Community perspectives on the impact of climate change on health in Nunavut, Canada. *Arctic* 1:89–97
- Henrique KP, Tschakert P, du Couray CB, Horwitz P, Krueger KDC, Wheeler AJ (2022) Navigating loss and value trade-offs in a changing climate. *Clim Risk Manag* 35:100405. <https://doi.org/10.1016/j.crm.2022.100405>
- Hodge FS et al. (2002) Utilizing traditional storytelling to promote wellness in American Indian communities. *J Transcult Nurs* 13(1):6. <https://doi.org/10.1177/104365960201300102>
- Hueffer K, Ehrlander M, Etz K et al. (2019) One health in the circumpolar North. *Int J Circumpolar Health* 78:1. <https://doi.org/10.1080/22423982.2019.1607502>
- IPCC (2018) *Global Warming of 1.5 °C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. [Masson-Delmotte, V, P Zhai, H-O Pörtner, D Roberts, J Skea, PR Shukla, A Pirani, W Moufouma-Okia, C Péan, R Pidcock, S Connors, JBR Matthews, Y Chen, X Zhou, MI Gomis, E Lonnoy, T Maycock, M Tignor, and T Waterfield (eds.)]. Intergovernmental Panel on Climate Change. In Press. <https://www.ipcc.ch/sr15/>
- Jackson G, N’Guetta A, De Rosa SP, Scown M, Dorkenoo K, Chaffin B, Boyd E (2023) An emerging governmentality of climate change loss and damage. *Prog Environ Geogr* 2(1-2):33–57. <https://doi.org/10.1177/27539687221148748>
- Kelman I, Ayeb-Karlsson S, Rose-Clarke K et al. (2021) A review of mental health and wellbeing under climate change in small island developing states (SIDS). *Environ Res Lett* 16(3):033007. <https://doi.org/10.1088/1748-9326/abe57d>
- Kral MJ, Idlout L, Minor JB et al. (2011) Meanings of wellbeing, unhappiness, health, and community change among Inuit in Nunavut, Canada. *Am J Commun Psychol* 48(3):426–438. <https://doi.org/10.1007/s10464-011-9431-4>
- Kuokkanen, R (2003) “Survivance” in Sami and first nations boarding school narratives: reading novels by Kerttu Vuolab and Shirley Sterling. *Am Indian Q*, 697–726. <https://www.jstor.org/stable/4138969>
- Laugrand F, Oosten J (2002) Canicide and healing. the position of the dog in the Inuit cultures of the Canadian Arctic. *Anthropos* 97(1):89–105. <http://www.jstor.org/stable/40465618>
- Leamy M, Bird V, Boutillier C, Williams J, Slade M (2011) Conceptual framework for personal recovery in mental health: systematic review and narrative synthesis. *Br J Psychiatry* 199(6):445–452. <https://doi.org/10.1192/bjp.bp.110.083733>
- Lee K, Gjerseø N, O’Neill S, Barnett J (2020) Youth perceptions of climate change: a narrative synthesis. *WIREs Clim Change* 11:e641. <https://doi.org/10.1002/wcc.641>
- Longman JM, Bennett-Levy J, Matthews V et al. (2019) Rationale and methods for a cross-sectional study of mental health and wellbeing following river flooding in rural Australia, using a community-academic partnership approach. *BMC Public Health* 19:1255. <https://doi.org/10.1186/s12889-019-7501-y>
- MacDonald DB, Hudson G (2012) The genocide question and indian residential schools in Canada. *Can J Political Sci/Rev Can de Sci Politique* 45(2):427–449. <http://www.jstor.org/stable/23320978>
- Manning C and Clayton S (2018) Threats to mental health and wellbeing associated with climate change. *Psychol Clim Change* 217–244. Academic Press. <https://doi.org/10.1016/B978-0-12-813130-5.00009-6>
- McHugh S (2013) “A flash point in Inuit memories”: endangered knowledges in the Mountie Sled Dog Massacre. *Engl Stud Can* 39(1):149–175. <https://doi.org/10.1353/esc.2013.0022>
- McMichael et al. (2023) Waiting for the wave, but missing the tide: case studies of climate-related (im)mobility and health. *J Migr Health* 7:100147. <https://doi.org/10.1016/j.jmh.2022.100147>
- McNamara KE, Westoby R, Chandra A (2021) Exploring climate-driven non-economic loss and damage in the Pacific Islands. *Curr Opin Environ Sustain* 50:1–1. <https://doi.org/10.1016/j.cosust.2020.07.004>
- McQuaid RJ, Bombay A, McInnis OA et al. (2017) Suicide ideation and attempts among first nations peoples living on-reserve in Canada: the intergenerational and cumulative effects of indian residential schools. *Can J Psychiatry* 62(6):422–430. <https://doi.org/10.1177/0706743717702075>
- Middleton J, Cunsolo A, Jones-Bitton A et al. (2020a) Indigenous mental health in a changing climate: a systematic scoping review of the global literature. *Environ Res Lett* 15(5):053001. <https://doi.org/10.1088/1748-9326/ab68a9>
- Middleton J, Cunsolo A, Jones-Bitton A et al. (2020b) “We’re people of the snow”: weather, climate change, and Inuit mental wellness. *Soc Sci Med* 262:113137. <https://doi.org/10.1016/j.socscimed.2020.113137>
- Moher D, Liberati A, Tetzlaff J et al. (2009) Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Ann Intern Med* 151(4):264–269. <https://doi.org/10.7326/0003-4819-151-4-200908180-00135>
- Nelson SE, Wilson K (2017) The mental health of indigenous peoples in Canada: a critical review of research. *Soc Sci Med* 176:93–112. <https://doi.org/10.1016/j.socscimed.2017.01.021>
- O’Donnell M, Taplin S, Marriott R, Lima F, Stanley FJ (2019) Infant removals: the need to address the over-representation of aboriginal infants and community concerns of another ‘stolen generation’. *Child Abus Negl* 90:88–98. <https://doi.org/10.1016/j.chiabu.2019.01.017>
- Ojala M, Cunsolo A, Ogunbode CA et al. (2021) Anxiety, Worry, and Grief in a Time of Environmental and Climate Crisis: A Narrative Review. *Annu Rev Environ Resour* 2021; 46. <https://doi.org/10.1146/annurev-environ-012220-022716>
- Orievulu K et al. (2022) Exploring linkages between drought and HIV treatment adherence in Africa: a systematic review. *Lancet Planet Health* 6(4):e359–e370. [https://doi.org/10.1016/S2542-5196\(22\)00016-X](https://doi.org/10.1016/S2542-5196(22)00016-X)
- Ostapchuk J, Harper S, Cunsolo Willox A, Edge VL (2012) Exploring elders’ and seniors’ perceptions of how climate change is impacting health and wellbeing in Rigolet, Nunatsiavut/. *Int J Indigenous Health* 9(2):6–24. <https://doi.org/10.18357/ijih92201214358>
- Overcash JA (2003) Narrative research: a review of methodology and relevance to clinical practice. *Crit Rev Oncol/Hematol* 48(2):179–184. <https://doi.org/10.1016/j.critrevonc.2003.04.00>
- Pearce T, Smit B, Duerden F, Ford JD, Goose A, Kataoyak F (2010) Inuit vulnerability and adaptive capacity to climate change in Ulukhaktok, Northwest Territories, Canada. *Polar Rec* 46(2):157–177. <https://doi.org/10.1017/S0032247409008602>
- Petrasek MacDonald JP, Cunsolo Willox A, Ford JD, Shiwak I, Wood M, Government RI, IMHACC Team (2015) Protective factors for mental health and wellbeing in a changing climate: perspectives from Inuit youth in Nunatsiavut, Labrador. *Soc Sci Med* 141:133–141. <https://doi.org/10.1016/j.socscimed.2015.07.017>
- Petrasek MacDonald JP, Harper SL, Cunsolo Willox A, Edge VL, Government RI (2013) A necessary voice: climate change and lived experiences of youth in Rigolet, Nunatsiavut, Canada. *Glob Environ Change* 23(1):360–371. <https://doi.org/10.1016/j.gloenvcha.2012.07.010>
- Pfeifer P (2020) Inuit, namiipita? Climate change research and policy: beyond Canada’s diversity and equity problem *North Rev* 49:265–269. <https://doi.org/10.22584/nr49.2020.018>
- Pollock NJ, Mulay S, Valcour J et al. (2016) Suicide rates in aboriginal communities in Labrador, Canada. *Am J Public Health* 106(7):1309–1315. <https://doi.org/10.2105/AJPH.2016.303151>
- Pollock NJ, Naicker K, Loro A et al. (2018) Global incidence of suicide among Indigenous peoples: a systematic review. *BMC Med* 16:145. <https://doi.org/10.1186/s12916-018-1115-6>
- Popay J, Roberts H, Sowden A et al. (2005) Developing guidance on the conduct of narrative synthesis in systematic reviews. *J Epidemiol Community Health* 59(Suppl 1):A7. <https://doi.org/10.1136/2005.1018.4643>
- Prowse TD, Furgal C (2009) Northern Canada in a changing climate: major findings and conclusions. *Ambio* 38(5):290–292. <https://www.jstor.org/stable/25515857>
- Ramsay G (2016) Black mothers, bad mothers: african refugee women and the governing of ‘good’ citizens through the Australian child welfare system. *Aust Feminist Stud* 31(89):319–335. <https://doi.org/10.1080/08164649.2016.1254021>

- Ready E, Collings P (2021) "All the problems in the community are multifaceted and related to each other": Inuit concerns in an era of climate change. *Am J Hum Biol* 33:e23516. <https://doi.org/10.1002/ajhb.23516>
- Reyhner J (2018) American Indian boarding schools: what went wrong? what is going right? *J Am Indian Educ* 57(1):58–78. <https://doi.org/10.5749/jamerindieduc.57.1.0058>
- Robertson S, Ljubicic G (2019) Nunamii'luni quvianaqtuq (It is a happy moment to be on the land): feelings, freedom and the spatial political ontology of well-being in Gjoa Haven and Tikiranaq, Nunavut. *Environ Plan D: Soc Space* 37(3):542–560. <https://doi.org/10.1177/0263775818821129>
- Rosol R, Powell-Hellyer S, Chan HM (2016) Impacts of decline harvest of country food on nutrient intake among Inuit in Arctic Canada: impact of climate change and possible adaptation plan. *Int J Circumpolar Health* 75(1):31127. <https://doi.org/10.3402/ijch.v75.31127>
- Royal College of Psychiatrists. (2021) Position Statement PS03/21: Our planet's climate and ecological emergency. Royal College of Psychiatrists. <https://www.rcpsych.ac.uk/docs/default-source/improving-care/better-mh-policy/position-statements/position-statement-ps03-21-climate-and-ecological-emergencies-2021.pdf>
- Shackleton, R (2012) "Not Just Givers of Welfare": The Changing Role of the RCMP in the Baffin Region, 1920–1970. *Northern Rev* (36), 5–26. <https://thenorthernreview.ca/index.php/nr/article/view/256/258>
- Sinclair R (2016) The Indigenous child removal system in Canada: an examination of legal decision-making and racial bias. *First Peoples Child Fam Rev* 11(2):8–18. <https://doi.org/10.7202/1082333ar>
- Smith A (2004) Boarding school abuses, human rights, and reparations. *Soc Justice* 31(98):89–102
- Smith, A (2008) Indigenous Peoples and Boarding Schools: A Comparative Study. Prepared by Andrea Smith for the Secretariat of the United Nations Permanent Forum to Indigenous Issues. New York, UNESC. https://www.un.org/esa/socdev/unpfii/documents/IPS_Boarding_Schools.pdf
- Stanley SK, Hogg TL, Leviston Z et al. (2021) From anger to action: differential impacts of eco-anxiety, eco-depression, and eco-anger on climate action and wellbeing. *J Clim Change Health* 1:100003. <https://doi.org/10.1016/j.jocl.2021.100003>
- Swain S (2013) "Homes are sought for these children": locating adoption within the Australian stolen generations narrative. *Am Indian Q* 37(1–2):203–217. <https://doi.org/10.5250/amerindiquar.37.1-2.0203>
- Takano T (2005) Connections with the land: land-skills courses in Igloolik, Nunavut. *Ethnography* 6(4):463–486. <https://doi.org/10.1177/1466138105062472>
- Tester FJ (2010a) Can the sled dog sleep? Postcolonialism, cultural transformation and the consumption of Inuit culture. *N. Proposals: J Marxism Interdiscip Inq* 3(3):7–19. <https://ojs.library.ubc.ca/index.php/newproposals/article/view/457>
- Tester FJ (2010b) Mad dogs and (mostly) Englishmen: colonial relations, commodities, and the fate of Inuit sled dogs. *Études/Inuit/Stud* 34(2):129–147. <https://doi.org/10.7202/1004073ar>
- Tester FJ, Irniq P (2008) Inuit Qaujimagatuqangit: social history, politics and the practice of resistance. *Arctic* 61:48–61. <http://www.jstor.org/stable/40513356>
- Thomas J, Harden A (2008) Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Med Res Methodol* 8(1):45. <https://doi.org/10.1186/1471-2288-8-45>
- Thompson R, Hornigold R, Page L, Waite T (2018) Associations between high ambient temperatures and heat waves with mental health outcomes: a systematic review. *Public Health* 161:171–191. <https://doi.org/10.1016/j.puhe.2018.06.008>
- Titz A, Cannon T, Krüger F (2018) Uncovering 'community': challenging an elusive concept in development and disaster related work. *Societies* 8(3):71. <https://doi.org/10.3390/soc8030071>
- Tschakert P, Ellis NR, Anderson C et al. (2019) One thousand ways to experience loss: a systematic analysis of climate-related intangible harm from around the world. *Glob Environ Change* 55:58–72. <https://doi.org/10.1016/j.gloenvcha.2018.11.006>
- Tschakert P, Neef A (2022) Tracking local and regional climate im/mobilities through a multidimensional lens. *Region Environ Change* 22(3):95. <https://doi.org/10.1007/s10113-022-01948-6>
- Vergunst F, Berry HL, Minor K, Chadi N (2023) Climate change and substance-use behaviors: a risk-pathways framework. *Perspect Psychol Sci* 18(4):936–954. <https://doi.org/10.1177/17456916221132739>
- Watts N, Amann M, Arnell N, Ayeb-Karlsson S, Beagley J, Belesova K, Boykoff M, Byass P, Cai W, Campbell-Lendrum D, Capstick S (2021) The 2020 report of the Lancet Countdown on health and climate change: responding to converging crises. *Lancet* 397(10269):129–170. [https://doi.org/10.1016/S0140-6736\(20\)32290-X](https://doi.org/10.1016/S0140-6736(20)32290-X)
- Wenzel G (1987) "I Was Once Independent": the Southern Seal Protest and Inuit. *Anthropologica* 29(2):195–210. <https://doi.org/10.2307/25605231>
- Wolf J, Allice I, Bell T (2013) Values, climate change, and implications for adaptation: evidence from two communities in Labrador, Canada. *Glob Environ Change* 23(2):548–562. <https://doi.org/10.1016/j.gloenvcha.2012.11.007>

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Author contributions

All authors took part in developing the conceptual and theoretical idea of the article with SAK leading on the systems understanding of a climate-violence-health nexus. All three authors supported the data collection and took active part in the data analysis and the drafting of the original manuscript. AH led the first data collection and article draft development under the guidance and active contribution of MLT and SAK. This manuscript draft was redeveloped through a second extended literature review and article revision that was led by SAK. MLT led the quality assessment with support from SAK. SAK led the revision work and incorporation of reviewer comments with support from MLT. Overall, SAK took the leading role in writing and reviewing the manuscript, but all authors contributed to the writing and actively engaged in critically shaping the final article.

Competing interests

The authors declare no competing interests.

Ethical approval

This secondary data study passed through the standard ethical approval process at Brighton and Sussex Medical School before the research began. This research did not directly involve human research participants. We have revised the ethical standards of each selected journal article involving human participants analysed as part of this study. The research was performed in accordance with the Declaration of Helsinki.

Informed consent

This article does not contain any direct research interactions with human participants.

Additional information

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