EXPLORING MANAGEMENT OPTIONS FOR EXPEDITION CRUISE TOURISM IN THE CANADIAN ARCTIC

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Author's Declaration

This dissertation consists solely of material for which I am the primary author or co-author: refer to Statement of Contributions below. This is a true copy of the dissertation, including any required final revisions, as accepted by my examiners.

I understand that my dissertation may be made electronically available to the public.

Statement of Contributions

The following dissertation contains five chapters, including an introductory chapter, three manuscript chapters, and a discussion and conclusion chapter. I am the sole author of the introductory and discussion and conclusion chapters. I am the main contributor to the three manuscripts featured in chapters two, three, and four, with various co-author contributions. Please refer below for a more detailed breakdown of these co-author contributions.

Chapter 1 Author Contributions:

Andrew Orawiec is the sole author.

Chapter 2 Author Contributions:

Andrew Orawiec conceived the idea, conducted the policy scan, completed the content analysis, and wrote the manuscript. Jackie Dawson and Laurel Besco contributed to the conceptualization of the project and provided guidance on structure and editing of the manuscript.

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Andrew Orawiec conceived the idea, compiled the data, conducted the analysis, and wrote the manuscript. Jackie Dawson provided guidance on structure and editing of the manuscript.

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Andrew Orawiec conceived the idea, designed the study methodology, conducted the fieldwork, collected the data, carried out a portion of the analysis, and wrote the manuscript. Laurel Besco helped design the original study methodology. Sierra Beacher provided support for portions of the analysis. Jackie Dawson provided guidance on structure and editing of the manuscript.

Chapter 5 Author Contributions:

Andrew Orawiec is the sole author.

Ethics approval was obtained for the manuscript included in Chapter 4 (*Exploring Cruise Passenger Behaviour at Remote Shore Sites in the Canadian Arctic*). A copy of the ethics certificate can be found in Appendix 1.

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Abstract

Expedition cruise tourism in the Canadian Arctic presents unique management challenges due to its operational characteristics and the region's jurisdictional complexity. Unlike other forms of marine vessel traffic that follow more predictable routes, expedition cruise vessels frequently deviate from common shipping corridors to enhance visitor experiences, including scenic cruising in fjords and conducting shore landings at culturally and ecologically sensitive sites. This operational model creates potential conflicts with Inuit use of both marine and terrestrial areas, effectively competing for some of the same resources and raising concerns about potential impacts on the environment, wildlife, and cultural sites.

This dissertation examines expedition cruise tourism management in the Canadian Arctic, with particular emphasis on the territory of Nunavut, Canada, to achieve the overarching aim of better understanding current management approaches to identify opportunities for improvement. This research addresses several existing important knowledge gaps including: 1) an absence of a publicly available comprehensive analysis of the regulatory and management frameworks applicable to expedition cruise tourism in Nunavut; 2) a limited understanding of the potential implications to expedition cruise operations stemming from proposed changes in existing management tools associated with existing and emerging marine protected area designations; 3) an absence of baseline data on visitor activity at remote shore locations in the region; and 4) limited information on the application of site-specific terrestrial management approaches that may constitute best practices in the Arctic.

These gaps were addressed through three key research objectives within this dissertation, including to: 1) produce a conceptual overview of the management and regulatory frameworks for marine tourism within Nunavut waters, including an assessment of the relative effectiveness of these identified tools and frameworks in addressing Inuit concerns; 2) explore the impact of the establishment of *Tallurutiup Imanga National Marine Conservation Area* (TINMCA) and the potential contributions towards improving the management of expedition cruise tourism within its boundaries; and 3) examine cruise passenger activity at remote shore locations, forming a baseline understanding of visitor use at these sites and examining the need for appropriate management strategies. To achieve these objectives, several methods were employed including policy, content, and gap analyses, as well as a variety of Geographic Information System (GIS) analyses (i.e. mapping of vessel movements, visualizations of historical shore visit locations, and overlaying of shapefiles representing the proposed TINMCA zoning framework), as well as spatiotemporal analysis of GPS tracking data from cruise passengers in the field.

Key results of this dissertation research reveal that while current regulatory frameworks effectively address vessel safety and environmental protection, they remain limited in their ability to address specific Inuit concerns. However, it was found that emerging approaches show promise in filling these gaps, such as new marine conservation mechanisms, a reconceptualization of the role of shore-based permitting regimes, and voluntary measures. The analysis of TINMCA's zoning framework probed the potential application of these emerging approaches, further identifying both opportunities and challenges in aligning marine spatial planning with existing terrestrial permitting systems. Finally, the examination of visitor movement patterns at remote shore locations revealed the need for improved terrestrial management strategies to protect sensitive cultural and environmental features.

This research contributes to both academic literature and practical management applications by providing a foundation for developing more effective, culturally appropriate approaches for expedition cruise tourism in the Canadian Arctic. The findings can be utilized by federal and territorial authorities, Inuit organizations, and industry stakeholders to ensure self-determined and sustainable tourism development that respects both broader conservation objectives for a globally significant region and Inuit rights.

CHAPTER 1: DISSERTATION INTRODUCTION

1.1 Problem Statement

The rapid growth of expedition cruise tourism in the Canadian Arctic, particularly within the territory of Nunavut, presents unique management challenges that are not adequately addressed by current regulatory frameworks and management approaches. The industry's growth has been driven by increasing accessibility due to climate change (Parkinson et al., 2021), related 'last-chance tourism' demand to visit the Arctic (Lemelin et al., 2010, 2012), and overarching interest in the region's natural environment and culture (Stewart et al., 2015). Unlike other forms of marine navigation in Canadian Arctic waters, expedition cruise vessels frequently deviate from main shipping routes to provide visitors with experiences such as scenic cruising in fjords, the pursuit of wildlife viewing opportunities, and disembarkation at remote locations for shore-based excursions to cultural and historic sites (Dawson et al., 2014; Ellis & Kriwoken, 2006). This operational model creates potential conflicts with Inuit use of both marine and terrestrial areas, effectively competing for some the same resources and raising concerns about potential impacts on the environment, wildlife, and cultural sites.

The existing governance regime for expedition cruise tourism in the Canadian Arctic is complex and fragmented (Greentree, 2023), leading to a range of operator behaviours that compound the perceived unpredictability of the industry's activity (Landriault et al., 2019). Dawson et al. (2017) have shown that this regulatory complexity can result in both intentional and unintentional rule-breaking by operators, partially accounting for this unpredictability. Moreover, the expeditionary nature of the industry, including a desire for exploration and 'off the beaten path' experiences, is frequently at odds with a federal regulatory approach focused on safety of navigation and environmental protection (Porta et al., 2017).

Recent attempts to address these challenges, such as the Low-Impact Shipping Corridors (LISC) initiative, have shown limited effectiveness for the expedition cruise industry. The LISC have been described as holding promise as an overarching framework that aims to address many of the longstanding issues related to marine navigation in Canada's Arctic waters (Pew Charitable Trusts, 2016). The federal government, meanwhile, considers LISC as a tool for identifying and incentivizing the use of the safest navigation route(s) through a given area or to a specific destination (Chénier et al., 2017). However, the issues posed by the expedition cruise industry are more nuanced and not necessarily well-captured by the LISC approach in its current form. In fact, approximately 50% of passenger vessel activity in the Canadian Arctic between 2010-2018 occurred outside these proposed corridors (Dawson et al., 2021), further highlighting the gaps in regulatory and management approaches.

The fact that approximately 50% of passenger vessel activity occurs outside these proposed corridors creates multiple risks and management challenges. These include navigation in areas with deficient or outdated navigational charts and potential inadvertent operation in ecologically/biologically/culturally significant areas which may or may not have formal protection status. All these issues are further compounded by the risks they represent to Inuit who call the region their home and who are intimately connected with the land, water, and ice which form the foundation of their identity and culture (QIA, 2013). Inuit concerns with the risks posed by the expedition cruise industry are well documented and have grown in concert with the increased presence of passenger vessel activity (see Carter et al., 2018; 2019; 2020). While the LISC may seek to minimize the most well-known risks of navigating in Canadian Arctic waters, it can be argued that the safety incentive is not strong enough to compel marine tourism vessels to operate exclusively within their confines. This, therefore, begs the question of how these unique management challenges can be better addressed.

While current management approaches like LISC focus primarily on navigational aspects of marine traffic, a critical missing piece in this larger governance puzzle is the industry's unique interfacing with shore locations for land-based excursions. This shore component is fundamental to the expedition cruise experience yet remains underexamined in both regulatory frameworks and academic literature. The navigation associated with accessing these shore locations can partially account for the distances travelled outside of the LISC framework and is most frequently associated with Inuit conflicts of use in the region's most culturally and ecologically sensitive areas. The underrepresentation of research on this component of the industry's operations represents a significant knowledge gap in understanding the full scope of expedition cruise operations, their impacts, and the pursuit of improved management approaches.

Beyond addressing the challenges of the current regulatory framework, there are emerging opportunities through new marine conservation mechanisms. The Canadian Arctic is becoming an increasingly important setting for achieving national marine conservation goals, introducing additional tools that could potentially address gaps in expedition cruise management. Canada has made a commitment to conserving 30% of its marine and coastal areas by 2030 and there are currently five different marine conservation sites at various stages of establishment in its Arctic waters (DFO, 2024). One of the most significant of these areas, and the closest to formal establishment (Bill S-14, *An Act to amend the Canada National Parks Act, the Canada National Marine Conservation Areas Act, the Rouge National Urban Park Act and the National Parks of Canada Fishing Regulations,* 1st session, 44th Parliament, 2024), is *Tallurutiup Imanga National Marine Conservation Area* (TINMCA). Situated at the eastern entrance to the Northwest Passage within the waters of Lancaster Sound, TINMCA expands across nearly 108,000 km^2 and represents some of the highest concentrations of expedition cruise activity in the Canadian Arctic (Parks

Canada, 2024). Upon establishment, TINMCA will introduce a new suite of management tools that may offer opportunities to address longstanding issues with the industry. As these marine conservation mechanisms begin to become a reality, there is a great deal of value in attempting to understand potential management implications for expedition cruise tourism.

In comparison with other circumpolar destinations, the development of the Canadian Arctic expedition cruise industry remains in its early stages (Lasserre & Têtu, 2015; Dawson et al., 2021; Weber et al., 2021). Furthermore, the fact that this region is characterized by multiple settled Inuit land claims provides further contextual distinction (Dawson et al., 2017). As this industry continues to develop, there is therefore a need to understand how management approaches can meaningfully respect Inuit rights. As such, the purpose of this dissertation research is to improve understanding of the effectiveness of current management and regulatory frameworks in addressing identified concerns.

1.2 Research Objectives

This dissertation addresses gaps in the understanding of expedition cruise tourism management in the Canadian Arctic, with a particular focus on the territory of Nunavut where over 80% of expedition cruise activity occurs (Stewart et al., 2010; Weber et al., 2021). The study was specifically designed to address several important research and knowledge gaps including: 1) a lack of comprehensive analysis of the regulatory and management frameworks applicable to expedition cruise tourism in Nunavut; 2) limited understanding of new marine protected area management tools and how they might impact expedition cruise operations; 3) an absence of baseline data on visitor activity at remote shore locations in the Canadian Arctic; and 4) a poor representation in the literature of the application of site-specific management tools. By examining the regulatory frameworks, exploring the implications of new marine protected areas in the region, and investigating visitor activity at remote shore locations, the research aimed to contribute to the identification of more effective and sustainable management approaches for the Canadian Arctic expedition cruise industry which meaningfully respect Inuit rights.

The research aim is guided by the overarching research question of how expedition cruise tourism can be managed more effectively to address Inuit concerns while supporting sustainable industry operations, the answer to which involves the pursuit of three primary objectives:

- **Objective 1:** Produce a conceptual overview of the management and regulatory frameworks applicable to expedition cruise tourism in Nunavut waters and assess the relevance/applicability of identified tools in addressing Inuit concerns;

- **Objective 2:** Explore the implications of TINMCA establishment and the potential impacts on expedition cruise management;
- **Objective 3:** Contribute to baseline understanding of expedition cruise passenger activity at remote shore locations within TINMCA and assess the need for terrestrial management strategies.

By addressing these objectives, this dissertation seeks to contribute to the development of more effective, culturally appropriate, and sustainable management approaches for expedition cruise tourism in the Canadian Arctic, with potential recommendations applicable to similar sensitive polar environments globally. The timing of this research aligns with key policy developments, including the pending establishment of TINMCA, the ongoing evolution of the LISC Initiative, and priorities identified in academic literature and among Inuit organizations, recognizing the importance of including Inuit perspectives in the co-management of tourism activities taking place in their traditional homeland. Findings of the study could be used by various stakeholders, including federal and territorial governments, Inuit organizations, and the expedition cruise industry itself, to inform future policy decisions and management strategies.

1.3 Overview of Relevant Literature

1.3.1 Canadian Arctic Marine Tourism Development

The growth of marine tourism in Canadian Arctic waters has evolved from its origins as a niche offering in the late 20th century to an increasingly significant industry in more recent years. This development trajectory has been characterized by slow progression and periods of more rapid expansion, spurred by a complex interplay of environmental, economic, and cultural factors (Dawson et al., 2014; Johnston et al., 2017a, Têtu et al., 2019).

The formal beginnings of cruise tourism in Canadian Arctic waters can be traced back to the successful transit of the Northwest Passage by the *MS Explorer* in 1984, which set a precedent for this form of commercial tourism in the region (Stewart et al., 2007). Sporadic growth followed this initial spark, with only minor increases in cruise activity throughout the 1980s, 1990s, and early 2000s, largely due to the constraints imposed by the region's geographic isolation and harsh climate; however, it is precisely those factors which attract larger numbers of visitors today (Johnston et al., 2012).

It took until 1995 for the total number of passengers in one season to reach 1,000, and it was not until 2008 until that number surpassed 2,000, but subsequent milestones have been achieved more quickly with 3,000 total passengers in 2015 and a jump to nearly 6,000 by 2017 (Weber et al., 2021). Passenger vessels now represent one of the fastest-growing segments of maritime traffic in the Canadian Arctic

(Dawson et al., 2021). This growth is not only limited to passenger numbers, with a corresponding tripling of the total distance travelled by vessels and a quadrupling of the total number of voyages annually since 1990 (Dawson et al., 2018; 2022).

Despite this growth, the Canadian Arctic cruise tourism industry remains modest in scale compared to other circumpolar destinations. For example, during a benchmark year of 2016 where Canada welcomed approximately 5,000 passengers, these numbers stand in stark contrast to Svalbard (35,000 passengers) and Greenland (20,000 passengers) (AECO, 2016). There are a variety of factors thought to explain these disparities, including sea ice conditions, limited infrastructure, minimal local services, and complex management regimes, among others (Dawson et al., 2014; 2017; Johnston et al., 2017b).

These factors also contribute to the Canadian Arctic cruise tourism industry being characterized primarily by smaller, purpose-built expedition style vessels. These expedition cruise ships typically carry between 50-500 passengers and focus on providing educational experiences and immersion in the natural environment (Dawson et al., 2021). Itineraries tend to be flexible, with a mixture of scenic cruising, opportunistic wildlife viewing, landings at remote locations, and community visits (Johnston et al., 2017b).

The future growth trajectory of marine tourism development in the Canadian Arctic is somewhat unclear. Recent studies indicate that the anticipated increase in accessibility due to climate change may not be as straightforward as originally predicted, with new navigational challenges presented by sea ice choke points (Cook et al., 2024), higher prevalence of maritime fog (Wang et al., 2023), and growing intensity and frequency of storms (Crawford et al., 2022). There is also a growing focus on marine conservation in the region, as well as a recognition and respect of Inuit rights and traditions (Hashimoto et al., 2021; Bishop et al., 2022). As the industry evolves, these factors will shape both the opportunities and constraints of future industry development.

1.3.2 Inuit Perspectives and Concerns Related to Expedition Cruise Vessel Activity

The Canadian Arctic is increasingly recognized as Inuit Nunangat – the homeland of Inuit in Canada, comprising the land, water, and ice that from the foundation of Inuit culture, well-being, and way of life (ITK, 2017). Within this context, the growth of expedition cruise tourism presents both opportunities and challenges for Inuit communities, whose perspectives and concerns must be central to any discussion of the development and management of the industry (Dawson et al., 2020).

These perspectives and concerns have been consistently brought forward in a variety of ways, including direct representation by Inuit Organizations at the national (i.e. Inuit Tapiriit Kanatami [ITK]) and regional level (i.e. Qikqitani Inuit Association [QIA]). Academia has also played an important role in

enabling Inuit voices to be heard, such as the outputs from efforts like the Arctic Corridors and Northern Voices (ACNV) project. In a broad sense, Inuit concerns with increasing expedition cruise activities primarily relate to impacts on the natural environment, disruption of traditional activities, and effects on cultural sites (Carter et al., 2018, 2019, 2020). The unpredictable nature of expedition cruise vessel operations, including last-minute itinerary changes and unannounced arrivals, can be perceived in different ways ranging from a mere nuisance to more seriously interfering with hunting and harvesting activities that are essential to Inuit food security and cultural integrity (Stewart et al., 2013; van Luijk et al., 2022).

Environmental concerns focus on potential disturbances to marine mammals (Kochanowicz et al., 2021), impacts on marine and coastal ecosystems (Vincent et al., 2023), and the introduction of pollution (Ell-Kanayuk & Aporta, 2023) or invasive species (van Luijk et al., 2021). Inuit have expressed particular apprehension about underwater noise impacts on marine mammals (Halliday et al., 2017; Mannherz et al., 2024), vessel interactions with migrating species (Martin et al., 2022), and the risks associated with possible accidents in remote areas (van Luijk et al., 2022).

While cruise tourism is seen as potentially providing value as an avenue of cross-cultural exchange, there can also be displeasure at the sense of being 'put on display' for visitors' benefits (Dawson et al., 2016). Additionally, concerns have been raised about unauthorized access to culturally significant sites and the potential removal or disturbance of artifacts during shore excursions (Carter et al., 2018).

The economic implications of cruise tourism for Inuit communities also remains mixed. While some scholars have noted the potential for economic benefits from increased tourism activity through the sale of arts and crafts and part-time work as tour guides or cultural performers (Hodgson et al., 2013; Stewart et al., 2015), the benefits are often limited. The unpredictability of cruise vessel visits, including last-minute cancellations, can result in unrecoverable costs and the loss of these income opportunities, contributing to the sense of distrust towards the industry (Dawson et al., 2016; 2018; Stewart et al., 2013).

Despite these concerns, there is also a sense of recognition of the potential benefits when cruise tourism is well-managed. There is a desire from Inuit to contribute to the improvement of the industry's management, including a greater involvement in decision-making processes (Dawson et al., 2020). This aligns with broader calls for Inuit self-determination in matters affecting their traditional territories and reflect principles that are now formally outlined at the federal level through instruments such as the Inuit Nunangat Policy (Government of Canada, 2022).

1.3.3 Management Approaches for Expedition Cruise Tourism in the Canadian Arctic

The management of expedition cruise tourism in the Canadian Arctic involves several distinct but interconnected approaches, reflecting the complexity of the overall governance of the industry and the multi-jurisdictional reality of the region. Aside from the maritime regulatory regime, there are three primary management frameworks which most significantly attempt to direct the activities of expedition cruise vessels: the federal Low-Impact Shipping Corridors initiative, formal conservation area mechanisms, and shore-based permitting systems.

The Low-Impact Shipping Corridors (LISC) initiative represents a federal attempt to create an overarching framework for managing vessel traffic in Canadian Arctic waters. First conceived in 2014, the initiative aims to enhance navigational safety and provide an efficient planning framework for Arctic maritime investments and management oversight (Chénier et al., 2017). Early iterations of the LISC were criticized for prioritizing historic marine traffic patterns and the insufficient consideration of environmental protection and Inuit rights (Pew Charitable Trusts, 2016). More recent efforts to address these shortcomings have focused on an explicit inclusion of Inuit knowledge and priorities through community-based workshops to identify Culturally Significant Marine Areas and Ecologically and Biologically Significant Areas (Dawson et al., 2020). The inclusion of Inuit input into the design of the LISC is hoped to improve the baseline management of vessel traffic across Inuit Nunangat and could provide a foundation for the most acceptable areas of operation for expedition cruise tourism (Dawson et al., 2021).

Formal conservation mechanisms have also emerged as an important management tool, examples of which include Migratory Bird Sanctuaries, National Wildlife Areas, Marine Protected Areas, and National Marine Conservation Areas. These types of protected areas are generally required to employ co-management arrangements when found within the boundaries of settled Inuit land claims. This formal involvement of Inuit in decision-making processes helps to ensure that activities taking place within a protected area are respectful of Inuit rights, with the ability to withhold the issuance of operational permits if that is found to not be the case.

Shore-based permitting is perhaps the most significant management approach, though it is frequently overlooked within the larger literature related to expedition cruise tourism in the Canadian Arctic. Multiple jurisdictions and authorities are responsible for the administration of lands across Inuit Nunangat, requiring various permits and permissions for activities such as accessing historic sites, visiting Inuit-owned lands, or seeking out areas with archaeological significance (Dawson et al., 2017). For example, the Government of Nunavut requires cruise operators to obtain a Class 1 Archaeological Permit for visiting archaeological sites across the territory (Canada, 2001), while regional Inuit associations

manage access to Inuit-owned lands through their own respective permitting processes (QIA, 2023). The overall system of permits and permissions related to accessing lands is therefore an important mechanism for formally controlling access to sensitive areas, though the coordination of individual permitting authorities remains a challenge and the sheer number of permits required can be a hindrance to applicants (Johnston et al., 2017b).

1.3.4 Tourism in Sensitive Environments

A growing body of research has documented the environmental and experiential impacts of visitor use in sensitive areas, including soil compaction and erosion, trampling of vegetation, wildlife disturbance, crowding, and conflicting uses (Barros et al., 2015; Hammitt et al., 2015; Marion et al., 2016, etc.). When unmanaged, these impacts can result in unacceptable changes in both resource conditions (e.g. loss of sensitive vegetation or natural features) and quality of the visitor experience (e.g. crowding and conflict among visitors). Impacts can be especially acute in areas with a high degree of ecosystem sensitivity, such as the Arctic. While usage of sites leads to inevitable resource and experiential change, visitor behaviour is a primary driving variable governing the intensity and proliferation of impacts (Monz et al., 2010). As such, managers of parks and protected areas often try to influence visitor behaviour in order to accomplish resource and visitor experience protection goals (Kidd et al., 2015).

Attempts to influence visitor behaviour can be grouped under ‘direct’ or ‘indirect’ management practices. ‘Direct’ management seeks to control visitor behaviour through actions such as limiting use, regulating movement, and site management actions. Examples of direct management practices include regulations, quotas, zoning, limiting length of stay, and the use of physical barriers such as fencing (Manning, 2011). ‘Indirect’ management, on the other hand, attempts to prevent undesired behaviours by influencing the cognitive processes of visitors (Manning, 2011; Gramann et al., 1992). Visitor education programs represent a commonly-applied form of indirect management, and research has shown that this approach is often preferred by both managers and visitors because it is less intrusive and maintains a sense of freedom to exploration (Manning & Anderson, 2012). Visitor education programs recognize that most visitor impacts are not from deliberate malicious acts, but instead result from insensitivity to the consequences of one’s actions or a lack of knowledge regarding appropriate minimum impact behaviours (see Roggenbuck, 1992; Manning, 2003; Marion et al., 2007). As such, the objective of visitor education programs is not to control behaviour per se, but rather to provide that cognitive basis which encourages appropriate minimum impact activities in natural settings (Peterson and Lime, 1979).

Various theoretical bases have been put forward over time to guide management approaches for tourism in sensitive environments. One such system is the Limits of Acceptable Change (LAC) popularized by McCool (1994) as a proposed framework for operationalizing the concept of sustainable tourism. The framework builds upon work conducted by Payne & Graham (1993), whereby resource managers and stakeholders are both involved in:

- Identifying acceptable and achievable social and resource standards;
- Documenting gaps between desirable and existing circumstances;
- Identifying management actions to close these gaps;
- Monitoring and evaluating management effectiveness. (Payne & Graham, 1993)

The LAC framework offers opportunity for public participation, which results in a consensus planning approach to natural area management (Ahn et al., 2002). However, LAC systems require considerable resources for establishment which makes implementation difficult (Lindberg et al., 1998). The LAC is a technical planning approach which provides a "systematic decision-making framework which helps determine what resource and social conditions are acceptable and prescribes appropriate management actions" (Stankey, 1991: 14). By establishing specific indicators and standards related to conservation values, coupled with monitoring, it is possible to define what impact levels can be permitted before management intervention becomes necessary (ibid).

Another important theoretical approach is Visitor Impact Management (VIM), which combines legislation/policy reviews, identification of problems through scientific approaches (both social and natural), as well as detailed analysis and professional judgment (Payne & Graham, 1993). Graefe et al. (1990) originally defined the principles of VIM as including:

- Identifying unacceptable changes occurring as a result of visitor use and development management strategies to keep visitor impacts within acceptable levels
- Integrating VIM into existing agency planning, design and management processes
- Basing VIM on the best scientific understanding and situational information available
- Determining management objectives that identify the resource condition to be achieved and the type of recreation experience to be provided
- Identifying visitor impact problems by comparing standards for acceptable conditions with key indicators of impact at designated times and locations
- Basing management decisions, to reduce impacts or maintain acceptable conditions, on knowledge of the probable sources of, and interrelationships with unacceptable impacts.
- Addressing visitor impacts using a wide range of alternative management techniques.
- Formulating visitor management objectives, which incorporate a range of acceptable impact levels, to accommodate the diversity of environments and experience opportunities present within any natural setting.

Building upon the VIM approach is the Visitor Activity Management Process (VAMP). This approach is meant to operate in parallel with other natural resource management processes, placing an emphasis on interpretation and visitor services (Mason, 2005). Taken together, VIM and VAMP are seen to contribute to a more integrated approach to managing sensitive areas through both 'direct' and 'indirect' approaches, understanding visitor use at sites, identifying issues, and introducing interventions to modify activity where required (Leung et al., 2018).

1.3.5 Tourism Tracking Research

The general literature related to understanding the behaviour of cruise passengers and the factors that influence their behaviour at a destination remains in its infancy. While general statistics pertaining to overall visitor numbers at a destination are increasingly available, little is understood about what takes place during the actual visitation period. One way that researchers are beginning to improve the understanding of these issues is through the use of GPS tracking technology.

GPS and other tracking technologies are used in a wide array of fields such as environmental health (Zenk et al., 2011), urban geography (Ahas et al., 2010), population geography (Silm & Ahas, 2010), and various fields in medicine (Miskelly, 2005). The use of tracking technologies in the field of tourism studies is a relatively new phenomenon, associated with decreases in both size and cost of GPS units (Shoval & Isaacson, 2006). This approach provides many advantages to tourism researchers over the previous use of traditional methods such as surveys and trip diaries; GPS data are more accurate, reduce the burden from participants, and are not dependent on respondents' enthusiasm and/or memory (Isaacson et al., 2016).

Over the past 20 years, GPS research in tourism studies has grown slowly. As Shoval & Ahas (2016) indicate in an overview paper on the first decade of the use of tracking technologies in tourism research, the number of published papers in peer-reviewed journals increased from 3-4 annually between 2007 and 2012 to 7 or more from 2012 onwards. There is enormous potential in understanding tourist movement, with profound implications for infrastructure and transport development, tourism product development, marketing strategies, and the management of the social, environmental, and cultural impacts of tourism (ibid).

As with the current state of tourism tracking research, specific research aiming to understand cruise passenger behaviour at a destination is limited. Publicly available information about cruise passengers at destination generally lacks details and has historically been limited to basic data related to the total number of passengers and ships which docked in port, though this is beginning to change (see Reif & Gross, 2024). Most of the research in the literature is based on traditional surveys: analyzing the experience at destination

based on activity participation (e.g. Andriotis & Agiomirgianakis, 2010); time spent at destination (e.g. Brida et al., 2013); expectation, satisfaction and intention of returning to the destination (e.g. Thurau et al., 2015); and spending patterns at destination (e.g. Larsen et al., 2013).

The literature pertaining to cruise passenger behaviour at remote sites is even more sparse, with no discernable attempts to conduct studies utilizing GPS tracking technology. Cessford and Dingwall (1994) administered pre- and post-visit questionnaires to a sample of cruise passengers to explore the expectation and satisfaction of their experience in New Zealand's sub-Antarctic islands, finding that limited time at the sites posed the largest constraint. They found that rural environments where the landscapes may be foreign and unknown to visitors can make it difficult to understand what the main attractions are. They conclude that high quality guidance and information about the site is vital to help make the site more 'legible' to visitors.

In Nunavut, even less is known about cruise passengers at destination. While the Government of Nunavut maintains a 'Master Cruise Itinerary' which outlines community visits, the actual number of passengers that disembark is mostly unknown and instead estimates are often used based on the maximum capacity of a given cruise ship (Weber et al., 2021). There is no publicly available information related to the shore locations that cruise ships visit in the territory; as such, there is little understanding about how many passengers disembark to explore each site, nor the range of site usage during their visit. This presents multiple management challenges, including monitoring issues and the impossibility of carrying out potential enforcement activities.

Monitoring and analyzing the flow of visitors in natural areas is key to understanding visitor behaviour, which in turn is needed for effective management that meets both conservation and recreation requirements (Lau & McKercher, 2006). One of the most important aspects of the spatial behaviour of visitors in recreational areas is their movement inside the area (intra-site flow). Monitoring the movement of people during their visits to a recreational area can help to identify which places they visit most or least, how much time they spend in each place, and which kind of attractions people prefer (Orellana et al., 2011). The study of intra-site flow of visitors can also provide information for conservation management, with the spatial and temporal distribution of visitors directly informing the prospective need for protection of sensitive areas or effectiveness of management interventions, for example. From a methodological point of view, it has been acknowledged that the secluded space and controlled setting on cruise vessels (in terms of both places and people) constitute close-to-ideal laboratory conditions for social researchers (Papathanassis & Beckmann, 2011).

1.3.6 Site-Specific Guidelines in Circumpolar Destinations

Site-specific guidelines are a common example of an indirect management approach, with curated information presented to help educate visitors on the particular sensitivities of an area and influence behaviour toward more respectful outcomes (Eagles, McCool, & Haynes, 2002). It is argued that the development of site-specific guidelines can help to confirm the vulnerability of visited areas in polar regions and convey this information to visitors in a comprehensible format, contributing to enhanced understanding, knowledge, and appreciation of a site (Poulsen et al., 2019). Amongst circumpolar destinations, site-specific guidelines are perhaps the most popular approach for the management of cruise visitation at shore locations, with widespread implementation in Antarctica (ATS, 2023) and formal recommendation at the international level by the Arctic Council's Protection of the Arctic Marine Environment (PAME) Working Group (2021).

Within contexts where jurisdiction may be complicated and there is an absence of direct management approaches, as is generally the case across the circumpolar regions, site-specific guidelines are a flexible tool which can be introduced at various levels ranging from governments to industry-led efforts (Liggett & Stewart, 2017). In fact, the site-specific guidelines in existence today in polar environments include those created in partnership between government and industry (i.e. Svalbard), as well as those created by industry alone (i.e. Antarctica).

Antarctica is largely considered to be the pioneer in the adoption of site-specific management approaches related to circumpolar expedition cruise tourism, with the Antarctic Treaty Secretariat (ATS) fully supportive of an industry-led initiative to self-regulate through the use of site-specific guidelines (ATS, 2024). The majority of tour operators in the region are organized under the umbrella of the International Association of Antarctic Tour Operators (IAATO), which has enjoyed multiple successes since its inception, including playing a major role in achieving the relatively strong record of safety and environmental protection in the region (Splettstoesser, 2000; Todd et al., 2004). IAATO has put a consistent and practical set of guidelines into place and is widely commended by various Antarctic Treaty Consultative Parties for the results that have been achieved (Haase et al., 2007). As of 2022, there are 45 total locations in Antarctica for which site-specific guidelines have been developed (ATS, 2023).

Inspired by the successes of site-specific guidelines in Antarctica, there has been a recent push toward the implementation of similar guidelines in the Arctic. In 2015, the Arctic Council's Protection of the Arctic Marine Environment (PAME) working group's ongoing Arctic Marine Tourism Project (AMTP) produced a Best Practices report with the recommendation to "develop a standardized framework for, and encourage the preparation of, site-specific guidelines for near-shore and coastal areas of the Arctic visited by passengers of marine tourism vessels and pleasure craft" (p. 8). In 2020, PAME convened an Arctic

Marine Tourism Workshop to follow-up on this particular recommendation, with the proceedings of this workshop becoming the foundation of a 2021 report whereby a standardized framework for the development of site-specific guidelines was introduced (PAME, 2021).

This standardized framework was created in close partnership with the Association of Arctic Expedition Cruise Operators (AECO), considered to be a 'sister organization' to IAATO and working to implement the best practices from Antarctica within the Arctic context (Van Bets et al., 2017). While the operational settings may be considered similar by their circumpolar connection, the Arctic represents several key differences, including varying national jurisdictions and regulations as well as the ongoing use and occupancy of the region by Indigenous peoples (Molenaar, 2005).

One of the fundamental pillars of AECO's work is a comprehensive set of guidelines that have been developed continuously since its founding in 2003, which members agree to follow to ensure that their operations are aligned with the organization's goals and objectives (AECO, 2023a). These guidelines include Operational Guidelines, Wildlife Guidelines, Community-Specific Guidelines, and Site-Specific Guidelines, among others (AECO, 2023b). At present, AECO's site-specific guidelines are only available for Svalbard (12 total) and Franz Josef Land (5 total), though the organization encourages all jurisdictions in which it operates to pursue their development (AECO, 2020). Aligned with this belief, AECO has created a standardized process for the creation of site-specific guidelines which is based on the methodology employed in Svalbard and has worked with PAME to publish a publicly available methodological template (Hagen et al., 2012; PAME, 2021).

1.4 Study Area

The research in this dissertation is divided by three distinct geographic areas of focus, ranging from broad to specific. Broadly, the research is focused on Inuit Nunangat, the homeland of Inuit across the Canadian Arctic (ITK, 2018). Jurisdictional complexity related to the marine environment in this region also necessitates a focus on those Canadian Arctic waters which fall under federal regulatory control. More specifically, much of the research is situated within the jurisdictional boundaries of Nunavut – the largest of the four Inuit land claim regions within Inuit Nunangat. Within Nunavut, *Tallurutiup Imanga National Marine Conservation Area* (TINMCA) is an important area of focus, as are two distinct shore location destinations located within TINMCA boundaries.

Inuit Nunangat has a long and complex history characterized by the political push by Inuit to achieve recognition as distinct regions defined by settled land claim agreements with the federal government (Simon, 2011). Distinct geographic, political and cultural foundations unite this region,

including an emphasis on the land, water, and ice. Inuit Nunangat encompasses roughly 35% of Canada's total landmass and nearly 50% of its coastline (ITK, 2018). There are 50 communities across the four settled land claim regions: Nunatsiavut (Northern coastal Labrador), Nunavik (Northern Quebec), the Inuvialuit Settlement Region (Northwest Territories), and the territory of Nunavut. The distribution of these communities and their Inuit populations can be found in Table 1.

Table 1 Community and Population Distribution Across Inuit Nunangat

Region	Population	# of Communities
Nunatsiavut	2,300	5
Nunavik	11,000	14
Inuvialuit Settlement Region	5,800	6
Nunavut	31,000	25

ITK, 2018; Statistics Canada, 2021

Nunavut is the largest of the four regions within Inuit Nunangat, including its geographic extent, population, and number of communities. The territory covers 1,936,113 km^2 of land and a nearly equal amount of ocean, representing approximately 21% of Canada's total land and ocean areas respectively (Hicks & White, 2000). The territory is comprised of portions of northern mainland Canada and encompasses the majority of the country's Arctic Archipelago (Macneill, 2019). As such, there are over 35,000 islands of various sizes within territorial boundaries and innumerable potentially navigable waterways (Aporta & Watt, 2020). Nunavut itself is divided into three regions: Qikiqtani (Eastern Arctic); Kivalliq (Central Arctic), and Kitikmeot (Western Arctic). There are no roads linking any Nunavut communities and therefore access is limited to air and sea (Miffin, 2008).

Nunavut has a mixed economy of land-based and wage-based employment (Government of Nunavut, 2022). Subsistence harvesting and related activities remain an important part of the territory's economy. There are several active resource development projects across the three regions, most notably iron ore and gold mining (Sinclair, 2017). The establishment of an Inuit-led fishing industry is also ongoing, with a goal of increasing its contribution to the territorial economy (Bernauer, 2022). Tourism is a small but growing sector of the economy, with four national parks, two national historic sites, and fifteen territorial parks, as well as several remote lodges offering land-based activities (Government of Nunavut, 2022). Cruise tourism is the largest component of the territorial tourism mix (Liggett & Stewart, 2020).

Located within the Qikiqtani region of Nunavut, TINMCA covers a total area of 108,000 km^2, representing 1.9% of Canada's total ocean coverage (Parks Canada, 2024). Upon formal establishment, TINMCA will be Canada's largest body of protected waters (QIA, 2019). Its location has been identified

by Inuit as requiring protection since at least the 1960s due to its unique ecosystem elements, intimately intertwined with the culture and wellbeing of those who have called the region home since time immemorial. According to Parks Canada (2022), this area has been frequently recognized internationally as one of the most ecologically significant parts of the world, including:

- Recognized as a natural site worthy of World Heritage Site status by the International Union for the Conservation of Nature (IUCN) in the 1980s;
- Identified as a Super Ecologically and Biologically Significant Area for the Arctic by the IUCN and the Natural Resource Defense Fund (NRDF) in 2010;
- Identified as an area of heightened ecological importance by the Arctic Council in 2013; and
- Identified as a potential Arctic marine World Heritage Site by the IUCN, NRDF, and the Marine World Heritage Program of UNESCO in 2016.

Situated at the eastern entrance to the Northwest Passage, TINMCA also experiences a disproportionate amount of vessel traffic as compared to the rest of Canadian Arctic waters with nearly every cruise ship that visits the Canadian Arctic transiting its waters at some point during any given itinerary (Weber et al., 2021).

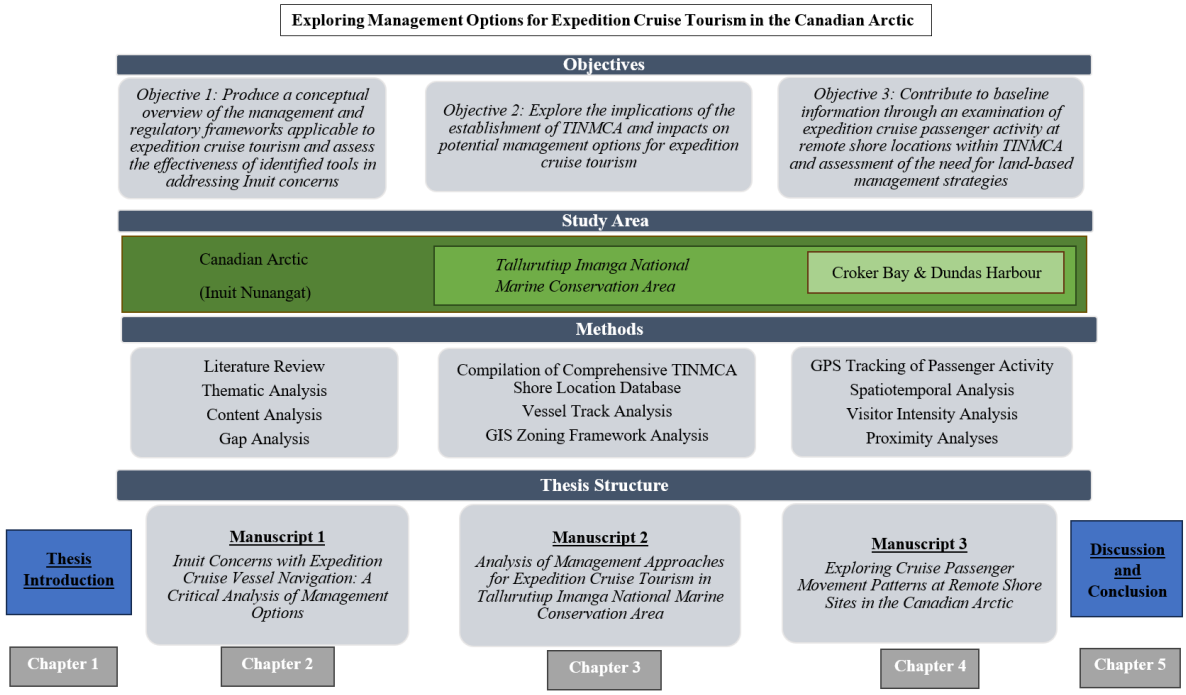
With this high level of cruise tourism activity comes associated elevated levels of visitation to the natural attractions within TINMCA. As Weber et al. (2021) have noted, only thirteen locations were found to be consistently advertised on cruise itineraries on an annual basis between 2008-2019 but five of these are located within TINMCA boundaries. Two of the most popular sites for visitation are Croker Bay and Dundas Harbour, both located on the southern coast of Devon Island and the setting for fieldwork associated with Manuscript 3.

Croker Bay is a scenic fjord with calm waters and home to the dynamic tidewater South Croker Glacier (Van Wychen et al., 2017). This area is generally visited for scenic cruising, as well as the deployment of zodiacs for closer viewing opportunities of the glacier. While marine-based activities are most common in the area, shore landings are also possible; however, only 13 such instances were reported between 2008-2019 (Weber et al., 2021). In close proximity to Croker Bay is Dundas Harbour, an abandoned RCMP outpost first established in 1924 to assert Canadian sovereignty and deter foreign activities such as whaling (University of Lethbridge, 2023). The Hudson's Bay Company leased the outpost in 1933; in the following year, 52 Inuit from Kinngait were relocated to the area before being returned home or to other outposts two years later (Alia, 2007). The RCMP once again occupied the site from the late 1940s to early 1950s, before it was permanently abandoned (Spitzer, 2020). Several Thule archaeological sites can also be found in the area, representing thousands of years of use and occupation by Inuit (Park, 1983).

1.5 Dissertation Structure

This dissertation contains three standalone manuscripts, though they may be interpreted as building upon one another sequentially as their level of focus increases from broad (i.e. Canada's Arctic waters) to narrow (i.e. two specific shore locations in Nunavut) in an exploration of potential improvements to the management of expedition cruise tourism in the Canadian Arctic (see Figure 1).

Figure 1 Dissertation Structure



Chapter 2 contains the first manuscript in this dissertation, with a planned submission to *Marine Policy*. This chapter has the broadest focus, examining the governance and regulatory frameworks for expedition cruise tourism in the Canadian Arctic and assessing the effectiveness of instruments and tools under these frameworks in addressing previously identified Inuit concerns related to this industry's operations. Chapter 3 is the second manuscript in this dissertation, with a planned submission to *Tourism in Marine Environments*. This chapter has a narrower focus, examining the potential implications stemming from the impending establishment of *Tallurutiup Imanga National Marine Conservation Area* as they pertain to the management of expedition cruise tourism. Chapter 4 is the third manuscript in this dissertation, with a planned submission to *Polar Journal*. This chapter continues the narrowing of focus by examining expedition cruise passenger activity at two remote shore locations within *Tallurutiup Imanga National Marine Conservation Area*. Chapter 5 is the concluding chapter to this dissertation which includes a discussion that unites the findings from all three manuscripts, provides observations on important

takeaways, outlines key contributions, and concludes with final remarks, limitations, and recommendations for future research (also see Appendices 1-5).

1.6 Positionality Statement

My interest in topics surrounding the governance and management of marine tourism in the Canadian Arctic stems personal and professional experience. This included 4 years working for the Government of Nunavut, with primary responsibilities related to the implementation of the *Nunavut Marine Tourism Management Plan* and helping prepare for the 2016 and 2017 voyages of the *Crystal Serenity*. During this time, I completed a Master of Science degree – for which my major research paper focused on community perspectives related to the *Crystal Serenity*'s maiden voyage.

I have continued my focus on Arctic marine policy development, moving from the territorial to federal level through my current position with Transport Canada. This experience has afforded me the privilege of observing firsthand the challenges of balancing multiple interests and perspectives in Canada's Arctic waters. I have been fortunate enough to also spend significant time on the ground in Nunavut's High Arctic communities, both as a researcher and territorial/federal representative. As such, I am keenly aware of the unique operational characteristics of expedition cruise tourism and the tensions between industry needs, regulatory frameworks, and Inuit priorities. This professional experience has provided me with valuable insights into the institutional and jurisdictional complexities of marine governance in the Canadian Arctic, while also highlighting the limitations of conventional regulatory approaches – including firsthand observations of the persistence of Inuit concerns over time.

As a 'southener' working and conducting research in Inuit Nunangat, I have always maintained an acknowledgment of my outside status to Inuit culture and continually strive to recognize the responsibility to conduct myself in a way that respects Inuit Qaujimajatuqangiit, priorities, and self-determination. My motivation for this research has been to draw together my myriad experiences from the past decade to contribute to more effective and culturally appropriate marine tourism management approaches that balance ecological protection, visitor experiences, and Inuit rights and interests. Throughout this work, I have sought to centre Inuit concerns and highlight opportunities for meaningful inclusion of Inuit in governance frameworks. This positionality has influenced my research questions, methodological choices, and interpretation of findings, particularly in identifying the need for management approaches that better align with Inuit priorities.

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CHAPTER 2: INUIT CONCERNS WITH EXPEDITION CRUISE VESSEL NAVIGATION: A CRITICAL ANALYSIS OF MANAGEMENT OPTIONS

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Abstract

This paper examines the governance and regulatory frameworks for expedition cruise tourism in the Canadian Arctic, with a particular focus on Nunavut. The aim of the study was to assess effectiveness among these frameworks in addressing previously identified concerns among Inuit communities about increased marine navigation activities across their homeland. These concerns include potential impacts to a pristine environment, disturbance to wildlife and traditional harvesting activities, and effects on cultural and historic sites, among others. A regulatory and policy scan was conducted to compile an inventory of applicable instruments and mechanisms from the broader marine and terrestrial regulatory frameworks based on the various jurisdictions at play, ranging from federal legislation to voluntary measures. Subsequently, a multi-criteria policy analysis approach was employed to assess the relevance and alignment of the inventory's contents in addressing Inuit concerns. Finally, a gap analysis was carried out to identify areas in the existing regulatory landscape where Inuit concerns remain inadequately addressed. Results show that while the current overall framework effectively addresses vessel safety and environmental protection, Inuit concerns persist. This study finds that a reconceptualization of the role of shore-based permitting regimes and emerging conservation mechanisms, particularly National Marine Conservation Areas, show promise in better aligning management approaches with identified Inuit priorities and in alleviating Inuit concerns. In addition, voluntary measures and industry self-regulation demonstrate potential to fill regulatory gaps in both the short and longer term.

Key words

Shipping, Arctic Cruise Tourism, Nunavut, Inuit Rights, Ocean Policy, Canadian Arctic

Planned submission to Ocean and Coastal Management

2.1 Introduction

Vessel activity in the Canadian Arctic continues to increase, with a quadrupling of the number of voyages since 1990 (Dawson et al., 2018; 2022). This growth trend is frequently attributed to the considerable decline in sea ice extent observed associated with a warming Arctic, particularly in the summer months (Min, et al., 2022; Mudryk, 2021; Parkinson & DiGirolamo, 2021). However, there are also other factors at play, including various economic drivers such as fisheries development (Shephard et al., 2016; Tai et al., 2019) and remote mining operations (Têtu et al., 2019; Tolvanen et al., 2019), as well as the socioeconomics of growing communities with greater annual re-supply needs (Carter et al., 2018; 2020). One of the fastest growing categories is among passenger vessels, reflecting a growing demand for cruise tourism experiences in a part of the world that is undergoing rapid change (Stewart et al., 2015; Lemelin et al., 2010).

The passenger vessel category in the Canadian Arctic is primarily composed of expedition cruise ships, characterized by smaller, ice-strengthened vessels carrying between 50-200 passengers (Dawson et al., 2017). Unlike other forms of marine traffic, these vessels frequently deviate from common shipping routes in search of 'off the beaten track' experiences (Ellis & Kriwoken, 2006). This unique operational approach, focused on exploration and education, sets expedition cruise tourism apart from other vessel categories in the region. The pursuit of remote destinations and experiences is not without risk. As navigation away from primary marine transportation routes frequently involves poor charting, a deficit of aids to navigation, and a lack of icebreaker assistance, among other factors, this confluence of variables influences the potential for increased risk among tourism vessels (Chénier et al., 2017; Chircop, 2023). Despite the unique operational characteristics of expedition cruise tourism, current marine regulatory frameworks apply equally to all vessel types. This has been previously identified as problematic and requiring reconceptualization to adequately address both the specific challenges posed by expedition cruise tourism, as well as concerns raised by Inuit related to the industry's operations (Dawson et al., 2017).

It is important to acknowledge the operational context within which the expedition cruise industry operates in the Canadian Arctic – an area that is mostly comprised of *Inuit Nunangat* which includes the major settled land claim areas of Inuit in Canada (ITK, 2024). Inuit continue to rely on this land, water, and ice as integral foundations of their culture and way of life, including traditional harvesting activities essential to the physical, mental, and spiritual health of many (Aporta, 2011; Wesch & Chan, 2010; Qikiqtani Inuit Association, 2013). When expedition cruise vessels sail to remote destinations within this context, the potential for direct conflicts of use arise with Inuit because both groups are often seeking the same resources (i.e. marine wildlife, cultural sites, etc.). In the territory of Nunavut, these conflicts of use and associated Inuit concerns have been well documented and consistent since the expedition cruise tourism industry began its growth trajectory at the beginning of the 21st century (Stewart et al., 2007; Dawson et al., 2021).

In a time of reconciliation, the Government of Canada is seeking to renew its relationship with Indigenous Peoples from coast to coast to coast. One of the ways that this renewal is being pursued is via new, permanent, bilateral mechanisms such as the *Inuit Nunangat Policy* introduced in 2022. This policy aims to guide federal departments and agencies "…in the design, development and delivery of all new or renewed federal policies, programs, services, and initiatives that apply in Inuit Nunangat… to support Inuit self-determination" (Government of Canada, 2022, preamble). An Inuit-Crown Partnership Committee has been struck to further this relationship renewal "based on the recognition of rights, respect, co-operation, and partnership" (ibid, 1.1).

In the spirit of this renewed relationship among Inuit and the Crown, there is a need to evaluate the effectiveness of existing regulatory frameworks and management mechanisms pertaining to expedition cruise activities through the lens of reconciliation. In other words, to what degree do the current regulatory frameworks and tools which govern and manage expedition cruise tourism address potential conflicts in use and recognize Inuit rights and concerns? This study aims to bridge this knowledge gap, with three main research objectives including to: 1) identify and categorize Inuit concerns related to expedition cruise tourism; 2) inventory and assess the suite of instruments and tools applicable to the full range of expedition cruise operations; and 3) evaluate the effectiveness of these instruments and tools in addressing identified Inuit concerns.

To achieve these objectives, this research employs a mixed-methods approach including document reviews, thematic analysis of Inuit concerns, and a regulatory and policy scan, further complemented by content, policy, and gap analysis techniques. By examining a wide range of documents, from international conventions to local permitting requirements, this study provides a holistic view of the current regulatory and management landscape that is grounded in the potential for a more respectful style of operation by expedition cruise vessels. To begin, further context is provided behind the growth trajectory of expedition cruise tourism in Nunavut, and Inuit perspectives on this growth. Next, a broad overview of the international and domestic governance frameworks for Arctic shipping is presented, followed by important background on the unique jurisdictional considerations in Nunavut. Study methods are subsequently outlined before presenting results, ending with a discussion on the evaluation of the current regime in addressing Inuit concerns and concluding with recommendations for improving management in the short and long term.

2.2 Context and Background

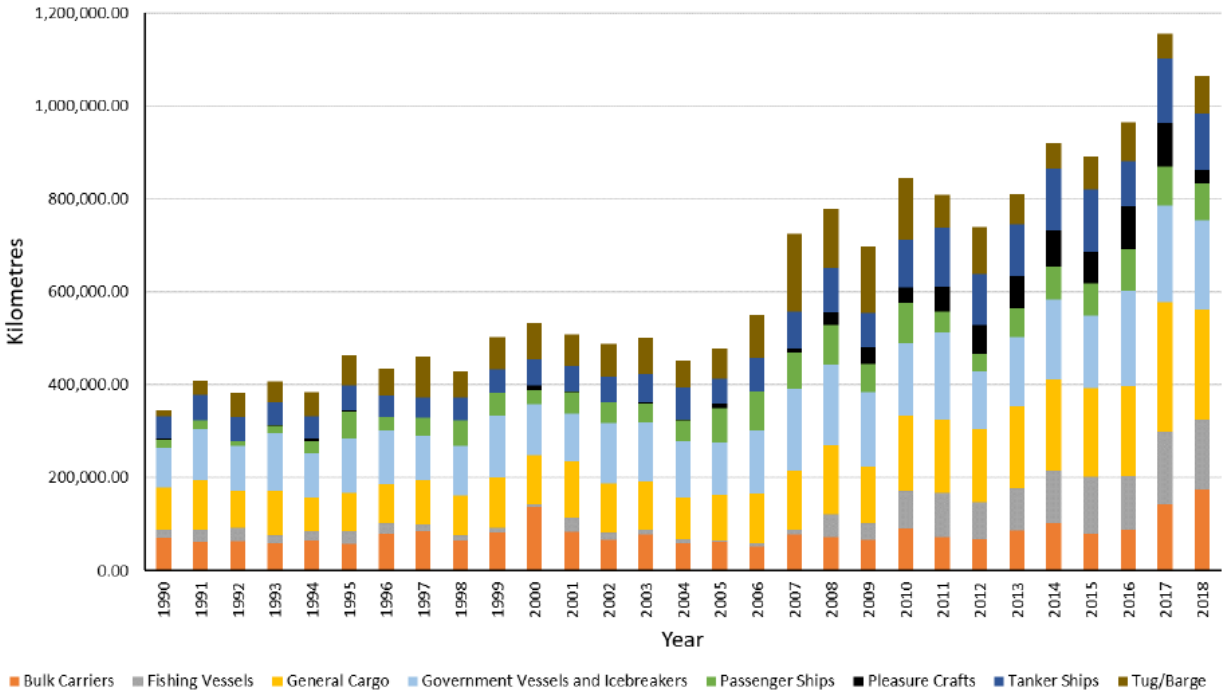
The increase in vessel traffic in the Canadian Arctic presents both opportunities and risks for Inuit communities. While it is recognized that marine shipping provides vital annual supplies and forms the basis of many economic development opportunities in the region, it also creates a situation where Inuit must

contend with the need to adapt to the more common presence of vessels and the potential threats they pose (Dawson et al., 2020a). Expedition cruise tourism encapsulates this balance between economic development and the limits of tolerable perceived risk. While Canada has a host of laws and associated regulations to ensure safety of navigation and protection of the marine environment, this regime does not necessarily align with Inuit perspectives on the current management of expedition cruise tourism. The following sections provide further context, situating the growth of expedition cruise tourism within the broader trend of increasing vessel traffic in the Canadian Arctic and introduce some of these Inuit perspectives on the industry. This is followed by a brief overview of the foundations of maritime governance in Canadian Arctic waters and the particularities of Nunavut as a marine tourism destination.

2.2.1 Trends in Canadian Arctic Marine Traffic and Growth of the Expedition Cruise Industry

Maritime traffic in the Canadian Arctic has increased substantially over the past two decades, where it has been observed that the total distance travelled by ships has tripled alongside the quadrupling in the total number of voyages since 1990 (Dawson et al., 2018; 2022). Figure 2 below illustrates this trend in total distance travelled between 1990-2018.

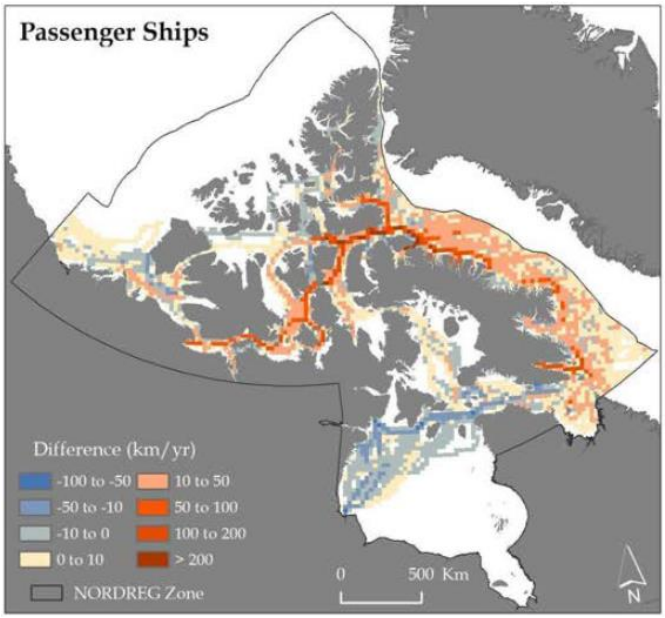
Figure 2 Total Kilometres Travelled Annually by All Vessel Types in the Canadian Arctic



Kochanowicz et al., 2021

Passenger vessels are among the fastest-growing categories, with the average distance travelled by this vessel class more than doubling in the 2010-18 period as compared to 1990-99 (Dawson et al., 2021). As shown in Figure 3, the spatial patterns of this growth are not evenly distributed across the Canadian Arctic, with specific concentrations in popular routes through the Northwest Passage.

Figure 3 Difference in Average Annual Distance Travelled (km/yr) in the Canadian Arctic between 1990-99 and 2010-18



Dawson et al., 2021

This increase in distance travelled is mirrored by growth in total annual voyages and estimates of total passenger volume (Bystrowska & Dawson, 2017; Palma et al., 2019), alongside increased usage of remote shore locations for expedition activities, with annual shore-based itinerary listings ranging from 69 in 2012 to 215 in 2019 (Weber et al., 2021).

2.2.2 Inuit Perspectives on the Growth of Expedition Cruise Tourism

The growth of cruise tourism in the Canadian Arctic, particularly in Nunavut, has elicited mixed responses from Inuit communities. While some view it as an opportunity for economic development and cultural exchange, this is often counterbalanced by the sentiment that cruise passengers do not spend enough during community visits and displeasure at the sense of being put on display for visitors' benefit (Johnston et al., 2012a, 2012b; Stewart et al., 2011, 2015; Dawson et al., 2016; Lemelin et al., 2012; Lopez, 2017). There is also an increasing apprehension regarding potential environmental influences, including underwater

noise impacts (Halliday et al., 2017; 2021a), interactions and collisions with marine mammals (Guzman et al., 2012; Martin et al., 2022), introduction of invasive species (Chan et al., 2019; van Luijk et al., 2021), and repercussions from accidents (van Luijk et al., 2022). Although a robust and complex regulatory framework exists in Canada to manage these risks, Inuit do not feel this system adequately addresses their concerns (ICC Alaska, 2020). This highlights the need for shipping-related governance and management approaches to consider Inuit input; in the absence of this input, "… having policies, regulations, and agreements that do not reflect Inuit ways of life and values have drastic impacts on Inuit communities, animals, water, and on the entire ecosystem" (ibid, p.25).

The basis of this existing regulatory framework has deep historical origins, maintained at the international level and implemented by individual nations at the domestic level. Due to this agreed-upon foundation, there are limits as to how far nations may go to restrict aspects of marine navigation (Aporta et al., 2024). Despite these limits Canada, continues to make attempts to introduce legislation that push to the maximum limits of allowable protections, examples of which are most clearly seen in its Arctic waters (Chircop, 2014).

2.2.3 International Maritime Governance and Canada's Domestic Implementation

The overall legislative framework for marine navigation in Canadian Arctic waters is rooted in a complex interplay between international maritime law and domestic legislation. At the international level, several key conventions form the foundation for global maritime governance: 1) United Nations Convention on the Law of the Sea (UNCLOS); 2) International Convention for Safety of Life at Sea (SOLAS); 3) International Convention for the Prevention of Pollution from Ships (MARPOL); and 4) International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

Often referred to as the 'constitution of the oceans', UNCLOS sets the overall legal framework for the regulation of shipping globally (Van Der Zwaag & Chircop, 2008). Of particular importance for shipping in Arctic waters is Article 234 of UNCLOS, which grants greater control over vessels operating in ice-covered waters, recognizing the rights of Arctic coastal states to adopt and enforce special pollution prevention and control laws in these areas (United Nations, 1982). Arctic waters are granted further special consideration at the international level with the introduction of the Polar Code in 2017, which was developed to supplement existing International Maritime Organization (IMO) instruments to increase the safety of ship operations and mitigate the impact on the people and environment in the remote, vulnerable, and potentially harsh polar waters (IMO, 2017).

Domestically, the Government of Canada has an important leadership role to play in the governance and management of vessel navigation in the Canadian Arctic given that maritime shipping is exclusively a federal responsibility under section 91 of the *Canadian Constitution Act, 1867*. Canada has taken both national and international steps to align its regulatory framework, integrating international norms in its domestic laws and ratifying key international agreements (Chircop, 2014). Van der Zwaag & Chircop (2008) provide an overview of the main parameters of shipping controls and domestic implementation of international conventions, summarized in Table 2 below.

Table 2 Foundational International Conventions for Maritime Governance and their Canadian Implementation

Convention	Notes	Canadian Implementation	Notes
Key International Conventions Related to Safety of Marine Navigation		***Key Acts and Regulations Related to Safety of Marine Navigation***	
United Nations Convention on the Law of the Sea (UNCLOS)	UNCLOS sets the overall international legal framework for the regulation of shipping, often referred to as the 'constitution of the oceans.' It sets out coastal state legislative and enforcement powers over foreign vessels according to maritime zones of jurisdiction.	Oceans Act	Provides the legal basis for Canada's jurisdiction over its maritime zones. The Act outlines the rights, responsibilities, and obligations of Canada within these zones, in accordance with UNCLOS.
		Canada Shipping Act, 2001	This Act governs shipping and navigation in Canadian waters, incorporating UNCLOS principles related to safety, security, and environmental protection. It sets out the licensing requirements for foreign vessels, enforcement measures, and penalties for non-compliance.
		Arctic Waters Pollution Prevention Act	This Act aims to protect the Arctic marine environment by regulating shipping and pollution in Canadian Arctic waters. It reflects UNCLOS provisions on the protection and preservation of the marine environment and the rights of coastal states in ice-covered areas.
International Convention for Safety of Life at Sea (SOLAS)	Specifies minimum standards for the construction, equipment and operation of ships. Flag States are required to ensure that ships under their flag comply with requirements.	Canada Shipping Act, 2001	This Act incorporates principles and provisions of SOLAS through several regulations, including those related to Navigation Safety (e.g. requirements for navigational equipment, charts, and publications, as well as safe navigation practices), Vessel Certificates (e.g. Safety Equipment and Safety Construction)
International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW)	Sets minimum standards that countries are obliged to meet or exceed for training, certification and watch keeping for shipmasters, officers and watch personnel on seagoing merchant ships.	Canada Shipping Act, 2001	The Marine Personnel Regulations under this Act provides the framework for the certification of seafarers, specifying the requirements for various certificates of competency, training courses, and examinations.
International Code for Ships Operating in Polar Waters (Polar Code)	Mandatory under SOLAS and MARPOL, the Polar Code covers matters relevant to ships operating in polar waters including design, construction, equipment, operational considerations, training, search and rescue, and environmental protection measures.	Canada Shipping Act, 2001	Recent amendments to regulations under this Act, such as Navigation Safety and Vessel Certificates, ensure that vessels operating in Canadian Arctic waters comply with the safety standards of the Polar Code.
		Arctic Waters Pollution Prevention Act	Amendments to the Arctic Waters Pollution Prevention Regulations under this Act address the Polar Code requirements related to pollution prevention, waste management, and discharge of oil, noxious liquid substances, sewage, and garbage.
Key International Conventions Related to Marine Environmental Protection		***Key Acts and Regulations Related to Marine Environmental Protection***	
International Convention for the Prevention of Pollution from Ships (MARPOL)	Regulations aimed at preventing and minimizing pollution from ships (accidental and routine). Ships flagged under countries that are MARPOL signatories are subject to its requirements regardless of where they sail.	Canada Shipping Act, 2001	Several Regulations under the Act enforce the provisions of MARPOL in Canadian waters, including Vessel Pollution and Dangerous Chemicals Regulations and Ballast Water Control and Management Regulations
		Arctic Waters Pollution Prevention Act	While this Act is not a direct implementation of MARPOL, it complements the goals of the Convention via its provisions related to pollution prevention and waste management that align with MARPOL requirements.

Adapted from Van der Zwaag & Chircop, 2008

2.2.4 *Nunavut Agreement* and Territorial Distinctions

Unlike other areas in the circumpolar Arctic, the Canadian Arctic is characterized by a major Land Claim Agreement which encompasses most of the Canadian Arctic Archipelago. Signed in 1993, the Nunavut Agreement (the Agreement) led to the formal creation of the territory of Nunavut in 1999. The Agreement established the Nunavut Settlement Area (NSA), which is based on "traditional and current use and occupation of the lands, waters and land-fast ice… in accordance with their own customs and usages" (preamble). The Agreement grants Inuit with certainty and clarity "…of rights for Inuit to participate in decision-making concerning the use, management and conservation of land, water and resources, including the offshore" (ibid) and enshrines the rights for Inuit to harvest wildlife throughout the NSA.

The Agreement also establishes a strong territorial governance framework composed of Institutions of Public Governance (IPGs), including the Nunavut Planning Commission (NPC) and Nunavut Impact Review Board (NIRB). These bodies play important roles in land use planning and environmental impact assessment within the NSA. The recent introduction of the Nunavut Planning and Project Assessment Act (NuPPAA) further codifies the environmental assessment process in Nunavut. Under NuPPAA, project proponents must seek a conformity determination with the Nunavut Land Use Plan (NLUP) via NPC and may also be subject to formal environmental impact assessment by the NIRB.

The NLUP remains under development at this time, but final submissions for input and comment occurred in early 2023, and a version of the plan has been recommended for approval (NPC, 2023a). Once approved, the NLUP will apply to all projects within the NSA and Outer Land Fast Ice Zone, including surface and subsurface lands, freshwater, marine areas, and the beds of these bodies of water; however, the NLUP does not apply within established National Parks, National Marine Conservation Areas, Territorial Parks, and National Historic Sites administered by Parks Canada (NPC, 2021).

Tourism activities, including expedition cruise tourism, are considered Projects as defined by NuPPAA (Canada, 2013), and therefore proponents will be required to submit a Project Proposal to the NPC for a determination of conformity against the NLUP. Should the NPC issue a positive determination of conformity, then the Project Proposal proceeds to the NIRB for environmental impact assessment. The NIRB is responsible for assessing the potential impacts of proposed projects before any required permits, licences and approvals can be granted (NIRB, 2023a).

Shipping associated with project proposals in the NSA is subject to Article 12 of the Nunavut Agreement, where the NIRB can make recommendations to the responsible government Minister(s) with regards to ecosystems and socio-economic impacts (s. 12.2.2). After the NIRB has screened a Project Proposal, it may be approved with or without conditions. Any potential conditions associated with an

approved project would be contained within the certificate granted, which can include aspects pertaining to marine navigation. Some prior examples of conditions within a Project Certificate have included speed limits, hiring ship-based Inuit monitors, and prescribed operational timeframes, among others (NIRB, 2023b).

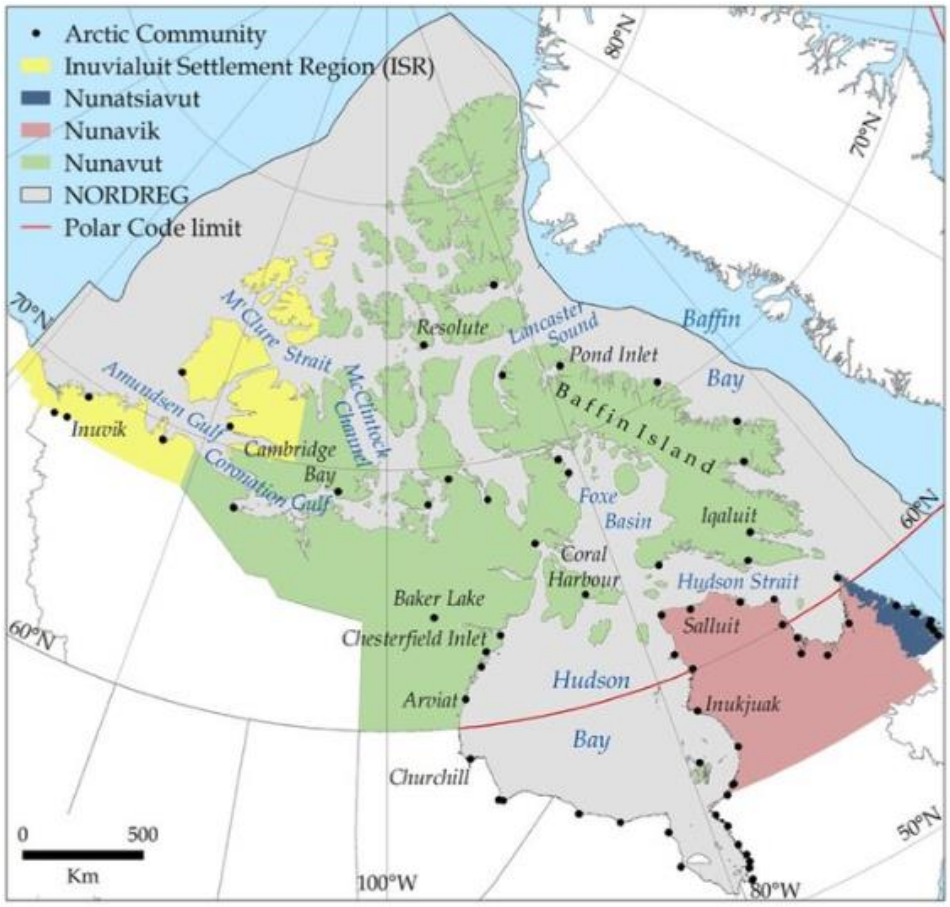
While Projects within the NSA are beholden to the potential conditions within their respective Project Certificates, it is important to note that Article 15 of the Nunavut Agreement, related to marine areas, provides clarification on limitations. Specifically, matters within the marine areas of the NSA "…shall be interpreted in a manner consistent with Canada's sovereignty, sovereign rights and jurisdiction, and with Canada's international obligations." (s. 15.5.1). This clarifies that international and domestic maritime law supersedes powers within the Nunavut Agreement with respect to marine navigation. It is important to keep these particularities of the governance structure within the NSA in mind when interpreting the regulatory frameworks and management tools introduced in the following sections.

2.3 Study Methods

2.3.1 Study Area

This research focuses on Canadian Arctic waters, with a particular emphasis on the territory of Nunavut and its adjacent marine areas. The boundaries of the Nunavut Settlement area include those waters within 12 nautical miles of the low water mark, also known as the territorial sea. The adjacent marine areas included in the scope of the study extend to encompass the Northern Canada Vessel Traffic Services Zone (NORDREG) outside of the Nunavut settlement area, including contiguous and exclusive economic zones. This geographical scope allows for a comprehensive examination of the overall regulatory framework applicable to expedition cruise tourism, ranging from Canada's maximum jurisdictional reach to territory-level permits and permissions.

Figure 4 Canadian Arctic Waters

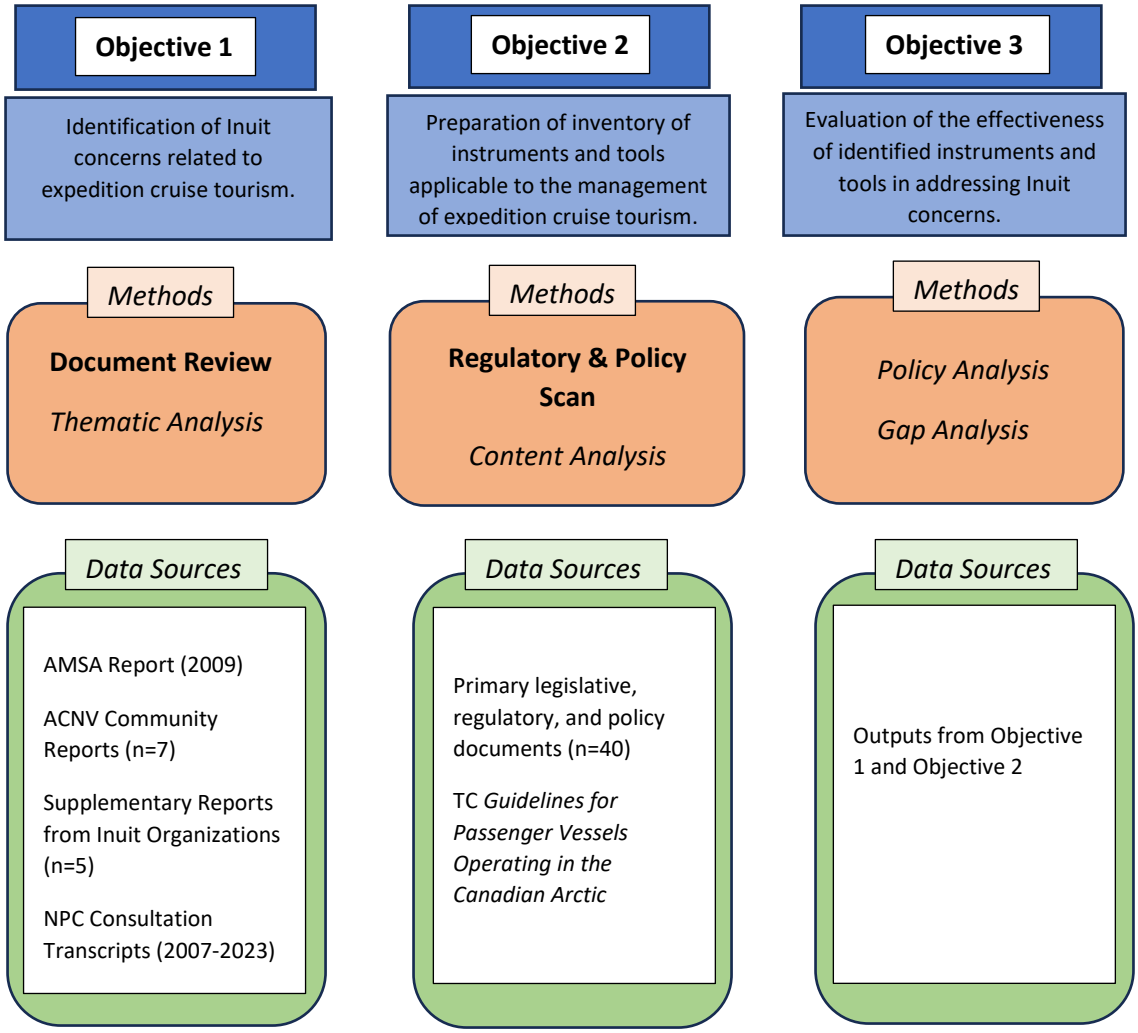


van Luijk et al., 2020

2.3.2 Study Methods

The overarching approach to this study involved engaging in a thematic analysis of Inuit concerns related to expedition cruise tourism and assessing the regulatory and management frameworks applicable to this industry in the Canadian Arctic with respect to their applicability in addressing these concerns. A mixed-methods approach was employed to achieve these main objectives, consisting of three interconnected steps (Figure 5).

Figure 5 Overview of Study Objectives, Methods, and Data Sources



First, a review of key documents was carried out to identify Inuit concerns with expedition cruise tourism. Efforts were made to prioritize materials that directly represented Inuit voices and perspectives. Primary sources included the Arctic Council's 2009 *Arctic Marine Shipping Assessment Report* (AMSA), which synthesized pan-Arctic Inuit concerns, and the community reports from the Arctic Corridors and Northern Voices (ACNV) project (n=7), which documented local Inuit perspectives on the impacts of marine vessel traffic broadly, as well as specific concerns about expedition cruise tourism (Dawson et al., 2020b). These sources were supplemented with position papers from Inuit organizations (e.g. QIA, 2017, 2019a, 2019b; ITK, 2017), and transcripts from consultations on the draft Nunavut Land Use Plan (NPC, 2023b). The document review followed a structured approach whereby statements of Inuit concerns related to expedition cruise vessel operations were extracted from the AMSA and ACNV reports, coded thematically

(see Clarke & Braun, 2017), and validated across supplementary sources to ensure consistency and representativeness.

Second, an inventory of instruments and tools applicable to expedition cruise vessel operations was compiled through a regulatory and policy scan. This built upon foundational work by Dawson et al. (2017) and was expanded using established methods from Pashkevich et al. (2015). The scan encompassed international conventions, federal legislation and regulations, territorial regulations, and voluntary measures. Further content analysis of primary documents, such as Transport Canada's *Guidelines for Passenger Vessels Operating in the Canadian Arctic* (2018a) was also carried out to ensure that the final inventory was complete and up to date. The initial scoping identified over 50 potential instruments and tools which were subsequently assessed against the thematic Inuit concerns identified using a content analysis approach (Krippendorff, 2018), with only those directly applicable retained in the final inventory. This final inventory was organized into four categories based on their jurisdictional and functional characteristics.

Third, an assessment of the relevance and alignment of the identified tools in addressing Inuit concerns was conducted, employing a multi-criteria approach. This assessment focused on determining how and to what extent each instrument addresses, or has the potential to address, the identified thematic Inuit concerns, based on three key dimensions:

1. **Scope of Applicability:** The degree to which the instrument's provisions relate to one or more of the identified Inuit concerns.
    i. *Directly Applicable* – Contains specific provisions addressing the concern(s)
    ii. *Indirectly Applicable* – Contains broader provisions that could be applied to the concern
    iii. *Not Applicable* – No provisions related to the concern
2. **Instrument Characteristics:** Factors impacting potential impact.
    i. *Strength* – Mandatory versus voluntary
    ii. *Scope* – Jurisdictional reach and limitations
    iii. *Prescriptiveness* – Capacity to dictate operational behaviour
    iv. *Requirements* – Necessary for operations
3. **Inuit Involvement:** The extent of Inuit involvement in the development, implementation, or administration of the instrument.

The assessment utilized a policy analysis method (Patton et al., 2015) to examine each instrument against these dimensions, providing insight into the effectiveness of the current suite of management approaches in addressing Inuit concerns with expedition cruise tourism.

Finally, a gap analysis was employed based on the outcomes of the steps above to identify areas in the current regulatory landscape where Inuit concerns remain inadequately addressed. This analysis also examined the interplay between different categories of instruments, providing insight into potential opportunities within existing governance frameworks and highlighting areas where new or modified approaches may be needed.

2.4 Results

Results begin with the identification of Inuit concerns related to expedition cruise tourism, with a focus on industry-specific issues which stem from the unique operational behaviours of these vessels. This is followed by the final inventory of instruments and tools applicable to the operation of expedition cruise vessels in the Canadian Arctic and Nunavut. Finally, an evaluation of these instruments and tools is presented based on the multi-criteria assessment approach described above, examining their effectiveness in addressing identified Inuit concerns. Despite the overall jurisdictional complexity and sheer number of available instruments and tools, results show that the system is effective in some respects and opportunities exist to improve its alignment with Inuit priorities.

2.4.1 Inuit Concerns with Expedition Cruise Tourism Operations

In comparison with other circumpolar destinations, the importance of Nunavut's marine environment in daily Inuit life, livelihoods, and cultural practices cannot be understated. As Inuit Tapiriit Kanatami (ITK) President Natan Obed has explained, "Inuit are a marine people… [with] culture and way of life inextricably linked to the ocean." (ITK, 2017; foreword). The changing climate in the region is affecting this marine environment, whether through altered distribution patterns of wildlife or reductions in sea ice (Descamps et al., 2017; Pizzolato et al., 2014, 2016), the latter of which has spurred concerns of continued growth in vessel traffic and further disruption to the Inuit way of life. As a result, communities increasingly express apprehension about vessel-related issues stemming from increased traffic generally and often about cruise tourism specifically (Stewart et al., 2013).

Given this intimate relationship between Inuit and the marine environment, the Arctic Council's AMSA report has identified five potential challenges related to how increased vessel traffic may affect Inuit, with a primary focus on environmental impacts. These challenges identified in the AMSA report are

corroborated by the more recent research conducted in the Canadian Arctic through the ACNV project, which focused on Inuit-identified risks of increased vessel traffic in their region. ACNV findings also included supplementary risks, including concerns unique to expedition cruise tourism (Carter et al., 2018, 2019, 2020).

Taken together, the challenges identified by the AMSA report and community perspectives noted through the ACNV project can be grouped thematically to identify higher-level Inuit concerns related to expedition cruise tourism in Nunavut. Table 3 below provides an overview of the results from this analysis, noting the identified challenge/concern, its source, and the emergent thematic grouping it falls under.

Table 3 Thematic Challenges and Inuit Concerns Related to Expedition Cruise Tourism

Emergent Theme	**Challenge / Concern**	**Source**	
		AMSA	*ACNV*
Impacts on the Environment	Introduction of contamination or invasive species into the marine environment	X	X
	Alteration of sea ice patterns, integrity, and resilience	X	
	Habitat degradation for ice-dependent species	X	
Disturbance of Wildlife and Traditional Harvesting Activities	Dissemination of underwater noise and light pollution	X	X
	Icebreaking negatively affecting community travel and harvesting activities	X	
	Safety concerns when the visit is unknown		X
	Interference with marine wildlife (including migration) and harvesting areas while transiting and anchoring in sensitive areas		X
Impacts to Cultural and Historic Sites	Tourists interfering with cultural / historic sites and artefacts during shore-based excursions		X
	Tourists visiting cultural and historic sites without communities' knowledge or consent		X

2.4.2 Inventory of Instruments and Tools Applicable to the Operation of Expedition Cruise Vessels

Based on the output of the thematic analysis of Inuit concerns, a comprehensive regulatory and policy scan was conducted to create an initial inventory of instruments and tools relevant to expedition cruise tourism operations. A preliminary scoping exercise revealed over 50 different items ranging from federal legislation and regulations to territorial permitting requirements, as well as voluntary measures and guidance material. The output of this scoping exercise was analyzed against the identified thematic Inuit concerns, leading to the inclusion of only those instruments and tools that directly address one or more of these concerns. The final inventory is organized into four categories:

1) **Safety of Navigation & Pollution Prevention:** Focused on domestic regulatory tools, these instruments align with international maritime law foundations, particularly UNCLOS.

2) **Marine Conservation:** Reflects Canadian legislation aimed at protecting marine environments, distinct from navigational safety.

3) **Shore-Based Permitting:** Covers the regulatory regime unique to shore-based expedition cruise tourism operations, including the issuance of permits for landing and excursions.

4) **Voluntary Measures and Guidance Material:** Includes recognized approaches for managing expedition cruise tourism that fall outside formal regulatory categories, covering federal processes and industry self-regulation.

Table 4 presents this final inventory, outlining how different regulatory and management approaches target specific aspects of expedition cruise operations, highlighting the multi-layered nature of the governance landscape, and drawing the linkage to addressing Inuit concerns.

Table 4 Final Inventory of Instruments and Tools Applicable to the Operation of Expedition Cruise Vessels in the Canadian Arctic

Category	Source	Instrument/Tool	Description	Linkage to Addressing Inuit Concerns
Safety of Navigation & Pollution Prevention	*Canada Shipping Act, 2001*	Northern Canada Vessel Traffic Services Zone Regulations (NORDREG)	Establishes vessel traffic services zones in Canadian Arctic waters, requiring mandatory reporting and clearance for vessels entering, proceeding, or leaving these zones.	Enhances navigational safety, environmental protection, and oversight. Addresses concerns about managing vessel traffic and ensuring Inuit communities are informed of vessel movements.
		Interim Orders	Allows the Minister of Transport to issue immediate, time-bound orders to manage marine safety or environmental risks, including on a precautionary basis.	Provides a flexible tool to address emerging risks or urgent concerns, offering the ability to protect Inuit interests in rapidly changing or unforeseen circumstances.
	Arctic Waters Pollution Prevention Act	Shipping Safety Control Zones (SSCZ) and Zone/Date System	Divides Canadian Arctic waters into zones with specific access regulations based on ice conditions and vessel standards.	Controls access to differing Arctic regions, aiming to protect the environment and reduce navigational risks.
		Arctic Ice Regime Shipping System (AIRSS)	A dynamic system that allows vessels to navigate based on actual ice conditions rather than fixed dates.	Reduces environmental risks through an understanding of real-time hazards related to sea ice conditions.
		Polar Code	The International Code for Ships Operating in Polar Waters, strengthens protections for navigating in challenging Arctic conditions.	Requires comprehensive voyage planning with specific considerations for ice conditions, marine mammals, and marine protected areas.
Marine Conservation	*Oceans Act*	Marine Protected Areas	Designates areas for the long-term conservation of marine ecosystems, including restrictions on certain activities to protect biodiversity	Protects critical marine habitats, addressing environmental impacts and preserving areas important to Inuit culture and traditional activities.
	Canada National Marine Conservation Areas Act	National Marine Conservation Areas	Establishes areas for protection which are representative of Canada's marine environments, including area-based management approaches to manage conservation objectives.	NMCA zoning framework can restrict activities which run contrary to conservation objectives, including the consideration of protecting Inuit-identified areas of importance.

	Canada Wildlife Act	National Wildlife Areas	Establishes and manages protected areas to conserve wildlife habitats, particularly for breeding and migration.	Protects key habitats for wildlife species, including those important to Inuit harvesting activities.
	Migratory Birds Convention Act	Migratory Bird Sanctuaries	Establishes protected areas specifically for migratory birds, restricting activities that could harm populations, nests, or eggs.	Protects important habitat for migratory birds, limiting activities that could cause disturbance to foraging areas and nesting sites.
Shore-Based Permitting	*Canada National Parks Act*	National Parks Business Licence	Required for commercial operators conducting activities within National Parks.	Ensures that tourism activities within National Parks respect sensitive environments and cultural sites.
	Historic Sites and Monuments Act	National Historic Sites Permit	Required to conduct activities at designated National Historic Sites.	Restricts access and provides protection for sites of national historical significance.
	Canada Wildlife Act	National Wildlife Area Permit	Required for any activities within National Wildlife Areas to ensure they align with conservation objectives.	Contributes to the protection of critical wildlife habitats.
	Migratory Birds Convention Act	Migratory Bird Sanctuary Permit	Required for activities that may be deemed to potentially cause harm to migratory bird populations or habitats.	Contributes to the protection of migratory birds, their habitats, and nesting grounds.
	Nunavut Act	Inuit-Owned Land Access Permit	Required for accessing Inuit-owned lands, typically managed by Regional Inuit Associations.	Ensures that activities conducted on Inuit-Owned Lands align with local priorities and usage.
	Nunavut Tourism Act	Outfitter Licence	Required for commercial tourism operators, ensuring they meet standards for operating in Nunavut.	Primarily can control activities taking place within municipal boundaries, allowing communities to restrict visitation.
	Nunavut Archaeological and Palaeontological Site Regulations	Archaeological Permit	Protects archaeological sites within Nunavut, requiring permits for any activities that may disturb these sites.	Provides direct protection of cultural and historic sites by controlling access and requiring adherence to site management best practices.
	Nunavut Territorial Parks Act	Territorial Parks Use Permit	Regulates activities within territorial parks, requiring permits for tourism activities.	Ensures that tourism activities within territorial parks respect sensitive environments and cultural sites.
	Nunavut Wildlife Act	Wildlife Observation Licence	Required for activities involving the observation or interaction with wildlife.	Aims to protect wildlife from disturbances associated with tourism activities.
Voluntary Measures and Guidance Material	Canadian Coast Guard	Notices to Mariners (NOTMARs)	Provides essential information to mariners about navigational safety, environmental protection, and other operational matters.	Helps ensure that mariners are aware of sensitive areas, environmental conditions, and operational requirements.
		Ice Navigation in Canadian Waters Manual	A comprehensive manual offering guidance on safe navigation in ice-covered waters, specific to Canadian conditions	Supports safe navigation practices that minimize the risk of accidents in ice conditions.
	Transport Canada	Ship Safety Bulletins	Bulletins that provide critical safety information and updates to maritime operators.	Keeps operators informed about safety practices and regulatory changes, promoting safer and more environmentally responsible operations.
		Guidelines for Passenger Vessels Operating in the Canadian Arctic	Offers guidance specific to passenger vessels, including best practices for environmental protection and respecting Indigenous rights.	Provides tailored recommendations for cruise operators to minimize their environmental footprint and ensure respect for Inuit cultural sites, directly addressing key concerns.

	Parks Canada	National Park Visitor Guidelines	Guidelines for visitors to national parks, including expectations for behavior and respect for natural and cultural resources.	Addresses tourism-related impact concerns, including the encouragement of responsible visitor behaviour.
	WWF	Eastern Arctic Mariners Guides	Developed to promote environmentally responsible navigation and interactions with wildlife in Canada's Eastern Arctic.	Provides industry-specific guidance on avoiding sensitive areas and minimizing impacts on wildlife.
	Association of Expedition Cruise Operators	Membership Operational Guidelines	Produced by industry to guide consistent, responsible operations in the circumpolar Arctic, including best practices for environmental and cultural protection.	Provides a framework for minimizing impacts on the environment and cultural sites, including a reinforcement of the importance of ongoing Inuit engagement.

2.4.3 Effectiveness of the Suite of Management Approaches in Addressing Inuit Concerns

The suite of instruments and tools identified as having the potential to directly address Inuit concerns with expedition cruise tourism operations reflects both the complexity of Nunavut as a jurisdiction and maritime governance in the Canadian Arctic more broadly. The assessment of effectiveness was carried out through the evaluation of each instrument/tool's scope of applicability to Inuit concerns (direct, indirect, or not applicable), characteristics (strength, scope, prescriptiveness, and requirements), and the extent of Inuit involvement (i.e. in development, implementation, or administration). The following results are organized according to the four categories from the final inventory presented in s.2.4.2 above.

2.4.3.1 Safety of Navigation and Pollution Prevention

While Canada's overall domestic marine regulatory regime sets out to create a "safe and secure, efficient, and environmentally responsible transportation system" (Transport Canada, 2019), only two primary pieces of legislation, each with two associated regulatory instruments, were found to have direct applicability to identified Inuit concerns. Table 5 provides an overview of these instruments, their legislative source, and respective relevance to Inuit concerns.

Table 5 Assessment of Safety of Navigation and Pollution Prevention Instruments

Relevant Legislation	**Relevant Instrument**	**Thematic Inuit Concern**			**Assessment**
		Impacts on the Environment	Disturbance of Wildlife and Traditional Harvesting Activities	Impacts to Cultural and Historic Sites	

Canada Shipping Act, 2001	Northern Canada Vessel Traffic Services Zone Regulations (NORDREG)	X			Addresses environmental protection by requiring vessels to obtain clearance before navigating Canadian Arctic waters, enabling proactive communication of Inuit concerns about areas of high use.
	Interim Orders	X	X	X	Demonstrated effectiveness via flexibility and enforceability, allowing rapid response across all thematic concerns with particular historical precedent of addressing environmental impacts and wildlife disturbance (Bent, 2022). Potential to be implemented based directly on Inuit concerns.
Arctic Waters Pollution Prevention Act	Zone/Date System / AIRSS / POLARIS	X	X		Effectively limits vessel access based on environmental conditions, directly applicable to Inuit concerns by potentially minimizing icebreaking activities which could disturb ice-dependent species and harvesting practices.
	Polar Code (Chapter 11)	X	X	X	Addresses all three thematic Inuit concerns by mandating consideration of marine mammal concentrations, vessel speed restrictions, and conservation objectives of marine protected areas – during both voyage planning and operations in polar waters.

The instruments related to Safety of Navigation and Pollution Prevention demonstrate effectiveness in addressing environmental impacts and, to some extent, wildlife disturbance concerns. The now-mandatory NORDREG regulations require that vessels obtain clearance from authorities before entering, proceeding, or leaving Canadian Arctic waters (Transport Canada, 2010b). This helps contribute to general marine domain awareness and provides an opportunity to communicate Inuit concerns before granting vessel clearance in areas with high levels of Inuit use, indirectly addressing environmental protection. The flexibility of Interim Orders allows for rapid response to emerging issues across all thematic concerns, though historic precedence is limited to managing environmental impacts and issues pertaining to the disturbance of wildlife (Bent, 2022). The Zone/Date System, complemented by AIRSS and POLARIS, provides a strong foundation for controlling vessel access based on environmental conditions. These navigational limitations for operating in particular types of ice conditions also have the potential to minimize icebreaking activities and therefore reduce the disturbance of ice-dependent species and Inuit harvesting practices taking place on landfast ice. The voyage planning requirements under Chapter 11 of the Polar Code also show applicability to all thematic Inuit concerns, designed "…to ensure that the Company, master, and

crew are provided with sufficient information to enable operations to be conducted with due consideration to the safety of ships and persons on board and, as appropriate, environmental protection" (s.11.1). This guidance includes a requirement for the ship's master to consider potential hazards of the intended voyage, including:

- Current information and measures to be taken when marine mammals are encountered relating to known areas with densities of marine mammals, including seasonal migration areas (s.11.3.6)
- Current information on relevant ships' routing systems, speed recommendations and vessel traffic services relating to known areas with densities of marine mammals, including seasonal migration areas (11.3.7)
- National and international designated protected areas along the route (s.11.3.8).

As such, expedition cruise itineraries must take existing environmental protection measures into consideration, both in advance during the planning process and while operations are underway, in addition to special consideration of marine mammal activities and various applicable designated protected areas throughout an intended sail plan.

2.4.3.2 Marine Conservation

The Marine Conservation category is comprised of four primary protected area designations, all of which can be found in Nunavut. Stemming from federal legislation, these protection mechanisms generally seek to conserve the natural environment and species found therein. An important note about the limits of this federal protection is that the *Nunavut Agreement* grants Inuit the right to conduct traditional activities anywhere within the Nunavut Settlement Area (NSA) – including the exercise of harvesting rights within protected areas (Article 5). As such, Marine Conservation mechanisms fundamentally protect Inuit rights and present an opportunity to address several concerns related to expedition cruise tourism operations. Table 6 provides an overview of these conservation mechanisms, and the Inuit concerns they address.

Table 6 Assessment of Marine Conservation Instruments

Relevant Legislation	**Relevant Mechanism**	**Thematic Inuit Concern**			**Assessment**
		Impacts on the Environment	Disturbance of Wildlife and Traditional Harvesting Activities	Impacts to Cultural and Historic Sites	
Oceans Act	Marine Protected Areas	X	X		Effectively addresses environmental impacts through legal protection for long-term conservation of marine ecosystems, while also formally including Inuit in co-management arrangements to ensure direct ongoing input and increased responsiveness to local concerns.

Canada National Marine Conservation Areas Act	National Marine Conservation Areas	X	X	X	Comprehensively addresses all three thematic concerns through an integrated management approach which considers cultural and historical significance alongside environmental protection, as well as the formal inclusion of Inuit in co-management activities.
Canada Wildlife Act	National Wildlife Areas	X	X		Direct applicability to environmental protection, with the prohibition of commercial activities that interfere with conservation objectives and involving Inuit in co-management committees.
Migratory Birds Convention Act	Migratory Bird Sanctuaries	X	X		Specific protection of critical habitat for migratory bird populations, with a permit system allowing for managed access, resulting in the conservation of broader harvesting locations, as well as Inuit involvement in co-management.

When assessed against the multi-criteria framework, these marine conservation instruments demonstrate varying degrees of effectiveness. In terms of scope of applicability, all four mechanisms directly address environmental impacts and wildlife disturbance concerns, while NMCAs uniquely extend protection to cultural and historical sites. These mechanisms also introduce mandatory requirements for operations within their boundaries and therefore provide strong prescriptive authority to restrict activities that conflict with conservation objectives. Overall, a distinguishing feature of these conservation instruments is the high degree of Inuit involvement in their establishment and ongoing management. All four mechanisms require formal co-management arrangements as specified in the *Nunavut Agreement*, ensuring that Inuit priorities are reflected in decision-making processes and enhancing the potential effectiveness of the category overall.

2.4.3.3 Shore-Based Permitting

The third category within the larger suite of instruments and tools identified diverges from the maritime focus of those above and is comprised of the shore-based permits and permissions required by expedition cruise operators to land and conduct excursions at remote locations across Nunavut. This shore-based permitting component is a vital contributor to the overall regulatory framework and seeks to manage the most unique facet of the industry's operating style and key differentiator from other forms of marine vessel traffic in the territory. As the only category containing terrestrial mechanisms, it necessarily provides the strongest protections for shore-based cultural and historical sites and directly addresses Inuit concerns related to potential impacts on these sites by expedition cruise visitation.

An important related consideration of the shore-based components of expedition cruise operations is the navigation required to access these remote locations. This perspective highlights a potentially elevated level of importance for the shore-based permitting regime, since granting permission to land passengers in these areas creates a situation whereby *de facto* permission has also been granted to navigate in adjacent waters for the purposes of access. As such, the shore-based permitting regime can be seen as having linkages to all three of the identified Inuit concerns.

There are also important jurisdictional considerations of the shore-based permitting regime which contribute to its ability to address Inuit concerns. Unlike the Safety of Navigation & Pollution Prevention and Marine Conservation categories, where jurisdiction rests primarily at the federal level with certain co-management arrangements, the shore-based permitting regime is significantly more local in nature. Not only do territorial government departments hold some of the strongest relevant legislation underpinning the regime, but the *Nunavut Agreement* outlines clear roles for Inuit in the decision-making process for issuing the permits granting access to their lands. This formal involvement of Inuit also extends to those permits and permissions which remain under federal jurisdiction via the co-management bodies comprised of members from adjacent local communities. The role that Inuit play in the shore-based permitting regime therefore provides an effective avenue for self-determination and addressing concerns with expedition cruise tourism operations through the process of reviewing and selective issuance of permits. Table 7 provides a summary of the effectiveness of these shore-based permitting mechanisms in addressing the identified Inuit concerns.

Table 7 Assessment of Shore-Based Permitting Mechanisms

Organization	**Relevant Permit / Permission**	**Thematic Inuit Concern**			**Assessment**
		Impacts on the Environment	Disturbance of Wildlife and Traditional Harvesting Activities	Impacts to Cultural and Historic Sites	
Federal					
Parks Canada	National Parks Business Licence	X	X	X	Directly controls commercial activities within park boundaries, following co-developed management plans and co-managed with Inuit.
	National Historic Sites Permit			X	Restricts access to prevent degradation of historical artifacts and cultural resources, including consideration of Inuit knowledge when determining site significance.
Canadian Wildlife Service	National Wildlife Area Permit	X	X		Directly conserves habitat, protecting wildlife areas critical for traditional harvesting activities via co-management and Inuit involvement in permitting decisions.
Environment and Climate	Migratory Bird Sanctuary Permit	X	X		Directly controls access to important nesting and feeding grounds,

Change Canada					preventing disturbance of sensitive habitats and helping to protect traditional harvesting areas. Co-managed with Inuit, including permitting decisions.
Territorial					
Regional Inuit Associations	Inuit-Owned Lands Access Permit	X	X	X	Addresses concerns by granting direct Inuit control, providing full self-determination on permitting access.
Dept. of Economic Development & Transportation	Outfitter Licence		X	X	Required for visiting communities, covering operator/visitor conduct; also provides guidance on respectful behaviour when interacting with wildlife.
Dept. of Culture & Heritage	Archaeological Permit			X	Strictest control on visiting cultural and historic sites, closely involving local communities in permitting decisions.
Dept. of Environment	Territorial Parks Use Permit	X	X	X	Addresses all three concerns within territorial park boundaries, with the potential to restrict visitation to protect sensitive resources and involving Inuit in permitting decisions.
	Wildlife Observation Licence		X		Focus on addressing wildlife disturbance concerns, complementing other permits by offering baseline controls on human-wildlife interactions.

Assessment against the multi-criteria framework shows the distinctive strength of these shore-based permitting mechanisms. These instruments have direct applicability in addressing identified Inuit concerns, with particular capability to emphasize the protection of cultural and historic sites. Permitting conditions also extend the ability to address wildlife disturbance and environmental impacts through intended management outcomes. Depending on the area of operation, these permits are mandatory for legal operation, highly specific in scope, and aim to directly influence visitor behaviour. Meaningful Inuit involvement in both administration and management decision-making processes also provides opportunities for self-determination by granting direct control over access to shore-based locations.

2.4.3.4 Voluntary Measures and Guidance Documents

The complexity of marine governance and the application of associated regulatory and enforcement procedures can often lead to a slow reaction to emerging issues, perceived unresponsiveness, and cumbersome procedures to introduce amendments (Lappalainen et al., 2013; Whitney et al., 2016). Recognizing these limitations, voluntary measures and guidance documents are often utilized to fill gaps in

the overall governance regime or as a first step towards the introduction of formal legislative reforms (Lalonde, 2014; Lyon & Maxwell, 2019).

This final category within the overall suite of instruments and tools represents a variety of approaches which serve to fill different gaps in the larger governance regime. These gaps range from communication issues to best practices within uncertain operational environments, as well as deficits in formal guidance related to softer issues such as visitor behaviour. There are several examples within Nunavut where voluntary approaches have been utilized to help cover areas where the reach of the formal legislative and regulatory mechanisms introduced above are limited – including specific recent instances where voluntary measures have been introduced to directly address Inuit concerns with expedition cruise tourism operations.

At the federal level, voluntary measures can be introduced as time-bound requirements which help set the foundation for a future regulatory posture (Transport Canada, 2022a). These federal voluntary measures can also be introduced on a more permanent basis, such as the case of recommended slowdown areas to avoid vessel strikes with whales in particular areas (Transport Canada, 2023b). Federal guidance documents are also frequently used in conjunction with voluntary measures to ensure accurate communication of details and timely instructions for safe vessel operation (CCG, 2022b). Table 8 below outlines the federal voluntary measures and guidance documents with applicability to expedition cruise tourism and addressing thematic Inuit concerns.

Table 8 Assessment of Federal Voluntary Measures and Guidance Documents

Organization	**Relevant Permit / Permission**	**Thematic Inuit Concern**			**Assessment**
		Impacts on the Environment	Disturbance of Wildlife and Traditional Harvesting Activities	Impacts to Cultural and Historic Sites	
Canadian Coast Guard	Notices to Mariners	X	X		Tool for direct communication with mariners, highlighting potential requirements related to environmental protection and wildlife conservation measures. Can also be used to communicate Inuit concerns.
	Ice Navigation in Canadian Waters Manual	X	X		Limited scope of applicability related to considerations to safe vessel operations in ice-covered waters.
Transport Canada	Ship Safety Bulletins	X	X		Source of information for new operator requirements within defined geographic areas.
	Guidelines for Passenger Vessels Operating in the Canadian Arctic	X	X	X	Comprehensive document aiming to facilitate understanding of the jurisdictional complexity of operating in Canadian Arctic

					waters, including an emphasis on Indigenous consultation and communication.
Canadian Wildlife Service	Guidelines for Visiting Seabird Colonies in Canada	X	X		Material aiming to provide guidance on appropriate operator/visitor behaviour to minimize disturbance of seabird colonies.
Parks Canada	National Park Visitor Guidelines	X	X	X	Park-specific information intended to highlight desired visitor behaviour and emphasize minimization of visitation impacts

While these federal voluntary measures and guidance documents often have direct applicability to Inuit concerns, especially those relating to emerging issues not yet captured in regulatory frameworks, they also necessarily have limitations related to their voluntary status and focused scope.

Non-Governmental Organizations (NGOs) also play a role in the creation and distribution of guidance documents, as well as the promotion of voluntary measures which are frequently aimed at influencing the federal government's regulatory posture (Burke, 2020). NGOs typically attempt to work directly with communities to understand their concerns and communicate back to government and/or industry using a variety of different products (WWF, 2022). One example of such a product created within the context of Nunavut is the Eastern Arctic Mariners Guide prepared by WWF-Canada (WWF, 2018). The intended audience of this guide is ship operators, with recommendations on how to minimize navigational impacts and avoid marine mammal strikes, including visual maps of the most at-risk areas. The guide also includes a community-identified 'recommended tourism exclusion zone' in the southern fjords of Eclipse Sound near Pond Inlet.

The expedition cruise industry itself plays an important role in this category, making efforts to self-regulate its operations across the circumpolar Arctic. Through a membership organization known as the Association of Arctic Expedition Cruise Operators (AECO), a host of guidelines have been created for "…managing responsible, environmentally friendly and safe tourism in the Arctic while striving to set the highest possible operating standards" (AECO, 2023a). While AECO members are obligated to operate in accordance with international and domestic laws and regulations, these guidelines form the basis of voluntary efforts to exceed baseline requirements (ibid). Table 9 below outlines the key membership guidelines developed by AECO to date.

Table 9 List of Association of Arctic Expedition Cruise Operator Guidelines

Name	Purpose
Visitor Guidelines	Rules for passengers, including basic principles, safety, and cultural and social interaction.

Vegetation Guidelines	Prevention of disturbance to Arctic vegetation.
Wildlife Guidelines	Information and behaviour related to encounters with Arctic wildlife.
Operational Guidelines	Mandatory guidance for AECO members, including planning procedures, environmental considerations, firearm safety, etc.
Community Guidelines	Addresses behaviour when visiting communities, including community-specific guidelines
Cultural Remains Guidelines	General guidelines for the preservation of sensitive cultural sites.
Biosecurity Guidelines	Avoiding the introduction of non-native species to Arctic ecosystems.
Site-Specific Guidelines	Safeguarding the environment and cultural remains via site-specific guidance.

AECO, 2023b

2.5 Discussion

Not all categories of instruments and tools within the suite of regulatory and management approaches are equally suited to address Inuit concerns with expedition cruise tourism. The discussion that follows is organized according to the four categories within the inventory above and provides greater insight into the most promising examples of utilizing these instruments and tools to address Inuit concerns with expedition cruise tourism operations.

2.5.1 The Strength of Instruments Related to Safety of Navigation and Pollution Prevention

The comprehensiveness of the international regime governing global shipping, coupled with a domestic approach that often goes above and beyond the base requirements of the IMO, has led to a strong track record for overall vessel safety and pollution prevention in the Canadian Arctic (Goerlandt et al. 2020). However, despite this strong record, community feedback indicates that Inuit concerns related to risks associated with vessel navigation persist (Carter et al., 2018).

It is well known that Canadian Arctic waters are poorly charted, with only 14% surveyed to modern or adequate standards (Chircop, 2023). A variety of harsh operating conditions are also commonplace, leading to increased navigational risks (Porta et al., 2017; Cook et al., 2024). Despite this reality, there have only been a total of 74 incidents involving vessel grounding or bottom contact by all vessels in the NORDREG zone since 2000; out of this total, 6 involved passenger vessels, with just 2 occurring within Nunavut waters and both classified as minor incidents (Stewart et al., 2011; TSB, 2021).

The division of Canadian Arctic waters into SSCZs and controls put in place via the Z/DS, AIRSS, and POLARIS most clearly address thematic Inuit concerns related to Impacts on the Environment and Disturbance of Wildlife & Traditional Harvesting Activities. This is one of the few examples of a direct prescriptive approach which can control where expedition cruise vessels can and cannot go. NORDREG regulations complement the SSCZ approach through its mandatory reporting requirements, contributing to overall marine domain awareness in the region and addressing Inuit concerns related to knowing when and where to expect vessels.

The voyage planning considerations found within Chapter 11 of the Polar Code also hold promise in addressing Inuit concerns through the requirements to consider the presence of marine mammals, speed recommendations, and designated protected areas along a chosen route. These requirements potentially bring together regulatory and voluntary approaches and can help bring Inuit concerns to the attention of operators both during the voyage planning phase and actual operations.

Interim Orders (IOs) are a tool generally applied in exceptional circumstances, with the Minister of Transport having the authority under the CSA for issuance if "…immediate action is required to deal with a direct or indirect risk to marine safety or to the marine environment," including on a precautionary basis (s.10.1(1)). IOs are flexible tools which may set out a variety of measures, generally lasting for a period of one year with the potential for extension. Given this flexibility and their enforceability, they are a strong option to address Inuit concerns should an emergent need arise.

2.5.2 Promise Held by Marine Conservation Mechanisms

Marine conservation mechanisms hold varying degrees of promise in addressing Inuit concerns. These protected area designations are generally more comprehensive in reflecting unique needs, and their establishment process involves direct Inuit participation. This results in the potential for environmental protection and wildlife conservation within a context of the recognition of Inuit rights. If activities within these protected areas run contrary to stated conservation objectives, then they would be deemed incompatible and, therefore, prohibited. Expedition cruise tourism activities would fall under this type of assessment, and therefore improved management options could be possible.

NMCAs, in particular, show promise in addressing the majority of Inuit concerns with expedition cruise tourism. Recent updates to Parks Canada's *Policy on the Establishment and Management of National Marine Conservation Areas* [NMCA Policy] (2022a) and *Directive on the Management of National Marine Conservation Areas* [NMCA Directive] (2022b) highlight this promise. Within the revised NMCA Policy, an updated zoning framework has been introduced which outlines a range of activity and use restrictions,

including on commercial tourism operations. Table 10 below highlights the permissibility of commercial tourism activities within the new NMCA zoning framework. It is important to note that the NMCA Directive outlines a requirement for an operational permit for all commercial tourism activities, even if those activities take place in a zone where they are generally allowed.

Table 10 Relevant NMCA Zoning Restrictions for Commercial Tourism

	Zone 1 Strict Protection	Zone 2 General Protection	Zone 3 Habitat Protection	Zone 4 Multiple Use
Commercial Tourism	Not allowed.	Generally allowed	Conditional	Generally allowed

Parks Canada, 2022b

The forthcoming establishment of *Tallurutiup Imanga National Marine Conservation Area* (TINMCA) will create the first NMCA in Canadian Arctic waters. At approximately 108,000 square kilometres in size, TINMCA represents roughly 1.9% of Canada's total marine area and encompasses the entirety of the main eastern entrance to the Northwest Passage (Parks Canada, 2023b). Nearly all expedition cruise vessels operating in the Canadian Arctic pass through the boundaries of TINMCA, meaning that any zoning framework introduced will have an impact on the industry's operations, and the operational permit can help introduce terms and conditions which are reflective of Inuit priorities.

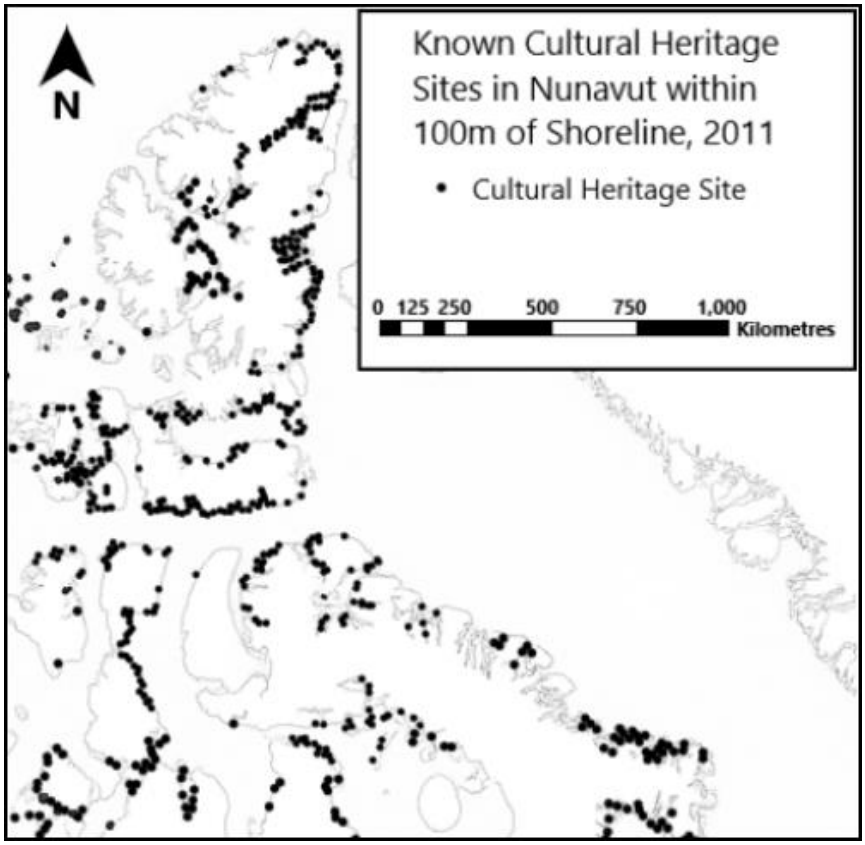
2.5.3 Acknowledging the Importance of the Shore-Based Permitting Regime

When the linkage between shore-based permitting and the navigation required to access those sites is fully acknowledged, this aspect of the management regime for expedition cruise tourism emerges as a powerful tool for addressing Inuit concerns, beyond being the strongest protection for cultural and historic sites.

The Archaeological Permit issued by the Government of Nunavut's Department of Culture & Heritage stands out as a particularly effective instrument. By limiting the number of sites that can be visited in a season and requiring adherence to visitation guidelines, this permit helps to protect cultural and historic sites while also influencing overall cruise itineraries. Of particular interest is that the territory's *Archaeological and Paleontological Site Regulations* define an archaeological site as "a site where an archaeological artifact is found", while an archaeological artifact is defined as "any tangible evidence of human activity that is more than 50 years old and in respect of which an unbroken chain of possession or regular pattern of usage cannot be demonstrated" (Canada, 2001b, Interpretation). This means that archaeological sites need not be formally recognized and logged to qualify for protection, and instead that sites should be protected if there are reasonable grounds to believe that an area is of archaeological, ethnographical or historical importance, interest or significance (Canada, 1993, s.33.1.1).

According to the North Baffin Regional Land Use Plan, there are approximately 2,000 known archaeological or cultural heritage sites within that region alone, which may only represent 10-20% of the actual total (NPC, 2000). Figure 6 below provides a broader sense of the known extent of these sites, focused on the High Arctic region of Nunavut.

Figure 6 Extent of Known Cultural Heritage Sites in Nunavut within 100m of Shoreline



Adapted from Arctic Council, 2013

With the vast number of known sites, and an even larger number undocumented, virtually all coastal areas in the territory can be considered archaeologically or culturally significant. If the conditions for a Class 1 Archaeological Permit are interpreted to include this broader definition of 'archaeological site', then it is possible that any shore location in Nunavut (outside municipal boundaries or National Parks) would fall under its conditions and the total number of shore visits would be capped at 5 per itinerary across the entire territory.

2.5.4 Ongoing Role for Voluntary Measures and Guidance Documents

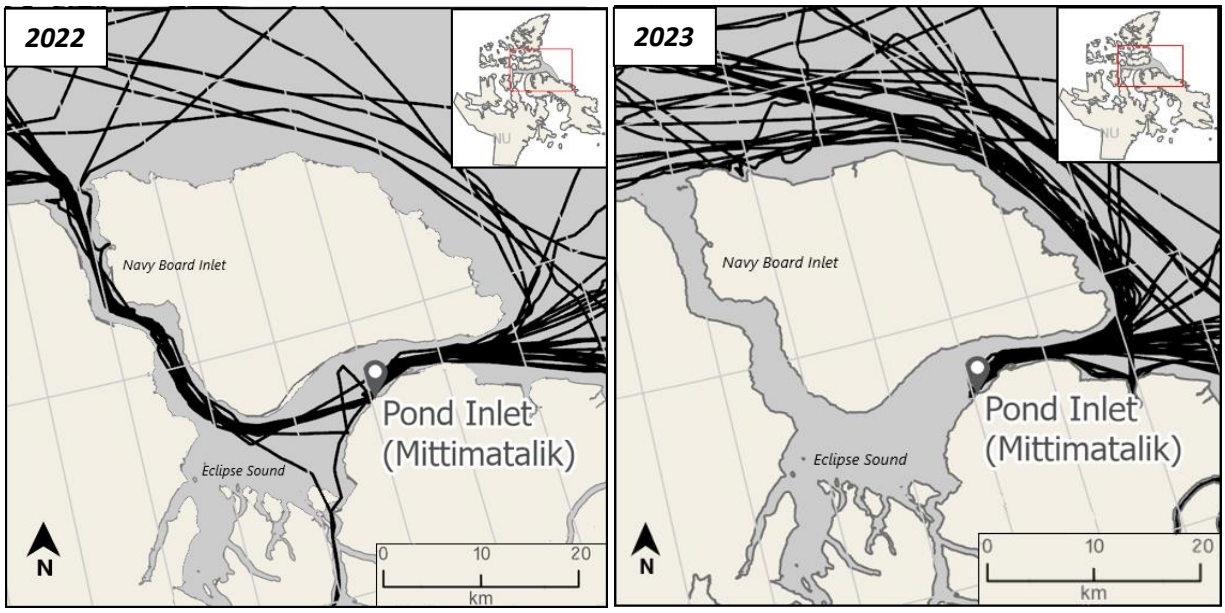
Voluntary measures and guidance documents offer flexibility in addressing emerging concerns and filling gaps in the formal regulatory framework (Vanderlaan & Taggart, 2009). This flexibility also applies in their

potential application to both marine and shore-based issues that intersect across different levels of jurisdiction and extend to the expedition cruise industry itself.

The fact that an organization such as AECO is already present in the Canadian Arctic, and that its membership demonstrates adherence to voluntary best practices to achieve their goal of the 'highest possible operating standards', provides an indication that further refinement of voluntary approaches could continue to ameliorate operational outcomes. By improving AECO's relationship with the Government of Canada, Government of Nunavut, and most importantly, Inuit, an industry self-regulative approach can be more reflective of existing and emerging concerns.

Recent evidence points to further confirmation of this. In advance of the 2023 expedition cruise season, a request was brought forward by the Mittimatalik Hunters & Trappers Organization (MHTO) concerning 'non-essential' vessel traffic in the waters of Eclipse Sound and Navy Board Inlet, close to Pond Inlet. The MHTO presented concerns related to a decrease in the number of narwhal observed in these waters and worked with Oceans North to write a letter to Transport Canada and AECO with a request to voluntarily avoid navigation in the area (Oceans North, 2023). Figure 7 shows the resulting passenger vessel tracklines around Eclipse Sound and Navy Board Inlet during the 2023 cruise season, revealing a clear pattern of deliberate avoidance.

Figure 7 Comparison of 2022 and 2023 Passenger Vessel Tracklines Demonstrating Compliance with Voluntary Avoidance Request for Eclipse Sound & Navy Board Inlet



A complete absence of vessel tracks within the voluntary avoidance area demonstrates a 100% compliance rate, providing compelling evidence of the industry's willingness to respect Inuit concerns when properly

engaged. If AECO continues to be willing to participate in similar voluntary measures, then this approach holds promise in addressing other Inuit concerns with the industry.

2.6 Conclusion

As the expedition cruise tourism industry continues its development trajectory in Nunavut, it will be important to carry out critical assessments of relevant governance frameworks and management tools against the persistence of Inuit concerns. This research provides a form of that assessment, whereby future studies may provide additional insight as changes are observed over time. The results from the detailed inventory and analysis of instruments as they exist today demonstrate the complex interplay of international conventions, federal regulations, and territorial management structures that govern this unique form of marine navigation in the region. Findings show that while there are significant efforts to ensure vessel safety and environmental protection, it is clear that Inuit concerns persist – particularly regarding cumulative environmental impacts, disturbance of wildlife and traditional harvesting activities, and the effects on culturally and historically significant sites.

The findings of this research underscore a need for greater alignment between regulatory frameworks and the priorities of Inuit communities. While some mechanisms show promise – particularly shore-based permitting and emerging conservation frameworks – there remain substantial gaps in the current management regime. Fundamentally, the application of general maritime laws and regulations to expedition cruise tourism does not fully capture the industry's unique operational characteristics, nor the specific sensitivities which characterize the marine environment of Inuit Nunangat. This is not to say that there is no hope for improvement. While large scale changes at the international level take time, there is an indication of the recognition that the circumpolar Arctic, and Inuit Nunangat specifically, require enhanced protections. This is evidenced through recent accomplishments such as the introduction of the International Polar Code, more formal inclusion of Inuit representation at IMO forums (IASC, 2024), and other related work still underway (ICC, 2023).

In the interim period prior to formal changes being made at the international level and enacted domestically, the present study finds that voluntary measures and industry self-regulation can adequately fill gaps in the short-term. These approaches provide the necessary flexibility to address emerging issues and support a more nimble, culturally responsive management style. Furthermore, improved application of shore-based permitting regimes and the rollout of emerging conservation mechanisms such as NMCAs demonstrate potential in fostering a more collaborative and inclusive approach aligned with Inuit priorities. Shore-based permits reveal themselves to be a candidate for a larger role in managing expedition cruise tourism activities

through their indirect influence on navigation and importantly provide for direct community input during the permitting process. NMCAs, on the other hand, are fully co-developed with Inuit, including the identification of overall conservation objectives and design of associated protections through zoning frameworks; this involvement is also ensured over time by the requirement of formal co-management arrangements.

In conclusion, while the current regulatory framework provides a foundation for managing navigational safety and ensuring a high baseline for general environmental vessel performance standards, its effectiveness in addressing the Inuit concerns with expedition cruise tourism outlined here remains limited. Moving forward, successful management of this industry lies in an improved integration of existing tools and enhanced incorporation of Inuit knowledge in decision-making, resulting in greater responsiveness to Inuit concerns. Ultimately, achieving improved management outcomes will require ongoing collaboration between federal and territorial authorities, Inuit organizations, local communities, and industry itself. By continually refining and adapting the overall management approach, it is possible to develop a framework that meaningfully respects Inuit rights and concerns while supporting responsible tourism development in this unique and sensitive region

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CHAPTER 3: ANALYSIS OF MANAGEMENT APPROACHES FOR EXPEDITION CRUISE TOURISM IN *TALLURUTIUP IMANGA NATIONAL MARINE CONSERVATION AREA*

Authors

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Abstract

The establishment of Tallurutiup Imanga National Marine Conservation Area (TINMCA) in the Canadian Arctic presents new challenges and opportunities for managing expedition cruise tourism within its boundaries. This study examines the potential implications of TINMCA's proposed zoning framework on cruise operations, focusing on the alignment between this type of marine spatial planning and existing shore-based permitting system, and in consideration of observed impacts of cruise vessel activity within TINMCA boundaries during the 2022 operational season. This is achieved through the compilation of a comprehensive database of shore locations within TINMCA, a substantiation of 2022 cruise vessel activity using both industry statistics and satellite-based automatic identify system (AIS) data, and an assessment against the most recent publicly available draft zoning framework. Findings include significant discrepancies in the industry's statistical reporting, notable restrictions on the accessibility of certain cruise destinations, and potential misalignments between the new marine zoning and existing terrestrial permitting system. These results highlight the need for improved data collection and reporting mechanisms, enhanced coordination between management authorities, and the development of integrated approaches that consider both marine and terrestrial components of expedition cruise operations. As the first National Marine Conservation Area in Canadian Arctic waters, TINMCA represents a new approach for balancing conservation goals, industry activity, and Inuit rights and this research contributes not only understanding potential management approaches in the TINMCA case, but also to the larger co-management efforts for marine areas across Inuit Nunangat.

Key words

Arctic Cruise Tourism, Marine Protected Areas, Co-Management, Nunavut, Canadian Arctic

Planned submission to Tourism in Marine Environments

3.1 Introduction

The management of expedition cruise tourism in the Canadian Arctic presents unique challenges compared to other types of maritime shipping in the region, due to the cruise industry's operational characteristics and needs. Unlike other forms of marine traffic that follow more predictable routes, expedition cruise vessels frequently deviate from these more common corridors in search of scenic landscapes, wildlife viewing opportunities, and remote shore locations for passenger landings (Dawson et al., 2014; Ellis & Kriwoken, 2006). This distinctive approach is central to the 'expeditionary' nature of the experiences promised to passengers, but it also raises concerns about navigational safety, environmental impacts, potential conflicts with Inuit use of marine areas, and impacts to ecologically and biological significant areas as well as culturally significant marine areas (Lajeunesse, 2012; Chénier et al., 2017; Dawson et al., 2017, 2020; Halliday et al., 2017; Ng et al., 2018).

These acknowledged and known management complexities are set against a backdrop of substantial growth in overall vessel activity in Canadian Arctic waters. The number of overall ship voyages in the region has quadrupled since 1990 (Dawson et al., 2018; 2022), driven by a variety of contributing factors. This growth has been in part been attributed to the considerable decline in sea ice coverage, particularly in the summer months (Cook et al., 2024; Parkinson, 2022). Socioeconomic factors have also played a significant role as northern communities grow, resource development projects expand, and more marine tourism opportunities are offered (Brigham, 2011; Pizzolato et al., 2014). This increase in traffic brings heightened risks to safety and the environment, necessitating adaptive management approaches (Arctic Council, 2018). The Office of the Auditor General of Canada (OAG) has more concretely identified several sources of risk, including inadequate hydrographic survey data, outdated nautical charts, a deficit of aids to navigation, poor weather and ice information, and a lack of icebreaking support, among others (OAG, 2014; del Pozo, 2021; Chénier et al., 2024). While some of these deficits have begun to be addressed in more recent years, environmental factors such as fog, variable sea ice conditions, and increased propensity of storms present ongoing risks to navigability in the region (Cook et al., 2024; Wang et al., 2023; Crawford et al., 2022).

In response to these emerging challenges, the Government of Canada has proposed the Northern Low-Impact Shipping Corridors (LISC) initiative as an overarching adaptation strategy (Transport Canada, 2024). The LISC are intended to be "…dynamic shipping routes throughout Canada's North where the necessary infrastructure, marine navigational support, and emergency response services could be provided to ensure safer marine navigation, while respecting the sensitive northern environment and its ecological and cultural significance" (Levitt, 2019, p.68). Designed as a voluntary system, the LISC aim to incentivize navigation within its boundaries by addressing sources of risk, including improved charting, navigational

aids, and other vessel supports (Chircop et al., 2020). The voluntary nature of the LISC is also a reflection of the jurisdictional complexity of Canadian Arctic waters and the limited ability of the existing maritime regulatory regime for prescriptiveness through formal approaches such as vessel traffic management schemes (Porta et al., 2017). The LISC are comprised of several tiers according to a hierarchical ranking system, ranging from Primary to Quaternary corridors and their initial design was shown to directly capture 80% of historic vessel traffic across the Canadian Arctic, with the proportion increasing to 90% when including a 5 nautical mile buffer radius (Chénier et al., 2017).

The inclusion of the reference to 'ecological and cultural significance' within the scope of the LISC is important, since Canadian Arctic waters are also increasingly recognized as a vital component of *Inuit Nunangat* – the land, water, and ice which comprise the homeland of Inuit in Canada (ITK, 2017). The original conceptualization of the LISC was based on a wide variety of geographic and operational data from various sources, including an emphasis on historical ship traffic patterns and volume (Chénier et al., 2017). It has been since identified that local Inuit knowledge was not adequately captured in this initial LISC design, and attempts have been made to fill this important gap (Dawson et al., 2020).

The importance of the consideration of Inuit use and perspectives in LISC design is fundamentally important. As the primary inhabitants of the region since time immemorial, Inuit have an intimate connection to, and understanding of, these waters (QIA, 2013). Inuit are also those who would be most adversely impacted if any sort of nautical disaster were to take place (van Luijk et al., 2022). Since the original conceptualization of the LISC, work has been undertaken to catalogue Inuit input into revised corridor designs. Importantly, extensive information has been captured to identify Ecologically and Biologically Significant Areas (EBSAs) and Culturally Significant Marine Areas (CSMAs) which are being more thoroughly reflected throughout the LISC network (see Carter et al., 2018; 2019; 2020; Dawson et al., 2020).

Despite attempts at improving LISC design, it appears as though their ability to manage expedition cruise vessel operations remains limited. Dawson et al., (2021) have found that for the period of 2010-2018, passenger vessels only travelled within the proposed LISC boundaries approximately 53% of the time; furthermore, passenger vessels were also found to have navigated within EBSAs and CSMAs 62% and 31% of the time, respectively. This divergence of expedition cruise vessel navigation from the LISC is largely driven by the industry's need to access remote fjords and shore locations to provide the 'expedition' experience that passengers expect, highlighting a significant gap in this management strategy.

Expedition cruise ships in the Canadian Arctic are primarily small, ice-strengthened vessels designed to carry between 50-200 passengers. The industry seeks to provide visitors with remote

experiences, viewing landscapes at close range, observing wildlife and sea ice, as well as disembarking at shore locations for land-based hiking and opportunities to experience cultural and historic sites (Dawson et al., 2014). This operational model creates a disconnect between terrestrial and maritime management approaches. While the shore-based permitting and licensing system in the Canadian Arctic is relatively robust, with virtually all shore locations requiring some form of permission prior to disembarking passengers, there are currently no effective equivalent management restrictions on the navigation required to access these locations – as made clear by the limitations the LISC initiative, one of the more recent attempts to improve this situation.

The impending establishment of Tallurutiup Imanga National Marine Conservation Area (TINMCA) may offer a new approach to address this management gap, at least within this particular area. Situated within the waters of the Canadian territory of Nunavut, TINMCA will be country's largest marine protected area at over 108,000 square kilometres and the first National Marine Conservation Area (NMCA) in its Arctic waters (Parks Canada, 2023a). The range of area-based management tools afforded under the *Canada National Marine Conservation Areas Act* (CNMCAA) provides an unprecedented opportunity to implement more comprehensive management oversight for activities taking place in this ecologically and culturally significant region (Parks Canada, 2023b).

Given the identified limitations in both the overall Canadian maritime regulatory regime and the LISC initiative, as well as the disconnect with the shore-based permitting system, this study seeks to understand how the tools afforded under the CNMCAA may improve the management of expedition cruise tourism within TINMCA boundaries. To achieve this, there were three objectives of this study including to: 1) compile a comprehensive inventory of expedition cruise activities within TINMCA boundaries; 2) analyze the potential implications of the proposed TINMCA zoning framework on expedition cruise operations; and 3) assess the alignment between the TINMCA zoning framework and existing shore-based permitting systems. Achieving these objectives enables for the analysis and evaluation of relevant management options for expedition cruise tourism in the region but particularly within TINMCA.

This research is significant as it represents one of the first attempts to evaluate how new protected area designation in the Canadian Arctic may address longstanding gaps in expedition cruise management (Dawson et al., 2017; Johnston et al., 2017). By examining the interplay between maritime zoning and terrestrial permitting systems, this study aims to inform more integrated and effective management approaches for this form of tourism in the region.

The paper begins by introducing TINMCA, including background on the CNMCAA, recent updates to the national NMCA Directive and NMCA Policy, and forthcoming NMCA Regulations. Given

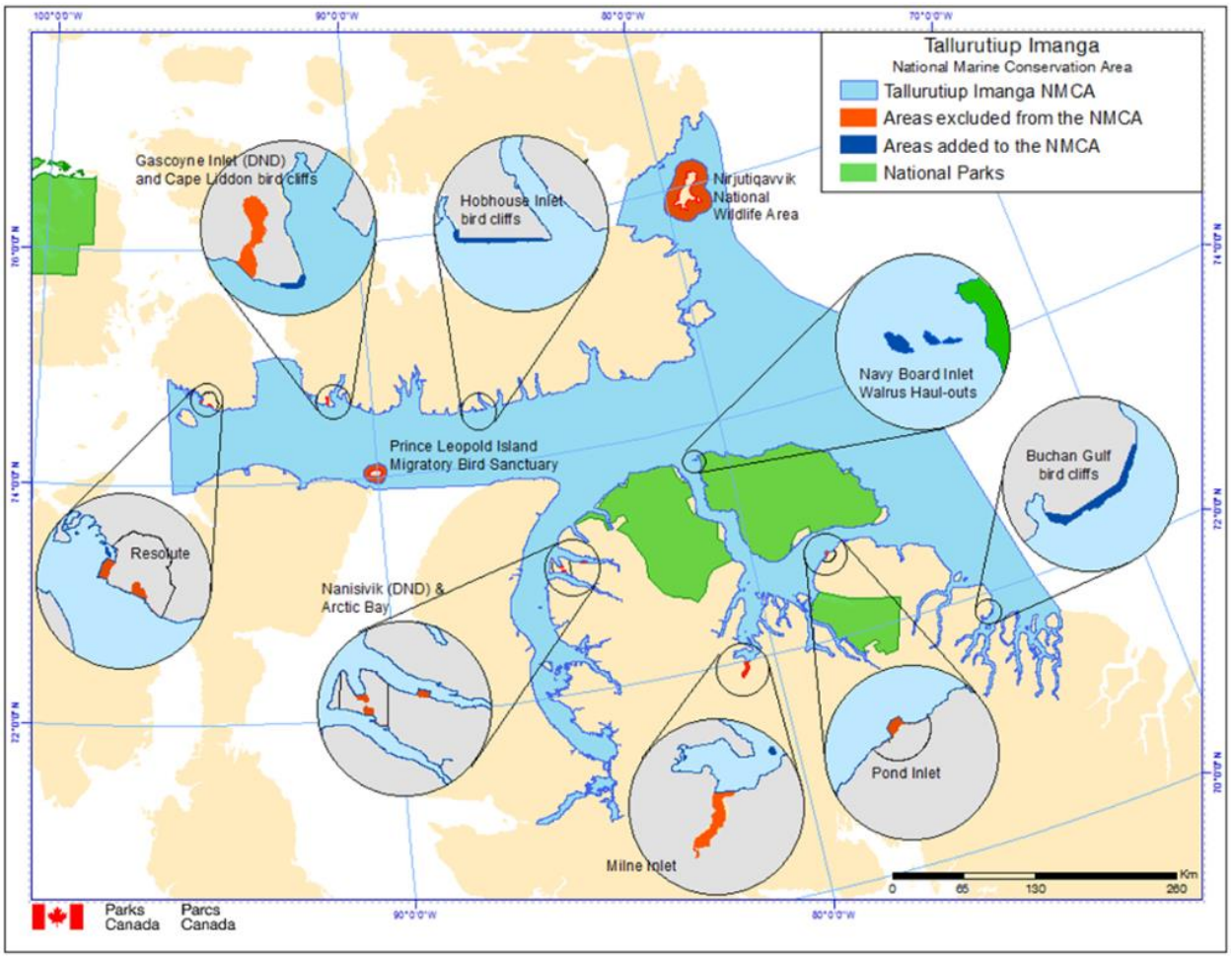
its location within Nunavut waters, context is also provided on the territory's environmental impact assessment process and some unique considerations that will apply once TINMCA is officially established. The methods section outlines the data sources and analytical approaches used to achieve the research objectives. Results are presented in three parts: a comprehensive shore location database for TINMCA, an in-depth substantiation of reported activities from the 2022 expedition cruise season, and a case study examining the potential impacts of the TINMCA zoning framework on these activities. The discussion explores the implications of these findings, addressing limitations and highlighting key considerations for policymakers as TINMCA moves towards establishment and beyond. The paper is concluded through the assessment of strengths and weaknesses of these new management approaches and calling for improved alignment between the various authorities responsible for expedition cruise management in Nunavut.

3.2 Background & Context

3.2.1 *Tallurutiup Imanga National Marine Conservation Area*

TINMCA is located in Canada's High Arctic within the Qikiqtani region of Nunavut. The area represents a unique and globally significant Arctic ecosystem that is intimately intertwined with the culture and well-being of Inuit (Parks Canada, 2023a). The establishment process for TINMCA began with the signing of an Inuit Impact and Benefit Agreement (IIBA) on August 1, 2019, between the Qikiqtani Inuit Association and the Government of Canada. This agreement outlines the roles and responsibilities of both parties in the establishment process and ongoing co-management of the area (Parks Canada, 2022a). As of 2024, TINMCA awaits formal establishment, pending the approval of an Interim Management Plan by the Aulatiqatigiit Board (AB), the co-management body for the area (Government of Canada, 2023). Figure 8 below shows the boundaries of TINMCA, with important inclusion and exclusion areas highlighted.

Figure 8 Map of TINMCA Boundaries



Parks Canada, 2023a

3.2.2 Canadian National Marine Conservation Areas

In Canada, NMCAs are established under the CNMCAA "…for the purpose of protecting and conserving representative marine areas for the benefit, education and enjoyment of the people of Canada and the world" (CNMCAA s4(1)). The CNMCAA emphasizes a sustainability approach, stating that NMCAs should be "…managed and used in a sustainable manner that meets the needs of present and future generations without compromising the structure and function of their ecosystems" (s4(3)). Under s8(1) of the CNMCAA, the Minister responsible for Parks Canada oversees the administration, management, and control of all matters within the NMCA that are not already the responsibility of other Ministers. This approach allows for integrated management that considers both conservation objectives and sustainable use of marine resources.

S9(1) of the CNMCAA sets out that the "Minister shall, within five years after a marine conservation area is established… prepare a management plan for the marine conservation area that includes a long-term ecological vision for the… area and provision for ecosystem protection, human use, zoning, public awareness, and performance evaluation". During this 5-year period post-establishment, each NMCA is guided by an Interim Management Plan (IMP) meant to contain broad management objectives and a zoning framework (CNMCAA s7(1)(d)). Both types of management plans are expected to prioritize ecosystem management via the use of the precautionary principle (CNMCAA s9(3)).

The content of both the Management Plan and IMP are guided by Parks Canada's Policy on the Establishment and Management of National Marine Conservation Areas [NMCA Policy] (Parks Canada, 2022b) and Directive on the Management of National Marine Conservation Areas [NMCA Directive] (Parks Canada, 2022c). While the NMCA Policy provides broad national direction on the establishment and management of NMCAs, the NMCA Directive outlines more specific instructions on how to achieve the direction articulated within the NMCA Policy. The interplay between these two documents is made clear through the expectations associated with the design and implementation of the NMCA Zoning Framework (Parks Canada, 2023c).

3.2.3 Canadian NMCA Zoning Framework

S8.3.2 of the NMCA Policy indicates that strategic direction for NMCAs is provided through management plans and that each NMCA must be divided into zones which are identified therein. The NMCA Zoning Framework itself is set out in the NMCA Directive, comprised of four different zones, each with a specific purpose, objectives, and a set of allowable activities. The current NMCA Zoning Framework is presented in Table 11 below.

Table 11 NMCA Directive Zoning Framework

Zone Name	Purpose	Objectives
Zone 1: Strict Protection	Strictly protects special features and sensitive ecosystem elements that are susceptible to disturbance. Access and extractive use are prohibited.	1. To protect special features and/or sensitive ecosystem elements in as undisturbed a state as possible. 2. To restore or recover depleted or degraded special features and/or sensitive ecosystem elements. 3. To provide reference areas for research. 4. To contribute to maintaining biodiversity.
Zone 2: General Protection	Protects special features, sensitive ecosystem elements and representative characteristics of the marine region while providing for compatible access and non-extractive uses. Extractive use is prohibited.	1. To protect representative characteristics of the marine region and contribute to maintaining biodiversity. 2. To protect special features and/or sensitive ecosystem elements. 3. To restore or recover depleted species or degraded habitats. 4. To provide research opportunities.

		5. To provide opportunities for education and non-extractive recreation. 6. To foster awareness, understanding and enjoyment of NMCAs.
Zone 3: Habitat Protection	Protects specific habitats while providing for compatible access and extractive uses. Some uses are prohibited to support specific habitat conservation objectives.	1. To protect, conserve or restore a specific habitat. 2. To support a range of uses that do not conflict with the specific conservation objective(s) of the zone. 3. To provide opportunities for research, education and appreciation of the habitat protected by the zone.
Zone 4: Multiple Use	Sustains the greatest range of uses that do not compromise ecological sustainability, cultural resources or heritage values.	1. To foster a range of uses that do not compromise ecological sustainability, cultural resources or heritage values. 2. To provide research opportunities in areas with multiple uses. 3. To provide opportunities for education and recreation. 4. To foster awareness, understanding and enjoyment of NMCAs.

Parks Canada, 2022c

S8.9 of the NMCA Directive outlines minimum management requirements for the planning and zoning of NMCAs, in particular:

> **8.9.1** As part of the management planning process, each NMCA is divided into zones. Each NMCA must have at least one fully protected zone (zone 1 or 2) and one ecologically sustainable use zone (zone 3 or 4)
>
> **8.9.3** Parks Canada considers positive, negative and cumulative socio-economic impacts to Indigenous people, stakeholders and coastal communities when developing zoning plans
>
> **8.9.7** Once the management plan is approved, zoning is implemented through regulations by the appropriate authority or authorities.

Parks Canada considers zoning as "…mostly suited to implementing consistent, long-term measures to manage activities that support management goals." (Parks Canada, 2022b). In situations where more specific and dynamic management issues are at play, the CNMCAA outlines other potential management tools that may be used. S8.10 of the NMCA Directive speaks to the need to consider these additional management tools outside of the more static zoning framework, including:

> **8.10.1** Permits and other authorizing instruments may be used to give individuals, organizations or businesses the authority to carry out an activity or use in an NMCA subject to conditions (CNMCAA s16(1)). Permits or other authorizing instruments may be tied to specific areas and/or zones.
>
> **8.10.3** Temporary closures may be used to restrict specific activities or access to certain areas in NMCAs on a case-by-case basis for the purpose of resource protections, public safety or other management requirements (CNMCAA s16(1)).

8.10.5 Distinct geographic areas that face complex conservation and/or access and use issues that warrant different management approaches may be designated special management areas.

Special Management Areas (SMAs) are a particularly flexible potential management tool, "…intended to manage specific activities on a temporary, seasonal or longer-term basis as needed to ensure key protection requirements are met… created at any point in time and within any zone type" (Parks Canada, 2023c). Some examples of situations where activities could be well suited to restriction via SMA can be found in Table 12.

Table 12 Examples of Potential Activities Restricted by Special Management Areas

Activities restricted in SMA	Example
Vessel access	No vessel access allowed within a defined perimeter around sea bird colonies or marine mammal haul-outs during breeding seasons.
Access to places that constitute a public safety hazard	Prohibiting access to hazardous sites such as sea caves, reefs, blow-holes, and high surf zones under specific conditions.
Visitation	Restricting the number of visitors allowed to access popular sites or areas in order to prevent over-crowding and poor quality visitor experiences.

Parks Canada, 2023c

Temporary closures, on the other hand, are a strategy for quickly responding to emergencies or other pressing issues that require immediate attention on a short-term basis. They will be instituted through authorities provided in the regulations that allow for "…the expedient closure of an area or restriction or prohibition of any activity within that area as needed to address the issue" (Parks Canada, 2023c). This authority would be limited to a 30-day period, while longer-term measures would be instituted through the creation of an SMA or other mechanism suited to an ongoing issue. Parks Canada provides relevant examples of how temporary closures, restrictions or prohibitions could be used to address a management issue, such as the "temporary restriction on vessel speed in a specific area due to an unexpected aggregation of a species at risk" (2023c).

3.2.4 Canadian NMCA General Regulations

Section 16(1) of the CNMCAA grants the Governor in Council the authority to "make regulations, consistent with international law, for the control and management of any or all marine conservation areas." These regulations can cover a broad scope, including ecosystem protection (s16(1)(a)), cultural and historical resource preservation (s16(1)(b)), zoning enforcement via summary convictions (s16(1)(d)), and the restriction of activities within zones (s16(1)(e)).

It is important to note that s16(3) of the CNMCAA sets out that regulations which "…restrict or prohibit marine navigation or activities related to marine safety, to the extent that such regulations can be made on the recommendation of the Minister of Transport under the *Canada Shipping Act, 2001* or the *Arctic Water Pollution Prevention Act*, may only be made on the recommendation of the Minister and the Minister of Transport." As such, there is an inability to create broad regulations pertaining to navigation and the management of issues related to vessel activity will instead likely focus on the regulation of categories of activities through a permitting approach. No regulations have been made pursuant to the CNMCAA at this time, though the regulatory process is underway and the NMCA General Regulations are expected to come into force sometime in 2025/26 (Parks Canada, 2023b).

3.2.5 Canadian NMCA Management of Marine Tourism

Despite the absence of NMCA General Regulations, it is still possible to understand the intent behind the desired management outcomes within the NMCA Zoning Framework. The NMCA Directive includes an annex which sets out the allowable uses and activities in Zones 1-4, with three broad categories contained therein (Table 13).

Table 13 NMCA Directive Zoning Categories

✓	Allowed	Activity or use is generally consistent, at the national level, with the purpose and objectives of the zone and is allowed, subject to applicable legislation, regulations, site-specific review processes, authorizations and permitting requirements.
C	Conditional	Activity or use will be assessed at the site level during zoning development. Activity may be allowed (✓) if it aligns with the purpose and objectives of the zone.
X	Not Allowed	Not allowed. Activity is inconsistent with the purpose of the zone or the NMCA and is not allowed.

Parks Canada, 2022c

Guidance on multiple types of uses and activities are provided within the NMCA Directive, including Commercial Tourism – under which expedition cruise tourism activities will fall. The guidance provided for how Commercial Tourism should be managed within the NMCA Zoning Framework is clear (Table 14).

Table 14 NMCA Zoning Guidance for Commercial Tourism Activities

	Full Protection Zones		**Ecologically Sustainable Use Zones**		**Limits/Permits/Exceptions**
	Strict Protection	*General Protection*	*Habitat Protection*	*Multiple Use*	
	ZONE 1	ZONE 2	ZONE 3	ZONE 4	
Commercial Tourism (Non-Extractive)	**X**	✓	**C**	✓	A business licence is required.

Parks Canada, 2022c

Based on this framework, expedition cruise tourism will not be permitted within Zone 1, is generally allowable is Zones 2 and 4, and conditionally allowed in Zone 3. The conditional nature of Zone 3 is reflective of s.8.10.1 of the NMCA Directive introduced above, whereby permits or other authorizing instruments may be tied to specific areas and/or zones, and therefore expedition cruise tourism activities will likely be managed in these zones through conditions associated with the business licensing process.

This licensing process points to the opportunity for management authorities such as the AB to review applications on an annual basis and to attach terms and conditions aligned with the zoning framework and conservation objectives. This type of application process and review by management authorities is reminiscent of the current environmental impact assessment process in Nunavut. The following section briefly provides background on this process and highlights some anticipated changes upon the establishment of TINMCA.

3.2.6 *NuPPAA* and TINMCA Establishment

The Nunavut Planning and Project Assessment Act (NuPPAA) governs the environmental assessment process for projects in Nunavut, including expedition cruise activities. Under this process, cruise operators must submit a Project Application to the Nunavut Planning Commission (NPC) for a determination of conformity with the applicable Land Use Plan (NPC, 2024). If positive conformity is determined, the application is then forwarded to the Nunavut Impact Review Board (NIRB) for further screening.

Upon establishment of TINMCA, this process will be modified. The IIBA (s.5) indicates that the AB will assume the responsibility current held by NPC for conformity determinations within TINMCA boundaries (Parks Canada, 2022a). Project Applications will be assessed by the AB against "…requirements in applicable laws, regulations and policies including the Interim Management Plan and subsequent Management Plans" (TINMCA IIBA, s.5.7.1(d)), with the Zoning Framework effectively becoming the new Land Use Plan for the area. After this conformity review, Projects with positive conformity determinations will continue to be sent to the NIRB for the same impact assessment screening process as currently exists. These changes represent an important additional layer of protection for

TINMCA, since the AB will be able to reject Project Applications and require modifications if proposed activities do not align with the contents of the Management Plan for the area. Only when Project Applications are approved by the AB and NIRB will the proponent be able to then proceed with the business licensing process, at which point enforceable terms and conditions may be introduced.

This evolving regulatory landscape presents both opportunities and challenges for managing expedition cruise tourism within TINMCA. The integration of the NMCA zoning framework with existing permitting systems and environmental impact assessment processes will be crucial in addressing the unique operational characteristics and potential impacts of this industry in the territory.

3.3 Study Design and Methods

A multi-faceted approach was employed to assess the management approaches for expedition cruise tourism within TINMCA, including the potential implications of the introduction of its Zoning Framework. The research was designed to include three main components which build upon each other sequentially to achieve the research objectives. First, the creation of a Comprehensive TINMCA Shore Location Database established a baseline understanding of all potential cruise activity locations. This was followed by a geospatial analysis of zoning implications, and finally a case study of actual 2022 cruise operations to examine real-world implications. This integrated approach allows for a broad understanding of potential management impacts and a detailed analysis of specific operational implications that may arise under the new zoning framework. Table 15 provides an overview of the research design, linking objectives with methods and data sources.

Table 15 Overview of Study Design

Research Objective	Method(s) Employed	Data Sources
Understand the full range of cruise activity locations within TINMCA boundaries	- Compilation of comprehensive shore location database - Cross-referencing and filtering of data sources	- Canadian Arctic Shore Location Database - AECO Off-Vessel Risk Assessment Tool (O-VRAT)
Analyze the potential implications of the proposed TINMCA zoning framework on expedition cruise operations	- Geospatial conversion and processing - Overlay analysis - Categorization of cruise activities by zone - Assessment of zoning restrictions on cruise operations	- Draft TINMCA zoning framework - Comprehensive Shore Location Database
Assess the alignment between the TINMCA zoning framework and existing shore-based permitting systems	- Substantiation of 2022 cruise activities - Comparison of 2022 cruise activities with zoning framework - Analysis of AIS vessel tracks	- AECO Cruise Database statistics - 2022 AIS cruise vessel tracks - Draft TINMCA zoning framework

3.3.1 Data Sources and Analysis

3.3.1.1 Comprehensive TINMCA Shore Location Database (Objective 1)

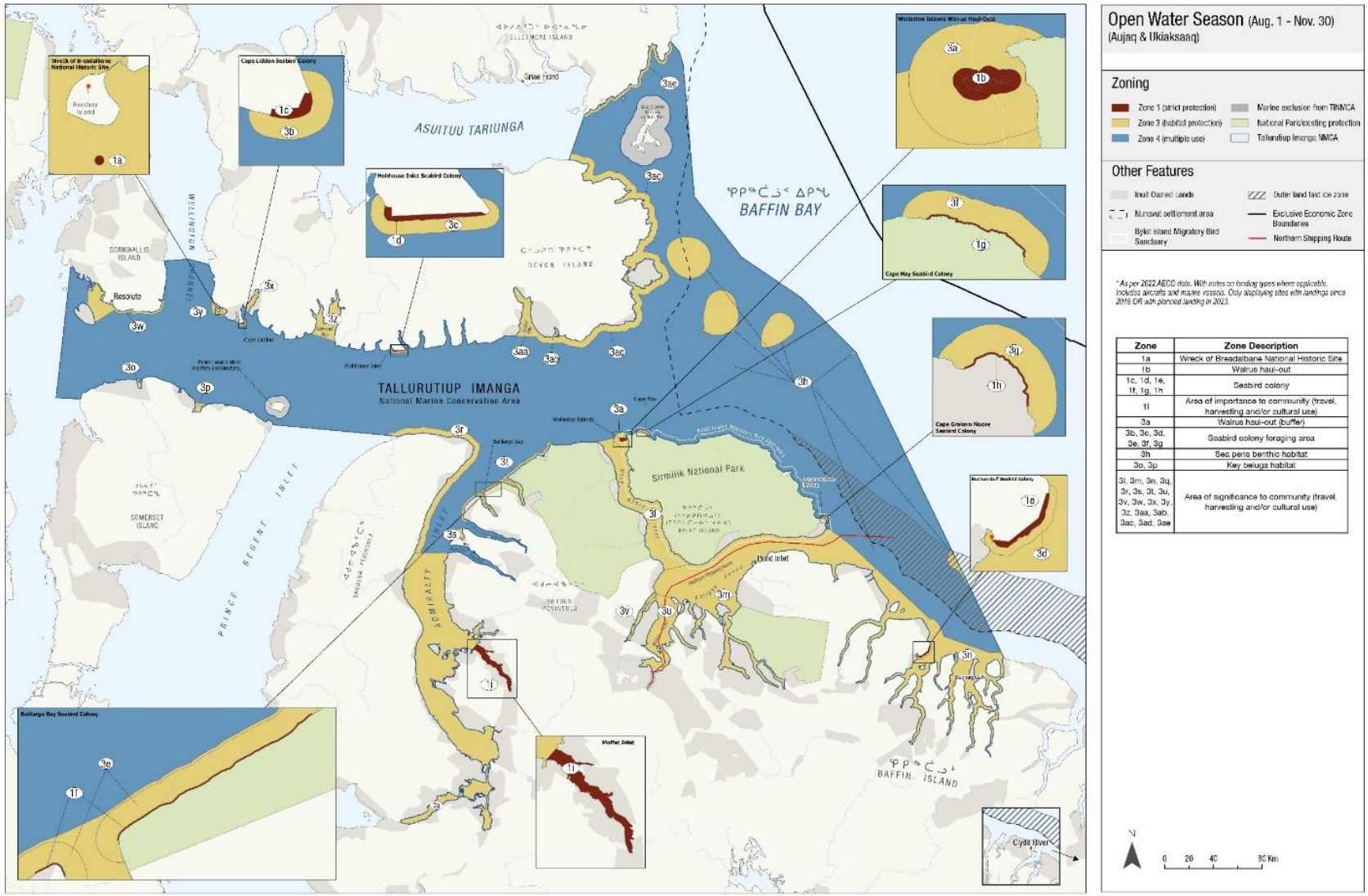
To create the Comprehensive TINMCA Shore Location Database, two complementary data sources were integrated and cross-referenced. The Canadian Arctic Shore Location Database, compiled by Weber et al. (2021), served as the initial foundation. This database was developed through a systematic annual internet search of advertised cruise itineraries between 2008-2020, recording location names, geographic coordinates, date of planned visits, and vessel information. For the purposes of the present study, database locations were plotted in ArcGIS and only those sites found within TINMCA boundaries were retained.

The second data source utilized was the Association of Expedition Cruise Operators (AECO) Off-Vessel Risk Assessment Tool (O-VRAT). O-VRAT is a mobile application intended to allow expedition field staff to carry out risk assessments prior to conducting landings across the circumpolar Arctic (AECO, 2021). Divided by region (Canada, Greenland, Iceland, Svalbard, Franz Josef Land), O-VRAT contains all the shore visit locations that have been logged historically in AECO's Cruise Database and displays this information on an interactive map (AECO, 2024). The O-VRAT database represents a thorough accounting of the industry's record of shore locations, including sites that may not appear in public marketing materials. All coordinates relevant to TINMCA were extracted from O-VRAT and added to the ArcGIS dataset, with duplicate entries removed via comparison and manual verification.

3.3.1.2 Draft TINMCA Zoning Framework Implications (Objective 2)

The analysis of zoning implications utilized the first publicly-available draft of the TINMCA zoning framework (December 2023), obtained from the Q4 meeting of the Aulatiqatigiit Board (Figure 9).

Figure 9 TINMCA Draft Zoning Framework



Parks Canada, 2024

To begin, the draft zoning framework was digitized and converted into GIS shapefiles using ArcGIS. This conversion included georeferencing the draft zoning map to ensure accuracy, hand-digitizing zone boundaries as polygon features, and attributing each polygon with its designated zone classification (i.e. Zone 1-4). This was followed by overlaying the Comprehensive TINMCA Shore Location Database on top of the zoning framework shapefiles to identify spatial relationships. This analysis included identifying shore locations within or adjacent to specific zones and qualifying each location according to applicable zoning restrictions. An assessment of zoning impact evaluated each shore location against the management implications outlined in the NMCA Directive and Policy guidelines. This assessment included activity restrictions specified for each zone type, permitting considerations, and potential operational constraints for expedition cruise vessels.

3.3.1.3 Alignment Between Draft TINMCA Zoning Framework and Existing Shore-Based Permitting System (Objective 3)

A case study approach was utilized to determine the alignment between the zoning framework and existing shore-based permitting system, focusing on observed expedition cruise activities during the 2022 operational season within TINMCA boundaries. Two primary data sources were utilized to reconstruct and substantiate vessel activities: AECO Cruise Database statistics and AIS Cruise Vessel Tracks.

AECO requires its members to submit Post-Visit Reports after each voyage, which forms the basis of a statistical overview of historical annual cruise activities (AECO, 2021). The information contained within these Post-Visit Reports are added each year to AECO's Cruise Database to track member activities over time. For the 2022 cruise season, the statistics included:

- On Shore: total number of passengers which visited a shore location
- Extended Walk: longer hike at a shore location
- Ships Cruising: scenic navigation into smaller waterways, offering opportunities for observation from the ship's deck.
- Zodiac Cruising (No Landing): launching of smaller watercraft from the main vessel, with the ability to conduct closer observation of natural features and wildlife.
- Zodiac Landing: use of the smaller watercraft to tender passengers from the main vessel for disembarkation at shore locations.

Next, a geospatial database of expedition cruise activity for the 2022 TINMCA cruise season was developed using satellite-base AIS data provided by exactEarth Ltd. Positional AIS messages for expedition cruise vessels included identification information, geographic position coordinates (latitude/longitude),

timestamp of transmission (hr/min/s), and speed over ground (knots). These positional AIS messages were subsequently converted into tracklines in order to visualize movements.

To validate and augment the AECO Cruise Database statistics, the data from AECO's Cruise Database was mapped in ArcGIS, followed by the addition of expedition cruise vessel AIS tracklines. This initial mapping and visualization provided a simple approach to determine the approximate accuracy of the statistics reported in the Cruise Database and identify discrepancies with the observed vessel movements. For locations with AIS tracklines but no corresponding AECO data, vessel activities were inferred using three main parameters:

- Ship Cruising: speed over ground did not fall under 2.5 knots for any period of 15 minutes or more.
- Zodiac Cruising: speed over ground observed at <0.5 knots for <2 hours, indicating that the vessel was either at anchor or maintaining station.
- Shore Landing: speed over ground observed at <0.5 knots for >2 hours, with suitable topography for landing.

The output of this analysis was considered to be the Substantiated 2022 TINMCA Cruise Activity. This substantiated cruise activity dataset was then overlayed on top of the converted draft zoning framework within ArcGIS. Each location where cruise activity took place was then categorized according to its adjacent zoning designation. Based on the NMCA zoning guidance, the potential implications for each type of substantiated 2022 cruise activity was analyzed based on its likely zoning designation, including potential conflicts between activities and zoning restrictions, as well as misalignments with the shore-based permitting regime. Finally, activities within and adjacent to areas designated as Zone 1 (Strict Protection) were examined in greater detail to understand the implications associated with this most restrictive management approach.

3.4 Results

3.4.1 Comprehensive TINMCA Shore Location Database

The compilation and filtering of the Canadian Arctic Shore Location Database and AECO's O-VRAT resulted in the identification of 53 unique areas within TINMCA boundaries (Table 16). Notably, while only 14 of these locations were originally present in the Canadian Arctic Shore Location Database, all 53 were included in O-VRAT.

Table 16 TINMCA Shore Excursion Locations

Shore Location Name	Canadian Arctic Shore Location Database	AECO O-VRAT
Albert Harbour		✓
Baillarge Bay		✓
Beatrice Point	✓	✓
Beechey Island	✓	✓
Bethune Inlet		✓
Blanley Bay		✓
Buchan Gulf	✓	✓
Button Point		✓
Burnett Inlet		✓
Bylot Island	✓	✓
Caswell Tower		✓
Canada Point		✓
Cape Charles Yorke	✓	✓
Cape Fitzroy		✓
Cape Graham Moore		✓
Cape Hay	✓	✓
Cape Hunter		✓
Cobourg Island	✓	✓
Coutts Inlet		✓
Craig Harbour	✓	✓
Croker Bay	✓	✓
Cuming Inlet		✓
Cunningham West Glacier		✓
Dundas Harbour	✓	✓
Dymond Islands		✓
Elwin Inlet	✓	✓
Emmerson Island		✓
English Bay		✓
Eric Harbour		✓
Feachem Bay	✓	✓
Graham Harbour		✓
Guy's Bight		✓
Hobhouse Inlet		✓
Hodgson Head		✓
Icy Arm Fjord	✓	✓
Maxwell Bay	✓	✓
Milne Inlet		✓
Navy Board Inlet		✓
North Arm Fiord	✓	✓
Philpots Island	✓	✓
Port Leopold	✓	✓
Powel Inlet		✓
Prince Leopold Island	✓	✓
Princess Charlotte Monument		✓
Queen Harbour		✓

Radstock Bay	✓	✓
Royal Society Fiord	✓	✓
Scallon Cove		✓
Sermilik Glacier		✓
Tay Bay		✓
Tremblay Sound		✓
White Bay		✓

3.4.2 Substantiation of 2022 TINMCA Cruise Activities

3.4.2.1 2022 AECO Cruise Database Statistics

Analysis of the AECO Cruise Database revealed that expedition cruise vessels visited 17 total locations within TINMCA during the 2022 season (Table 17), of which 10 sites experienced reported passenger disembarkation. The total visitor count across these 10 sites was 6,754, with the most visited being Beechey Island (2,377 visitors), Dundas Harbour (1,965 visitors), Radstock Bay (767 visitors), and Croker Bay (562 visitors).

Table 17 2022 TINMCA Cruise Activities Reported in AECO Database

Site	On shore	Extended walk	Ships Cruising	Zodiac Cruising	Zodiac Landing
Beechey Island	2377	202			2308
Blanley Bay	21				13
Burnett Inlet	38	12		18	8
Bylot Island	0		432		
Canada Point - Simirlik National Park	192				192
Coburg Island	0		310		
Croker Bay	562	12	549	1294	24
Cuming Inlet	44	12		38	32
Dundas Harbour	1965	157	195	19	1940
Feachem Bay	195		432		195
Ice Arm Fiord	260		432		260
Maxwell Bay	327	17		136	130
North Arm Fiord	0		214		
Powell Inlet	6			18	6
Prince Leopold Island MBS	0		0	120	
Radstock Bay / Caswell Tower	767	6	689	117	747
Tay Bay - Navy Board Inlet	0			95	
Totals	6,754	418	2,297	1,640	5,855

3.4.2.2 Accuracy of the 2022 AECO Cruise Database Statistics

Comparison of AECO Cruise Database Statistics with AIS vessel tracks revealed several discrepancies. Two reported locations (Cuming Inlet and North Arm Fiord) had no corresponding AIS vessel tracks, suggesting erroneous reporting or misattribution of activity from a different location. More significantly, AIS data indicated cruise activities at 7 additional locations not reported in the AECO database (Table 18).

Table 18 Unreported 2022 TINMCA Cruise Activities

Site	Vessel Identified	Date	Transmission Time		Total Time	Min. Speed over Ground (knots)	Total Time Speed over Ground <0.5 knots	Max. Speed over Ground (knots)	Avg Speed (knots)
			Entry	Exit					
Aqiarurnak Bay	*Ultramarine*	Sept. 19	14:35	19:06	4 hrs 31 mins	0.0	3 hrs 37 mins	12.1	
Cambridge Fiord	*L'Austral*	Aug. 20	16:39	18:40	2 hrs 1 min	8.7	n/a	11.7	9.75
	Nat. Geo Endurance	Aug. 25	12:45	14:54	2 hrs 9 mins	3.7	n/a	16.1	13.3
Elwin Inlet	*Ultramarine*	Sept. 19	06:21	12:50	6 hrs 29 mins	0.0	4 hrs 8 mins	11.3	
Graham Harbour	*Ultramarine*	Sept. 20	07:33	12:40	5 hrs 7 mins	0.0	3 hrs 54 mins	11.1	
Rannoch Arm	*Nat. Geo Endurance*	Aug. 25	13:23	14:43	1 hr 20 mins	3.7	n/a	16.1	12.6
Stratton Inlet	*Ocean Endeavour*	Sept. 16	09:04	10:55	1 hr 51 mins	2.5	n/a	9.9	6.9
Tay Sound	*Hanseatic Inspiration*	Aug. 7	13:13	20:42	7 hrs 28 mins	0.0	3 hrs 50 mins	14.4	

3.4.2.3 Inferred Unreported 2022 TINMCA Cruise Activity

The type of activity undertaken in each of the instances indicated in Table 18 was inferred following the methods described in Section 3.3.1.3. There is a range of confidence in these results – ship cruising has a high degree of confidence, as does zodiac cruising when those vessels were outfitted with their own AIS devices. Shore landings have a lower degree of confidence, based on an assessment of the surrounding topography and the total amount of time elapsed in the area. The output of this analysis is shown in Table 19 below.

Table 19 Inferred Unreported 2022 TINMCA Cruise Activity

Site	Vessel Identified	Ships Cruising Only	Zodiac Cruising	Zodiac Landing	Permit Required?
Aqiarurnak Bay	*Ultramarine*		Possible	Possible	Inuit Owned Land
Cambridge Fiord	*L'Austral*	✓			n/a
	Nat. Geo. Endurance	✓			n/a
Elwin Inlet	*Ultramarine*		✓	Possible	National Park Business Licence
Graham Harbour	*Ultramarine*		✓	Possible	Archaeological Permit
Rannoch Arm	*Nat. Geo Endurance*	✓			n/a
Stratton Inlet	*Ocean Endeavour*	✓			n/a
Tay Sound	*Hanseatic Inspiration*		✓	Possible	Inuit Owned Land

It should be noted that only 2 of these 7 locations are contained within AECO's O-VRAT system (Elwin Inlet & Graham Harbour). The absence of the other 5 locations in O-VRAT likely explains why the activity went unreported, but also indicates that the O-VRAT system is incomplete and does not fully reflect the range and extent of annual operations.

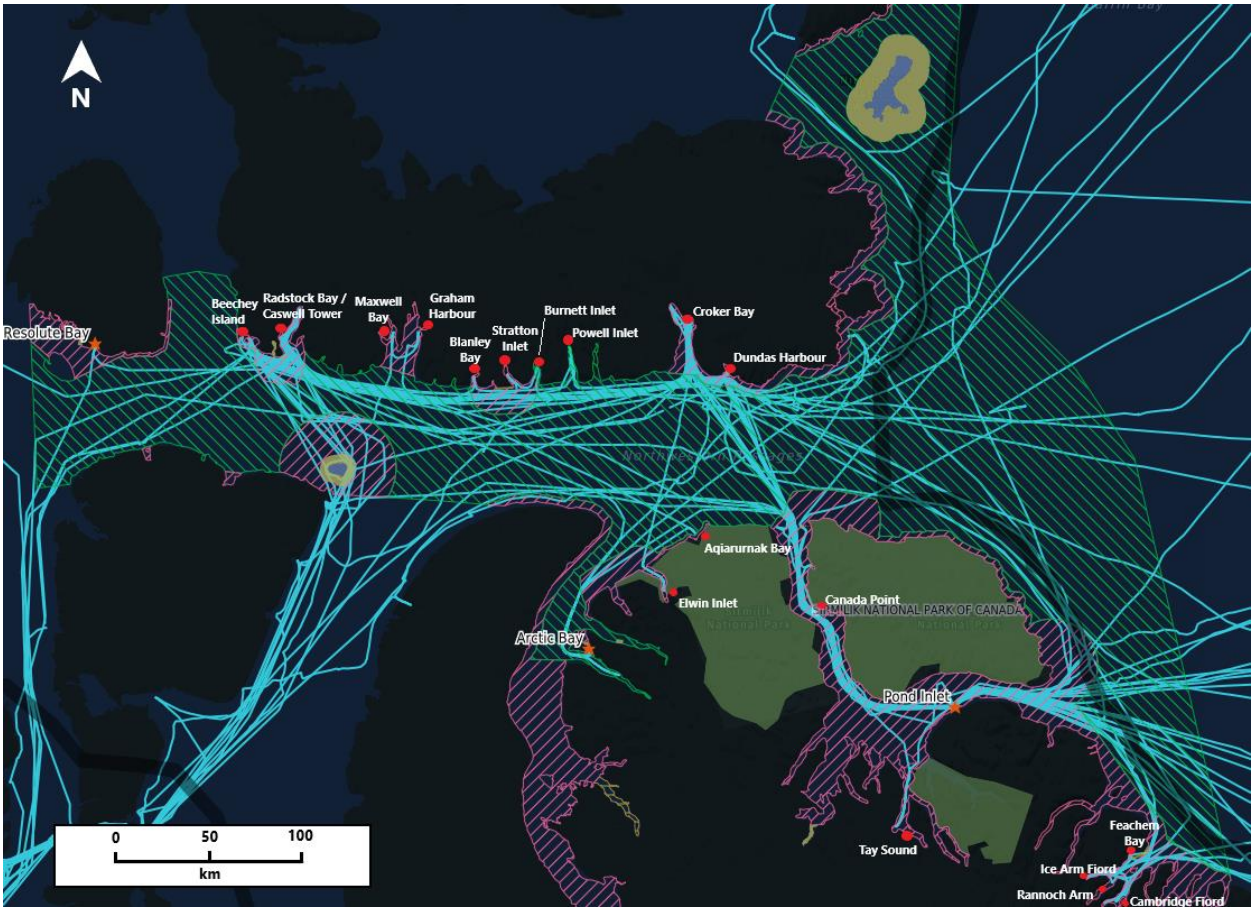
3.4.2.4 Substantiated 2022 TINMCA Cruise Activity

Based on the confirmatory analysis of the statistics within the AECO Cruise Database and identification of missing cruise activities, a total of 22 distinct locations within TINMCA saw some form of cruise activity in 2022 (Figure 10). Out of these 22 locations, the AECO cruise database confirms 10 locations where a shore landing occurred, with a lower degree of confidence of 4 additional locations where this activity could have also taken place.

Figure 10 Map of Substantiated 2022 TINMCA Cruise Activity

Figure 11 further visualizes the extent of cruise activity during the 2022 operational season within TINMCA boundaries, providing a summary of all individual passenger vessel movements as captured by AIS signals between the months of July and September.

Figure 11 2022 TINMCA Cruise Activity – AIS Vessel Tracks



3.4.3 Implications of TINMCA Zoning Framework on Substantiated 2022 TINMCA Cruise Activity

Overlay analysis of the substantiated 2022 cruise activities with the draft TINMCA zoning framework revealed several key findings. Table 20 summarizes the areas visited during the 2022 season, including their relevant zoning designation, rationale for protection, and management implication.

Table 20 2022 TINMCA Cruise Activity Locations with Zoning Implications

Site	Zone	Rationale	Implication	Existing Permitting Requirement?
Aqiarurnak Bay	Zone 1	Terrestrial Walrus Haul-Out	Access prohibited	
	Zone 3	EBSA	Conditional	IOL Access Permit
Beechey Island	Zone 3	EBSA	Conditional	Archaeological Permit
Blanley Bay	Zone 1	Terrestrial Walrus Haul-Out	Access prohibited	
	Zone 3	EBSA	Conditional	
	SMA	Migratory Bird Foraging Area	Seasonal restrictions	

Burnett Inlet	Zone 1	Terrestrial Walrus Haul-Out	Access prohibited	
	Zone 3	EBSA	Conditional	
	SMA	Migratory Bird Foraging Area	Seasonal restrictions	
Bylot Island	Zone 3	EBSA	Conditional	National Park Business Licence
	SMA	Migratory Bird Foraging Area	Seasonal restrictions	
Canada Point - Simirlik National Park	Zone 3	EBSA	Conditional	National Park Business Licence
Cambridge Fiord	Zone 3	EBSA	Conditional	IOL Access Permit
	SMA	Migratory Bird Foraging Area	Seasonal restrictions	
Coburg Island	Zone 3	EBSA	Conditional	Migratory Bird Sanctuary Permit
	SMA	Migratory Bird Foraging Area	Seasonal restrictions	
Croker Bay	Zone 3	EBSA	Conditional	IOL Access Permit Archaeological Permit
Dundas Harbour	Zone 3	EBSA	Conditional	Archaeological Permit
Elwin Inlet	Zone 3	EBSA		National Park Business Licence IOL Access Permit
	SMA	Migratory Bird Foraging Area	Seasonal restrictions	
Feachem Bay	Zone 1	Bird Cliffs	Strict minimum setback distance	IOL Access Permit
	Zone 3	EBSA	Conditional	
	SMA	Migratory Bird Foraging Area	Seasonal restrictions	
Graham Harbour	Zone 3	EBSA	Conditional	Archaeological Permit
Ice Arm Fiord	Zone 3	EBSA	Conditional	
	SMA	Migratory Bird Foraging Area	Seasonal restrictions	
Maxwell Bay	Zone 3	EBSA	Conditional	Archaeological Permit
Powell Inlet	Zone 1	Terrestrial Walrus Haul-Out	Access prohibited	
	Zone 4	n/a	n/a	
Prince Leopold Island MBS	Zone 3	EBSA	Conditional	Migratory Bird Sanctuary Permit
	SMA	Migratory Bird Foraging Area	Seasonal restrictions	
Radstock Bay / Caswell Tower	Zone 1	Terrestrial Walrus Haul-Outs	Access Prohibited	Archaeological Permit IOL Access Permit
	Zone 3	EBSA	Conditional	
	SMA	Migratory Bird Foraging Area	Seasonal restrictions	
Rannoch Arm	Zone 3	EBSA	Conditional	IOL Access Permit
	SMA	Migratory Bird Foraging Area	Seasonal restrictions	
Stratton Inlet	Zone 3	EBSA	Conditional	
	SMA	Migratory Bird Foraging Area	Seasonal restrictions	
Tay Bay - Navy Board Inlet	Zone 3	EBSA	Conditional	National Park Business Licence
Tay Sound	Zone 3	EBSA	Conditional	IOL Access Permit

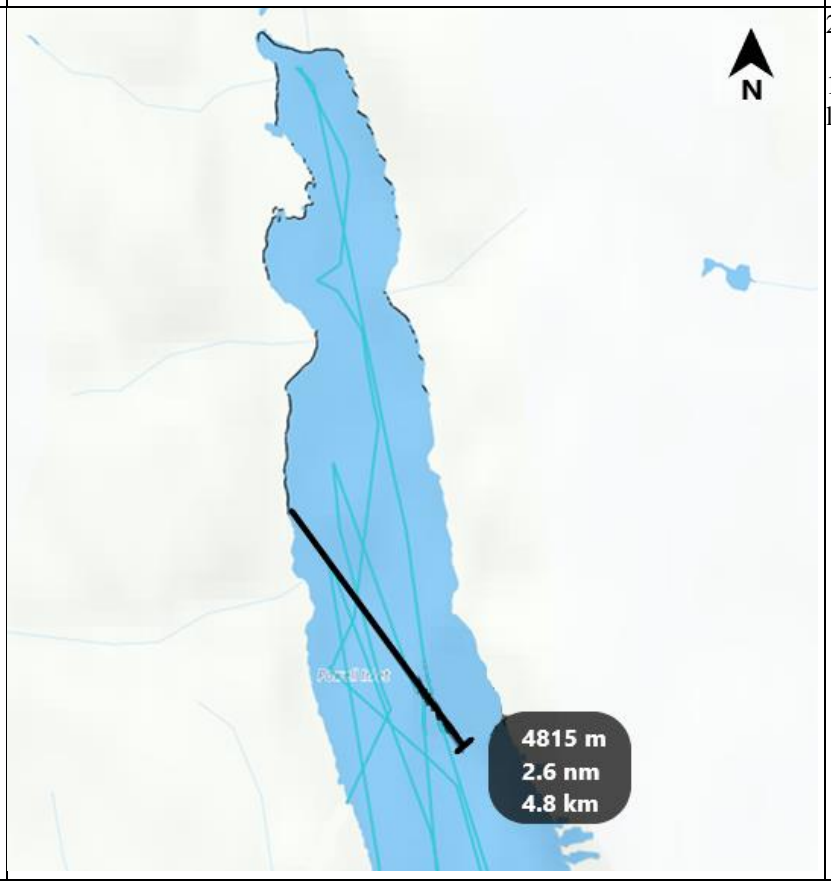
3.4.3.1 Zone Distribution

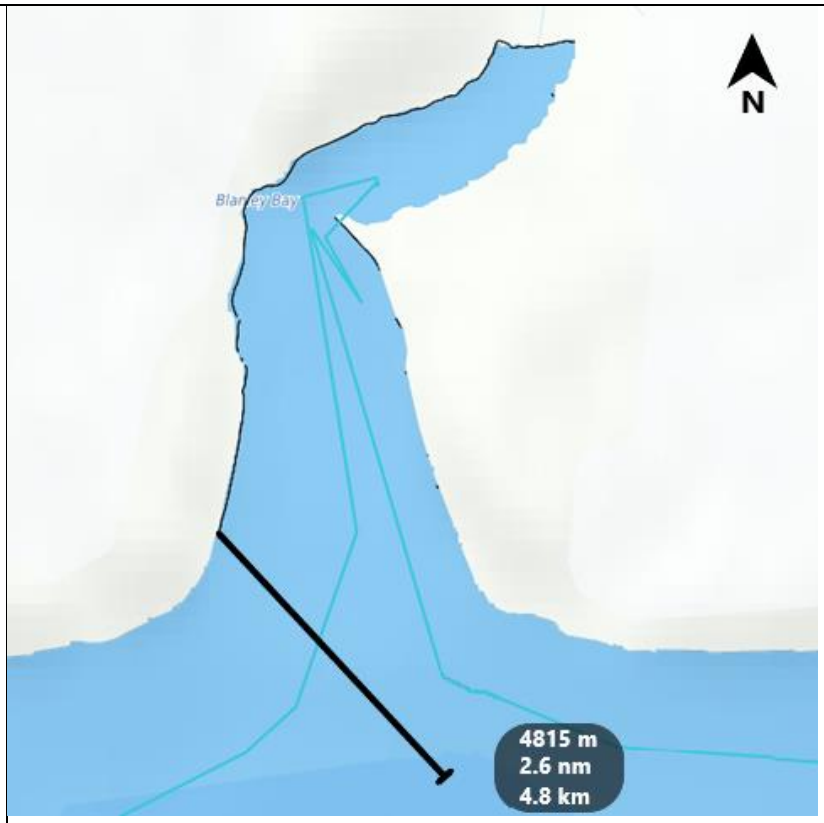
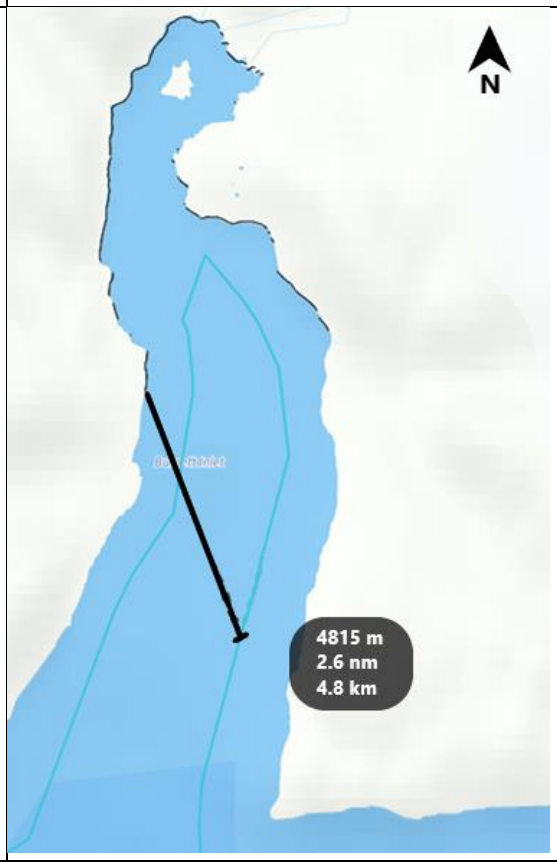
The majority (18 of 22) of 2022 cruise activity locations fall within proposed Zone 3 areas (Habitat Protection), where tourism activities are conditionally allowed. These Zone 3 areas are reflective of identified protections for migratory birds, including setbacks for seabird colonies and associated foraging areas. 6 of the 22 identified cruise activity locations are potentially impacted by Zone 1 (Strict Protection) designations, primarily due to proposed 4.8 km buffer zones around terrestrial walrus haul-outs. Only one location (Powell Inlet) falls under the proposed Zone 4 (Multiple Use) designation.

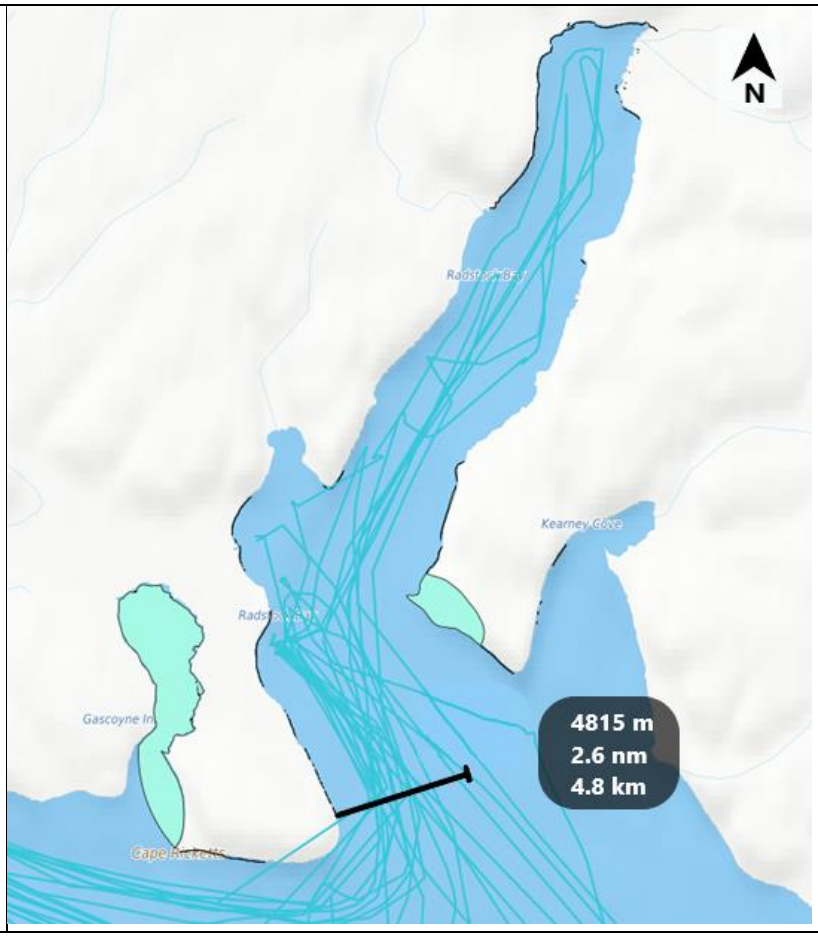
3.4.3.2 Significant Implications

The most significant implications of the TINMCA zoning framework on 2022 cruise activity are associated with potential Zone 1 designations, particularly the 4.8 km buffer zone for terrestrial walrus haul-outs. Table 21 provides the output of more detailed analyses of these areas.

Table 21 Impact of Zone 1 Designations on 2022 Cruise Activity

Location	Map	2022 Cruise Activity	Impact
Powell Inlet		2 vessels 1 shore landing	Access would not be permitted to the inner 11 km of the 21 km long fjord.

Blanley Bay		1 vessel 1 shore landing	No access would be permitted within Blanley Bay, nor 2 km from the shoreline surrounding its entrance.
Burnett Inlet		1 vessel 1 shore landing	Access would not be permitted to the inner 7 km of the 14 km long fjord.

Radstock Bay		11 vessels 5 shore landings	Access would be completely prohibited within Radstock Bay. Coastal navigation to/from Beechey Island would be required to move further from shore.

These results highlight the potential for significant changes to expedition cruise tourism operations within TINMCA under the proposed zoning framework, particularly in areas designated as Zone 1 for the protection of terrestrial walrus haul-outs. The implications of these findings extend beyond mere operational changes for the expedition cruise industry, since they also reflect the requirement to balance conservation objectives and public use and enjoyment of the NMCA. There are also significant questions raised about the effectiveness of current monitoring and reporting systems, and how these deficiencies will be overcome when active management of TINMCA begins. The discussion that follows touches on these issues, focusing on the challenges and opportunities presented by the TINMCA zoning framework, the limitations of current management approaches, and potential strategies worthy of consideration.

3.5 Discussion

This study provides a foundation for better understanding the implications of the proposed TINMCA zoning framework on the management of expedition cruise tourism activities, while also confirming that historical knowledge gaps exist (Johnston et al., 2017; Dawson et al., 2021). These findings are significant and timely

– the current pre-establishment status of TINMCA provides an opportunity to address historical management shortcomings proactively, but the 5-year period of the Interim Management Plan post-establishment also means that iterative improvements can be made over time. The present discussion will focus on the data discrepancies observed, the major implications of the draft TINMCA zoning framework, and the need for alignment with the shore-based permitting system. Implications for future management and ongoing research needs will also be discussed, providing guidance and recommendations for policymakers and academia as TINMCA moves closer to establishment.

3.5.1 Data Discrepancies

The comparison of the Canadian Arctic Shore Location Database with AECO's O-VRAT system revealed significant discrepancies in the number of identified shore locations within TINMCA. Weber et al. (2021) made the first attempt at compiling a complete inventory of shore visit locations across the Canadian Arctic, though the source of their information was publicly advertised cruise itineraries. While the authors acknowledge that these sources are incomplete, it is nonetheless noteworthy that the database was missing 75% of the total logged on O-VRAT.

As previous studies have noted (i.e. Dawson et al., 2017; Johnston et al., 2017) challenges remain in accurately tracking and reporting expedition cruise activities in the Canadian Arctic. The identification of seven unreported cruise activity locations through AIS data analysis, including 5 locations not even listed in O-VRAT, further underscores these challenges, and points to potential issues in the manner that industry pursues its own self-reporting mechanisms.

These data inconsistencies have important implications for the management of expedition cruise tourism in the Canadian Arctic generally, but also for activities within TINMCA specifically. As Lasserre & Têtu (2015) have noted, effective management of these activities requires accurate and comprehensive data on vessel movements and activities. The discrepancies identified in this study suggest that existing monitoring and reporting systems may be insufficient to capture the full extent of cruise operations in the region and management approaches will be undermined until these systems are improved.

3.5.2 Potential Zoning Framework Implications on Expedition Cruise Operations

The analysis of the draft TINMCA zoning framework's potential impacts on the substantiated 2022 cruise activities reveals significant implications for future operations, particularly in areas designated as Zone 1. The proposed 4.8 km buffer zones around terrestrial walrus haul-outs would effectively prohibit access to popular destinations such as Radstock Bay and limit navigation in several fjords.

AECO itself has raised concerns regarding such access restriction issues, particularly in relation to marine setback distances associated with terrestrial walrus haul-outs. During a recent public callout for comment on the Draft Nunavut Land Use Plan (DNLUP) where the same haul-out setbacks were proposed, the following submission was made:

> AECO is concerned that these proposed setback distances to terrestrial walrus haul-outs may limit the general public's opportunity to experience these animals in their natural habitat. In addition, the proposed setback distances to terrestrial walrus haul-outs will result in certain areas becoming off-limits, even if walrus are not being visited. Lastly, the setback distances may represent a challenge for vessel operations.
> AECO members operate with a non-disturbance principle for wildlife, and has, in collaboration with researchers, developed guidelines for walrus that members of AECO are obliged to follow. As far as we are aware, all expedition cruise vessels size 13-500 passengers operating in Arctic Canada are members of AECO and obliged to follow these guidelines.
> AECO would like to question the basis for the proposed setback distances from walrus terrestrial haul-outs and asks for evidence to support the proposed distances…
> AECO would like to propose that walrus haul-outs can be visited if AECO's walrus guidelines are applied, in addition to existing regulations.
>
> NPC, File No. 21-206E-2023-10-02

Canada's Marine Mammal Regulations (SOR/93-56) currently only identify a maximum 300 m approach distance when walrus are present on shore. The proposed setback distances in the TINMCA Zoning Framework appear to be the same as those in the DNLUP, the source of which stems from a submission by the Qikiqtaaluk Wildlife Management Board (QWMB) in its written submission related to the 2016 DNLUP (NPC, 2018). The rationale for the distances in the QWB submission is unclear but given that the board is comprised of the Chair from each community Hunters and Trappers Organization, it is likely to reflect regional consensus on the matter (QWMB, 2024).

It is therefore important to note that, from the perspective of Inuit communities within the boundaries of TINMCA, these significant limitations on expedition cruise activities are in fact a reflection of longstanding desires to protect these areas (QIA, 2024). As such, from this perspective these restrictions are long overdue and represent a tangible example of Inuit self-determination.

3.5.3 Alignment with Shore-Based Permitting Systems

The results of the study also raise questions about the alignment between the proposed TINMCA zoning framework and existing terrestrial permitting systems. As indicated at the outset, Nunavut has a robust shore-based permitting regime that applies to expedition cruise tourism activities. However, the TINMCA

zoning framework introduces a new layer of marine spatial management that may not always correspond with these existing systems.

For instance, some areas where cruise operators hold valid permits to access shore locations fall in the vicinity of Zone 1 areas under the TINMCA framework, potentially creating conflicts between management entities. This potential misalignment echoes challenges raised by Dawson et al. (2017) regarding the fragmented nature of marine tourism governance in the region. Early identification of these conflicts is therefore important and will require enhanced coordination between the AB co-management body responsible for TINMCA and territorial authorities overseeing shore-based permitting. The development of integrated management approaches that consider both the marine and terrestrial components of cruise operations could help mitigate potential conflicts and ensure more coherent governance of the industry.

3.5.4 Considerations for Future Management Approaches and Need for Additional Research

The findings of this study have several implications for the future management of expedition cruise tourism in TINMCA and the broader Canadian Arctic. There is a need to pursue improved data collection and reporting mechanisms to ensure that management decisions are based on accurate and comprehensive information about industry activities. AECO's self-reporting appears to be an improvement on the status quo, but gaps remain, and the statistics collected do not necessarily reflect the needs of regulatory authorities. Enhanced collaboration between industry and regulatory authorities could help to develop more robust monitoring systems.

The potential impacts of the TINMCA zoning framework on expedition cruise operations underscore the importance of Inuit consultation and stakeholder engagement in the development of marine protected area management plans. The incorporation of Inuit and industry perspectives throughout the planning process can help identify and mitigate potential conflicts before they arise (Dawson et al., 2016). Given that TINMCA will become the first NMCA in Canadian Arctic waters, future research will be necessary to assess management outcomes over time. For example, while Parks Canada and co-management partners have the responsibility under the IIBA (Article 13) to monitor activities within TINMCA on an ongoing basis, the efficacy of the zoning framework should periodically be assessed in a similar manner to the present study by a neutral third party. Similarly, it will also be important to determine the effectiveness of the zoning framework in achieving its conservation goals, especially with regard to the areas with the strictest protections such as terrestrial walrus haul-outs. Inuit perspectives on the successes and failures of the NMCA will also be important in the years ahead, and local involvement in adaptive management approaches can help to course correct when necessary.

While the TINMCA zoning framework represents an important step towards more comprehensive management of expedition cruise tourism, its implementation will require careful consideration of its intended oversight objectives and the actual outcomes once it becomes operationalized. The balance between conservation goals, Inuit rights and interests, and the operational style of the cruise industry will likely be a moving target, but there are now more tools in the larger toolkit to tackle this challenge.

3.6 Conclusion

This study provides a comprehensive analysis of the potential implications of the TINMCA zoning framework on expedition cruise tourism operations. By compiling a detailed inventory of cruise activities within TINMCA boundaries and assessing these against the proposed zoning framework, this research offers valuable insights into the challenges and opportunities presented by this new conservation approach in the region.

The key findings of this study are threefold: first, significant discrepancies were identified between different data sources tracking expedition cruise activities, highlighting the need for more robust and comprehensive monitoring systems; second, the proposed TINMCA zoning framework, particularly the designation of Zone 1 (Strict Protection) areas, has the potential to substantially alter cruise operations by restricting access to popular destinations, but also to address longstanding Inuit concerns related to the impacts caused by this industry; third, the introduction of this zoning framework may create misalignments with existing terrestrial permitting regimes, necessitating enhanced coordination between federal and territorial management authorities.

These findings have important implications for the management of expedition cruise tourism in the Canadian Arctic. As TINMCA moves towards establishment and other marine protected areas are considered in the region, careful consideration must be continually given to lessons learned and improvements over time. Based on the initial results from this study, several recommendations can be made:

1. Improve data collection and reporting mechanisms: Enhance collaboration between regulatory authorities, AECO, and academic researchers to develop more comprehensive and accurate systems for tracking expedition cruise activities in the Canadian Arctic.

2. Develop integrated management approaches: Foster greater coordination between the authorities responsible for TINMCA and territorial bodies overseeing shore-based permitting to create a more coherent management approach.

3. Prioritize Inuit involvement: Ensure that Inuit knowledge, perspectives, and interests are central to the ongoing management and evaluation of TINMCA.

This research contributes to the growing body of literature on the management of expedition cruise tourism in the Canadian Arctic and marine protected area management more broadly. By providing one of the first detailed analyses of how new marine conservation measures may impact expedition cruise operations in the Canadian Arctic, there are valuable insights provided to policymakers, industry stakeholders, management entities, and Inuit rightsholders.

As expedition cruise tourism in the Canadian Arctic continues to mature, the development of effective and adaptive management strategies becomes increasingly crucial. The impending establishment of TINMCA represents an important step in this direction, but its success will depend on the ability to balance conservation goals and Inuit rights against industry pressure to maintain its freedom to operate in the ways that it has been accustomed in the past. Ultimately, TINMCA will provide a new way of managing expedition cruise tourism in Canadian Arctic waters and eventual lessons learned can be used to continue the push toward improved outcomes across Inuit Nunangat and potentially other sensitive polar regions around the world.

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CHAPTER 4: EXPLORING CRUISE PASSENGER MOVEMENT PATTERNS AT REMOTE SHORE SITES IN THE CANADIAN ARCTIC

Authors

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Abstract

While common in other circumpolar jurisdictions, there is a currently a lack of shore-based management approaches for governing cruise tourism activities in the Canadian Arctic. As cruise tourism grows in the Canadian Arctic, gaining a better understanding of visitor use of remote shore sites is crucial for developing effective management strategies that can mitigate potential impacts to important and significant ecological, historical, and cultural sites. This study examines cruise passenger use and movements at two popular shore excursion sites in Nunavut, Canada: Croker Bay and Dundas Harbour. The research employed GPS tracking and observational methods to analyze spatiotemporal activity, quantify the intensity of site usage, assess the risk of disturbance to sensitive areas. This study provides valuable baseline data for understanding visitor-site interactions in the Canadian Arctic, highlighting important management challenges and opportunities. Findings suggest the need for tailored management strategies, such as site-specific guidelines, to balance visitor experiences with ecological and cultural resource protection. This research contributes to developing context-appropriate management approaches for this form of tourism against the background of a settled land claim, ultimately emphasizing the importance of Inuit involvement in both design and monitoring of recommended management strategies.

Key words

Expedition Cruise Tourism, Canadian Arctic, Spatial Analysis, Site Management

Planned submission to Polar Journal

4.1 Introduction

Marine tourism represents the largest segment of the overall tourism industry across the circumpolar Arctic, including the total annual number of tourists, geographic range of operation, and types of activities offered (Arctic Council, 2009; Liggett et al., 2023). This sector is primarily comprised of commercially packaged experiences offered on vessels specialized for operation in polar waters, ranging from smaller expedition-style (<200 passengers) to larger luxury cruise ships (200-500 passengers), as well as independent tourists visiting on private pleasure craft such as sailboats and yachts (Dawson et al., 2021). The majority of this marine tourism activity in the region takes place during a small window in the summer months (i.e. July-September) when sea ice conditions are most favourable, the weather is more predictable, and the days are the longest in terms of sunlight (Orams, 2010).

Compared to other vessel activity in Arctic waters, such as destinational shipping associated with resupply of communities and resource development projects, the navigation associated with marine tourism is unique in the sense that they often do not transit via the most direct route. Instead, these vessels seek out opportunities to provide remote experiences for their guests, including sailing into scenic fjords and often traveling closer to shore to view landscapes and observe wildlife. Landing passengers onshore is also a key component of cruise itineraries, particularly with expedition-style vessels. Accessing these remote shore locations frequently necessitates entry into challenging and uncharted waters (Dawson et al., 2014), setting this operational style apart from other forms of marine traffic in the region and presenting unique management challenges (Ellis & Kriwoken, 2006).

Marine tourism in the Canadian Arctic represents a small segment of the overall circumpolar industry, but it is growing rapidly (Dawson et al., 2022; Palma et al., 2019) and therefore presents significant opportunities, risks and challenges for Inuit and northern residents (Dawson et al., 2021) as well as implications for the sustainability of the natural environment (Olsen et al., 2019). The total number of annual cruise voyages in the region has increased from 99 in 2004 to 399 in 2017 (Weber et al., 2021), while the total annual distance traveled has grown from an average of 31,483 km for the period of 1990-99 to 67,964 km between 2010-18 (Dawson et al., 2021). This growth is driven by various factors, including climate change-induced reductions in sea ice extent (Cook et al., 2024), consumer demand stemming from an interest in ‘last chance tourism’ experiences (Lemelin et al., 2010), and associated increases in the number of purpose-built passenger vessels to serve this demand (Têtu et al., 2020).

The overarching management of expedition cruise tourism in the Canadian Arctic is governed by a set of international conventions and codes, and federal and territorial regulations that apply equally to all vessel types (i.e. cargo, tankers, cruise ships, etc.) (see Dawson et al., 2014). Regulatory regimes for shipping are both complex and constantly evolving, further characterized by region-specific regulatory instruments

and multi-jurisdictional challenges (Chircop et al., 2020). This complexity is exacerbated for the expedition cruise industry since operators are required to obtain a host of additional permits and permissions for the more tourism-focused portions of their sail plans. This additional regulatory burden can include submission of planned itineraries to multiple departments and agencies, proof of liability insurance, and multiple applications to visit and disembark passengers at shore locations considered to be protected under federal or territorial acts or located on Inuit-owned lands (Johnston et al., 2017; Transport Canada, 2018).

A typical cruise itinerary in the Canadian Arctic lasts between 10-17 days and generally includes 4-6 shore visits, in addition to other operational activities such as zodiac, helicopter, and submersible tours (Weber et al., 2021). The literature surrounding expedition cruise tourism development in this region is modest, with previous research providing analysis on spatiotemporal trends (Pizzolato et al., 2014, 2016; Dawson et al., 2018), policy and governance challenges (Dawson et al., 2014; Johnston et al., 2017), climate change impacts (Stewart et al., 2007; Lemelin et al., 2010), and local community perspectives on risks and adaptation strategies (Stewart et al., 2015; Dawson et al., 2016; Lamers & Huijbens, 2018). Despite the increasing number of cruise itineraries offered in the Canadian Arctic and associated increases in shore-based excursions to various key sites in the region, there is currently limited understanding of visitor use of these sites and the possible impacts that heavier visitation may pose for the long-term environmental conditions and protection of cultural heritage.

The management of shore-based activities specifically is frequently referenced within the literature on expedition cruise tourism in the Canadian Arctic as difficult and has been identified as a knowledge gap requiring future research considering increased visitor use of these sites, potential visitor impacts, effectiveness of existing management tools, and the need for new potential management strategies in this region (Marquez & Eagles, 2007; Johnston, 1997, 1998; Johnston et al., 2017; Dawson et al., 2014, 2021; Liggett & Stewart, 2020; AECO, 2020; etc.). There is a broad recognition that the Canadian Arctic is a particularly sensitive area with ecosystems susceptible to disturbance and therefore there is a heightened risk of disturbance which can stem from a lack of organized management oversight (Cajaiba-Santana et al., 2020; Larm et al., 2020). This has led to more formal recommendations which urge the exploration of management strategies to improve protection of these areas, pointing to best practices employed by other circumpolar destinations (PAME, 2015, 2021).

Perhaps the most cited best practice related to improving management of remote sites is the use of site-specific guidelines (herein also referred to as ‘site guidelines’) (Gilman, 2002). Site guidelines are commonly employed by other circumpolar cruise destinations with longer histories of operation and higher visitation rates, such as Antarctica (IAATO, 2024), Svalbard (AECO, 2020), and Franz Josef Land (PAME, 2021). Detailed methodologies have been established to assist in the creation of these guidelines, including

recommended approaches for carrying out baseline studies and suggesting the involvement of multidisciplinary teams of biologists, ecologists, archaeologists, and cultural experts, among others (Hagen et al., 2012; Ward et al., 2002). However, criticism has been pointed at these methods for being Eurocentric in nature and neglecting to fully consider Indigenous rights and the unique approaches that may be necessary in settled Inuit land claim areas such as the Canadian Arctic (Hall, 2021; Viken et al., 2021; Vandermale & Mason, 2024).

Unlike the more established Arctic marine tourism destinations mentioned above, the Canadian Arctic lacks a coordinated implementation of site guidelines. Given the availability of methodologies and analogue examples from which to learn and compare, there is a need to gather relevant information in this region to support the exploration of a potentially unique and tailored 'Made in Canada' approach and determine if site guidelines are in fact an appropriate management option for this region. Building on our general understanding of marine tourism trends in the Canadian Arctic, this research aims to begin this exploration by better understanding movement patterns of cruise ship passengers at two of the most popular remote sites in the territory of Nunavut. To achieve this aim, three research objectives were achieved in this study including to: 1) Evaluate the spatiotemporal activity of visitors while on shore; 2) Quantify the intensity of usage at both sites; 3) Assess the risk of disturbance to sensitive areas.

The paper begins by providing further context on the development of cruise tourism in the Canadian Arctic and background on the growth and extent of shore excursions in the region. This is followed by a brief overview of management approaches for sensitive areas, with a particular focus on site-specific guidelines and their implementation in other circumpolar destinations. The methods utilized to achieve the research objectives are then presented, including a novel fieldwork approach and associated data analysis techniques. Results are organized and summarized according to each shore location, with a discussion following to help situate potential next steps towards the longer-term development of shore-based management approaches in Nunavut. The paper concludes by highlighting the significance of this starting point in understanding visitor movement patterns at shore locations across the territory and calling for future research to continue working towards a 'Made in Canada' solution for managing this type of tourism activity.

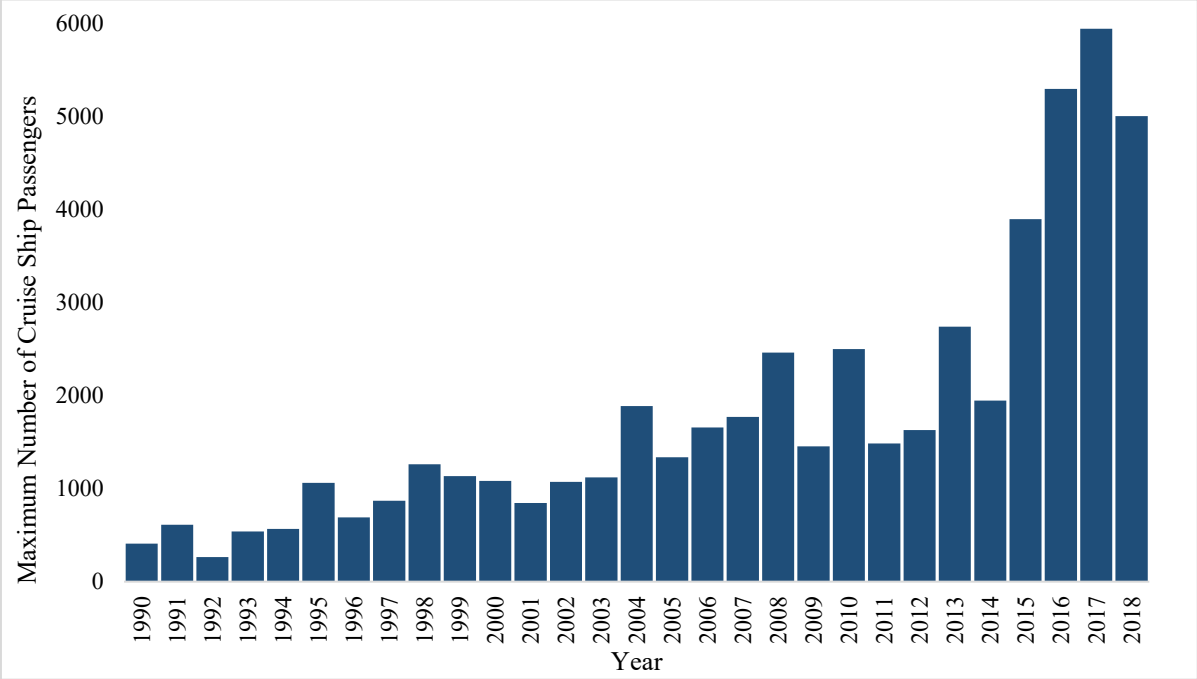
4.2 Background

4.2.1 Cruise Tourism in the Canadian Arctic

The Canadian Arctic cruise industry began to emerge in the 1990s, with total passenger numbers reaching 1,000 for the first time in 1995 followed by a period of irregular growth where the total passenger numbers

reached 2,000 for the first time in 2008 (Weber et al., 2021). The industry began a more consistent growth trajectory after this point, with 3,000 passengers reached in 2015 and from 2016-18 numbers consistently exceeded 5,000 (ibid). Figure 12 shows this growth trajectory, summarizing the annual total passenger numbers based on maximum vessel capacity between 1990-2018.

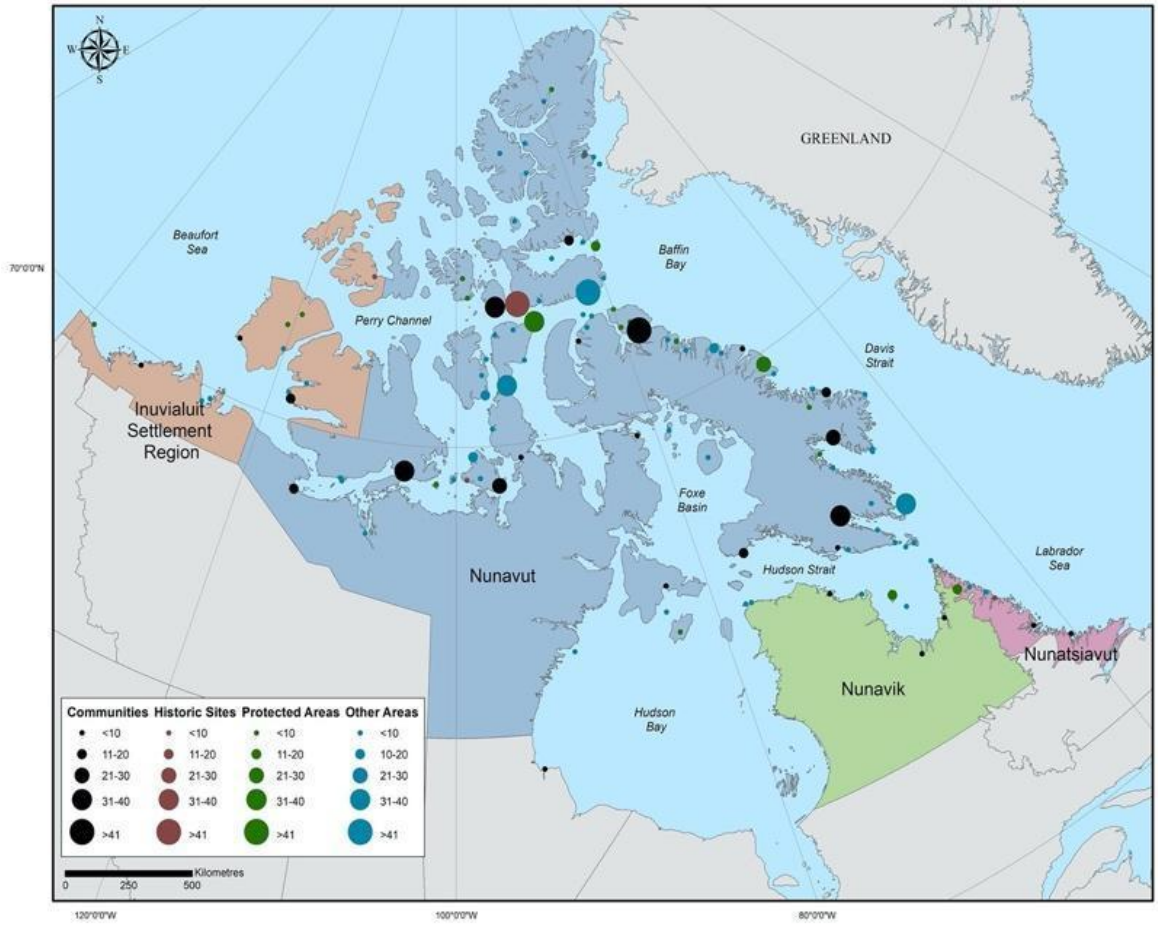
Figure 12 Maximum Number of Cruise Ship Passengers Annually in the Canadian Arctic from 1990-2018



Weber et al., 2021

Despite this understanding of the industry's overall growth, there is not an equal understanding of the shore-based components of cruise activities. Weber et al. (2021) conducted the first comprehensive analysis of shore locations used by the industry in the region, with results based on an in-depth review of advertised cruise itineraries taking place between 2008 and 2019. During this period, 150 unique locations were noted as planned shore excursions, including 30 communities, 7 historic sites, 23 natural areas, and 90 'other' sites. Out of this total, only 13 locations were consistently advertised each year. Figure 13 below provides an overview of the distribution of advertised shore locations between 2014-2019.

Figure 13 Number of Advertised Itinerary Listings per Shore Location Across Inuit Nunangat, 2014-2019



Weber et al., 2021

The management of expedition cruise vessels in the Canadian Arctic lacks a coordinated approach overall, but there is virtually a complete lack of formal management for shore-based locations in particular. While visitation levels at shore sites in the region may seem low in comparison with other circumpolar destinations, the sensitivity of the sites (both environmentally and culturally) means that visitation impacts can be disproportionate to use levels (Scherrer & Pickering, 2006).

4.2.2 Management Approaches for Sensitive Areas in Polar Environments

According to the United Nations Environment Program (2023), sensitive areas can be defined as having multiple characteristics, including:

- Important for biodiversity;
- High ecosystem integrity;

- Experiencing rapid decline in ecosystem integrity; and/or
- Important for ecosystem service provision, including benefits to Indigenous Peoples, local communities and stakeholders.

Within the context of the Canadian Arctic, it can be argued that the definition of sensitive areas should include cultural components with the recognition of the historical significance of many sites and the ongoing "…spiritual, cultural, religious and educational importance to Inuit." (Nunavut Agreement, s.33.2.2). Many sites also maintain cultural importance for contemporary Inuit lifestyles, including areas where the harvesting and processing of 'country food' takes place, as well as seasonal camping areas (Dawson et al., 2020).

From an environmental perspective, tourist activity in tundra environments can rapidly degrade sites by damaging native flora and soils (Whinam & Chilcott, 2003), with natural revegetation potentially taking decades to centuries (McDougall, 2001; Sarmiento et al., 2003). Degradation may continue even after the damaging activity ceases (Johnston et al., 2003). Culturally, Inuit have expressed concerns with visitation of cruise passengers to remote sites including interference with areas of historical significance and removal of cultural artefacts (Carter et al., 2018).

Management approaches for sensitive areas can be grouped into two categories, both intended to influence visitor behaviour towards more sustainable use of sites: 'direct' and 'indirect' (Graefe et al., 1990). Direct management approaches attempt to control visitor behaviour through strict actions that limit access and use, including the introduction of formal regulations, quotas, or the use of physical barriers such as fencing (Manning, 2011). Indirect management approaches, on the other hand, aim to prevent undesired behaviours by influencing visitors' cognitive processes and generally focus on education (Gramann et al., 1992).

When faced with limited resources, management bodies tend to prefer indirect approaches since they are more easily introduced and do not necessarily require strict oversight (Matthews, 2020; Goh, 2023). These approaches are also often preferred by visitors since they are less intrusive and help maintain a sense of freedom for exploration (Manning & Anderson, 2012). These indirect management approaches also recognize that most visitor impacts are not from deliberate malicious acts, but instead result from the "…insensitivity to the consequences of one's actions" (Roggenbuck, 1992, p.7) or a lack of knowledge of how to minimize impactful behaviours (Manning, 2003). In fact, research has shown that visitors in polar environments in particular have difficulty identifying sensitive areas, despite a desire to behave in a

responsible manner (Davis, 1995; 1998). As such, visitor education is seen as key tool to improving management outcomes for remote sensitive areas (Marion et al., 2007).

4.2.3 Site-Specific Guidelines

Site-specific guidelines are a common example of an indirect management approach, with curated information presented to help educate visitors on the particular sensitivities of an area and influence behaviour toward more respectful outcomes (Eagles, McCool, & Haynes, 2002). Amongst circumpolar destinations, site-specific guidelines are perhaps the most popular approach for the management of cruise visitation at shore locations and are recommended as a best practice at the international level by the Arctic Council's Protection of the Arctic Marine Environment (PAME) Working Group (2021).

The rationale for site-specific guidelines in Arctic marine tourism management is multi-faceted. PAME (2021) points to the need to recognize the ecological and cultural diversity of the Arctic, which benefits from "individualized or context-specific approaches to management" (p.10). They argue that these guidelines can "…encourage sustainable use, mitigating certain safety and environmental risks, addressing risks to areas of vulnerability, and educating visitors on ecological, cultural and historical features unique to a particular area" (p.12). Furthermore, they also argue that site-specific guidelines can serve as a "…tailored tool that complement and support more general activity guidelines and broader national or regional approaches to tourism and marine management" (p.15).

Within contexts where jurisdiction may be complicated and there is an absence of direct management approaches, site-specific guidelines are therefore a flexible tool that can be introduced at various levels ranging from governments to industry led efforts (Liggett & Stewart, 2017). In fact, the site-specific guidelines in existence today include those created in partnership between government and industry (i.e. Svalbard) (AECO, 2020), as well as those created by industry alone (i.e. Antarctica) (Splettstoesser, 2000). Table 22 below provides an overview of the circumpolar jurisdictions where site-specific guidelines can currently be found, including their key features and the extent of their implementation.

Table 22 Site-Specific Guideline Implementation at Circumpolar Destinations

Organization	Region	Key Features	Implementation
PAME	Pan-Arctic	Recommendation of standardized framework Emphasis on context-specific approaches	Serves as a guiding document for Arctic nations to develop site-specific guidelines

Organization	Region	Key Features	Implementation
		Addresses both ecological and cultural sensitivities	
Association of Arctic Expedition Cruise Operators (AECO)	Svalbard & Franz Josef Land	Developed with subject matter experts Covers environmental, cultural, and visitor safety aspects Part of a broader set of operational guidelines for members	20 locations in Svalbard 5 locations in Franz Josef Land
International Association of Antarctic Tourism Operators (IAATO)	Antarctica	Form of industry self-regulation Significant detail and monitoring requirements Focus on environmental protection and visitor safety	45 locations

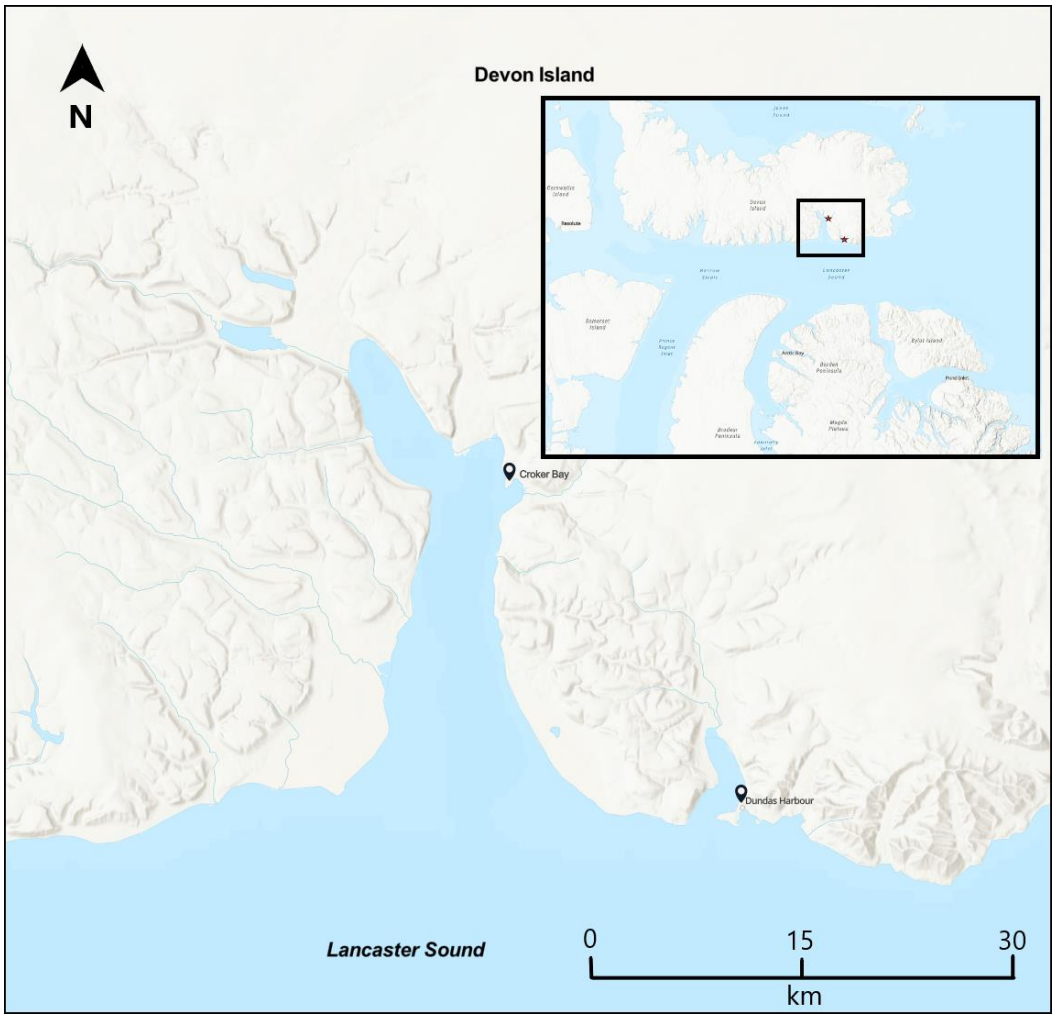
Adapted from PAME (2021), AECO (2020), & IAATO (2024)

4.3 Data and Methods

4.3.1 Study Area

This study focused on two popular shore excursion locations in Nunavut: Croker Bay and Dundas Harbour. Both sites are located on Devon Island, accessible via Lancaster Sound, and within the boundaries of the eventual *Tallurutiup Imanga National Marine Conservation Area* (TINMCA). Croker Bay is a fjord on the south coast of Devon Island, featuring the South Croker Glacier. It is primarily visited for scenic cruising and zodiac tours to view the glacier from close proximity (Van Wychen et al., 2017). Dundas Harbour is located approximately 40 km to the east of Croker Bay and is well known for its abandoned Royal Canadian Mounted Police (RCMP) outpost camp established in 1924, as well as several Thule archaeological sites representing thousands of years of Inuit occupation (University of Lethbridge, 2023; Spitzer, 2020). Figure 14 shows the relative location of both these sites within the broader region.

Figure 14 Map of Croker Bay and Dundas Harbour



Both Croker Bay and Dundas Harbour experience significant annual cruise ship visitation and are among the 13 locations identified by Weber et al. (2021) as consistently advertised annually between 2008 and 2019. During the 2022 season when this study took place, 18 visits were made to Croker Bay (562 total passengers on shore) and 20 visits were made to Dundas Harbour (1,965 total passengers on shore) (AECO, 2022).

4.3.2 Study Design

The study utilized GPS tracking devices to capture baseline data on cruise passenger behaviour at remote sites in Nunavut. As a baseline study, there was a desire to capture general usage of these remote sites by visitors in the absence of formal interventions or management approaches. The use of tracking technologies in the field of tourism studies is relatively nascent, associated with the decreases in both size and cost of GPS

units (Shoval & Isaacson, 2006). This means of data collection presents many advantages over the previous use of traditional methods such as surveys and trip diaries – GPS data are more accurate, reduce the burden on participants, and are not dependent on respondents' enthusiasm and/or memory (Isaacson et al., 2016).

The study was conducted via fieldwork which took place over the course of two separate expedition cruise itineraries in August 2022, with each itinerary lasting 11 days. The first itinerary began in Kangerlussuaq, Greenland, with a planned final destination of Resolute Bay, Nunavut. The second itinerary was intended to be the 'mirror image' of the first, beginning in Resolute Bay and finishing in Kangerlussuaq. The full intended sail plan for both itineraries is shown in Figure 16 below.

Figure 15 Intended Sail Plan for 2022 Expedition Cruise Fieldwork

In reality, significant concentrations of multi-year sea ice surrounding Resolute Bay prohibited safe navigation into the community and the vessel was required to return to Kangerlussuaq in order to complete the passenger turnaround at the end of the first itinerary. Given that the second itinerary also had Kangerlussuaq as its final destination, a modified sail plan was adopted which mirrored the modified first itinerary. As a result of these unforeseen changes, it was necessary that the study design be opportunistic in nature, since the location of the shore landings in Nunavut was unknown. As such, Croker Bay (itinerary 1) and Dundas Harbour (itinerary 2) became the two sites included in the study because they were the only shore excursions that took place in Nunavut over the course of both voyages.

A mixed-methods approach was employed combining the GPS tracking with in-situ observations (Patton & Cochran, 2002; Hardy et al., 2017). This design was chosen to provide a quantitative basis for analysis complemented by important contextual details in order to address the three main research objectives of evaluating spatiotemporal activity, quantifying density of use and patterns of visitation, and identifying the risk of disturbance to key sensitive sites.

4.3.3 Data Collection

4.3.3.1 GPS Tracking

A total of 10 GPS devices (i-gotU GT-120; Mobile Action Technology Inc., Taipei, Taiwan) were used to collect passenger movement data, with 20 unique participants recruited overall (10 at each site). According to the manufacturer, these devices have an error margin of 0-10m and are set by default to record positions at 6-second intervals. The number of devices was limited to ten based on retailer availability, but also served to manage the logistics of solo data collection in a challenging field environment. Prior to data collection, all units were tested for accuracy and consistency in similar environmental conditions. Devices were programmed to automatically begin recording upon activation and to maintain the consistent 6-second recording interval throughout deployment.

Participant recruitment took place on shore in the immediate vicinity of zodiac disembarkation points at both sites. A convenience sampling approach was utilized, though efforts were made to recruit as diverse a set of participants as possible. This approach was selected due to the short duration of the excursion, and the need for timely deployment when passengers first arrived on site. While the total number of passengers onboard was 180 (first itinerary) and 188 (second itinerary), it was estimated that only 100-150 passengers took part in each shore excursion and therefore the sample represented approximately 10-15% of the total passenger count at each landing. Passengers who agreed to participate in the study were given a GPS device with instructions to keep it in a secure pocket for the duration of their time at the shore location. No further instructions were provided, with participants encouraged to otherwise explore freely according to the briefing provided by the expedition leader. Devices were collected prior to passenger embarkation on zodiac to return to the cruise vessel and deactivated upon retrieval.

4.3.3.2 In-Situ Observations

To complement the GPS data, in-situ observations were carried out by the principal investigator during each shore visit. These observations followed a modified behavioural mapping approach (Nordh et al., 2017; Goličnik & Ward Thompson, 2010), including focus on general flow patterns at key site features, interactions with expedition staff, and apparent congregation points. These observations were recorded in

field notes and later integrated with the GPS tracking data during analysis. While this approach was challenging due to site size and visitor dispersal, it provided valuable contextual information that enhanced the interpretation of the GPS data.

4.3.4 Analysis

The analysis of GPS tracking data followed a six-step framework adapted from Ferrante et al. (2018), as outlined in Table 23. This framework was selected because it was developed specifically for analyzing cruise passenger movements at destinations and provides guidance on processing and interpreting GPS tracking data.

Table 23 General Framework for Analyzing GPS Data of Cruise Passengers at the Destination

		Description	Output	Linkage to Research Objective
Step 1	**Preprocessing Information**	Data cleaning and validation, including elimination of recording errors and outlier observations	Dataset is cleaned and ready for subsequent analysis	
Step 2	**Preliminary Mapping and Calculation of Basic Indicators**	Initial visualization of GPS tracks and summary of five basic indicators of spatial activity	GPS tracks visualized with ArcGIS Five basic indicators of visitor activity calculated - Total duration of tour - Total length of tour - Maximum distance from origin - Average distance from origin - Average speed	Evaluation of the spatiotemporal activity of visitors
Step 3	**Context-Specific Approaches and Selection of Relevant Methods**	Determining which aspects of visitor activity are most relevant for further analysis, selecting the most relevant/appropriate method	Intensity of passenger activity Proximity to key sensitive areas	Quantification of the intensity of site usage Assessment of the risk of disturbance to sensitive areas
Step 4	**Mapping, Extraction, and Synthesis**	Additional context-specific visualization outputs, calculation of relevant movement indices, and synthesis of both outputs	Fishnet analysis Haversine formula Movement suspension patterns Generalized sequential patterns	Identification of the risk of disturbance to known cultural sites. Identification of additional points of interest Visitor flows

		Description	Output	Linkage to Research Objective
Step 5	**Merging with Observations**	Comparison of results against field-based notes and observations	Behavioural mapping	Improvement of the overall strength of analyses
Step 6	**Final Analysis and Results**	Results amalgamated from combined output of previous steps	Baseline understanding of cruise passenger movement at the destination(s)	

Adapted from Ferrante et al. (2018)

4.3.4.1 Step 1 – Preprocessing Information

This first step involved data cleaning and validation. The margin of error for the I-gotU GT-120 devices can extend up to 10m, therefore systematic errors and outlier observations were eliminated. Some examples of outliers included erroneous measurements caused by certain natural features of the study sites, including mountain ranges, deep valleys, etc.

4.3.4.2 Step 2 – Preliminary Mapping and Calculation of Basic Indicators

Once the dataset had been cleaned and validated, preliminary mapping of GPS tracks was carried out and basic indicators were calculated. Ferrante et al. (2018) recommend deriving five basic indicators of spatial movement at this stage, outlined in Table 24 below. These indicators provide a foundation for understanding visitor activity patterns at each site and combine with preliminary visualization of GPS tracks to form an overview of the data collected.

Table 24 Basic Indicators for Analyzing Tourist Activity with GPS Tracking Data

#	**Indicator**	**Description**
1	Total Duration of Tour	*Total time spent at the site, measured in minutes.*
2	Total Length of Tour	*Total distance travelled at the site, measured in metres*
3	Maximum Distance from Origin	*Furthest point reached from starting location, measured in metres*
4	Average Distance from Origin	*Average distance of all recorded points from starting location, measured in metres.*
5	Average Speed	*Total distance travelled divided by total time, measured in metres/minute*

Adapted from Ferrante et al., 2018

4.3.4.3 Step 3 – Context-Specific Approaches and Selection of Relevant Method(s)

De Cantis et al. (2016) describe the need to evaluate cruise passenger activity at a site based on a set of measures or attributes which vary based on the research question(s) at hand. For the purposes of capturing baseline information for Croker Bay and Dundas Harbour and addressing the research objectives, the following four main indices were selected for examination:

- Intensity of Passenger Activity
- Proximity to Known Points of Interest
- Identification of Additional Points of Interest
- Visitor Flows

4.3.4.4 Step 4 – Mapping, Extraction, and Synthesis

Intensity of Passenger Activity

To determine which areas of each site were most heavily visited, a fishnet analysis was utilized to quantify the intensity of passenger activity. Using ArcGIS, each site was divided into square grids and the total number of signals picked up by the GPS receivers were counted for each individual cell. Based on the size of both sites, in addition to the small number of GPS receivers utilized, a 50m x 50m grid size was chosen. The intensity of passenger activity in each grid square was then visualized based on a simple four-colour gradient corresponding to the number of signals counted: Yellow (low intensity): 1-2 signals; Orange (moderate intensity): 3-4 signals; Red (high intensity): 5-6 signals; Maroon (very high intensity): ≥7 signals). This approach provided a spatial visualization of visitor density across each site, highlighting areas of concentrated use.

Proximity to Known Points of Interest

For remote shore locations in Nunavut, the primary points of interest (POI) are frequently limited to archaeological sites or natural features. GPS coordinates for currently identified archaeological sites were provided by the Government of Nunavut's Territorial Archaeologist for both Croker Bay and Dundas Harbour. These coordinates were inputted to ArcGIS and the distance between each GPS point and each archaeological site was calculated using the Haversine formula, which determines the shortest distance between two points given their respective coordinates (Prasetya et al. 2020). A 20-metre threshold distance was then applied to determine visitor proximity to the archaeological sites, in addition to frequency and duration of visitor presence within this threshold. This distance was chosen in part due to the margin of error associated with the GPS devices, but also because it aligns with the required setback distances prescribed

within the territory's *Class 1 Permit Guidelines and Regulations for Heritage Site Visitation* (Government of Nunavut, 2018).

Identification of Additional Points of Interest

To identify POI not previously documented, Movement Suspension Patterns (MSPs) were analyzed following the method proposed by Orellana et al. (2012). MSPs are intended to denote the suspension of movement when individuals stop at a place and can therefore be used to discover places that may be of interest to visitors. This approach identified periods where walking speeds were significantly reduced ($\leq$ 1 km/h) over a minimum time threshold (5 minutes) in order to distinguish between brief pauses and meaningful stops. These points where then clustered to identify spatial patterns, and the average duration spent at each cluster was calculated.

Visitor Flows

Building upon the analysis of MSPs, Orellana et al. (2012) propose a complementary method to identify movement patterns to analyze the flow of visitors at a location. These generalized sequences in which places are visited, known as Generalized Sequential Patterns (GSPs), do not rely on the trajectory followed by visitors and instead uncover commonalities in the way that people explore an area (ibid). Once the MSPs were identified for both sites, the sequence of visitation by each participant for each MSP was established, allowing for analysis and comparison of potential patterns in the order(s) that those places were visited. This was accomplished by examining the MSP dataset and assigning an integer to each spatial cluster, with the temporal sequence emerging by identifying the order in which each participant visited each MSP.

4.3.4.5 Step 5 – Merging with Observations

As introduced above, the quantitative analysis of the GPS tracking data was complemented with participant observation via behavioural mapping. This approach was meant to provide more granularity and context to the participant movement tracks and to aid in the overall analysis.

4.3.4.5 Step 6 – Final Analysis and Results

After carrying out the previous five steps, the final analysis of outputs was undertaken, with the results summarized in the following section.

4.4 Results

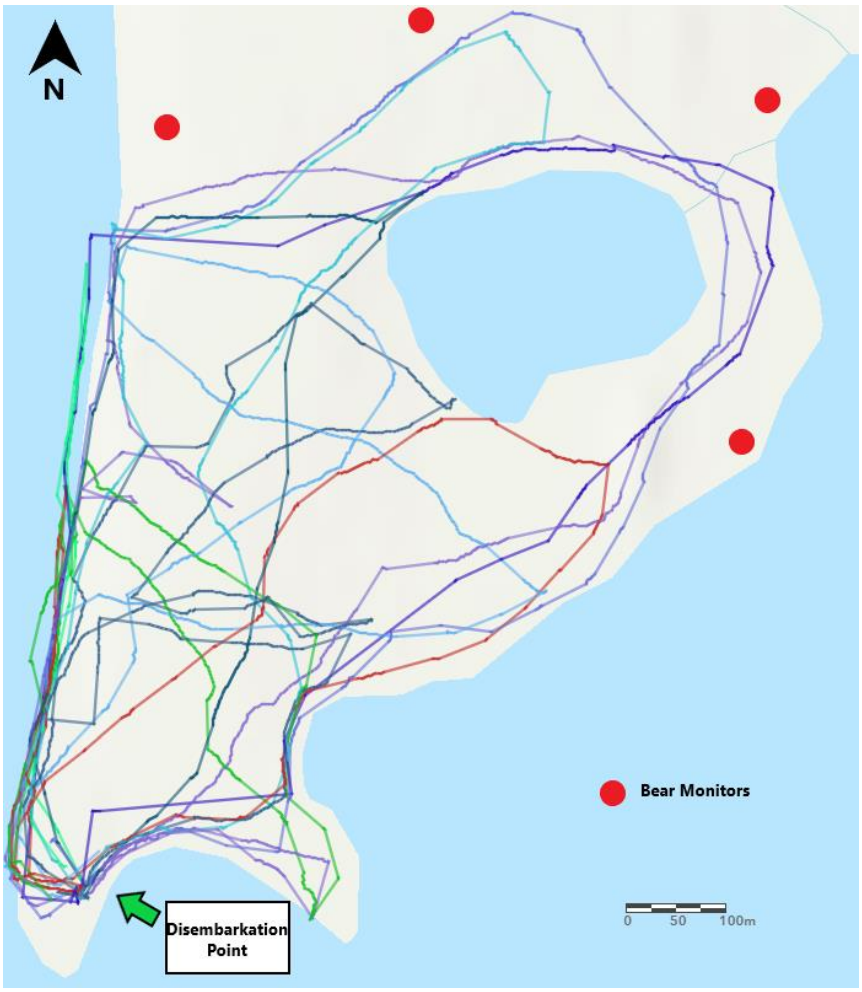
Analysis of the GPS tracking data for each shore locations reveals a preliminary understanding of a range of spatiotemporal and visitor site use characteristics. Results are organized here according to the three main research objectives. The evaluation of spatiotemporal activity of visitors is accomplished by visualizing the collected GPS tracking information and calculating a series of basic movement indices, as well as determining Movement Suspension Patterns and Generalized Sequential Patterns (4.4.1). Next, the quantification of the intensity of usage at both sites is provided via outputs of fishnet analyses and associated 'heat maps' of visitor activity (4.4.2). Known archaeological sites are subsequently identified, with passenger proximity determined to assess the potential risk of disturbance to these sensitive areas (4.4.3).

4.4.1 Spatiotemporal Activity of Visitors

4.4.1.1 GPS Track Visualizations

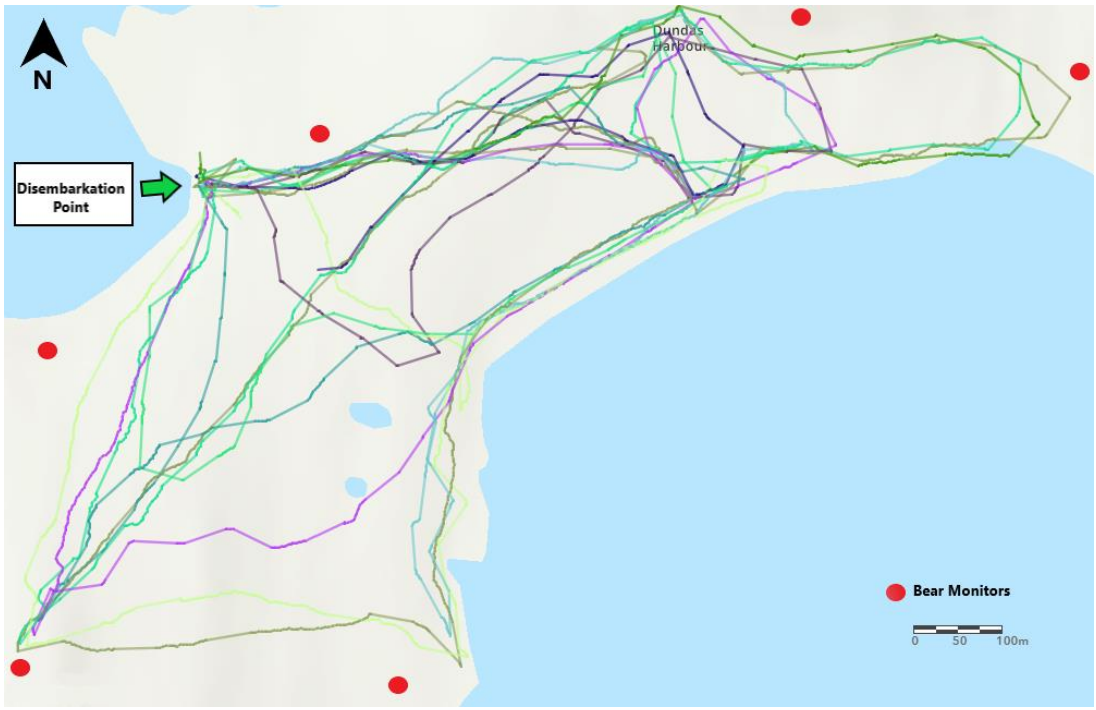
Basic visualizations of passenger activity at Croker Bay (Figure 16) and Dundas Harbour (Figure 17) are provided below. A secure perimeter was established at each site by expedition staff members assigned with bear monitoring duties, stationed approximately 200 m apart as indicated by red circles on each map. The zodiac disembarkation points are also displayed, showing the common point where all participants started and finished their visit. Each individual participant's movement trajectory while on site is represented by tracks, with a unique colour assigned for differentiation.

Figure 16 Visualization of Passenger Tracks at Croker Bay



The total area available for exploration at Croker Bay was approximately 1,000 m from north to south and 600 m from east to west. From the zodiac disembarkation point, all participants immediately traveled west towards the shoreline. There was significant overlap in visitor activity for approximately 300 m up the west coast of the site, with 6 of the 10 participants moving down to a beach area and traversing this distance on landfast ice which was present. The west coast of this site provides viewing opportunities of the Croker glacier, which helps to explain the popularity of this initial route. After the initial similarity in visitor activity, walking routes began to randomize with no consistent discernable path followed.

Figure 17 Visualization of Passenger Tracks at Dundas Harbour



Dundas Harbour was a larger site with a more irregular perimeter spanning approximately 1,600 m north to south and 1,100 m east to west. Similarly to Croker Bay, participant activity upon zodiac disembarkation was concentrated along a main route as passengers travelled east towards the main attractions. This overlap in activity continued for approximately 400 m until arrival in the vicinity of the abandoned RCMP outpost. Overall activity was concentrated in this area for most participants, though 7 of 10 individuals continued their exploration of other areas at the site. Once again, walking routes were largely random in nature and no consistent trail was followed.

4.4.1.2 Basic Spatiotemporal Indicators

The basic spatiotemporal indicators of participants at Croker Bay (Table 24) and Dundas Harbour (Table 25) both show variability in the overall use of each site and echo the observations from the visualizations of GPS tracking above.

Table 25 Passenger Movement Data Indices at Croker Bay

GPS Device	Total Length of Tour (m)	Total Duration of Tour (min)	Maximum Distance from Origin (m)	Average Distance from Origin (m)	Average Speed (m/min)
T1	1,781.2	83.0	773.8	414.9	21.5
T2	2,383.5	139.0	984.3	488.3	17.1
T3	2,424.1	123.0	1,012.2	536.8	19.7
T4	2,536.5	139.0	689.6	340.3	18.2
T5	3,262.2	149.0	995.7	368.8	21.9
T6	2,490.4	118.0	646.9	368.3	21.1
T7	2,000.6	121.0	425.8	264.4	16.5
T8	1,160.8	79.0	566.9	309.1	14.7
T9	2,775.7	129.0	645.3	280.1	21.5
T10	2,681.5	121.0	994.7	512.3	22.2

At Croker Bay, participants walked an average distance of 2,349 m (range: 1,160 – 3,262 m) over an average duration of 138 minutes (range: 79 – 149 mins). The furthest distance from the disembarkation point was 1,012 m, showing that the perimeter formed by the bear monitors was respected.

Table 26 Passenger Movement Data Indices at Dundas Harbour

GPS Device	Total Length of Tour (m)	Total Duration of Tour (min)	Maximum Distance from Origin (m)	Average Distance from Origin (m)	Average Speed (m/min)
T1	1,324.8	71.0	607.7	431.3	18.7
T2	1,851.1	137.0	715.9	418.6	13.5
T3	2,756.5	135.0	692.3	460.2	20.4
T4	2,970.8	162.0	706.4	389.8	18.3
T5	3,436.6	148.0	965.9	530.0	23.2
T6	1,468.3	88.0	982.2	618.3	16.7
T7	2,956.6	170.0	624.8	373.6	17.4

T8	2,183.3	151.0	593.9	361.8	14.5
T9	4,632.2	164.0	989.5	476.5	28.2
T10	1,902.5	160.0	610.9	373.4	11.9

At Dundas Harbour, participants covered an average distance of 2,547 m (range: 1,324 – 4,632 m) over an average duration of 138 minutes (range: 71 – 170 mins). The furthest distance from the disembarkation point was 989 m, once again showing that the bear monitor perimeter was respected.

4.4.1.3 Movement Suspension Patterns

As recommended by Orellana et al. (2012), the concept of Movement Suspension Patterns (MSPs) provide value in determining areas that potentially represent non-obvious Places of Interest (POI) at a tourism destination. As opposed to identifying a formal stop, defined as portions of an individual's trajectory where movement ceases completely, the MSP approach can be used to obtain stronger analytical outcomes through the identification of "spatial clusters of low-speed vectors with a strong spatial association" (ibid, p.12). Effectively, MSPs require a critical threshold where enough visitors reduced speed within the same general vicinity. In other words, a single individual stopping for a short amount of time at a location where everyone else continued walking would not be considered an MSP and that location would not be included as a potential POI.

For both Croker Bay and Dundas Harbour, it was anticipated that the disembarkation point would be captured as an MSP. After arriving via zodiac, passengers made 'wet' landings whereby they were required to travel a short distance in shallow water at a beach area while wearing rubber boots provided by the cruise operator. Most individuals would subsequently choose to change into more practical footwear in the vicinity of the disembarkation point before continuing their exploration of the area. With this strong spatial association and suspension of movement, these areas are obvious candidates for identification as MSPs. Outputs from further MSP analyses for Croker Bay and Dundas Harbour are visualized in Figure 18 and 19 below.

Figure 18 Croker Bay MSPs

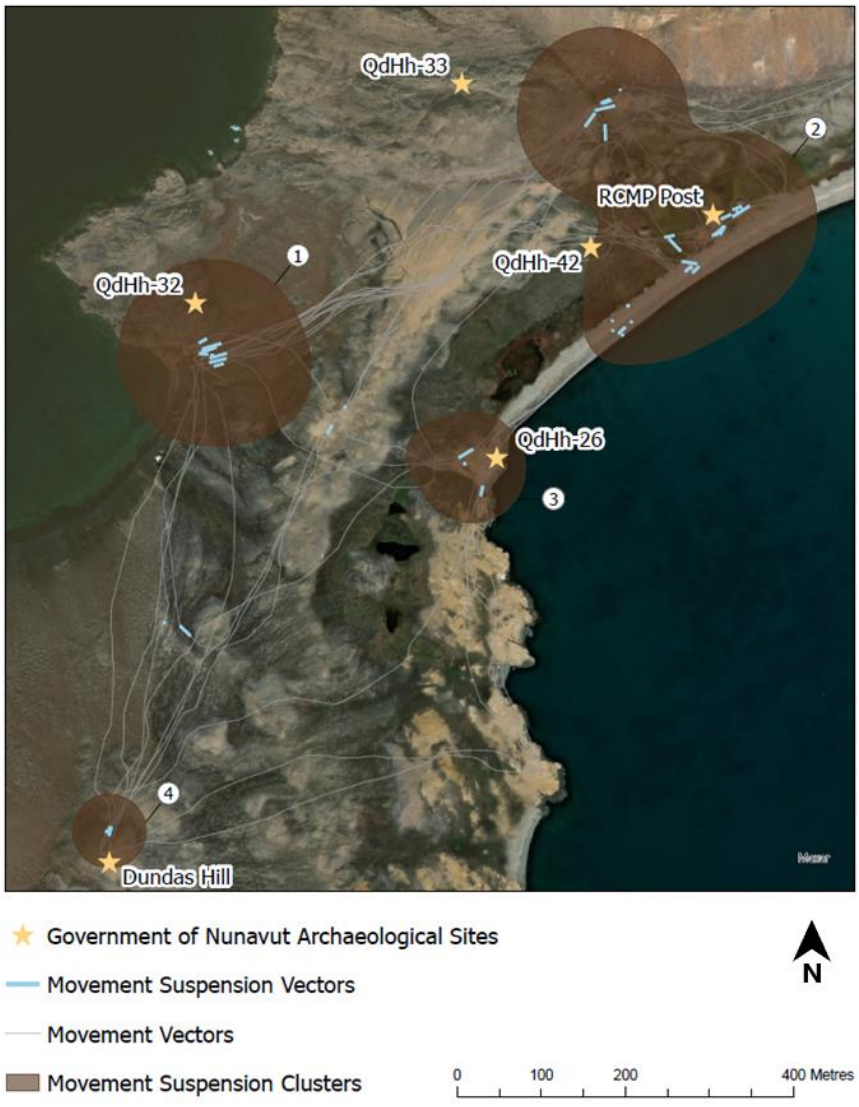
MSP #1 on the figure above is associated with the disembarkation point at the site. MSP #2 is associated with archaeological site QeHj-1. MSP #3 is not associated with any known location and could indicate a POI which warrants further investigation. The detailed statistics associated with these clusters are presented in Table 26 below.

Table 27 MSP Statistics for Identified Clusters (Croker Bay)

Tracker	**Duration (s)**		
	Cluster 1 ***(Disembarkation Point)***	**Cluster 2** ***(Site QeHj-1)***	**Cluster 3** ***(Undefined)***
1	420	300	
2	360	300	
3	180	660	
4	1020	720	
5	300	1320	

6		420	840
7	60	1320	180
8	120	1380	
9	480	2100	2100
10	480	180	
Average Duration (s)	380	870	1040
Average Duration (mins)	6	15	17

Figure 19 Dundas Harbour MSPs



MSP #1 on the figure above is associated with the disembarkation point at the site. MSP #2 is associated with the abandoned RCMP outpost, including the buildings and the burial site to the north. MSP #3 is

associated with archaeological site QdHh-26. MSP #4 is associated with Dundas Hill, a scenic lookout at the high point of the site. The detailed statistics associated with these clusters are presented in Table 27 below.

Table 28 MSP Statistics for Identified Clusters (Dundas Harbour)

Tracker	**Duration (s)**			
	Cluster 1 ***(Disembarkation Point)***	**Cluster 2** ***(Abandoned RCMP Outpost)***	**Cluster 3** ***(Site QdHh-26)***	**Cluster 4** ***(Dundas Hill)***
1	300	2520		
2	900	3540	1080	
3	240	3120	600	1020
4	1080	2040	1200	
5	840	3720		600
6	540	1920		
7	840	900	1680	1560
8	300	960	780	1620
9	1140	2700	540	540
10	1380	4200	600	
Average Duration (s)	756	2562	926	1068
Average Duration (mins)	13	43	15	18

4.4.1.4 Generalized Sequential Patterns

Based on the MSPs identified above, it was possible to analyze the generalized flow of visitors at both sites. As Orellana et al. (2012) describe, Generalized Sequential Patterns (GSPs) are understood to be the "…identification of the order(s) of aggregated collective movements of visitors between MSPs" (p.12). The analysis of GSPs allow for the detection of commonalities amongst passenger usage at both sites, or lack thereof. The output of the GSP analyses for Croker Bay and Dundas Harbour are presented in Table 28 and 29 below.

At Croker Bay, a clear counterclockwise pattern emerged:

Table 29 Croker Bay GSPs

Tracker	Sequential Pattern
1	1->2->1
2	1->2->1
3	1->2->1
4	1 ->2 ->1
5	1 ->2 ->1
6	1 ->2 ->3 ->2 ->1
7	1 ->2 ->3 ->2 ->1
8	1 ->2 ->1
9	1 ->2 ->3 ->2 ->3 ->1
10	1 ->2 ->1

All participants travelled from Cluster 1 (disembarkation point) to Cluster 2 (site QeHj-1). Seven participants then returned to Cluster 1, while three continued to Cluster 3 (undefined POI) before returning to Cluster 2 and then Cluster 1.

At Dundas Harbour, movement patterns were more varied but showed some common elements:

Table 30 Dundas Harbour GSPs

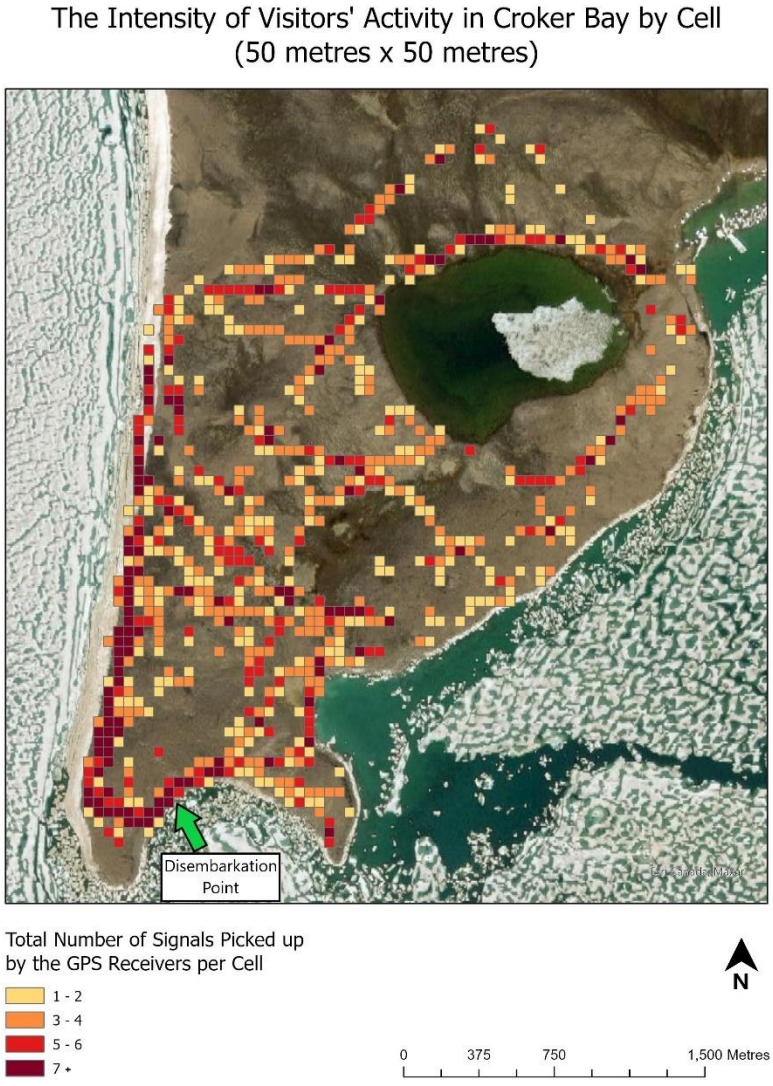
Tracker	Sequential Pattern
1	1->2->1
2	1->2->3 ->1
3	1->2 ->3 ->4 ->1
4	1 ->2 ->3 ->2 ->1
5	1 ->2 ->4 ->1
6	1 ->2->1
7	1 ->3 ->2 ->3 ->4 ->1
8	1 ->4 ->3 ->2 ->1
9	1 ->2 ->4 ->3 ->2 ->1
10	1 ->2 ->3 ->1

Eight out of ten participants travelled from Cluster 1 (disembarkation point) to Cluster 2 (Abandoned RCMP Outpost). Five participants then continued to Cluster 3 (Site QdHh-26). The order of visiting Cluster 4 (Dundas Hill) varied among participants.

4.4.2 Quantification of the Intensity of Site Usage

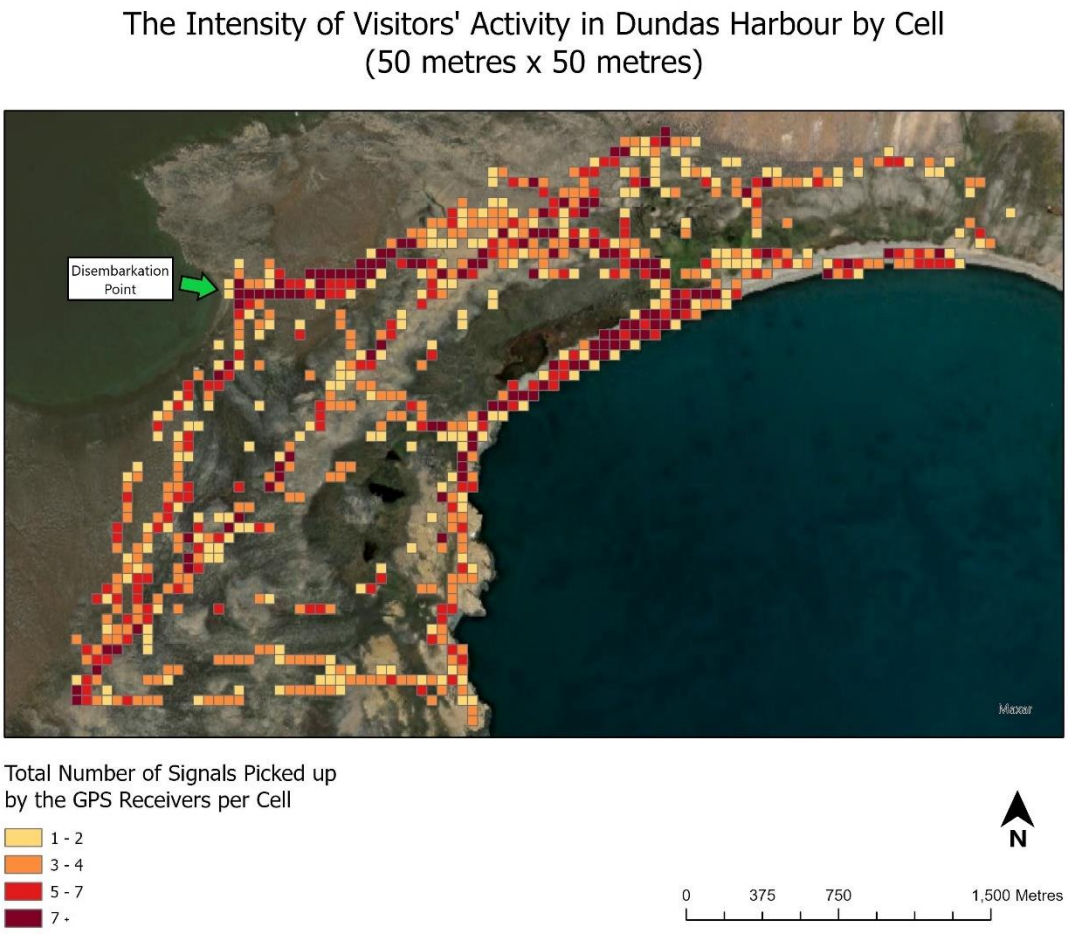
Building upon the initial visualization of GPS tracks at both sites, the intensity of visitor activity is displayed by the outcomes of fishnet analyses using a grid cell size of 50 m x 50 m (Figure 20 and Figure 21).

Figure 20 Intensity of Passenger Activity at Croker Bay



Similar to the map of GPS tracks, the results of the fishnet analysis for Croker Bay shows high intensity of use from the disembarkation point westward towards the coast. Moderate to high intensity of use is also observed along the western coastline, consistent with the passenger GPS tracks and attributable to visitors seeking viewpoints of the Croker glacier. The area around archaeological site QeHj-1 has medium intensity, corresponding with the MSP identified above. Finally, inland areas generally show lower intensity, with some moderate use patches possibly corresponding to POI or rest areas.

Figure 21 Intensity of Passenger Activity at Dundas Harbour



The same initial takeaways can be seen on the results of the fishnet analysis for Dundas Harbour, but there are also more varied patterns of intensity of visitor activity. The highest intensity of use is observed near the disembarkation point and travelling toward the abandoned RCMP outpost. The area immediately surrounding the outpost shows a very high level of activity, confirming its importance as a focal point for visitors. The area corresponding to archaeological site QdHh-26 shows moderate to high use, aligned with the general visibility of this POI. There is a rough path of moderate intensity leading up Dundas Hill, while the scenic viewpoint itself at the top of the hill has a stronger pattern of high intensity of use. Finally, the eastern coastline at the site shows an unexpected area of high visitor intensity, which was not immediately apparent in the preliminary visualization of GPS tracks.

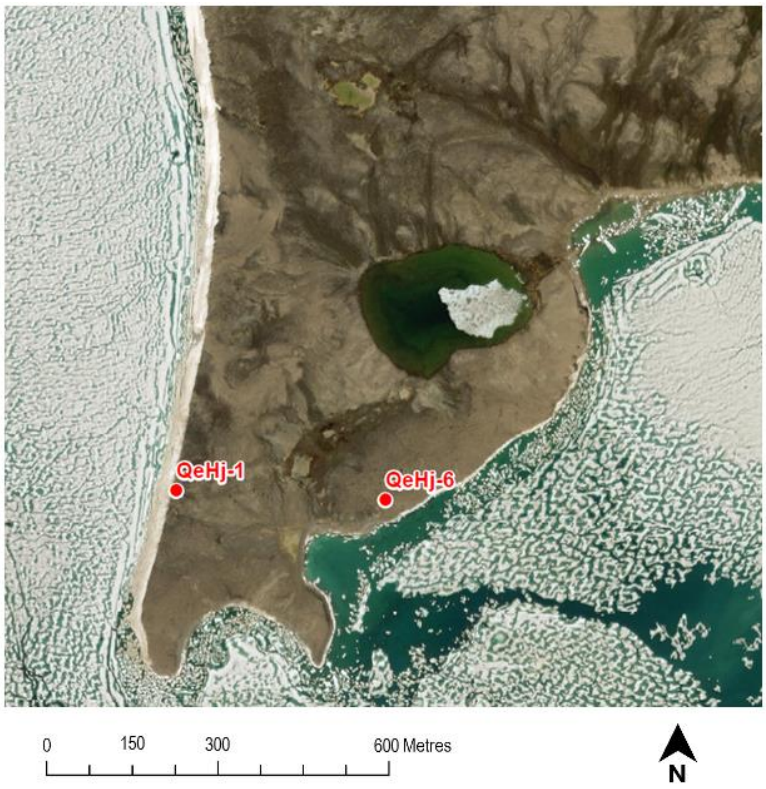
4.4.3 Assessment of the Risk of Disturbance to Sensitive Areas

The key sensitive areas at Croker Bay and Dundas Harbour are archaeological sites, defined by the *Nunavut Archaeological and Paleontological Sites Regulations* as "…any tangible evidence of human activity that is more than 50 years old and in respect of which an unbroken chain of possession or regular pattern of usage cannot be demonstrated." Section 2.6 of the Government of Nunavut's *Class 1 Permit Guidelines and Regulations for Heritage Site Visitation* also includes a special note on historic sites and buildings, indicating that such sites with an assigned Borden Number are considered archaeological sites and any building over 50 years old is designated as such (Government of Nunavut, 2018). The *Guidelines* specifically mention that the buildings associated with the abandoned RCMP outpost at Dundas Harbour fall under this interpretation as an archaeological site.

Many of the archaeological sites in the territory, especially those associated with historic Inuit use and occupancy since time immemorial, are difficult to identify without specialized background or training (Stewart et al., 2004; McCormack, 2017). Dundas Harbour provides an interesting counterexample, however, and demonstrates the range of potential archaeological sites across the territory since some are highly visible and recognizable (i.e. large abandoned RCMP outpost buildings, western burial headstones) while others are less so (i.e. tent rings, traditional Inuit burial grounds).

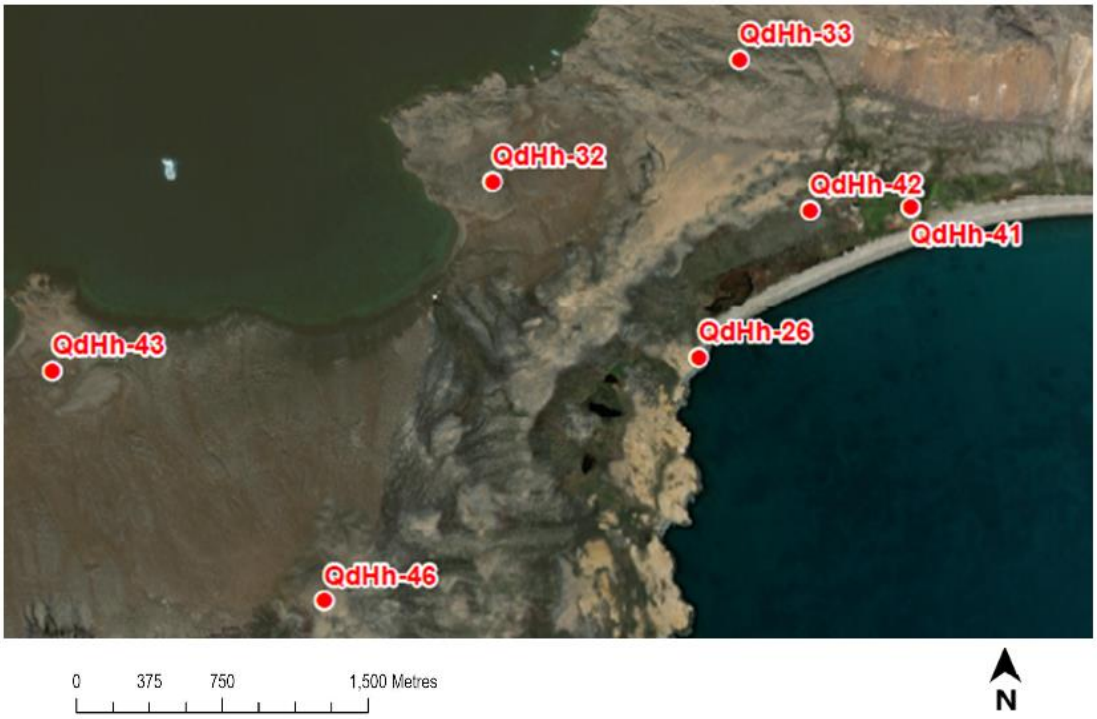
Croker Bay and Dundas Harbour both have archaeological sites with associated Borden numbers. Maps showing the locations of these respective archaeological sites are provided in Figure 22 and Figure 23.

Figure 22 Known Archaeological Sites at Croker Bay



There are only two known archaeological sites at Croker Bay, both of which are several hundred years old and difficult to identify. QeHj-1 contains the remains of an ancient campsite, including food caches and tent rings, while QeHj-6 is a fox trap from the same historical era. Both sites were located within the secure perimeter established for passengers to explore freely, but only QeHj-1 had an archaeologist stationed nearby to provide interpretation and enforce the management practices required by the *Class 1 Guidelines and Regulations*.

Figure 23 Known Archaeological Sites at Dundas Harbour



Seven archaeological sites are formally identified at Dundas Harbour, though only three (QdHh-41, QdHh-42, and QdHh-26) were accessible within the perimeter established by bear monitors and one located just outside (QdHh-46). As mentioned above, these sites include a mix of obvious settlements and more subtle features. QdHh-41 and QdHh-42 are both more recent artefacts associated with the abandoned RCMP outpost and therefore readily identifiable. QdHh-26 contains the remains of a large, multi-family campsite with evidence of usage over hundreds of years. Despite the age of the campsite, portions were readily identifiable due to the number of tent rings in the area and large quantities of animal bones. Only QdHh-41 and QdHh-42 had an archaeologist stationed nearby to provide interpretation and enforce the management practices required by the *Class 1 Guidelines and Regulations*.

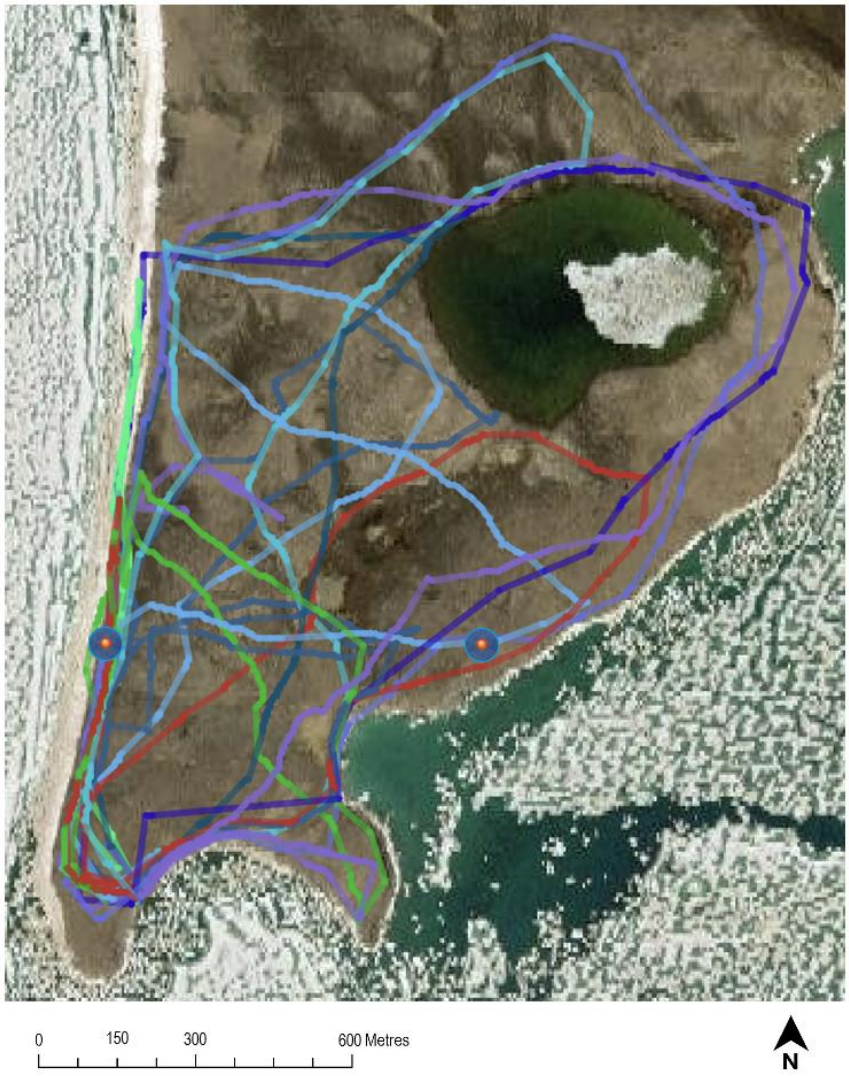
An analysis was carried out to determine passenger proximity to each archaeological site at both Croker Bay and Dundas Harbour. This included a determination of interactions within a 20 m radius of each site, including the amount of time spent in this zone, the average proximity, and the closest point of approach. The results of these analyses for both Croker Bay and Dundas Harbour are provided in Table 30 and 10, with additional visualizations also provided in Figures 25 and 26.

Table 31 Results of Interactions with Archaeological Sites at Croker Bay

Tracker	Archaeological Site	Time Elapsed	Average Proximity	Closest Proximity
1	QeHj-1	6s	5.3m	4.3m
2	n/a	n/a	n/a	n/a
3	QeHj-1	12s	5.4m	3.2m
4	QeHj-1	11 mins, 3s	11.7m	3.8m
5	QeHj-1	3s	18.7m	18.7m
6	QeHj-1	18s	9.8m	3.7m
	QeHj-6	9s	14.3m	11.6m
7	QeHj-1	1 min, 42s	12m	6.6m
8	QeHj-1	18s	8.2m	5.1m
9	n/a	n/a	n/a	n/a
10	QeHj-6	3s	12.2m	12.2m

Results for Croker Bay show that 8 out 10 visitors were measured as passing within 20 m of at least one of the two known archaeological sites. QeHj-1 saw the most activity, with five visitors passing within 5 m of the site and two additional visitors passing within its 20 m radius. Of the seven total visitors to QeHj-1, four only spent between 6-18 seconds in the vicinity. This could indicate that they did not know that the site was there, or simply that they were not interested in stopping to take a closer look. One visitor spent slightly more time (1 min 42 s), and another spent over 11 minutes at the site. QeHj-6, on the other hand, saw two visitors pass within the 20 m radius around the site. These two interactions were also brief (3-9 s), which is attributable to the fact that the site was unmarked, difficult to identify, and no interpretation was offered. The visualization of these passenger interactions with Croker Bay's archaeological sites can be seen below.

Figure 24 Visualization of Passenger Interactions with Croker Bay Archaeological Sites



Given the larger number of archaeological sites at Dundas Harbour, as well as their more visually obvious nature, there were significantly more interactions by passengers observed. The summary of the analysis of these interactions is provided in the table below.

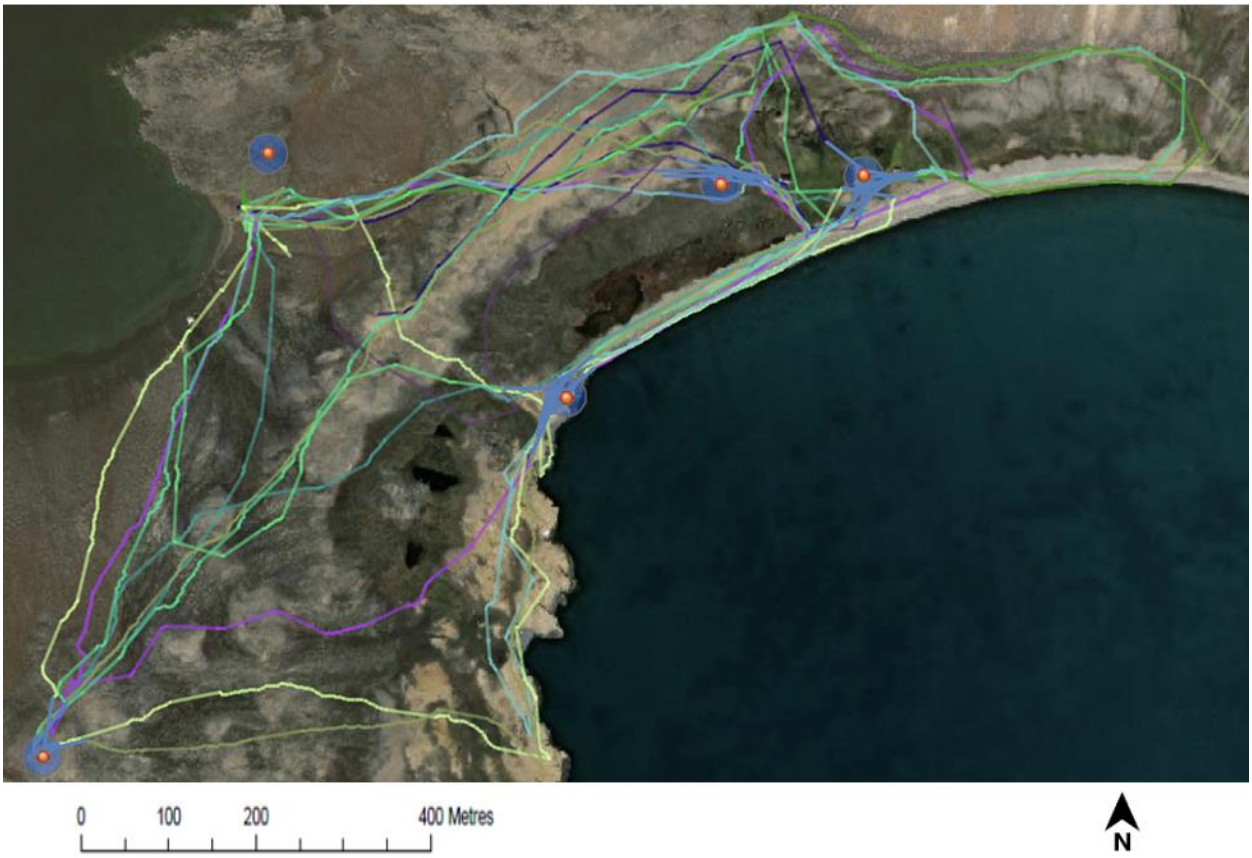
Table 32 Results of Interactions with Archaeological Sites at Dundas Harbour

Tracker	Archaeological Site	Time Elapsed	Average Proximity	Closest Proximity
1	QdHh-41	3s	4.1m	3.9m
2	QdHh-41	3s	6.1m	6.1m
	QdHh-42	3s	14.3m	14.2m
3	QdHh-26	12s	15.1m	11.4m
	QdHh-42	12s	15.9m	13.2m

4	QdHh-26	3s	19.8m	19.8m
		3s	20m	20m
	QdHh-41	6s	3.3m	1.8m
	QdHh-42	15s	17.6m	15.7m
5	QdHh-41	3s	19.1m	19.1m
		3s	13m	12.8m
	QdHh-46	9s	16.1m	14.3m
6	n/a	n/a	n/a	n/a
7	QdHh-26	21s	15.9m	13.8m
	QdHh-46	15s	12.5m	9m
8	QdHh-42	3s	16.9m	15.8m
9	QdHh-42	3s	11.8m	11.4m
		3s	19.8m	19.7m
	QdHh-46	15s	13.8m	8.9m
10	n/a	n/a	n/a	n/a

Eight out of ten visitors were measured as passing within 20 m of at least one archaeological site at Dundas Harbour. Fewer close approaches were observed compared to Croker Bay, an outcome that could be attributable to the obvious nature of certain sites which prevent inadvertent disturbance. The size and visibility of the buildings associated with the abandoned RCMP outpost also lend themselves to appreciating the sites from a distance, not necessarily requiring closer viewing. There were also significantly more expedition staff members present in this area (QdHh-41 and QdHh-42) to enforce management practices – particularly to prevent visitors from entering the buildings. The three gravesites nearby were also naturally treated with significant respect, in addition to the presence of expedition staff monitoring an established perimeter. All these aspects combined for an outcome of only four visitors passing within 10 m of any archaeological site. The visualization of the results of passenger interactions with Dundas Harbour archaeological sites can be seen below.

Figure 25 Visualization of Passenger Interactions with Dundas Harbour Archaeological Sites



4.5 Discussion

The results from this study provide valuable insights into visitor movement patterns and site usage at two popular shore excursion locations in Nunavut, offering a foundation for understanding the potential impacts and management needs of the land-based components of expedition cruise tourism in the Canadian Arctic. The findings reveal several key points that relate to implications of visitor use of remote sites and the development of potential management strategies.

4.5.1 Spatiotemporal Patterns and Outcomes

The analysis of GPS tracks and basic movement indicators showed that visitors at both Croker Bay and Dundas Harbour utilized a significant portion of the available area within the established perimeter boundary. This extensive use of space highlights the exploratory nature of these shore excursions and the outcomes of a more permissive site management approach which prioritizes freedom of movement.

The identification of MSPs and analysis of GSPs provide a more nuanced understanding of the visitor use of both sites. MSPs clearly identified key areas where visitors tended to congregate, including both known attractions (e.g. viewpoints of the Croker glacier and the abandoned RCMP outpost at Dundas Harbour), as well as other locations that may represent previously unrecognized POI. GSPs, on the other hand, revealed distinct patterns in how visitor move through the sites. At Croker Bay, a clear counterclockwise pattern emerged, while Dundas Harbour showed more varied patterns overall but still saw certain common discernible routes. Understanding these flows of movement can inform the design of suggested pathways or the strategic placement of interpretive materials to enhance visitor experience while minimizing environmental impacts.

4.5.2 Intensity of Site Usage and Potential Impacts

Results from the fishnet analysis provided a clear visualization of the intensity of site usage, revealing areas of high, moderate, and low use. These findings provide some insight into potential visitor impacts at these remote sites and can help to inform management decisions. High use areas, particularly around zodiac disembarkation points and key attractions, may represent elevated risks of visitor impacts. This type of concentrated use of specific locations is common in nature-based tourism settings (Hammitt et al., 2015) and can lead to localized impacts such as soil compaction and loss of vegetation if left unaddressed (Monz et al., 2010).

The fishnet analysis also served to confirm the initial takeaways from the GPS track analysis. Clear paths of high-intensity use were identified at both sites, indicating common routes taken by visitors. These movement corridors may benefit from management strategies to mitigate impacts. Conversely, areas of both sites were found to receive significantly less use. This information is also useful for future management decisions, such as redirecting visitors to less impacted areas or identifying locations for new POI to distribute visitor pressure.

4.5.3 Risk of Disturbance to Sensitive Areas

The proximity analysis of visitors to archaeological sites revealed important insights about the potential risk of disturbance to these key sensitive areas. At both Croker Bay and Dundas Harbour, a high proportion of visitors (80%) came within 20 m of at least one archaeological site. This high frequency of proximity indicates a high probability of disturbance to these sites over time – intentional or not. This raises concerns about the protection of these sites, especially for less visible or unmarked locations (Hollesen et al., 2018).

The results from the proximity analysis for the sites at Dundas Harbour proved to be particularly interesting. Despite, or because of, the size and visibility of the primary archaeological sites, there were significantly fewer close approaches than at Croker Bay. This suggests that an emphasis on clearly identifying sensitive locations may naturally encourage more cautious behaviour from visitors. There is also a link to the effectiveness of on-site interpretation. The presence of a large number of expedition staff in the area immediately surrounding the key sensitive areas at Dundas Harbour also likely played a role in the respectful visitor behaviour observed. Similarly, the extended stay of one visitor near the main archaeological attraction at Croker Bay also shows the influence of on-site interpretation on visitor behaviour and potentially mitigating risks.

These findings highlight the need for carefully considered management strategies to protect key sensitive areas while still allowing for meaningful visitor experiences. The guidance provided by Nunavut's *Class 1 Permit Guidelines and Regulations for Heritage Site Visitation* is currently the only formal management protection for shore locations in the territory. These results point to at least some degree of effectiveness of this guidance when it is followed and can help inform additional potential management approaches.

4.5.4 Management Implications and Considerations

The overall findings from this study point to several considerations for management of remote sites of this nature. A lack of concrete information or guidance provided to passengers prior to visiting each site, as well as an approach emphasizing freedom of exploration, saw varied levels of use in both locations. Areas of high visitor intensity, common emergent paths, and risks of disturbance to key sensitive areas all point to a need for the introduction of improved management.

The development of site-specific guidelines, as used in other circumpolar destinations, could be a valuable tool for managing visitor movement and protecting sensitive areas. Some of the findings from this study could contribute to the development of these types of guidelines. Identified movement patterns and key sensitive areas can be used to suggest optimal routes and viewing locations throughout both sites. The utility of these site guidelines is also not only limited to visitors themselves but can also be used to educate expedition team members and help to provide improved interpretation or strengthen their monitoring of particularly sensitive areas. Strategy placement of walking paths or boardwalks, as well as signage in relevant areas could also serve to enhance visitor experience while encouraging responsible and culturally respectful behaviour. These site guidelines could also incorporate area-based management approaches such as zoning to help manage visitor impacts. This zoning approach could be tailored to each site, including

designating certain areas for unrestricted exploration, others for guided access only, and some for complete protection.

At its core, a site guideline approach is a deliberate attempt at providing information and education about the area being visited (Kidd et al., 2015). Nunavut, in particular, requires an awareness that one is a visitor within Inuit Nunangat and that special effort is expected to be a respectful guest. Cultural sites in this region call for an especially high level of respect and awareness, and site guidelines could help protect these locations. Given that these sites can often be difficult to identify with an untrained eye, inadvertent disturbance is a significant risk factor. As previous research has indicated, most visitor impacts are not from deliberate malicious acts, but instead result from the insensitivity of one's actions or a lack of knowledge of how to minimize impactful behaviours (Roggenbuck, 1992; Manning, 2003). The information provided by site guidelines could help raise sensitivity levels and provide precisely the education required to minimize these impactful behaviours.

4.6 Conclusion

This study provides some of the first baseline data of its kind on visitor movement patterns and site usage at two popular shore excursion locations in Nunavut, offering valuable insights into the potential impacts and management needs of expedition cruise tourism's land-based activities in the region. By examining spatiotemporal activity, quantifying intensity of site usage, and assessing potential disturbance of key sensitive areas, this research provides a starting point towards a more comprehensive understanding of how cruise passengers interact with remote Arctic environments.

The analysis of GPS tracks and movement indicators revealed that visitors at both Croker Bay and Dundas Harbour utilized significant portions of the area available within the established perimeters. This extensive use of space underscores the exploratory nature of these shore excursions and highlights the need for comprehensive site management approaches. The identification of Movement Suspension Patterns (MSPs) and analysis of Generalized Suspension Patterns (GSPs) provided a more nuanced insight into visitor activity, pointing toward important areas of congregation and distinct passenger movement flows. This type of analysis can help inform the development of suggested pathways or strategic use of interpretive materials to enhance visitor experiences while attempting to minimize potential environmental impacts.

The results from analyzing the intensity of site usage further confirmed the takeaways from the initial spatiotemporal assessments, revealing areas of high, moderate, and low use across both sites. This information is crucial for understanding visitor impacts and informing management decisions. High-use

areas, particularly around zodiac disembarkation points and key attractions, may be at elevated risk of potential impacts over time. The confirmation of high passenger flows along clear movement corridors, as well as underutilized areas, also provide important takeaways for future management strategies such as the need to consider redistribution of visitor pressure.

Perhaps most critically, the proximity analysis of visitors to key sensitive areas shows the risks of disturbance to these sites inherent to shore excursions. Archaeological and cultural sites are key attractions in this region, but they are often disproportionately vulnerable to disturbance due to their age, condition, and often unassuming visibility (Mathews, 2020). While the territory's *Class 1 Permit Guidelines and Regulations for Heritage Site Visitation* aim to provide protection for these sites, these results demonstrate that risks still exist. The high proportion of visitors coming within close range of the archaeological sites at both locations points to the vital importance of carefully considered protection measures and expedition team adherence to monitoring and enforcement efforts. Interestingly, the more visible nature of archaeological sites at Dundas Harbour appeared to encourage more cautious behaviour from visitors, suggesting that clear identification of sensitive locations may naturally promote respectful conduct.

These findings point to several key management implications and considerations. The development of site-specific guidelines, similar to those used in other circumpolar destinations, could be a valuable tool for managing visitor movement and protecting sensitive areas. Such an approach within the context of Inuit Nunangat could benefit from a 'made in Canada' lens in order to reflect some of the unique aspects of this region. A zoning approach could help to simplify the communication of these site guidelines, incorporating clear areas for unrestricted exploration, guided access, and complete protection. Similarly, clear demarcation of suggested walking paths and/or boardwalks and strategic placement of interpretive signage could help encourage responsible and culturally respectful visitor behaviour. Communication and education of the information contained within site guidelines at pre-visit briefings and through on-site interpretation could also help mitigate inadvertent disturbance. The presence of well-informed expedition staff in particular appears to have a positive impact on visitor behaviour, especially concerning archaeological sites. Site guidelines could play an important role in providing relevant details to expedition staff which would increase their knowledge and quality of interpretation.

While this study focuses on two specific locations in Nunavut, the findings are likely applicable to other shore excursion sites across Inuit Nunangat given the similarities in operational models and site characteristics across the region. The baseline information provided here represents an important step towards improved management of the land-based components of expedition cruise tourism. It is important to note that any management approaches developed for this region must be sensitive to its unique nature,

especially Inuit rights. As such, Inuit must be considered an essential partner in the co-development of management approaches. Site guidelines in particular should include Inuit in both the design and long-term monitoring of their effectiveness. Future research is needed to explore the potential implementation of a management approach such as site guidelines, assessing outcomes related to the modification of visitor behaviour and whether impacts are reduced.

Ultimately, the goal of improved site management should be to strike a balance between allowing meaningful visitor experiences and protecting the ecological and cultural integrity of these sensitive Arctic environments. By building on the insights provided by this study, including Inuit in the determination of preferred management approaches, and refining the understanding of visitor-site interactions over time, it is possible to develop more effective, tailored management strategies that respect both the natural environment and cultural significance of these unique locations across Inuit Nunangat.

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CHAPTER 5: DISSERTATION DISCUSSION AND CONCLUSION

5.1 Key Findings

The key findings from each manuscript collectively address the dissertation's aim in contributing to the identification of more effective and sustainable management approaches for the Canadian Arctic expedition cruise industry which meaningfully respect Inuit rights. The findings demonstrate important contributions to the academic literature by providing an improved understanding of foundational regulatory frameworks (Objective 1), the promise of new management approaches through emerging marine conservation mechanisms (Objective 2), and site-specific considerations to address visitor impacts on shore (Objective 3). This multi-scale approach provides a comprehensive understanding of the current gaps in the management of expedition cruise tourism and identifies potentially sustainable pathways forward. Crucially, this research shows that respecting Inuit rights and addressing related concerns requires a holistic approach that integrates maritime and terrestrial management frameworks, aligns multiple jurisdictional authorities, and creates space for meaningful Inuit involvement in decision-making at all scales. The findings from each objective, detailed below, build upon one another to answer the overarching research question of how expedition cruise tourism in the Canadian Arctic can be managed more effectively to address Inuit concerns while supporting sustainable industry operations.

Figure 26 Summary of Key Findings

5.1.1 Effectiveness of Current Management and Regulatory Frameworks in Addressing Inuit Concerns with Expedition Cruise Tourism (Objective 1)

The first manuscript of this dissertation examined the complex interplay of international conventions, federal regulations, and territorial management structures that govern expedition cruise tourism in the Canadian Arctic, and Nunavut specifically. Results demonstrate that while significant efforts exist to ensure vessel safety and environmental protection through traditional marine governance approaches, Inuit concerns with industry activities persist – particularly regarding cumulative environmental impacts, disturbance of wildlife and traditional harvesting activities, and effects on culturally and historically significant sites.

Findings show that the current overall regulatory framework is limited in its ability to address Inuit concerns for several key reasons. First, the international conventions that form the foundation of maritime law create what can be characterized as a 'pro-navigation' regime, whereby vessels are free to navigate so long as they meet basic safety and environmental standards (Van der Zwaag & Chircop, 2008; Chircop, 2023). Second, while Canada has historically pushed the boundaries of allowable protections within its Arctic waters through legislation such as the *Arctic Waters Pollution Prevention Act* (Chircop, 2014) and ensuring that the domestic implementation of international conventions does not erode the strength of the existing system (Fraser, 2020), there remain jurisdictional constraints stemming from the international level which preclude the ability to impose navigation restrictions (Fraser, 2020; Chircop, 2014). Third, the application of the domestic maritime regulatory regime to expedition cruise tourism does not fully capture the industry's unique operational characteristics, particularly the propensity for these types of vessels to deviate from more common shipping routes to access remote scenic destinations and shore locations (Dawson et al., 2021).

However, the analysis also revealed promising approaches that could help fill these regulatory gaps. The shore-based permitting regime emerged as a candidate for a larger role in managing expedition cruise activities through its indirect influence on navigation. While the existing literature has acknowledged shore-based permits as an important component of the overall management regime for marine tourism, their linkage to navigation has not been examined in-depth (Dawson et al., 2017; Johnston et al., 2017; Weber et al., 2021). Findings show that the Archaeological Permit issued by the Government of Nunavut has a particularly strong capacity to influence itinerary design by limiting operators to visiting a maximum of only 5 sites per itinerary (Government of Nunavut, 2018). Given that the territory's *Archaeological and Paleontological Site Regulations* (Canada, 2001) define these sites broadly to include any area where artifacts over 50 years old may be found, this effectively creates an enforceable mechanism to manage the overall structure of cruise itineraries, and the navigation associated with accessing these sites.

Emerging marine conservation mechanisms, specifically National Marine Conservation Areas (NMCAs), were also identified as promising tools for addressing current regulatory gaps. NMCAs are unique among marine protected areas in Canada as they are fully co-developed with Inuit, including the identification of overall conservation objectives and the design of associated protections through zoning frameworks (Parks Canada, 2019). NMCAs also provide a broader scope for management that can incorporate Inuit knowledge and priorities directly into decision-making processes over long time horizons (Parks Canada, 2022a). This ongoing co-management allows for iterative changes to be made, thereby allowing for greater responsiveness to Inuit concerns. NMCA zoning frameworks also represent intriguing management approaches through their ability to create varying levels of protection and use restrictions (Parks Canada, 2022b; Vis et al., 2024). As such, these zoning frameworks are another strong candidate as a mechanism for addressing Inuit concerns, particularly by influencing expedition cruise vessel navigation in culturally and ecologically sensitive areas that may not be possible through conventional maritime regulatory approaches.

Regulatory gaps were also shown to be addressed through the application of voluntary measures and industry self-regulation. These 'soft' approaches have several benefits, including flexibility (Chion et al., 2018) and timely responsiveness (Whitney et al., 2016) to emerging issues, and are therefore well-suited to addressing Inuit concerns. The strengths of these approaches were recently evidenced by the 100% compliance rate with the 2023 voluntary avoidance request for Eclipse Sound and Navy Board Inlet. The success of such a measure suggests that when Inuit concerns are clearly communicated and industry is properly engaged, meaningful changes to operational activities are possible even in the absence of formal regulatory requirements.

5.1.2 Potential Management Implications of TINMCA's Zoning Framework on Expedition Cruise Operations (Objective 2)

The second manuscript examined the potential implications of TINMCA's proposed zoning framework on expedition cruise operations, focusing on the alignment between this new form of marine spatial planning and existing management approaches. Analysis of substantiated 2022 cruise activities within TINMCA boundaries against the proposed zoning framework revealed several key findings regarding both the current operational patterns and future management possibilities.

To begin, the research uncovered significant data discrepancies in how expedition cruise activities are currently tracked and reported. There is limited research available on the topic of marine tourism shore visit locations in the Canadian Arctic, and while these findings are limited to the boundaries of TINMCA,

a total of 53 unique locations were identified as having historical expedition cruise tourism visitation compared to only 14 identified previously (Weber et al., 2021). Comparison of industry statistics with AIS vessel tracking data further identified multiple unreported cruise activity locations, including five areas which have never been listed within the industry's own site database. This finding highlights ongoing challenges in monitoring expedition cruise activities in the Canadian Arctic (Government of Nunavut, 2016; Johnston et al., 2017; Stewart et al., 2010; Têtu et al., 2019) and underscores a continued need for improved reporting mechanisms to support effective management under the new TINMCA regime (Vis et al., 2024).

The analysis of TINMCA's draft zoning framework revealed several notable implications for future cruise operations. The majority (18 of 22) of 2022 cruise activity locations fell within proposed Zone 3 areas (Habitat Protection), where tourism activities are conditionally allowed but are beholden to an operational permitting scheme. Depending on the conservation objectives within these Zone 3 areas, expedition cruise tourism will be limited in some regard (Parks Canada, 2022b). More significantly, however, 6 popular marine tourism destinations within TINMCA are potentially impacted by Zone 1 (Strict Protection) designations due to proposed 4.8 km buffer zones around terrestrial walrus haul-outs. These Zone 1 restrictions would effectively prohibit access to these areas, making certain shore landing sites off-limit and placing limitations on navigation in several fjords.

These findings demonstrate both opportunities and challenges, particularly in ensuring alignment of TINMCA's zoning framework with existing shore-based permitting systems. While the zoning framework provides new tools for managing marine areas, jurisdiction over shore locations remains unchanged. As such, there are potential misalignments between marine zones and terrestrial permits that will require enhanced coordination between management authorities. The example of Radstock Bay most neatly captures this conflict since it is a location where operators have historically received valid permits for shore access (see NIRB, 2019, 2022a, 2022b, etc.) but potential Zone 1 designation in its vicinity creates a jurisdictional conflict that will require resolution.

TINMCA's strategic location at the eastern entrance to the Northwest Passage positions its conservation to have significant influence on expedition cruise tourism management. Nearly all cruise itineraries in Canadian Arctic waters pass within TINMCA boundaries each season, and a large proportion of total activity occurs there (Dawson et al., 2021; Kochanowiz et al., 2021; Pizzolato et al., 2016). This research suggests that if the new management tools afforded under the NMCA approach are effective in reflecting Inuit priorities for protection, and adequate enforcement and monitoring is carried out, many of the longstanding concerns with the industry's activities could be addressed and lessons learned could be applied to other marine protected areas in development across the Canadian Arctic. However, any success will rely on the outcomes from the consideration of how the new NMCA permitting system integrates with

existing shore-based permitting processes, as well as enhanced coordination between federal and territorial authorities and local communities.

These findings highlight the need for adaptive and integrated management approaches as TINMCA moves toward establishment. While the zoning framework presents new opportunities for managing expedition cruise activities, it will require improved data collection and reporting efforts, significant coordination between stakeholders, and careful consideration of the linkages between marine and terrestrial areas. As the first NMCA in Canadian Arctic waters, TINMCA represents a unique opportunity to develop a more comprehensive and culturally responsive approach which holds promise to improve the management of managing expedition cruise tourism both within its boundaries and across the broader region.

5.1.3 Understanding Visitor Movement Patterns to Inform Shore-Based Management Strategies (Objective 3)

The third manuscript provided some of the first baseline data of its kind on visitor movement patterns and site usage at two popular shore excursions locations within TINMCA – Croker Bay and Dundas Harbour. Building upon methods utilized in other parts of the world (e.g. De Cantis et al., 2016; Ferrante et al., 2018; Casado-Diaz, 2021) GPS tracking devices were utilized to study how expedition cruise passengers interacted with these remote shore locations and assess potential risks to specific key identified sensitive areas. The findings of this research represent a starting point in understanding the terrestrial components of expedition cruise activities and contribute to an assessment of the need to consider site-specific management strategies common in other circumpolar destinations.

The results from the analysis of spatiotemporal activity showed that visitors at both sites utilized significant portions of the available area within established perimeter boundaries. This extensive use of space underscores the exploratory nature of visitor activity during these shore excursions and points toward potential challenges associated with ‘permissive’ management approaches which enable full freedom of movement (Orellana et al., 2012; Kidd et al., 2015). This ‘permissive’ approach can be interpreted as an absence of more formal management styles (Zheng et al., 2019) and therefore sets a reasonable baseline against which future management approaches can be assessed (Dragovich & Bajpai, 2022).

The identification of Movement Suspension Patterns (MSPs) revealed key areas where visitors tended to congregate, including both known attractions and previously unrecognized points of interest. Subsequent analysis of Generalized Sequential Patterns (GSPs) demonstrated some patterns of visitor flows at both sites, with a counterclockwise pattern of movement emerging at Croker Bay and more varied activity at Dundas Harbour apart from one major pathway to/from its main attractions.

Results from analyzing the intensity of site usage provided some important insights into potential visitor impacts (Hallo et al., 2012; Wolf et al., 2012). High-use areas were identified around zodiac disembarkation points and key attractions, suggesting elevated risk of localized environmental impacts over time (Barros et al., 2015; Marion et al., 2016). The emergence of clear visitor flow corridors, even in the absence of formal trails or directional guidance, points to opportunities for taking advantage of these 'natural' paths through more formal visitor management approaches such as boardwalks or strategic placement of interpretive materials (Bradford & MacIntyre, 2007; D'Antonio & Monz, 2016; Johnson & Swearingen, 1992).

Proximity analyses provided important findings about potential risks to sensitive areas, particularly archaeological sites (Beeco et al., 2014). At both study sites, a high proportion of visitors (80%) came within 20 meters of at least one archaeological site. Findings also pointed to the phenomenon whereby clearly marked archaeological sites with established protective boundaries tended to attract greater visitor attention than unmarked sites, potentially mirroring so-called 'designation effects' (Buckley, 2004; Fredman, 2004; Lemelin & Dawson, 2014). While Nunavut's *Archaeological and Paleontological Site Regulations* require the establishment of a 30-meter "protected area" around all archaeological and historical sites, as well as a secure "boundary perimeter" 2-3m from the feature (p.6), these findings suggest that some sites may experience better protection through reduced visibility by remaining unmarked (Unger & Kvetina, 2017).

Despite the baseline nature of this study, findings point toward clear recommendations for the development of shore-based management strategies in the region. The current 'perimeter management' approach may be the simplest from an operational perspective, but it does not provide adequate protection for sensitive environmental and cultural features (Epure et al., 2017; Peterson et al., 2020). Site-specific guidelines, as employed in other circumpolar destinations, are worthy of further consideration for the management of visitor movement (Leung et al., 2018), protection of sensitive areas (Hagen et al., 2012), and overall education of both expedition staff and passengers (Marion et al., 2007). Unlike other circumpolar destinations, however, any such guidelines produced for sites within Inuit Nunangat must be co-created with Inuit to ensure they appropriately reflect cultural values and traditional knowledge.

These findings contribute to an important foundation for improving shore-based management of expedition cruise activities in the Canadian Arctic. While site-specific guidelines show promise as a management tool, their development must move beyond copying what has been done elsewhere to create a 'made in Canada' solution that meaningfully incorporates Inuit perspectives and priorities. Only through this co-creation approach can this type of shore-based management strategy effectively protect both the environmental and cultural significance of these locations.

5.2 Key Contributions

This dissertation makes several important contributions to both academic scholarship and policy development related to the management of expedition cruise tourism in Nunavut and the broader Canadian Arctic.

From an academic perspective, this research contributes material advancements in the overall understanding of marine tourism governance. First, it provides the first comprehensive analysis of how shore-based permitting regimes can influence vessel navigation patterns through the management of shore landing site access. This finding challenges the conventional notion that maritime and terrestrial governance systems are separate and distinct domains and signals the need for a new research perspective which is more holistic in nature. Second, the research establishes novel baseline data on visitor movement patterns at remote Canadian Arctic shore locations using GPS tracking methods. This introduces an adaptation of research methods utilized in other tourism contexts and calls for these methods to be used more broadly in order to understand cruise passenger use of these remote sites. Third, a contribution is made to the emerging literature on marine protected area management. The examination of a new mechanism such as National Marine Conservation Areas and their associated zoning frameworks explores the potential promise of complementing existing regulatory approaches and improving the ability to address Inuit concerns with expedition cruise activities.

From a policy perspective, this work provides timely insights to inform the development of more effective management approaches for marine tourism. The analysis of current regulatory frameworks identifies specific gaps in addressing Inuit concerns, but also shows that existing mechanisms have the potential to fill some of these gaps if leveraged more strategically. New mechanisms, such as TINMCA's draft zoning framework, is also shown to represent an improvement in the alignment between marine spatial planning and terrestrial permitting systems. This could be used as a model to address similar management challenges in other parts of Nunavut and demonstrates the value of the NMCA mechanism overall. Finally, the baseline visitor movement data gathered provides evidence that supports the preliminary exploration of developing 'made in Canada' site guidelines for remote Arctic locations that could better protect sensitive cultural and ecological areas while respecting Inuit rights and Inuit Qaujimajatuqangit.

5.3 Limitations

There were several limitations encountered throughout the research undertaken across the three manuscripts within this dissertation, with varying degrees of influence on the final outcome(s). Each manuscript faced

its own unique constraints, which influenced the scope of analysis and findings that could be drawn. These constraints are outlined here, along with their relation to the final conclusions drawn.

In Manuscript I, the complexity and breadth of maritime governance in the Canadian Arctic required an approach that narrowed the focus to a specific relation to expedition cruise tourism operations. While this enabled a more targeted examination of management tools directly applicable to this industry and the potential ability to address Inuit concerns, it is necessarily incomplete and therefore likely excludes relevant approaches from the broader maritime regulatory framework. Furthermore, the analysis was largely limited to the regulatory framework as it exists today and may not reflect the full range of policy tools under consideration by relevant authorities.

Manuscript II faced several data limitations in its assessment of TINMCA's draft zoning framework. Most significantly, the analysis relied on a draft version of the zoning framework which is now likely out of date. As community consultations proceed and the Interim Management Plan is finalized, this framework will likely evolve and some of the conclusions drawn may no longer be relevant. The substantiation of cruise activities in this manuscript encountered limitations in incomplete industry reporting, as well as gaps in AIS coverage accuracy in the High Arctic latitudes where TINMCA is located. Furthermore, the analysis was limited to the 2022 operational season, which includes its own limitations since it may not be representative of typical activity patterns across multiple years.

The most substantial limitations in this dissertation are found within Manuscript III given the field work involved with examining visitor movement patterns at the two remote shore locations within TINMCA. The original study was designed to collect GPS tracking data during multiple visits at each location to enable a comparative analysis. However, severe ice conditions prevented follow-up visits, requiring adaptation to the single-visit baseline data collection approach used here. Further limitations included the small sample size (10 GPS units per site) and limited study locations (2), which constrain any attempt to generalize these findings to other areas. As with the issues with AIS coverage, the accuracy of the GPS data collected is somewhat problematic. There were several instances where GPS units lost satellite connectivity, which required some interpolation of missing data points. This margin of error was acknowledged and its effects on analysis were minimal, but it remains a limitation, nonetheless.

Overall, these challenges reflect the reality of conducting research in the Canadian Arctic, where environmental conditions, logistical complexities, and data availability often require adapting initial study designs. The limitations across this dissertation also point to opportunities for future research, however, as remaining gaps in knowledge can be built upon through expanded data collection, longer-term monitoring, and a broader geographical scope.

5.4 Future Research

Each of the manuscripts within this dissertation point to distinct future research needs, especially considering the evolving nature of marine governance in a changing Arctic environment. Perhaps the clearest requirement for additional research is related to the development of 'made in Canada' management approaches that meaningfully incorporate Inuit perspectives and priorities. Specifically, site-specific guideline research in the Canadian Arctic significantly lags behind other circumpolar destinations which represents a sort of management inequity for the residents of Inuit Nunangat in particular. Future studies should explore co-development processes with Inuit communities, drawing upon Inuit Qaujimajatuqangit to create guidelines that reflect cultural values and traditional knowledge. Pilot testing of these guidelines at key locations like Croker Bay and Dundas Harbour could build upon the baseline visitor movement data established in this research, allowing for assessment of their effectiveness in modifying visitor behaviour and protecting sensitive areas.

Another critical area for future research is the integration of emerging management tools with existing regulatory frameworks. As TINMCA moves toward establishment, studies will be needed to examine how its zoning framework impacts expedition cruise activities in practice, as well as how it aligns with shore-based permitting systems. While long-term monitoring of the overall NMCA co-management approach will likely be conducted by Parks Canada, it may be prudent for an academic lens to impartially evaluate outcomes over time.

There is also a need for longitudinal studies of visitor impacts at remote shore locations. Future research should examine options for the introduction of systematic monitoring programs to track both environmental and cultural impacts over time. The involvement of local communities will be vital in these efforts, both from the contribution of local knowledge, but also as leaders in the collection of this monitoring data. The collection of consistent statistics related to site use by expedition cruise passengers over multiple seasons would also aid management efforts, allowing for the identification of areas with high levels of visitation that may need enhanced protection.

Finally, research is needed to better understand the effectiveness of various communication approaches in achieving management outcomes. This includes examining how site guidelines, voluntary measures, and permitting requirements are conveyed to industry and evaluating which methods lead to highest compliance. As the management framework for expedition cruise tourism continues to mature in the Canadian Arctic, this type of research on communication effectiveness will be crucial for building a respectful and responsive industry that fully recognizes the sensitivity of the region and respects the desires of its residents.

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APPENDIX 1: ETHICS CERTIFICATE FOR MANUSCRIPT 3

08/08/2023

Université d'Ottawa
Bureau d'éthique et d'intégrité de la recherche

University of Ottawa
Office of Research Ethics and Integrity

CERTIFICAT D'APPROBATION ÉTHIQUE | CERTIFICATE OF ETHICS APPROVAL

Numéro du dossier / Ethics File Number	S-07-22-8121
Titre du projet / Project Title	Exploring Management Options for Expedition Cruise Tourism in the Canadian Arctic: An Examination of the Potential for Site-Specific Guidelines
Type de projet / Project Type	Thèse de doctorat / Doctoral thesis
Statut du projet / Project Status	Renouvelé / Renewed
Date d'approbation (jj/mm/aaaa) / Approval Date (dd/mm/yyyy)	26/07/2022
Date d'expiration (jj/mm/aaaa) / Expiry Date (dd/mm/yyyy)	25/07/2024

Équipe de recherche / Research Team

Chercheur / Researcher	Affiliation	Role
Andrew ORAWIEC	Département de géographie / Department of Geography	Chercheur Principal / Principal Investigator
Jackie DAWSON	Département de géographie / Department of Geography	Superviseur / Supervisor

Conditions spéciales ou commentaires / Special conditions or comments

APPENDIX 2: PARTICIPANT CONSENT FORM

ESPG Environment, Society and Policy Group

uOttawa

Exploring Management Options for Expedition Cruise Tourism in the Canadian Arctic: An Examination of the Potential for Site-Specific Guidelines

Participant Consent Form

Purpose of the study:

This research aims to explore the effectiveness of current management and regulatory frameworks that govern expedition cruise tourism in the Canadian Arctic and explore the use of site-specific guidelines as a potential management option.

Who will participate in this research:

All passengers onboard the *Ocean Endeavour* are eligible to participate if they plan on participating in a shore excursion at the study site(s). It may not be possible to accommodate all those interested in participating due to a limited number of GPS units. As such, participation will likely be available on a first-come first-served basis.

What you will be asked to do in the research:

You are being asked to participate in a non-invasive observation of patterns of visitor movement at a shore location in Nunavut. There will be no requests from participants beyond accepting to carry a GPS unit when arriving on site and returning it once you return to the vessel.

Your participation in this study is completely voluntary and you may choose to withdraw your participation at any time by returning the GPS unit to the researcher.

Data collection description:

GPS tracking is increasingly being used as an approach to studying tourism mobility generally, and the movements of cruise passengers at their destination more specifically. The GPS units can produce a pair of coordinates every 10 seconds or less and can therefore capture accurate movement tracks across space, as well as provide indications of how much time is spent at specific locations.

Expected outcomes of this research:

This research will help inform future work to reduce the regulatory complexity associated with expedition cruise tourism in the Canadian Arctic and contribute towards the preservation of visitor sites for both present and future generations.

Confidentiality:

There will be no identifying information collected as part of this research. The results of this research will be used in the preparation of a manuscript associated with the requirements of completing doctoral education.

Potential benefits:

By choosing to participate in this research you are helping to provide data which will be the first of its kind within the Canadian Arctic. The potential outcomes of this research could help shape the future of managing expedition cruise tourism, with participation providing the foundation for analysis and recommendations. It is also possible that future visitor experience at shore locations could be improved as a result of this research.

Questions about the research:

Any questions about the research in general or about your role in the study can be directed to Andrew Orawiec, Principal Investigator. This research has been reviewed and approved by the Ethics Board at the University of Ottawa and licensed by the Nunavut Research Institute.

If you have any questions about this process, or about your rights as a participant, you may contact 1) the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5, Tel.: (613) 562-5387, Email: ethics@uottawa.ca.

Principal Investigator, Andrew Orawiec

PhD Candidate, Department of Geography, uOttawa

You have read the above information and understand the nature of the study.

You understand that your participation in the study is entirely voluntary and that you may refuse to participate or withdraw from the study at any time.

By agreeing to carry the GPS tracker during this shore excursion, my consent to participating in this study is implied.

APPENDIX 3: RESEARCH POSTER

Exploring Management Options for Expedition Cruise Tourism in the Canadian Arctic:

An Examination of the Potential for Site -Specific Guidelines

Context

Accessibility of the Canadian Arctic is increasing due to climate change. Popularity of marine tourism has been steadily increasing and the trend is expected to continue. These two factors contribute to more visitors at shore locations across Nunavut. Little is known about the visits to these shore locations

The Project

My research is interested in the effectiveness of current management and regulatory frameworks that govern expedition cruise tourism in the Canadian Arctic, but more specifically filling the gap in knowledge about what takes place at the shore locations where cruise passengers disembark.

Participation

Participants will be asked to carry a small GPS unit during shore excursions (pictured at right).

Andrew Orawiec

PhD Candidate

University of Ottawa

ESPG Environment, Society and Policy Group

uOttawa

APPENDIX 4: RESEARCH INFORMATION LETTER

Project Title
Exploring Management Options for Expedition Cruise Tourism in the Canadian Arctic: An Examination of the Potential for Site-Specific Guidelines

Researcher's Name and Affiliation

Principal Investigator
Andrew Orawiec, uOttawa

Supervisor
Dr. Jackie Dawson, uOttawa

Project Location & Timeframe
Nunavut – August 2-24, 2022

Project Description

Context

Accessibility of the Canadian Arctic is increasing due to climate change. The popularity of marine tourism has also been steadily increasing in recent times and the trend is expected to continue. These two factors contribute to more visitors at shore locations across Nunavut. Little is known about the visits to these shore locations and few management and governance tools exist to track these activities.

Purpose

This research aims to explore the effectiveness of current management and regulatory frameworks that govern expedition cruise tourism in the Canadian Arctic and explore the use of site-specific guidelines as a potential management option.

Methodology

Collection Protocol

Spatio-temporal movement data will be captured during one or more shore excursions. There will be no identifying information attached to the collection and the methods are meant to be completely non-invasive.

Collection Mechanisms

GPS Tracking Units

Small GPS tracking units will be used to collect spatio-temporal data from participants as they participate in one or more shore excursions. These units are highly portable and can fit in pant or jacket pockets. Data collected will be completely anonymous.

Outcomes

This research will help inform future work to reduce the regulatory complexity associated with expedition cruise tourism in the Canadian Arctic and contribute towards the preservation of visitor sites for both present and future generations.

APPENDIX 5: SAMPLE SITE-SPECIFIC GUIDELINE

77°33.1'N 014°58.8'E

Ahlstrandhalvøya

Sør-Spitsbergen National Park – Ahlstrandhalvøya is named after the Swedish librarian, Johan August Ahlstrand (1822-96) who was interested in polar exploration.

Photo: Ole Magnus Rapp

When belugas were big business

Large piles of beluga whale bones adorn the beach, the result of hectic and valuable summer-hunting during the interwar years. The beluga blubber as well as the skin was sought after. The beluga whales swam in large groups into the fjords where trappers were waiting with large seine nets to close the mouth of the fjord, trapping and slaughtering the whales. This slaughtering place is a unique cultural remain in Svalbard.

VEGETATION This is one of the most favorable and productive climatic regions for plants at Svalbard. Within the range of a short walk, several of the most typical of Svalbard vegetation types can be observed, including saxifrage heath, wetland, grassland, moss heath, along with exposed ridges of vegetation.

FAUNA The birdlife on this peninsula is relatively rich and varied and Ahlstrandhalvøya is an important feeding area for family groups of barnacle geese and female common eider. Several species of waders, including ruddy turnstone, purple sandpiper, sanderling and grey phalarope are also present in the area. Reindeer are commonly seen grazing on the rich vegetation.

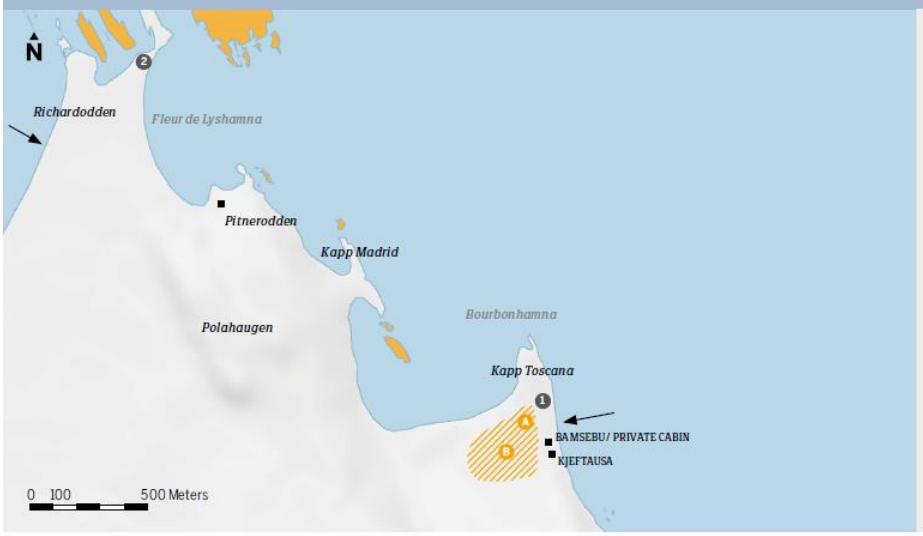
CULTURAL REMAINS The cabin, Bamsebu, in Ingebrigtsenbukta, was built as a beluga whaling station and is the only excellent example of a beluga whaling station remaining in Svalbard. Next to the cabin is the small storage place, Kjeftausa, where a turned boat forms the roof. Three of the seine boats lie on the beach in Fleur de Lyshamna. The names of the bays, beaches and headlands of Ahlstrandhalvøya originated from the cultural heritage environment connected with the hunting of beluga.

Reviewed by the Governor of Svalbard

Disclaimer:
Please note that AECO guidelines are subject to change.
Always make sure, that you have the latest version available.
Be aware that AECO guidelines never precede national or international legislations and regulations.

Association of Arctic Expedition Cruise Operators AECO

AHLSTRANDHALVØYA



GUIDELINES

The slaughtering place and the remains of the belugas are protected cultural remains. Please do not touch.

The small patches of wetland next to the cabin Bamsebu have low trampling tolerance, so please walk outside them.

Avoid landings and traffic in areas with large numbers of eiders and geese.

Approach areas with family groups of eiders and geese carefully. Keep the group of visitors together and walk slowly. Disturbance during breeding and moulting season may cause chicks being separated from the adults, making them easy prey for glaucous gull and Arctic fox.

From late May through July avoid traffic on and around the islets off Fleur de Lyshamna as birds are breeding there.

Please respect the private cabin Bamsebu.

TIP

A four kilometer hike will take you from Ingebrigtsenbukta to Fleur de Lyshamna. If you walk the first part along the beach you will avoid the wet tundra. During the trip you will cross the spectacular tilted folded strata of the Ullaberget series.

Photo: Yan-Ali Tabarnd

The spectacular tilted folded strata are part of the Ullaberget series.

Photo: Trond Haugskott

The charming grey phalarope is relatively common in the area.

Photo: Ole Magnus Rapp

Quite well kept seine boats lie on the beach in Fleur de Lyshamna.

Funded by SVALBARD ENVIRONMENTAL PROTECTION FUND

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