Tourism Vessels and Low Impact Shipping Corridors in Arctic Canada

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Trends, Risks, Community Perspectives and Management Strategies

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EXECUTIVE SUMMARY

Marine tourism in the Canadian Arctic is a small but rapidly growing industry. Since 1990, the average annual distance travelled by passenger vessels (e.g., cruise ships) has more than doubled, and for pleasure crafts (e.g., commercial or private yachts) the average annual distance travelled has increased by nearly 4000%. This growth is tremendous, yet, at the same time, pleasure craft vessels are also some of the least regulated vessels in the Canadian Arctic (Johnston et al., 2017a).

The Federal Government of Canada has responded to the overall need for additional regulatory frameworks for all vessels in the Canadian Arctic. The government is in the process of developing what is now known as the Low Impact Shipping Corridors (LISC). The LISC are described as shipping routes throughout the Canadian Arctic that are intended to provide "infrastructure, navigational support and emergency response services needed for safer marine navigation, while respecting the environment and local ecology and cultures" (Transport Canada, 2017a). While this management system has the potential to provide much needed support to many types of vessels travelling through the Canadian Arctic (e.g. re-supply vessels), this report highlights the need for the creation of alternative and additional management systems for tourist vessels in particular.

Tourist vessels present unique risks in terms of travel through the Canadian Arctic. The purpose of this type of travel is not simply to transit through, or to find the safest and fastest route, the purpose is adventure and exploration. This means that tourist vessels often travel to areas of the Canadian Arctic that are not necessarily well serviced or charted. The findings of this report show that a significant portion of the distance travelled by both passenger ships and pleasure crafts occurs outside of the LISC. At the same time, the findings also show that tourist vessels like to travel through government and community identified areas of significance, such as Ecologically and Biologically Significant Areas (EBSAs; See Science Advisory Report 2011/055) and Culturally Significant Marine Areas (CSMAs). The amount that the distance travelled increased through these areas was similar to the overall increase in distance travelled throughout the entire Northern Canada Vessel Traffic Services (NORDREG) zone (see Canadian Coast Guard, 2021), which represents the zone of Canadian waters North of 60°, as well as southern Hudson Bay and Ungava Bay, where vessels must report their daily location and other information to the Canadian Coast Guard. It has also been found that a number of cruise ship itinerary listings fall within these culturally (CSMA) or environmentally and biologically (EBSA) significant areas. These findings show that tourist vessels often transit beyond the LISC, which raises questions about the usefulness of LISC as the single regulatory framework for all vessels.

This report also highlights the concerns of Inuit and northern communities about the effects of tourist vessels accessing important cultural and/or environmental sites and disrupting subsistence activities in or near their communities. While tourist vessels have the potential to benefit Arctic communities through supporting the local economy, the findings show that community members did not always feel that they experienced these benefits. The report details community-identified recommendations that could be implemented as part of a broader management system to ensure tourist vessels have minimal negative impacts on communities and marine wildlife, while at the same time maximizing the positive impacts they could have on these communities.

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1.0. BACKGROUND AND CONTEXT

1.1 PROBLEM STATEMENT

Low impact shipping corridors (LISC) were designed by the Government of Canada to support safe shipping and navigation in Arctic Canada. As the region is large and underserviced, a corridors approach is an effective way to support decision making and investments in infrastructure and marine services. However, it is unclear if corridors are an effective governance tool for tourism vessels, including cruise ships and private yachts, which when not in transit tend to travel off the main corridors in search of wildlife and to engage in shore visits. There may be a need for more diverse governance, as marine tourism vessels and their passengers have different motivations, transport people versus goods, and exhibit different behaviors.

In direct response to this problem statement, in this report we provide an analysis of tourism vessel trends in Arctic Canada since 1990 and an evaluation of the extent that passenger ships (cruise) and pleasure crafts (yachts) utilized the corridors in this timeframe. To understand impacts and risks from tourism vessels in Inuit Nunangat, the analysis further examines the extent to which tourism vessels operate in ecologically and biologically significant areas (EBSAs) and locally identified culturally significant marine areas (CSMAs) as well as Inuit community perspectives.

1.2 GEOGRAPHIC FOCUS AREAS

The area of focus for this study is the Northern Canada Vessel Traffic Services (NORDREG) zone, which represents the zone of Canadian waters North of 60°, as well as southern Hudson Bay and Ungava Bay, where vessels must report their daily location and other information to the Canadian Coast Guard (Figure 1). This zone coincides with Inuit Nunangat, which is an Inuktitut term meaning “Inuit homeland in Canada” used to describe the four Inuit settled land claims regions: Nunatsiavut (Northern coastal Labrador), Nunavik (Northern Quebec), the territory of Nunavut, and the Inuvialuit Settlement Region in the Northwest Territories (Figure 1). The distinct geographic, political and cultural region includes not just the land but also the water and ice. Inuit Nunangat encompasses roughly 35% of Canada’s landmass and 50% of its coastline (Inuit Tapiriit Kanatami (ITK), 2018). There are 65,000 Inuit in Canada, the majority of whom live in the 51 communities located in Inuit Nunangat (ITK, 2018). However, the NORDREG zone notably excludes Nunatsiavut waters (Figure 1). The majority of analysis was conducted exclusively within the NORDREG zone as it relied on the daily ship location reports that are only provided within this zone. Additional regions were included in the analysis of shore-locations, as this relied on vessel itineraries rather than location reports.

1.3 DEFINING ARCTIC MARINE TOURISM VESSELS

The marine vessels that are the topic of discussion for this white paper are referred to as 'tourism vessels', which includes passenger vessels (cruise ships and expedition cruise ships) and pleasure craft vessels (commercial yachts and non-commercial yachts). See Table 1 for detailed descriptions.

Table 1: Marine tourism vessel types.

Passenger Vessels	
Cruise Ship 	A large passenger ship (200+ passengers) used for commercial tourism purposes where the voyage itself and the ship's onboard amenities, in addition to destinations (i.e. ports of call), are part of the experience.
Expedition Cruise Ship 	A smaller passenger ship, typically carrying between 50 and 200 paying visitors, that is used for commercial tourism purposes. They emphasize adventure, wilderness, education, and personal experiences. These are the most common type of vessels operating within the global Arctic.
Pleasure Craft Vessels	
Commercial Yacht 	A vessel used for commercial purposes. These vessels include private yachts or motorboats where passenger berths are sold and money or other form of remuneration for passage on board the vessel occurs.
Non-Commercial Yacht 	A vessel used for recreational purposes only. These vessels include private yachts and motorboats that are solely being used for pleasure and where no money or other form of remuneration occurs.

1.4. CANADIAN ARCTIC MARINE TOURISM

Marine tourism is the largest segment of the global Arctic tourism industry in terms of numbers of people, geographic range, and types of recreational activities (Arctic Council, 2009). It consists of passenger vessels with commercial or packaged tourists (e.g., cruise ships) that range from expedition (less than 200 passengers) to luxury style and pleasure craft vessels with independent tourists (e.g., sailboats and

yachts). Activity is generally concentrated in the summer months (June-September) when sea ice conditions are more favorable, the weather is more settled, and there is 24-hour daylight (Orams, 2010). Compared to other vessels transiting in the Arctic (i.e., re-supply vessels), marine tourism vessels are unique in the sense that they often do not transit via the most direct route. Instead, they view landscapes at close ranges, land passengers on shore, seek wildlife and sea ice, and venture into challenging and sometimes uncharted waters (Dawson et al., 2014).

While the Canadian Arctic represents a small segment of the global Arctic marine tourism industry, it presents enormous opportunities, risks and challenges for Inuit and Northerners (non-Inuit residents in Arctic Canada). The Canadian Arctic marine tourism industry emerged in the late 1990s and continues to attract tourism operators because of its rich culture, history, scenery, natural environment and increased accessibility (Dawson et al., 2014; 2016; Government of Nunavut, 2016; Johnston et al., 2017b). Many notable events have influenced and contributed to the development of the marine tourism industry. In 2009, the Government of Canada declared that vessels could traverse the Northwest Passage without being accompanied by an icebreaker (Bone 2016). In 2014 and 2016 respectively, HMS *Erebus* and HMS *Terror* (from the famous 1845 Franklin expedition) were located; a discovery that generated an enormous amount of attention. Additionally in 2016, Crystal Serenity became the largest cruise ship to travel through the Northwest Passage; this ship can carry up to 1070 passengers. It is expected that marine tourism in the Canadian Arctic will continue to develop because of several factors: greater accessibility, greater availability of ice-strengthened vessels, demand for remote and authentic tourism experiences, the landscape and wildlife, and a growing base of retired baby boomers with the means and desire to travel (Dawson et al., 2010, 2011, 2014; Lemelin et al., 2010, 2012; Johnston et al., 2012).

In the Canadian Arctic marine tourism is managed by a set of international conventions and codes, and federal and territorial regulations that apply to all vessel types (i.e. cargo, tankers, cruise ships) (see Dawson et al. 2014). Regulatory regimes for shipping are both complex and constantly evolving and are further characterized by unique regulatory instruments and multi-jurisdictional challenges. Despite the complex regulatory environment for maritime shipping in general, non-commercial pleasure crafts, regardless of size or licensing/ registration status are *not* subject to the rigorous inspection and certification regime applicable to commercial craft and larger vessels. In short, non-commercial pleasure crafts are largely unregulated and fall through the well-entrenched safety nets applicable to international shipping. Small vessels that are operating as commercial tourism operators are subject to some regulations but not all.

Please see Appendix 1 for additional information about international, national, and territorial shipping regulatory frameworks.

1.4.1 LOW IMPACT SHIPPING CORRIDORS

In response to rapid increases in shipping and expected further increases due to climate change and the prospect of heightened global maritime trade through the Arctic, the Government of Canada is developing 'Low Impact Shipping Corridors' as an adaptation strategy. In a series of announcements in 2016 and 2017, the Government of Canada stated that they, "will enhance partnerships with Indigenous communities and Arctic stakeholders to establish **Low Impact Shipping Corridors** [emphasis Government of Canada]. The shipping routes established through these initiatives will provide the infrastructure, navigational support and emergency response services needed for safer marine navigation, while respecting the environment and local ecology and cultures" (Transport Canada, 2017a).

Ship operators' use of 'the corridors' will be incentivized and voluntary (not mandatory or enforced), meaning that ship operators may choose to use the corridors because of the infrastructure, navigational support and emergency response services available within the corridors but they will not be required to use the corridors. The corridors cover approximately 451,000 km^2 out of 3,749,596 km^2 of the Canadian Arctic waters in the Northern Canada Vessel Traffic Services (NORDREG) Zone, which includes Canadian waters north of 60°, as well as southern Hudson Bay and Ungava Bay (Chénier et al., 2017; Canadian Coast Guard, 2021).

Preliminary versions of the Low Impact Shipping Corridors, known as Northern Marine Transportation Corridors (NMTC), were developed based on best available bathymetry, historic shipping traffic (approximately 80% of vessels traveling in the NORDREG Zone were traveling within the NMTC, and 90% were traveling within a 5 nautical mile (9.3 kilometre) radius of the corridors at the time of NMTC inception) (Chénier et al., 2017). Canadian Hydrographic Service paper and digital charts, satellite imagery, especially in critical depth areas, ice data and avoidance of marine protected areas were main drivers of NMTC placement (Chénier et al., 2017). Secondary approach corridors, "characterized by medium- to low-density traffic levels, which can provide access to navigational ports to fulfill supply links and the movement of passengers" were developed but the primary approach corridors, "The main traffic highways in the Arctic, [provided] a means to enable secondary access to ports" (Chénier et al., 2017 p.4). Figure 1 shows a draft map of the Low Impact Shipping Corridors. Note that the corridors are dynamic and are continually being updated by the Government of Canada.

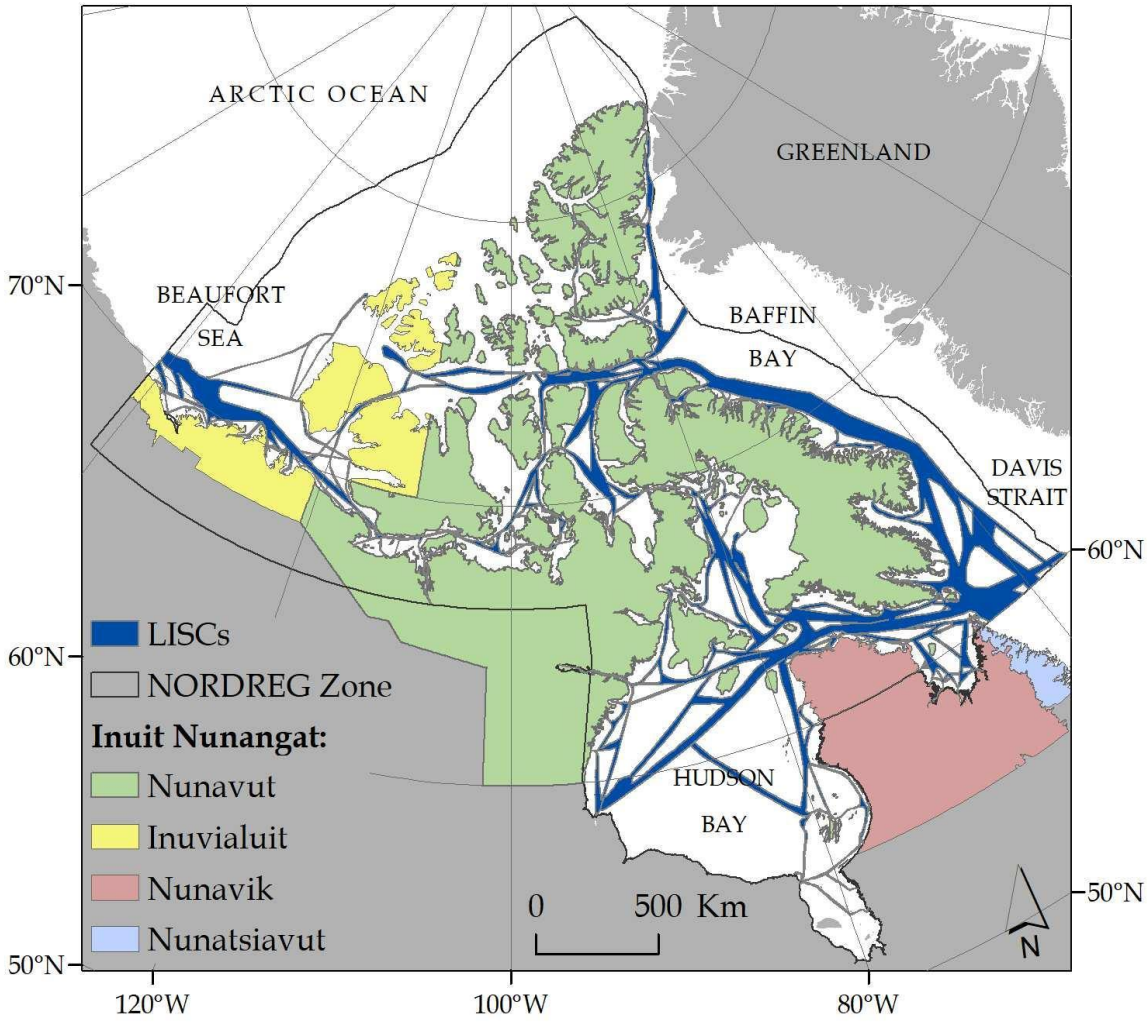

Figure 1: Location of the Low Impact Shipping Corridors (LISCs), the NORDREG Zone, and the four regions of Inuit Nunangat.

1.4.2 ECOLOGICALLY AND BIOLOGICALLY SIGNIFICANT AREAS AND CULTURALLY SIGNIFICANT MARINE AREAS

Ecologically and Biologically Significant Areas (EBSAs) and Culturally Significant Marine Areas (CSMAs) signify areas within the marine environment that are either of ecological, biological, or cultural importance. EBSAs identified by the Canadian Government are shown in Figure 2. CSMAs identified by community members who participated in the Arctic Corridors and Northern Voices research project are shown in Figure 3.

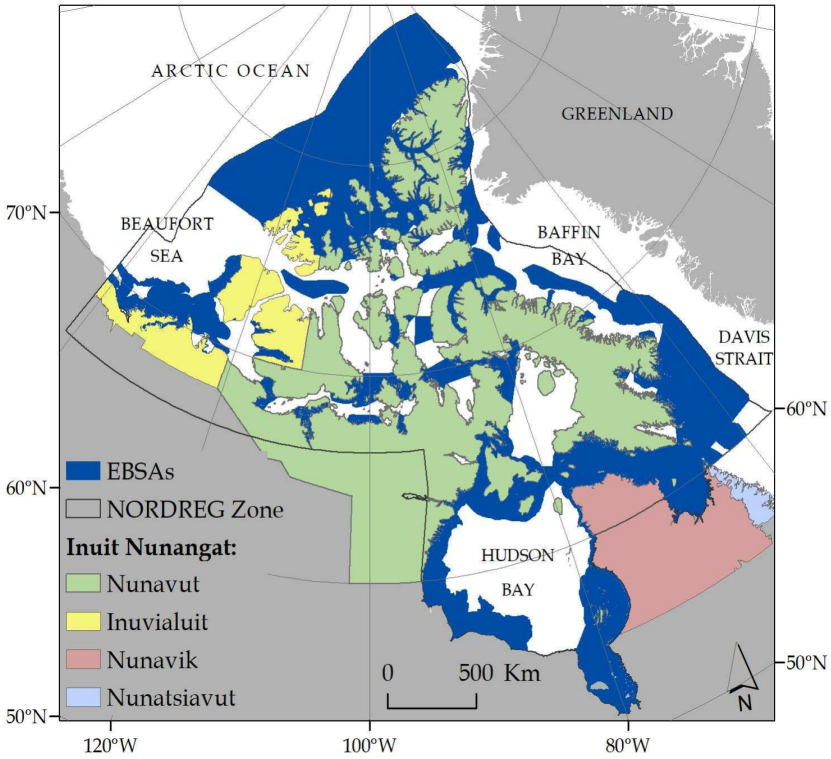

Figure 2: Ecologically and Biologically Significant Areas.

Ecologically or Biologically Significant Areas (EBSAs) are areas within Canada's oceans that have been identified by the Department of Fisheries and Oceans Canada through formal scientific assessments as having special biological or ecological significance, when compared with the surrounding marine ecosystem (See Science Advisory Report 2011/055 for additional information on EBSAs in the Canadian Arctic). S total of 38 EBSAs have been identified and mapped throughout the Canadian Arctic as shown in Figure 2. The EBSA data utilized for this report have been sourced from the Open Governmental Data Portal.

Culturally Significant Marine Areas (CSMAs) are described by Gee et al (2017) as "…places containing one or several culturally significant features, where one or more communities have a significant connection to

that feature. The term features is used here as shorthand for elements or objects in the landscape (such as a monument, heritage site, a beach or rock), places or areas (e.g. sacred places or historical sites), or the activities associated with either of these. Features may also be an ecosystem property (e.g. the migration of a species), or species themselves." (143).

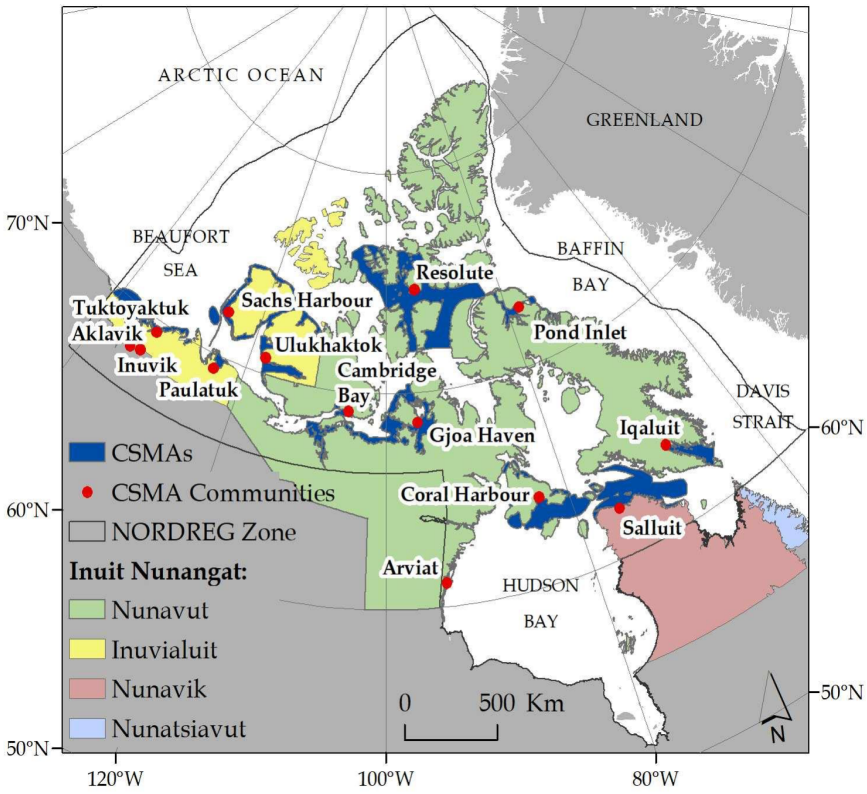

Figure 3: Culturally Significant Marine Areas and communities in Inuit Nunangat.

The data utilized for this report have been sourced from the Arctic Corridors and Northern Voices Research Project (ACNV). The ACNV project was established in 2014 in direct response to the vital need to consider local and Inuit knowledge in the low impact corridors across Arctic Canada (see www.arcticcorridors.ca for more information). The CSMAs identified in Figure 3 represent CSMAs during the open-water season (~ July to October) as identified by the 14 communities that participated in the project. CSMAs identified by community members during the non-open water season (November to June) are not discussed in this report.

Additional information about how these data were sourced is provided in the methods section in Appendix 2.

2.0. TOURISM VESSEL TRAFFIC IN INUIT NUNANGAT (1990-2018)

2.1. TEMPORAL AND SPATIAL TRENDS

To compare how tourism vessel traffic has changed over time in Inuit Nunangat, the recent past (2010-2018) was compared to a baseline period (1990-99). Detailed methodology can be found in Appendix 2. The number of kilometres travelled by both passenger ships and pleasure crafts within the Canadian Arctic (NORDREG Zone) increased significantly from 1990-99 to 2010-2018. Table 2 shows the kilometres

travelled by both passenger and pleasure crafts in the NORDREG Zone. The average distance travelled by passenger ships has more than doubled in 2010-2018 compared to 1990-99. The average distance travelled by pleasure crafts increased by nearly 4000% in 2010-2018 compared to 1990-99. Figure 4 shows the spatial trends in the change in average distance travelled for both passenger ships and pleasure crafts compared to 1990-99 and 2010-18. For passenger ships the greatest increase in distance travelled occurred mostly through the eastern and central section of the Northwest Passage. For pleasure crafts the greatest increase in average annual distance travelled occurred throughout the Northwest Passage. There was a slight decrease in the average annual distance travelled for passenger ships throughout some sections of the Canadian Arctic, specifically in Hudson Bay. This was likely linked to the closing of the Port of Churchill in 2016, which is located along the west shore of Hudson Bay in Churchill, Manitoba. Appendix 3 provides additional shipping figures that may be of interest.

Table 2: Distance travelled throughout the Canadian Arctic (NORDREG Zone) in early years (1990-99) and recent years (2010-18) for passenger ships and pleasure crafts

Region and Ship Type	Sum Distance travelled (Km) 1990-99	Sum Distance travelled (Km) 2010-2018	Distance travelled per year (km/yr) 1990-99	Distance travelled per year (km/yr) 2010-2018	Difference in distance travelled per year (km/yr)	**Factor increase in distance travelled per year**
Total NORDREG zone Passenger Ships	314,830	611,672	31,483	67,964	36,481	2.2
Total NORDREG zone Pleasure Crafts	15,974	570,437	1,597	63,382	61,784	39.7

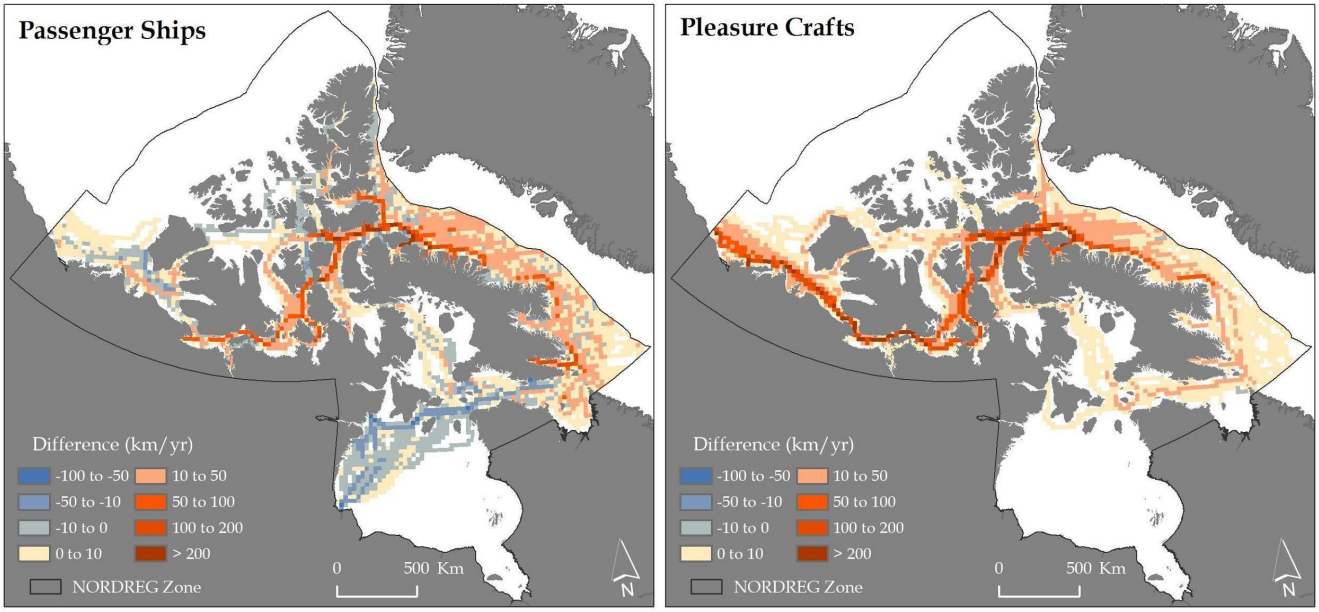

Figure 4: Difference in average annual distance travelled (km/yr) between 1990-99 and 2010-18, for passenger ships (left) and pleasure crafts (right), throughout the NORDREG Zone.

2.2. TOURISM VESSEL USE OF LOW IMPACT SHIPPING CORRIDORS

Table 3 shows the distance travelled by passenger ships and pleasure crafts both inside and outside the LISC. The LISC were first developed in 2014, then known as the Northern Marine Transportation Corridors (see *Low Impact Shipping Corridors* above) and prioritization of the corridors continues today. They have yet to be introduced for recommended marine use thus any travel within or outside the corridors is unintentional *per se*, however, we do point out that the LISC have been developed using similar resources e.g. bathymetry, ice data etc. that marine vessels would use for navigation, therefore overlap of use is not unexpected. Figure 5 shows the difference in average annual distance travelled between 1990-99 and 2010-18 by tourist vessels through the LISC. This shows some changes in spatial distribution, for example, and increase in tourist vessel travel through Inuvialuit Settlement Region and the Northwest Passage through Nunavut within the proposed LISC.

Approximately half of the distance travelled by both passenger ships and pleasure crafts occurred outside of the LISC, as shown in Table 4; and approximately half occurred within the LISC [1]. Thus, both passenger ships and pleasure crafts are essentially as likely to be travelling within the LISC as outside of the LISC.

Given the expeditionary nature of tourism vessels and the drivers behind NMTC/LISC placement, it is not surprising to see that passenger ships and pleasure crafts operators did not confine themselves to the LISC.

Table 3: Distance travelled inside and outside the LISC for 1990-99 and 2010-18.

Region and Ship Type	Sum Distance travelled (Km) 1990-99	Sum Distance travelled (Km) 2010-2018	Distance travelled per year (km/yr) 1990-99	Distance travelled per year (km/yr) 2010-2018	Difference in distance travelled per year (km/yr)	**Factor increase in distance travelled per year**
Inside LISC Passenger Ships	163,412	327,124	16,341	36,347	20,006	2.2
Outside LISC Passenger Ships	151,418	284,548	15,142	31,616	16,475	2.1
Inside LISC Pleasure Crafts	7,494	294,192	749	32,688	31,939	43.6
Outside LISC Pleasure Crafts	8,480	276,244	848	30,694	29,846	36.2

[1] We note here that the LISC area makes up 627,000km², while the area outside LISC (within the NORDREG zone) makes up a significantly larger marine area 2,982,170 km².

Table 4: Distance travelled inside and outside the LISC for 1990-99 and 2010-2018.

Region and Vessel Type	Distance travelled inside and outside LISC 1990-99 (%)	Distance travelled inside and outside LISC 2010-18 (%)
Inside LISC Passenger Ships	52%	53%
Outside LISC Passenger Ships	48%	47%
Inside LISC Pleasure Crafts	47%	52%
Outside LISC Pleasure Crafts	53%	48%

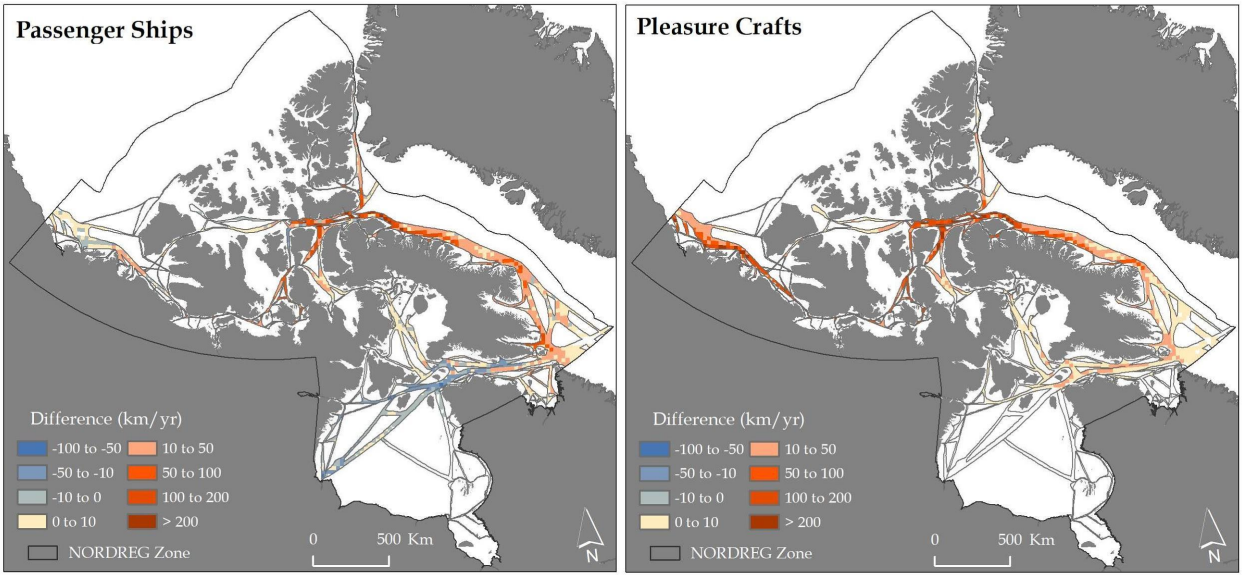

Figure 5: Difference in average annual distance travelled (km/yr) inside Low Impact Shipping Corridors between 1990-99 and 2010-18, for passenger ships (left) and pleasure crafts (right).

2.3. TOURISM VESSEL USE OF SIGNIFICANT AREAS

In the following section we identify specific areas of potential increased risk throughout the NORDREG zone that passenger ships and pleasure crafts may travel through. These areas of risk are described as Ecologically and Biologically Significant Areas (EBSAs) and Culturally Significant Marine Areas (CSMAs). Section 1.5.2 provides a brief description of these areas. While all vessels could be encouraged to avoid EBSAs and CSMAs, tourist vessels may specifically seek out these areas to visit as they could include areas of interest to them (e.g. areas that are home to significant numbers of marine wildlife, or areas of cultural significance). In this section, we also discuss cruise ship itinerary listings of shore locations as potential areas of increased risk. These are locations that are identified by cruise ship operators as areas of interest that might be accessed during the cruise (weather and time permitting). The use of and visitation to significant areas by tourism vessels can present many risks (e.g. conflict between community members and tourism vessels; disruption of subsistence hunting activities; impacts to wildlife). While these locations may not be considered areas of risk in and of themselves, they are of interest as they could become areas of risk if accessed by cruise ships and tourists.

2.3.1. TOURISM VESSEL USE OF ECOLOGICALLY AND BIOLOGICALLY SIGNIFICANT AREAS

As described in the methods section in Appendix 2, EBSAs are areas within Canada's oceans that have been identified through formal scientific assessments as having special biological or ecological significance when compared to the surrounding marine ecosystem.[2] EBSAs make-up just under 60% of the total NORDREG Zone. Table 5 shows the distance travelled by both passenger ships and pleasure crafts through EBSAs from 1990-99 and 2010-18. The findings on this table reflect the similar overall trend in increase in average annual distance travelled by both passenger ships and pleasure crafts from 1990-99 to 2010-18 (see Table 2). Figure 6 shows location of the EBSAs and the difference in average annual distance travelled through these areas comparing 1990-99 and 2010-18 for both passenger ships and pleasure crafts. As shown in this figure, there was a significant increase in average annual distance travelled by both passenger ships and pleasure crafts through some EBSAs, particularly those located along Lancaster Sound, near Pond Inlet, Nunavut and near King William Island in Kitikmeot Region, Nunavut. There was also a significant increase in distance travelled by pleasure crafts in EBSAs located in the western coast of the ISR in the Beaufort Sea. For passenger ships there was also an increase in average annual distance travelled through EBSAs along the more southerly east coast of Baffin Island.

[2] https://dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2011/2011_055-eng.html

Table 5: Distance travelled inside and outside Ecologically and Biologically Significant Areas (EBSAs) in 1990-99 and 2010-18.

Region and Ship Type	Sum Distance travelled (km) 1990-99	Sum Distance travelled (km) 2010-2018	Distance travelled per year (km/yr) 1990-99	Distance travelled per year (km/yr) 2010-2018	Difference in distance travelled per year (km/yr)	**Factor increase in distance travelled per year**
Inside EBSAs Passenger Ships	210,807	380,735	21,081	42,304	21,223	2.0
Outside EBSAs Passenger Ships	104,036	230,931	10,404	25,659	15,255	2.5
Inside EBSAs Pleasure Crafts	8,301	317,781	830	35,309	34,479	42.5
Outside EBSAs (Pleasure Crafts)	7,672	252,643	767	28,071	27,304	36.6

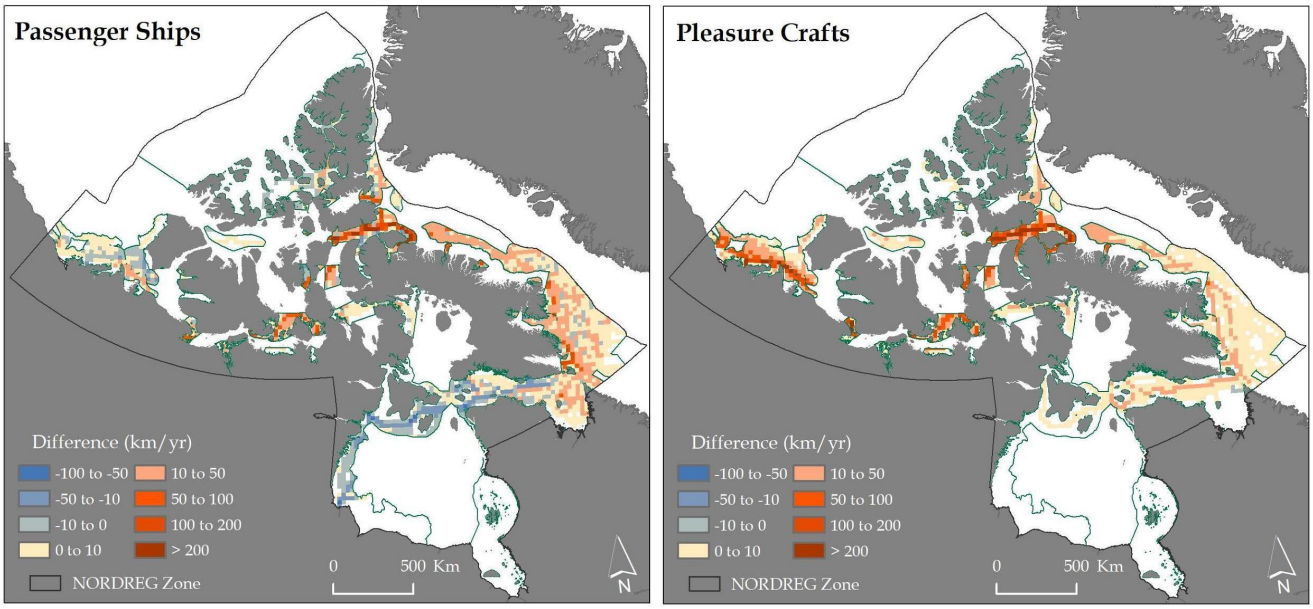

Figure 6: Difference in average annual distance travelled (km/yr) between 1990-99 and 2010-18 inside Ecologically and Biologically Significant Areas (EBSAs) by passenger ships (left) and pleasure crafts (right).

2.3.2. CULTURALLY SIGNIFICANT MARINE AREAS (CSMA)

The data for Culturally Significant Marine Areas (CSMAs) have come from the results of the Arctic Corridors and Northern Voices (ACNV) research project led by Dr. Jackie Dawson. The methods section in Appendix 2 describes how CSMAs were identified and documented. These areas represent information documented in 14 Arctic communities and therefore do not represent all of the potential CSMAs in the Canadian Arctic, they do however, provide a useful insight into how tourist vessel travel might overlap with areas identified by communities as being significant to them. These identified CMSAs currently make up 11% of the total

NORDREG Zone. Table 6 shows the distance travelled by passenger ships and pleasure craft inside and outside the CSMAs in 1990-99 and 2010-18. The findings in this table reflect the similar overall trend in increase in average annual distance travelled for both passenger ships and pleasure crafts from 1990-99 to 2010-18 (see Table 2). Similar to the EBSAs, the CSMAs that have experienced the most significant increases in average annual distance travelled are around Lancaster Sound, Pond Inlet and King William Island for both passenger ships and pleasure crafts. Figure 7 also shows that there has been a significant increase in the average annual distance travelled for passenger ships in CSMAs near Iqaluit and for pleasure craft in CSMAs near the western section of the ISR.

Table 6: Distance travelled inside and outside Culturally Significant Marine Areas (CSMA) in 1990-99 and 2010-18.

Region and Ship Type	Sum Distance travelled (Km) 1990-99	Sum Distance travelled (Km) 2010-2018	Distance travelled per year (km/yr) 1990-99	Distance travelled per year (km/yr) 2010-2018	Difference in distance travelled per year (km/yr)	**Factor increase in distance travelled per year**
Inside CSMA Passenger Ships	100,670	190,765	10,067	21,196	11,129	2.1
Outside CSMA Passenger Ships	214,173	420,900	21,417	46,767	25,349	2.2
Inside CSMA Pleasure Crafts	5,407	189,068	541	21,008	20,467	38.9
Outside CSMA Pleasure Crafts	10,567	381,580	1,057	42,398	41,341	40.1

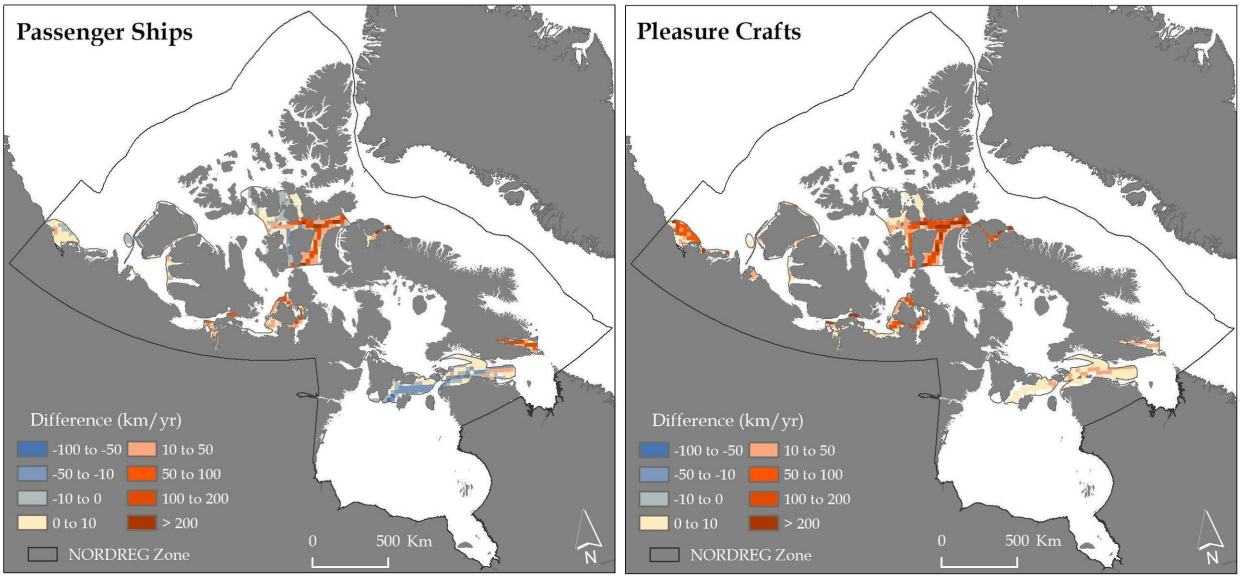

Figure 7: Difference in average annual distance travelled (km/yr) between 1990-99 and 2010-18 inside Culturally Significant Marine Areas (CSMAs) for passenger ships (left) and pleasure crafts (right).

2.3.3 CRUISE SHIP ITINERARY LISTINGS: ADVERTISED SHORE-LOCATION VISITS

From 2014 through 2019, cruise ship itinerary listings (i.e., advertised daily travel plans) featured 121 unique locations with 1025 planned shore-location visits. Appendix 4 shows these 121 locations divided into four categories, including 25 communities, 5 historic sites with protected area designation, 19 designated protected areas, and 72 other locations (without protected area designation e.g. fiords, islands). Data in this section are not limited to the NORDREG Zone as this analysis does not rely on daily ship location reports; rather it relies on advertised trip itineraries (which are not limited to NORDREG). Itineraries listed consisted of: one location in each of Manitoba and Yukon Territory, five locations in Nunavik, six locations in Nunatsiavut, 11 locations in the Inuvialuit Settlement Region, and 97 locations in Nunavut. Figure 8 shows the locations of the cruise ship itinerary listings from 2014 to 2019. Appendix 2 describes the methods used to identify these itinerary listings.

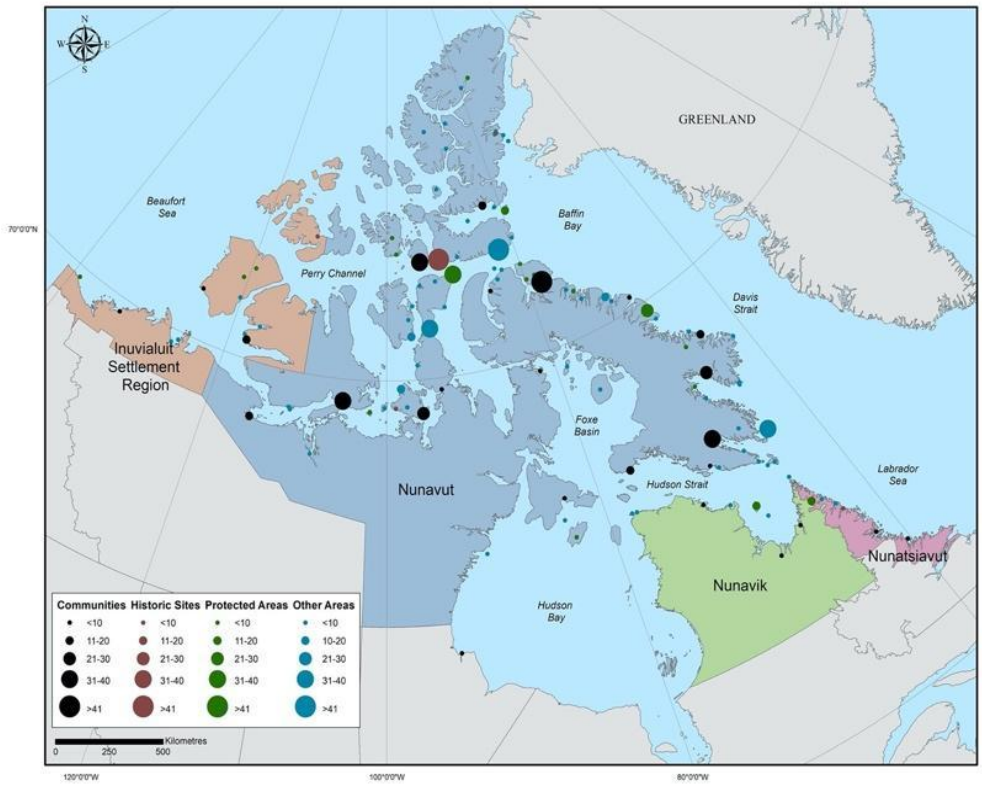

Figure 8: Number of Advertised Itinerary Listings per Shore Location 2014 to 2019.

Of the 121 shore locations visited by passenger ships since 2014, 79 (65%) had fewer than five planned visits and 31 locations (24 %) had only one planned visit between 2014 and 2019. These numbers reflect the infancy of the marine tourism industry in the Canadian Arctic, but they can also be attributed to the challenging nature of the environment and navigation in the Canadian Arctic. For example, while a location may have a stunning view, the fiord may not be favorable for navigation or the disembarkation of passengers may be challenging due to poor visibility, rough seas, rain, wind or the presence of polar bears, which may result in landing plans being revised or cancelled entirely. The number of locations with

planned visits ranged from 44 to 75 annually between 2014 and 2019, with the greatest number planned in 2017. The total number of planned visits on shore ranged from 131 to 192 annually; with the greatest number planned in 2019.

Figure 9 shows the cruise ship itinerary listings alongside CSMAs, EBSAs, and the LISC. A total of 46 (38%) cruise ship itinerary listings intersected with CSMAs, 23 (19%) cruise itinerary listings intersected with EBSAs and only 11 (9%) cruise itinerary listings intersected with LISC. This illustrates that a number of listings are located within culturally or ecologically and biologically significant areas, while fewer listings fall within the LISC.[3] This demonstrates that passenger vessels are transiting beyond the LISC to reach cruise itinerary listings.

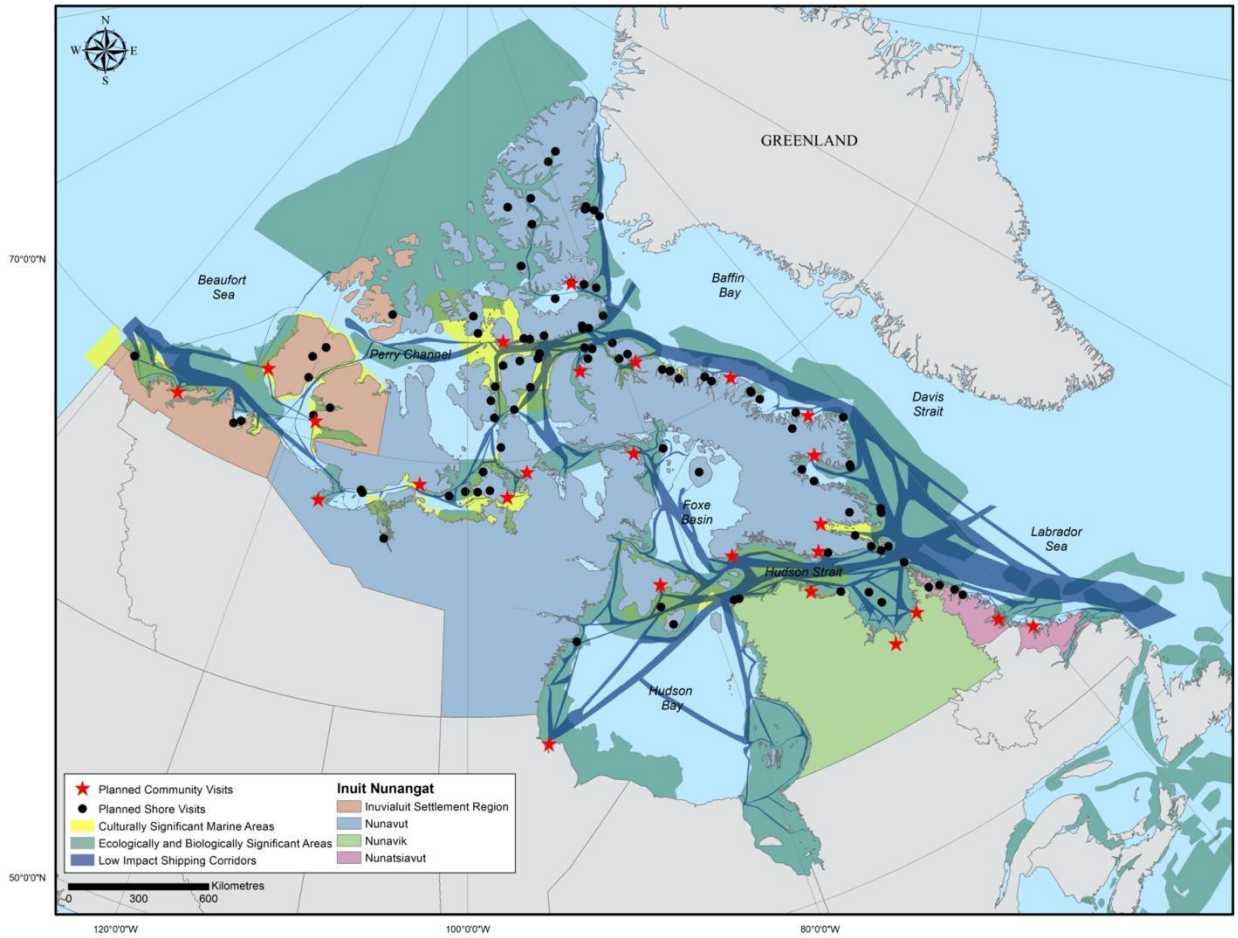

Figure 9: Culturally significant marine areas, ecologically and biologically significant areas, and the Low Impact Shipping Corridors overlaid with cruise itinerary listings from 2014 to 2019.

[3] It is likely that the overlap between EBSAs and cruise ship itinerary listings would increase significantly when taking into account that vessels have to travel through an EBSA to reach an itinerary listing that is located on-land. Tourist vessel travel through EBSAs can be seen in Figure 6.

3.0. COMMUNITY PERSPECTIVES ON TOURISM VESSELS IN INUIT NUNANGAT

In this section we present some of the findings of the Arctic Corridors and Northern Voices research project. The ACNV project involved 14 communities in three regions of Inuit Nunangat (Inuvialuit Settlement Region (6), Nunavut (7) and Nunavik (1)). Note that Nunatsiavut was not covered in the ACNV project. During workshops held in each of these communities, community members shared their perspectives about the risks of increased marine vessels traffic and the LISC as a management framework. This included discussions about tourism vessels such as cruise ships and pleasure craft. These findings are presented below. See Carter et al., (2019) and Dawson et al., (2020) for detailed information about the methodological approach of this project.

It is important to note that as a result of the research methods, which involved contributors self-identifying their community regions, the research does not cover all maritime areas of the federally-proposed LISC nor of the entire Canadian Arctic region. The recommendations that have emerged are limited to the areas that communities in this research project utilize, have knowledge about, and wished to share, and should not be considered regionally comprehensive. See www.arcticcorridors.ca to access the community reports.

Key concerns about tourism vessels identified by community members included: interference with marine wildlife and community travel, as well as pollution from tourism vessels; tourists' (mis)conduct at important sites and in communities; cultural misunderstandings; insufficient communication with tourism vessel operators; and lack of tourism benefits to local communities. The tourism-vessel-related concerns and management recommendations that were identified by our more than 130 project contributors are presented here (Table 7).

Table 7: Community-identified tourism vessel-related concerns and management recommendations.

Impacts to marine wildlife and environment	
Concerns	**Recommendations**
Tourism vessels interfere with marine wildlife (including migration) and harvesting while transiting and anchoring in sensitive areas	- Have local wildlife or environmental monitors onboard passenger ships who could identify areas to avoid thus helping to protect wildlife.* - Establish anchoring areas that will not disturb wildlife or harvesters.

Icebreaking (to support tourism vessels) negatively affects animal migration and community travel and hunting	- Prohibit all tourism vessel travel outside of the summer months (i.e. transit during open water only) to maintain safe travel conditions for Inuit, and avoid disruption of wildlife migration and harvesting (e.g. caribou).
Tourists lack an understanding of Inuit culture and way of life and sometimes invade community members' privacy or judge them (e.g. take unwanted photos, make judgmental comments based on assumptions)	- Have local cultural hosts onboard passenger ships to educate tourists about the communities, Inuit culture and way of life. This may stimulate tourists to purchase more local art and crafts.*
Tourists interfere with historic sites and artefacts during on-the-land excursions	- Have local cultural hosts onboard passenger ships to educate, guide, and monitor tourists regarding respecting the land, leaving it clean and undamaged, not walking on historic sites, and not removing artefacts.* - Limit the number of tourists allowed on land at a time, to minimize foot traffic impacts on historic and natural sites, and to make it easier to ensure tourists follow guidelines.
Tourists visit sites (on land, historic, cultural) outside of communities without communities' knowledge	- Restrict tourists to only visiting communities to ensure that tourists do not disturb areas outside of communities without community knowledge and cultural hosts. - Require tourism vessels to obtain permission to visit cultural sites. Some cruise ships already do this; this provides communities with control over who accesses the sites and the knowledge of how many people are visiting.
Pollution from tourism vessels	
Concerns	**Recommendations**
Marine vessels dump garbage, grey water and sewage which can impact the marine environment and food chain which affects people consuming country (wild) food	- Consult with vessel operators to make sure there is no dumping of garbage, sewage, grey water during travels.
Communication with tourism vessels	
Concerns	**Recommendations**

Tourism vessels impede community members' ability to successfully fish and hunt. Unknown vessels accessing the community or areas nearby pose safety concerns.	- Require tourism vessels to register with each community even if only passing through the community's (culturally significant) marine use area. Knowing where and when tourism vessels are transiting will enable community members to mitigate travel risks and choose alternate harvesting sites and times.
Not enough notice is given by passenger ships for communities to prepare for tourists.	- Passenger ships should provide adequate notice of their estimated arrival date to enable communities to prepare crafts and cultural performances.*
Pleasure crafts travel through the Canadian Arctic unannounced and do not have to notify anyone of their presence. They arrive in communities without notice and some engage in illegal and (or) dangerous behaviour which poses a risk to local safety.	- Increase Royal Canadian Mounted Police (RCMP) and Canada Border Services Agency (CBSA) presence. RCMP and CBSA should assist communities when unannounced pleasure crafts arrive and/or if security concerns arise.
Ensuring that tourism benefits local communities	
Concerns	**Recommendations**
Communities do not reap potential economic benefits from cruise ship tourists. Passenger ship tourists do not spend (much) money in communities.	- Enable increased numbers of community members to benefit from the economic opportunities (i.e. craft sales) that passenger ship tourists present through publicly-funded 1) training for artisans and crafters, and 2) infrastructure for cultural centres to attract investments and to support tourism.* - Employ community members as guides, drivers, crafters, and performers on passenger ships and during excursions.* - Encourage tourists to disembark and spend money in the town versus staying on the ship. *

*Source of income/economic benefit to community members.

4.0. MANAGEMENT OPTIONS

In this white paper, our findings have shown that the distance travelled by tourist vessels in the Canadian Arctic in the past 10 years is significantly greater than thirty years ago. We have also shown that passenger ships and pleasure crafts travel near equally within and outside LISC and travel extensively through EBSAs and CMSAs. Indeed, the very features that lead to CSMAs and EBSAs being designated as such, carry great appeal for passengers onboard passenger ships and pleasure crafts. Thus, while the LISC can support safer travel, infrastructure and prioritization, for 50% of the distance tourism vessels travel it is evident that enhanced management systems for passenger ships and pleasure craft are needed to mitigate risks when travelling outside of the LISC and within CSMAs and EBSAs. Moreover, local (Inuit) community perspectives must be considered in the development of those management systems through co-governance and other approaches, as must domestic and international codes and legislation.

Through our analysis we identified potential management options that could be implemented in addition to, or alongside, the LISC framework to create a more robust management approach that caters to tourism vessels travelling beyond the LISC and into areas designated as 'increased risk' such as EBSAs and CSMAs. The management options provided in Table 8 are based on the findings of this report, including the tourist vessel data and the community-based data. In addition, we have a drawn on successful existing regulatory approaches that have been implemented in Canada and internationally.

Table 8: Management options for tourism vessels travelling in Inuit Nunangat.

Management Options
Develop site specific guidelines for highly visited significant, sensitive shore locations
Site guidelines are codes of conduct for specific locations or areas which simultaneously allow for the possibility of great nature experiences while safeguarding the environment and cultural remains. Site guidelines that are already in place in Antarctica and Svalbard are a voluntary management mechanism, which have been highly effective in reducing impacts on sensitive shore sites across the Polar Regions. Shore locations that are highly visited and that are sensitive would benefit from site-specific guidelines to help ensure that visitors carefully conserve the natural and cultural heritage of the sites. Site guidelines are often used in Polar Regions in order to drive traffic to certain pre-selected sites/shore locations so that traffic can be managed. By default, sites that do not have established site guidelines are 'preserved' because they are not advertised. Highly visited and (or) significant sites across Inuit Nunangat, such as those presented in this report, should be identified and a series of site guidelines developed. The guidelines should include both interpretative/educational information as well as instructions for behavior and use and be integrated with any existing guidelines, for example, at protected sites. Existing guidelines from Antarctica and Svalbard can be used as a template and adapted for Inuit Nunangat. A booklet of site guidelines should be made available electronically through a range of sources (e.g., Regional Tourism Agencies, Territorial and Provincial Governments, and AECO websites) with hard copies available for purchase.

Develop community-visit codes of conduct (guidelines) to complement the site-specific guidelines

Codes of conduct should be developed by communities in collaboration with relevant stakeholders (e.g. government and operators) and once established should be reviewed annually in collaboration with communities. Existing guidelines from Pond Inlet, Nunavut (Appendix 5) and Sisimiut, Greenland (Appendix 6) and the Cruise Handbook for Svalbard (Norwegian Polar Institute 2015) should be adapted to a regional scale and distributed as needed for use in Inuit Nunangat communities and on passenger ships and pleasure crafts. Codes of conduct should reflect local priorities (e.g., guided-tour requirement, use of public washroom facilities, bargaining, interacting with dogs, photography and privacy preferences, export laws, traffic, and safety) and include maps and information about sites and attractions that visitors are welcomed to explore**.**

Enhance local monitoring programs to include ship observations

Monitoring programs are becoming very common across the Arctic and are generally used to observe wildlife patterns and environmental changes. The increasing number of vessels operating in Canadian Arctic waters and the vast geography of the region makes monitoring and enforcement for non-compliance among vessels very difficult. Informal and formal programs can be established whereby harvesters and other marine users can participate in ship monitoring and reporting. The Nunavut Tunngavik Incorporated (NTI) led Inuit Marine Monitoring Program Pilot Project could serve as a model for expansion to interested communities across Inuit Nunangat (NTI 2017).

Develop and adapt additional codes of conduct for use in Inuit Nunangat (e.g. travel outside of communities)

Shore locations (e.g. historic sites, protected areas, fiords) also require attention. If it is not possible to legally require operators to have paid Inuit guides/interpreters on board vessels operating in Inuit Nunangat, then this should be included in a code of conduct and highly encouraged as a voluntary measure. There are some examples, such as the AECO code of visitor conduct for Arctic regions or the World Wildlife Fund (WWF) codes of conduct for tourists and operators. It is also recommended that a series of wildlife viewing guidelines be established for the specific context of Inuit Nunangat.

Implement co-governance approaches involving Inuit

With the Government of Canada's revitalized commitments to renewing nation-to-nation, Inuit-to-Crown relationships, and upholding Indigenous legal traditions, there exists a unique opportunity to create innovative co-governance arrangements. Such arrangements must recognize the inherent jurisdiction of Inuit over coastal and ocean areas, and that Inuit and colonial governments jointly share decision-making authority through collective decision-making. Co-governance implementation will necessitate greater collaboration between federal, provincial, territorial and Inuit governments, and must take into account the livelihood, health and well-being of communities who depend on the ocean for their livelihood and way of life. Co-governed areas in Arctic marine areas such as Tallurutiup Imanga National Marine Conservation Area, and avenues being explored to establish a Canadian-Greenlandic management regime for Pikialasorsuaq (the North Water polynya) that is Inuit led can serve as a framework for developing these approaches (Inuit Circumpolar Council N.D).

Implement community-identified tourism vessel-related management recommendations

The recommendations made by community members related to tourism-vessel management in section 3.0. demonstrate ways in which Inuit knowledge can be incorporated and Inuit themselves can be involved in more meaningful ways. Not only will implementation of these recommendations ensure that tourism vessels are managed in effective, culturally appropriate ways and will potentially become a global example of respectful, sustainable tourism-vessel management in the global Arctic., they will also create and much-needed income and employment opportunities for Inuit.

Enhance tourism vessel tracking systems

Promote and support mechanisms to make Automatic Identification System (AIS) mandatory for all vessels, regardless of vessel size throughout Arctic Canada.

Adapt the Pew Charitable Trusts' 2016 integrated Arctic corridors framework as a foundation for tourism vessel management

In accordance with recommendations outlined above, develop a governance system for marine tourism that integrates human and vessel safety, Inuit rights, and environmental protection in order to provide Canada with a balanced and adaptable structure for managing tourism vessels (The Pew Charitable Trusts 2016). This co-governance system must be guided by three principles: 1) Develop and adhere to world-leading standards for human and vessel safety in Arctic waters; 2) Establish comprehensive protection for the Arctic marine environment and its wildlife; and 3) Fully and formally include Inuit in Arctic shipping policy creation and implementation. Additionally it will be important to 1) consult and meaningfully engage Inuit leadership and communities; 2) integrate information including shipping and ice data, wildlife migration routes, and human use, including Inuit traditional knowledge; 3) designate guidelines and policies that meet appropriate environmental standards for commercial shipping in ecologically and biologically sensitive areas; and 4) classify tourism-vessel management according to risk to ensure targeted investment in infrastructure and services and management of high-risk areas.

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APPENDICES

APPENDIX 1. MARITIME AND TOURISM VESSEL REGULATIONS

International Regulations

United Nations International Maritime Organization (IMO)

The IMO is a specialized agency of the United Nations that governs international maritime law. The IMO is the global standard-setting authority for safety, security, and environmental performance of international shipping (IMO, 2020a). International maritime governance measures cover all aspects of international shipping, including ship design, construction, equipment, manning, operation and disposal (IMO, 2020a).

IMO International Conventions

The IMO has four main conventions that form the foundation for multi-national maritime governance (Table A1).

Table A1: Notable International Maritime Organization Conventions.

Convention	Abbrev.	Description
United Nations Convention on the Law of the Sea	UNCLOS	Adopted in 1982, UNCLOS provides a comprehensive regime of law and order in the world's oceans and seas, establishing rules governing all uses of the oceans and their resources. It embodies in one instrument traditional rules for the uses of the oceans, while at the same time it introduced new legal concepts and regimes. It also provides the framework for further development of specific areas of the law of the sea.
International Convention for Safety of Life at Sea	SOLAS	Specifies the minimum standards for the construction, equipment and operation of ships, compatible with their safety. Flag states are responsible for ensuring that ships under their flag comply with SOLAS requirements, and a number of certificates are prescribed in the convention as proof of conformation.
International Convention for the Prevention of Pollution from Ships	MARPOL	The main international convention covering prevention and minimization of pollution of the marine environment by ships from routine operational or accidental causes.
International Convention on Standards of Training Certification and Watchkeeping	STCW	Focuses on the prescription of minimum standards related to training, certification, and watchkeeping for seafarers, which countries are obligated to meet or exceed.

The IMO has also introduced other conventions with applicability to tourism vessels, presented below.

Table A2: Additional International Maritime Organization Conventions.

Convention	Description
Convention on Search and Rescue	"Parties to this convention should establish search and rescue (SAR) regions within each sea area... [and] accept responsibility for providing SAR services for a specified area" (International Maritime Organization (IMO) 2019a). within those regions.
Convention on Oil Pollution Preparedness, Response, and Co-operation	"Parties to [this convention] are required to establish measures for pollution incidents either nationally or in cooperation with other countries . Ships are required to carry a shipboard oil pollution emergency plan...which must be coordinated with national systems for responding..., and [establish] stockpiles of oil spill combating equipment" (IMO 2019b) .
Convention on Civil Liability for Oil Pollution Damage	Ensures "adequate fair compensation is available to persons who suffer pollution damage from maritime casualties involving oil-carrying ships" (IMO 2019c). Under the convention liability is placed on the owner of the ship from which the polluting oil was discharged. (IMO 2019c)
Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter	Aims to promote the effective control of all sources of marine pollution and to take all practicable steps to prevent pollution of the sea by dumping of wastes and other matter (IMO 2019d).
Athens Convention relating to the Carriage of Passengers and their Luggage by Sea	"Establishes a regime of liability for damage suffered by passengers carried on a sea going vessel…[and carriers are liable] for damage or loss suffered by a passenger if the incident... occurred in the course of carriage and was due to the fault or neglect of the carrier" (IMO 2019e).

Polar Code

In addition to the conventions introduced above, the IMO also oversees maritime transportation management protocols or codes. The most significant code, as it relates to Arctic marine tourism, is the Polar Code – a binding international framework to protect the two polar regions (Arctic & Antarctic) from maritime risks. It stems from previous IMO documents, including voluntary guidelines, and was developed in full consideration of existing conventions that encompass maritime safety; however, the Polar Code increases protections from other conventions that did not adequately meet the unique operating risks in polar waters.

Table A3: Polar Code.

Convention	Description
International Code for Ships Operating in Polar Waters (Polar Code)	Entered into force in January 2017, the Polar Code is mandatory under both the International Convention for the Safety of Life at Sea (SOLAS) and the International Convention for the Prevention of Pollution from Ships (MARPOL). It applies to ships operating in Arctic and Antarctic waters. The Polar Code covers design, construction, equipment, operational, training, search and rescue and environmental protection matters relevant to ships operating in waters surrounding the two poles. The aim is to provide for safe ship operation and the protection of the polar environment by addressing risks present in polar waters and not adequately mitigated by other instruments.

Additional Guidance Documents

Three IMO- produced documents provide guidance for cruise vessel operators in polar regions as well as tourism-related commercial small vessels : *Guidelines for ships operating in Arctic ice-covered waters* (MSC/Circ.506 and A.1024 (26)) (IMO, 2010); *Guidelines on voyage planning for passenger ships operating in remote areas* (A.999 (25)) (IMO, 2008), and *Guidance for passenger ships operating in areas remote from SAR facilities* (MSC.1/Circ. 1184) (IMO, 2007).

Association of Expedition Cruise Operators (AECO)

AECO is an international association for expedition cruise operators in the Arctic that was founded in 2003. Conceived as a 'sister organization' to the established International Association of Antarctic Tour Operators (IAATO), AECO is dedicated to managing responsible, environmentally friendly, and safe tourism in the Arctic while setting the highest operating standards (AECO, 2020). Arctic Canada was included under AECO's jurisdiction in 2014. Membership to AECO is voluntary and members incur an annual membership fee. AECO offers its members " a broad industry contact network, operational coordination, industry meetings, newsletters and updates, access to resources, advice and many other activities" (AECO, 2020). It should be noted that membership is not necessarily limited to expedition cruise operators, and the organization encourages specialized pleasure craft charters and logistics teams to join.

Guidelines

As AECO matures, it continues to introduce additional requirements upon its members to ensure good standing and promote responsible operator behaviour. To date, the organization has created a host of guidelines that operators must follow during voyages. These include:

- "Visitor Guidelines;
- Yacht Guidelines;
- Clean Seas Guidelines;
- Community Guidelines;

- Vegetation Guidelines;
- Cultural Remains Guidelines;
- Wildlife Guidelines;
- Biosecurity Guidelines;
- Operational Guidelines; and
- Site Guidelines" (AECO, 2020).

Polar Field Staff Online Assessment

In 2017 AECO introduced a Polar Field Staff Online Assessment. This Assessment comprises three online exams that test field staff knowledge of pertinent regulations and the guidelines listed above (AECO, 2020) . Since staff in the field are generally those that make judgment calls relating to tourist behaviour, the Assessment aims to ensure competence in following all relevant rules and regulations. It should be noted, however, that the current iteration of the Assessment only includes questions on Svalbard and Greenland, with other jurisdictions currently in development.

Community Engagement Program

This program seeks to work directly with local communities to ensure "that expedition cruise tourism in the Arctic is carried out in partnership and dialogue" (AECO, 2020). AECO believes that engagement with the 'front lines' of expedition tourism helps to set expectations, improve considerations for local well-being, and allows for mutual benefits. The organization has created a Community Engagement Toolkit that can be utilized during sessions, and also encourages the co-creation of Community-Specific Guidelines to empower communities to create their own rules for tourist behaviour.

Canadian National Regulation

Shipping in the Canadian Arctic falls under a "joint-management model" whereby a variety of federal, provincial, and territorial government departments and agencies, along with Indigenous and local communities, and regulatory boards are involved (Transport Canada, 2017). Therefore, no single regulatory organization is responsible for all aspects of Arctic passenger vessel operations (Transport Canada, 2017).

Transport Canada's Arctic shipping responsibilities include, though not limited to: marine safety; vessel pollution prevention; and maritime security (Transport Canada, 2017). In addition, Transport Canada oversees Arctic specific regulations focused on: vessel reporting; vessel design; equipment carriage; vessel-ice interaction; crew training; communications; on-board procedures and operations; and protection of the marine environment. The Canadian Coast Guard's Arctic Shipping responsibilities include, though not limited to: icebreaker escort; search and rescue (in conjunction with the Canadian Armed Forces); vessel traffic management, position reporting, and other communications; and pollution incident response. Several other federal departments are involved in shipping and marine tourism in the Canadian Arctic including: Department of Fisheries and Oceans, Canadian Hydrographic Services, Canada Border Services Agency, Royal Canadian Mounted Police, Department of National Defense, Environment

and Climate Change Canada, Canadian Wildlife Services, Parks Canada Agency, and Public Health Agency Canada.

Table A4: Canadian Federal Acts.

Act	Department	Description
Oceans Act	Department of Fisheries and Oceans	Provides a framework for modern and future ocean management initiatives and calls for the Minister of Fisheries and Oceans to lead and facilitate the development of a national ocean management strategy (Government of Canada, 2017a). It has a principle-based approach, premised on collaboration and co-operation, and respect for assigned constitutional and legislative responsibilities, including existing Indigenous and treaty rights (Government of Canada, 2017a).
Fisheries Act	Department of Fisheries and Oceans	Ensures the protection of fisheries and their ecosystems.
Migratory Bird Conservation Act	Department of Fisheries and Oceans	Provides the authority to pass and enforce regulations to protect those species of birds that are included in the Convention.
Arctic Waters Pollution Prevention Act	Transport Canada	Aims to prevent pollution in Canadian Arctic waters (Government of Canada, 2012). It is a zero-discharge act, which states "no person or ship shall deposit or permit the deposit of waste of any type in the Arctic waters" (Government of Canada, 2012). 'Arctic waters' refers to the internal waters of Canada and the waters of the territorial sea of Canada and the exclusive economic zone of Canada, within the area enclosed by the 60th parallel of north latitude, the 141st meridian of west longitude and the outer limit of the exclusive economic zone; however, where the international boundary between Canada and Greenland is less than 200 nautical miles from the baselines of the territorial sea of Canada, the international boundary shall be substituted for that outer limit.
Canada Shipping Act, 2001	Transport Canada	Principal legislation "governing the safety of marine transportation and recreational boating and the s protection of the marine environment" (Government of Canada, 2017b).
Marine Liability Act	Transport Canada	Requires that the owners and/or operators of vessels are responsible and liable for their vessels and the consequences of their operation (Government of Canada, 2013a).
Marine Transportation Security Act	Transport Canada	Provides for the security of marine transportation and applies to marine facilities in Canada and Canadian ships outside Canada (Government of Canada, 2013b).
Navigable Waters Protection Act	Transport Canada	Protects the public right to navigate and ensure a balance between public right and need to build works which may obstruct navigation (Government of Canada, 2013c)
Coasting Trade Act	Transport Canada, Canada	Supports domestic marine interests by "reserving the coasting trade of Canada to Canadian registered duty paid vessels.. provides a process to temporarily import a foreign or non-duty

	Border Services Agency	paid vessel under a coasting trade licence when a suitable Canadian- registered duty paid vessel... is not available" (Government of Canada, 2013d). This also applies to carrying passengers. In this case duty taxes under *Customs Tariff* and *Excise Tax Act* apply (Government of Canada, 2013d).
Canadian Environmental Protection Act	Environment and Climate Change Canada	"An Act respecting pollution prevention and the protection of the environment and human health in order to contribute to sustainable development" (Government of Canada, 2019).
Species at Risk Act	Environment and Climate Change Canada	The purpose is to prevent wildlife species from disappearing, to provide for the recovery of wildlife species that are extirpated (no longer exist in the wild in Canada), endangered, or threatened as a result of human activity, and to manage species of special concern to prevent them from becoming endangered or threatened (Government of Canada, 2016).
Canada National Parks Act	Parks Canada	Ensures that Canada's national parks, national historic sites and related heritage areas are protected and presented for current and future generations (Parks Canada, 2018).

Table A5: Canadian Federal Regulations.

Act	Department	Description
Arctic Shipping Safety and Pollution Prevention Regulations	Transport Canada	Key features include: incorporating the content of the Polar Code; inclusion of zone/date system, the Arctic Ice Regime Shipping System, and the Polar Operational Limit Assessment Risk Indexed System; requirements for certain vessels that intend to operate in areas with low air temperatures; and a complete prohibition on the discharge of waste generated onboard the vessel except where authorized (Transport Canada, 2017).
Northern Canada Vessel Traffic Services Zone Regulations	Transport Canada	The regulations implement the requirements for ships to report information prior to entering, while operating within, and upon exiting Canada's northern waters, and are intended to enhance Canada's ability to facilitate the safety of ships, crew and passengers, while safeguarding the unique and fragile Arctic marine environment.
Long-Range Identification and Tracking of Vessels Regulations	Transport Canada	Regulations that satisfy Canada's obligation as a contracting state to SOLAS, requiring that certain passenger and cargo vessels transit long-range identification and tracking information to other participating states.
Marine Transportation Security Regulations	Transport Canada	Provides a framework to detect security threats and take measures to prevent security incidents that could affect marine vessels and their facilities.
Charts and Nautical Publications Regulations	Transport Canada	Provide official charts for navigation.

Shipping Safety Control Zone Orders	Transport Canada	The Zone / Date System in which the Arctic waters are divided into sixteen *Shipping Safety Control Zones*, with a schedule of earliest and latest entry dates for each zone corresponding to specific categories of vessels.
Anchorage Regulations	Transport Canada	Regulations respecting the anchoring of ships in certain prohibited waters.
Collision Regulations	Transport Canada	Govern marine traffic behaviour and patterns to reduce the risk of collisions at sea.
Navigation Safety Regulations	Transport Canada	Ship requirements relating to navigational safety and equipment help to ensure that ships navigate and operate safely, avoid collisions and groundings, and that navigational errors are minimized. There are navigation equipment carriage requirements and operational requirements to enhance navigational safety.
Life Saving Equipment Regulations	Transport Canada	Regulations concerning lifesaving appliances on board vessels.
Marine Personnel Regulations	Transport Canada	Regulations concerning requirements for certification and training of crew onboard vessels.
Steering Appliances and Equipment Regulations	Transport Canada	Regulations related to steering and operation of the vessel.
Ballast Water Control and Management Regulations	Transport Canada	This was established as an ongoing attempt to keep foreign species out of Canada's marine ecosystem.
Voyage Data Recorder Regulations	Transport Canada	Passenger ships and ships other than passenger ships of 3000 gross tonnage and upwards constructed on or after 1 July 2002 must carry voyage data recorders (VDRs) to assist in accident investigations, under regulations adopted in 2000, which entered into force on 1 July 2002.
Marine Mammal Regulations	Department of Fisheries and Oceans	Prevents the disturbances of marine mammals, except for when fishing for marine mammals under the authority of the regulations.

Legislative Reporting Requirements

Table A6: Arctic-Specific Reporting Requirements **(Table verbatim from Transport Canada, 2020 page 3).**

Northern Canada Vessel Traffic Services Zone Regulations (NORDREG)	*Arctic Shipping Safety and Pollution Prevention Regulations* (ASSPPR) Arctic Ice Regime Shipping System (AIRSS) Polar Operational Limit Assessment Risk Indexing System (POLARIS)
- 300 gross tonnes (GT) or more	- 300 GT or more

- Engaged in towing or pushing another vessel, with combined GT of 500 or more - Carrying a pollutant or dangerous goods as cargo, or towing or pushing such a vessel	- Engaged in towing or pushing another vessel, with combined GT or 500 or more - Carrying pollutants or dangerous goods, or towing or pushing such a vessel
Report to Canadian Coast Guard: - Sailing Plan - Position - Final - Deviation Minimum of one report per 24 hrs is required	Report to Transport Canada and be provided to Marine Communications and Traffic Services (MCTS) Iqaluit: - Ice class - Final destination - Intended route - Ice regime(s) to be encountered - Ice Navigator(s) details AIRSS reporting can potentially only be required once.

Figure A1: Canadian Shipping Safety Control Zones (left) and NORDREG Zone (right). Source: Transport Canada, 2020 page 4).

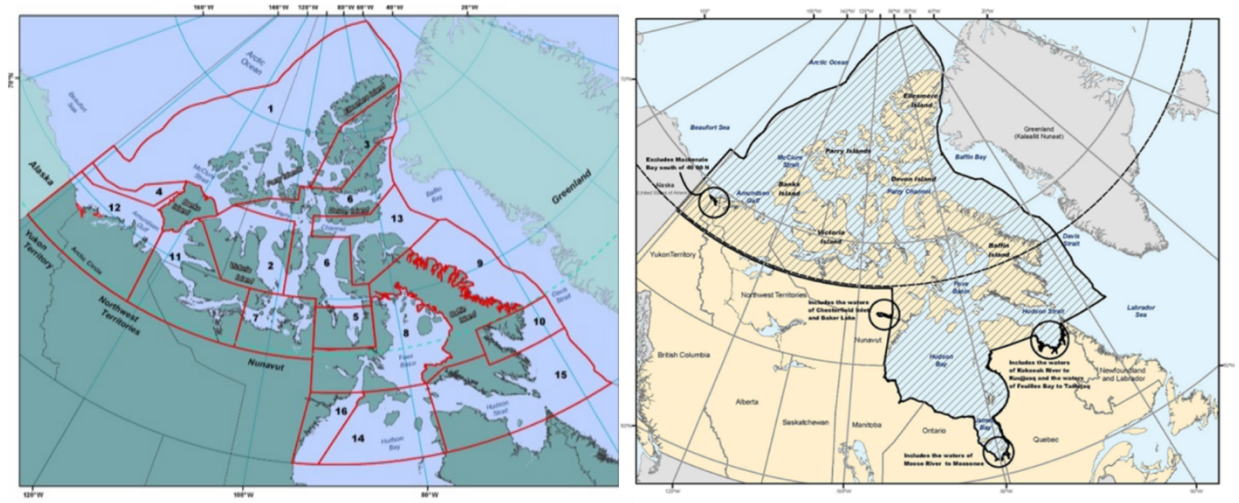

Table A7: Non-Arctic-Specific Reporting Requirements (Table verbatim from Transport Canada, 2020 page 5).

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Vessel Traffic Management Information System (Identified as INNAV in Canada)	Long-Range Identification and Tracking of Vessels Regulations (LRIT System)
- One way to provide pertinent information on marine traffic to Marine Communications and Traffic Services (MCTS) - System mainly used by MCTS operational centres	- Apply to Canadian vessels everywhere if they are engaged on international voyages and are cargo vessels of 300 gross tonnes (GT) or more, or passenger vessels (carrying 12 passengers or more) - Do not apply to pleasure crafts or government vessels
Examples of information available: - Vessels' current position, origin, destination, estimated arrival time, passage times at specific points, source position, etc. - Detailed itineraries - Detailed movement reports	- Requires vessels to be fitted with LRIT equipment - Equipment automatically transmits the vessel's identity; position (latitude and longitude); and date/time of transmission
Implementation of IMO International Automatic Identification System (AIS) Carriage Requirements via the Navigation Safety Regulations	Marine Transportation Security Regulations
Class 'A' AIS carriage requirements Current regime: - Vessels >150 GT and carrying >12 passengers on an international voyage - Vessels >300 GT on and international voyage (excluding fishing vessels) - Domestic vessels >500 GT Forthcoming amendments to also include: - Vessels (not on a sheltered waters voyage) that carry >12 passengers or are >8 m and carry passengers	- Vessels in Canada - All Canadian ships outside Canada (both International Convention for the Safety of Life at Sea (SOLAS) and non-SOLAS) Report to Canadian Coast Guard: - Pre-Arrival Information Report (96 hrs) - If there is a change, must be reported to the Minister

Territorial Regulations

<u>Land Claims Agreements</u>

A significant portion of the Canadian Arctic is subject to comprehensive Land Claims Agreements that include regulatory processes. Land Claim Agreements include: The Nunavut Agreement; Inuvialuit Final Agreement; Nunavik Inuit Land Claims Agreement; Eeyou Marine Region Land Claim Agreement; Labrador Inuit Lands Claim Agreement; and the Yukon Land Claim Agreement (Transport Canada, 2017). Several of these

agreements have established independent co-management boards for: land use planning, environmental screening; land/water licensing; and fish and wildlife management.

NUNAVIK INUIT LAND CLAIMS AGREEMENT (NILCA)

The *Nunavik Inuit Land Claims Agreement* covers the southern portion of Hudson Strait, including Ungava Bay, Manse Island and wraps around the eastern coastline of Hudson Bay into James Bay near the community Chisasibi, Quebec.

Through this agreement the Nunavik Marine Region Planning Commission (NMRPC) was established. The NWRPC mandate is to create priorities and policies for the Nunavik Marine Region (NMR). The NMRPC strives to use and adopt the Nunavik Planning Commission (NPC) rules and by-laws whenever possible. Marine vessel operators are asked to contact the NMRPC for information about processes, authorizations and permits. In Hudson Strait, some islands are managed jointly by Nunavik and Nunavut. The Nunavik Marine Region Impact Review Board (NMRIRB) and the Nunavik Impact Review Board (NIRB) coordinate activities happening along or in overlapping jurisdictional borders through a Memorandum of Understanding. (Transport Canada 2017b).

LABRADOR INUIT LAND CLAIMS AGREEMENT (LILCA)

The *Labrador Inuit Land Claims Agreement* outlines who is permitted to access Labrador Inuit Lands, and the conditions and reasons under which access is permitted. Use and access are managed by The Nunatsiavut Government Lands Division. To protect against land and resource use deemed inappropriate, and to enhance agreement compliance, a land administration system is being developed by The Lands Division. Marine vessel operators are invited to contact the Lands Division for information (Transport Canada 2017b).

INUVIALUIT FINAL AGREEMENT (IFA)

In 1984, the Inuvialuit Final Agreement was the first comprehensive land claim agreement signed north of the 60th parallel, covering approximately 20% of the Canadian Arctic. The core principles expressed by the Inuvialuit and recognized by Canada in concluding this Agreement are:

1) To preserve Inuvialuit cultural identity and values within a changing northern society;
2) To enable Inuvialuit to be equal and meaningful participants in the northern and national economy and society; and
3) To protect and preserve the Arctic wildlife, environment and biological productivity.

The IFA provides overarching principles for all activity taking place in the ISR including the commercial and non-commercial activities of small vessels. The IFA affords Inuvialuit in the region decision-making power and oversight of some elements of tourism development, management, and regulation occurring in the

ISR. The Environmental Impact Screening Committee (EISC) is the 'gate-keeper' under the IFA and must be contacted by all commercial operators approximately 150 days in advance of operation. No permit or licence for commercial tourism operations can be issued without final approval from EISC[4]. Note that vessels that are not carrying fare-paying passengers (i.e.: non-commercial pleasure craft) are exempt from the EISC screening process.

The ISR boundaries cross two territorial jurisdictions, the Northwest Territories and the Yukon. Non-commercial Pleasure Crafs are allowed to travel freely with limited obligation to communicate their location or planned itinerary. However, commercial yacht (pleasure craft) operators must contact each community they plan to visit and provide proof of consultation as part of the Environmental Impact Screening Committee process. A Tourism Operator's License to conduct commercial, guided tourism activities in the NWT must also be obtained as required by the *Tourism Act* (NWT Department of Tourism, Industry and Investment TII). Depending on the planned voyage itinerary, operators may also need to obtain; an Archaeological and Heritage Site Permit; a Land Use Permit for commercial activities on private Inuvialuit lands; a permit to visit Territorial Parks and Wildlife Sanctuaries[5].

THE NUNAVUT AGREEMENT (NA)

Signed in 1993, the Nunavut Agreement covers roughly 45% of the Canadian Arctic. All vessels planning to visit the territory must submit relevant project application to Nunavut's Institutions of Public Government (IPG).

- Nunavut Planning Commission (NPC)

NPC will screen projects to determine whether activities conform to any applicable land use plans and whether the proposal requires screening by the Nunavut Impact Review Board. Should screening be required, NPC will forward the project proposal and associated determinations to NIRB.

- Nunavut Impact Review Board (NIRB)

Generally, vessels planning to visit Nunavut will seek to access cultural, heritage or other conservation areas. When accessing these types of areas, these activities are considered projects under the *Nunavut Planning and Project Assessment Act* (NuPPAA). No further permits, licences, or approvals may be granted until the project assessment phase has been completed.

Regional Inuit Associations

There are three Regional Inuit Associations in Nunavut: Qikiqtani Inuit Association, Kivalliq Inuit Association, and Kitikmeot Inuit Association. Once a project has been screened and approved by NPC/NIRB, it must then be forwarded to the relevant Regional Inuit Associations. This may require additional translation of certain sections and will require approval from impacted Community Lands and

[4] see pages 11-13 in Guidelines for Passenger Vessels Operating in the Arctic (*https://www.tc.gc.ca/media/documents/marinesafety/tp13670e.pdf).*

[5] see pages 9-11 in "Guidelines for Passenger Vessels Operating in the Arctic" (*https://www.tc.gc.ca/media/documents/marinesafety/tp13670e.pdf).*

Resources Committees. Upon approval of project activities, Access Permits for Inuit-Owned Lands may be issued.

Table A8: Government of Nunavut Regulations.

Requirement	Department	Description
Outfitter Licence	Economic Development & Transportation	Licence required to carry out tour operations in the territory
Consent to Public Disclosure of Tourism Information	Economic Development & Transportation	Requirement to be listed in the Government of Nunavut's publicly available database of tourism operators, outfitters, and establishments. Information is circulated to community contacts to allow residents and local committees to prepare for upcoming tourism season.
Pre-Trip Economic Benefit Reports Post-Trip Economic Benefit report	Economic Development & Transportation	Pre-trip form should estimate the expected ship expenditures for each planned community visit Post-trip form should note the actual level of expenditures in each community visited.
Certificate of Compliance as an Extra-Territorial Corporation	Justice	All entities carrying out business in Nunavut are required to be registered in the Corporate Registry.
Archaeology and Paleontological Site Visitation Permit	Culture and Heritage	A Class 1 permit is a "non-intervention permit" that strictly prohibits any distribute of a site – essentially a "look but do not touch" permit. Application is forwarded to the Inuit Heritage Trust who reviews, translates, and forwards the application to communities along the planned itinerary. The assessment is returned to the IHT, who forwards the application to the Department of Culture and Heritage for final approval.
Territorial Parks Use Permit	Environment	Required for groups of 10 or more people intending to access any Nunavut Park. May require community support from the local hamlet office, Hunters and Trappers Organization (HTO) or Community Lands and Resource Committee (CLARC) and may require comprehensive liability insurance – minimum coverage $2 million
Wildlife Observation Licence	Environment	Required if the intent is to film, photograph or otherwise observe wildlife anywhere in Nunavut, an activity description is required

APPENDIX 2. METHODS

A quantitative and qualitative analysis of tourism-related marine vessel traffic was conducted including:

1. The temporal and spatial historic ship traffic patterns for passenger vessels (cruise ships) and pleasure crafts (yachts) comparing 1990-99 and 2010-18;
2. The extent to which tourism vessels have intersected with Ecologically and Biologically Significant Areas (EBSAs) in 1990-99 and 2010-18;
3. The extent to which tourism vessels have intersected with Culturally Significant Marine Areas (CSMAs) in 1990-99 and 2010-18;
4. The extent to which tourism vessels have utilized Low Impact Shipping Corridors since their implementation in 2014;
5. Inuit community-identified concerns and recommendations for tourism vessels; and
6. The usefulness of Low Impact Shipping Corridors, including discussion of alternative and/or supplementary management options. Here 'usefulness' relates to the corridors' support or lack thereof of tourism vessels based on spatial locations of historic traffic, identified EBSAs and CSMAs and also on existing regulatory mechanisms that are in place for smaller vessels (pleasure crafts) and expedition cruise ships (small passenger vessels).

Six regional datasets were used for this analysis including Low Impact Shipping Corridors, Ecologically and Biologically Significant Areas (EBSAs), Culturally Significant Marines Areas (CSMAs), Community-Identified Concerns and Management Recommendations for Tourism Vessels Cruise Ship Itinerary Listings for Planned Shore-location Visit and the NORDREG Ship Activity Database. Descriptions of the data sets and sources are summarized in Table A11 and are also described in detail, below.

Table A9: Regional datasets and related shapefiles used.

Dataset	Data Source	Description
Low Impact Shipping Corridors	Canadian Hydrographic Service, Department of Fisheries and Oceans Canada	Recommended shipping routes that will provide the infrastructure, navigational support and emergency response services needed for safer marine navigation, while respecting the environment and local ecology and cultures. See also section 1.5.1.
Ecologically and Biologically Significant Areas	Open Government Data Portal Department of Fisheries and Oceans Canada	A total of 38 areas within Canada's oceans that have been identified through formal scientific assessments as having special biological or ecological significance when compared with the surrounding marine ecosystem. https://open.canada.ca/data/en/dataset/d2d6057f-d7c4-45d9-9fd9-0a58370577e0

Culturally Significant Marine Areas	Arctic Corridors and Northern Voices Research Project 14 community workshops	Culturally significant [marine] areas are community-identified areas containing one or several culturally significant features e.g. sacred places or historical sites, or important marine wildlife area. Data were documented with 14 Arctic communities during the Arctic Corridors and Northern Voices Research Project. For more information visit www.arcticcorridors.ca
Community-Identified Concerns and Management Recommendations for Tourism Vessels	Arctic Corridors and Northern Voices Research Project 14 community workshops	Concerns and management recommendations for tourism vessels were documented with 14 Arctic communities during Arctic Corridors and Northern Voices Research Project. For more information visit www.arcticcorridors.ca
Cruise Ship Itinerary Listings for Planned Shore-location Visit	Comprehensive Internet Search	An internet search was performed annually to record locations listed (i.e. locations cruise ships planned to disembark passengers). A database was created containing information on: location, date of planned visit, and name of vessel. Ice, weather and operational difficulties can cause ship operators to change plans, often at the last minute (Stewart et al., 2010). It is important to note that the database includes itinerary listings as advertised, and not confirmed visits to the sites.
NORDREG Ship Activity Database	Canadian Coast Guard Ship Archive (1990-2018)	This database includes detailed information including: voyage ID (ship name); start and end date of voyage; kilometres travelled; IMO number; flag; vessel class; length; draught; and ice class.

Ecologically and Biologically Significant Areas

A total of 38 EBSAs were broadly identified, mapped and described within five of Canada's Arctic marine biogeographic units: the Hudson Bay Complex, Eastern Arctic, Western Arctic, Arctic Basin and Arctic Archipelago (Please see https://waves-vagues.dfo-mpo.gc.ca/Library/344747.pdf for additional information on how these EBSAs have been identified and by whom). The identification and evaluation of EBSAs considered a number of published local and traditional ecological knowledge reports. However, it was recognized that more detailed knowledge held by the Indigenous Peoples in the North would likely add to or further refine the boundaries of Arctic EBSAs. Given the limitations of the current process and the array of changes that are expected to occur in Arctic ecosystems (e.g. climate change), further work is needed to refine boundaries and potentially identify more specific areas within each of these broadly identified EBSAs. Future re-evaluations are critical to ensure management decisions are made with the best available information.

Community-Identified Culturally Significant Marine Areas (CSMAs) and Concerns and Recommendations for Tourism Vessel Management

CSMAs were identified by community members from 14 communities who participated in the Arctic Corridors and Northern Voices research project. These communities span three settled land claims regions within Inuit Nunangat including, six (all) from the Inuvialuit Settlement region (ISR); Aklavik, Inuvik, Paulatuk, Sachs Harbour, Tuktoyaktuk, and Ulukhaktok; seven from Nunavut (which consists of three different regions – Kivalliq, Kitikmeot, Qikiqtaaluk): Arviat, Cambridge Bay, Coral Harbour, Gjoa Haven, Iqaluit, Pond Inlet, and Resolute; and one from Nunavik: Salluit. In each community participatory mapping workshops, interviews, results validation, and results sharing exercises were conducted (see Carter et al., 2019 and Dawson et al., 2020 for further explanation of the project methods and framework). Expert community members who participated in the workshops and interviews were identified by local organizations that were familiar with community members. Workshop participants identified areas as significant (i.e. wildlife habitat areas; local harvesting and camping sites; local travel routes; and other meaningful areas) which were then classified as CSMAs to include areas where both human activities and marine wildlife activities occur. These areas were documented on maps and digitized by researchers.

CSMAs include areas where both human activities and marine wildlife activities occur. One is not considered more important than the other. Human activities in the marine environment during open, freeze-up, frozen, and break-up stages include harvesting and fishing a variety of marine animals, hunting areas, and travel areas and routes. Other culturally significant areas include cabins, historical sites, camping, and burial sites. The vast majority of these occur on land so therefore very rarely in the marine areas. Wildlife activities include all marine wildlife and land wildlife during freeze-up, frozen, and break-up stages as identified by community members. Some communities identified the different activities such as breeding, calving, feeding, and migrating. For more information about culturally significant areas, please see the community reports available at: www.arcticcorridors.ca. There are approximately 51 coastal Arctic communities that utilize the Canadian Arctic marine environment. These data represent the responses of experts in 14 communities that participated in the ACNV study. The 14 communities

discussed culturally significant areas within self-identified community boundaries. There are many areas of the Canadian Arctic where culturally significant areas have not yet been identified.

Methods for calculating shipping activity

a) Database for shipping activity (1990-2018)

The dataset used for this analysis was produced from the archive of Canadian Coast Guard (CCG) Northern Canada Vessel Traffic Services Zone (NORDREG Zone) ship data (1990 – 2018). Within the NORDREG Zone, vessels provide daily reporting of their position and other information to the CCG Marine Communications and Traffic Services (MCTS). This reporting is required for vessels of 300 gross tons or more; vessels that are towing or pushing another vessel if the combined gross tonnage is 500 tons or more; or, if the vessel cargo contains a pollutant or dangerous good, or the ship is towing a vessel that contains a pollutant or dangerous good (CCG, 2021). Data within the NORDREG Zone also includes vessels that fall outside of these categories through voluntary reporting. Rompkey and Cochrane (2008) report that 98% of all ships operating in the NORDREG zone provide a report. The dataset was created by combining position reports for every vessel in the NORDREG Zone between 1990 and 2018 (see Pizzolato et al. 2014; 2016). There were more than 1200 unique vessels operating in this region, resulting in over 100,000 reports. From the reports, ship tracks were modelled using a least-cost path (LCP) approach, which is based on weighted cost surfaces of total sea ice concentration, bathymetry, and distance from land, as described in Pizzolato et al (2014, 2016). The vessel types selected for this study are passenger ships and pleasure crafts as classified according to the Arctic Marine Shipping Assessment (AMSA) (Arctic Council 2009).

b) Changes in shipping over time

Using ArcGIS (ESRI), LCP-derived ship tracks were used to calculate distances travelled by the passenger ships and pleasure crafts within 25-km grid cells based on the National Snow and Ice Data Center Equal-Area Scalable Earth Grid (EASE-Grid 2.0) projection. For this report, to show change in vessel traffic over time, we compared the recent past (2010-2018) to a baseline period (1990-1999). Grids were produced to show the average annual distance travelled during the two time periods to show change over time. For example, a grid for the average annual distance travelled between 2010-18 was calculated based on the sum of all ship track lengths within each grid cell during this time period, divided by the number of years. A grid for the average annual distances travelled between 1990-99 was also calculated, and then subtracted from the average annual distances travelled in 2010-18. This resulted in a grid that shows the difference between the early and recent time periods, which was used in the maps for NORDREG Region-wide, as well as for the regional maps. Results in the tables and graphs were calculated not from the grids, but from the sum of the ship track lengths within the relevant time periods and regions. The ship tracks were clipped to regional boundaries to calculate distances travelled both inside and outside the regions (N.B. 'outside' the region is the NORDREG regional limit minus the applicable region). Note that, due to data availability, 2019 was excluded, and therefore the two compared periods are not the same length. However, data is presented as distance per year, averaged over the number of years in each period, so the results are directly comparable.

Methods for analyzing community recommendations data

Qualitative data were collected during focus-groups and interviews in 14 different Canadian Arctic communities as part of the Arctic Corridors and Northern Voices project (www.arcticcorridors.ca). See Carter et al. (2019) and Dawson et al. (2020) for additional detail). Focus groups and interviews were audio-recorded and transcribed verbatim in English. These transcriptions were analyzed using conventional content analysis, where common categories and themes were determined through constant comparison and coding (Nowell et al., 2017). Nvivo software was used to store and code all of the qualitative data.

Table A10: Code book used for white paper community-identified concerns and recommendations analysis.

Primary Code	Secondary Codes	Tertiary Codes
Tourism	**Concerns**	Economic benefits
Tourists	- Environmental	Rules and regulations
Cruise Ships	- Economic	Education for tourists
Small vessels	- Cultural	Communities affected by tourists
		Tourists disturbing the land
	Recommendations	Limit number of tourists
	- Environmental	Enforcement
	- Economic	Spill equipment and support required
	- Cultural	Ice breaking
		Hunting
		Anchoring
		Security concerns
		Inuit culture
		Pollution
		Protect important sites
		Support crafting
		More effective communication

Methods for identifying cruise ship shore location data

Vessel name and dates specified were cross-checked in order to avoid double counting (as at times multiple tour operators advertise and sell passage on the same cruise). The itinerary listings were coded according to our distinct categories: communities, natural areas (with protected area designation), historic sites (with protected area designation), and other areas (e.g. island, fiords without protected area designation). Latitude and longitude of each location was acquired and the database was imported into ArcGIS (ESRI) for statistical analysis. To determine the cruise itinerary listings (i.e. planned shore-location visits) within the CSMAs and EBSAs we utilized the intersect tool in ArcGIS.

APPENDIX 3. SPATIAL TOURISM VESSEL TRENDS BY YEAR

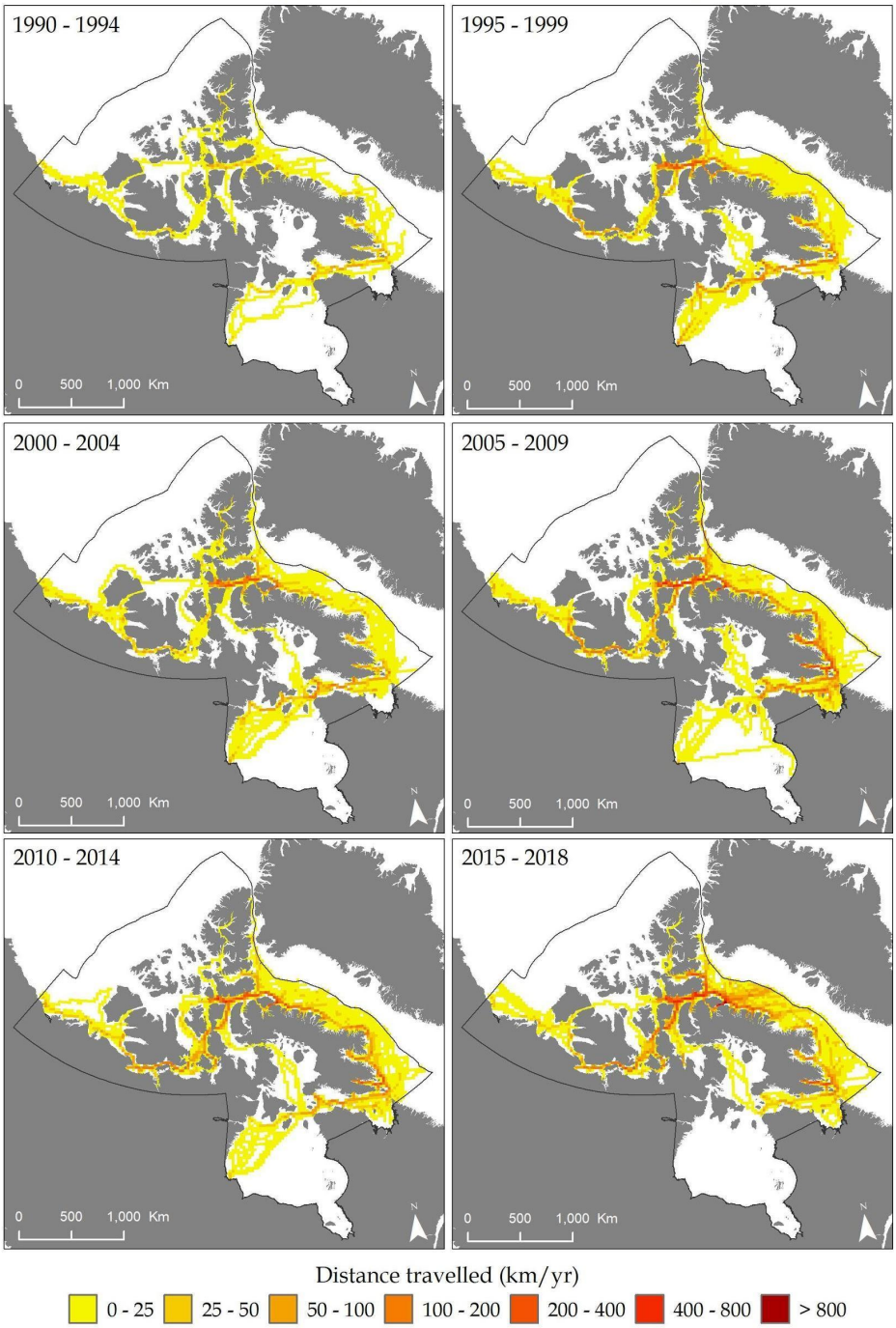


Figure A2: Temporal trends in average annual distance travelled by passenger ships from 1990 to 2018.

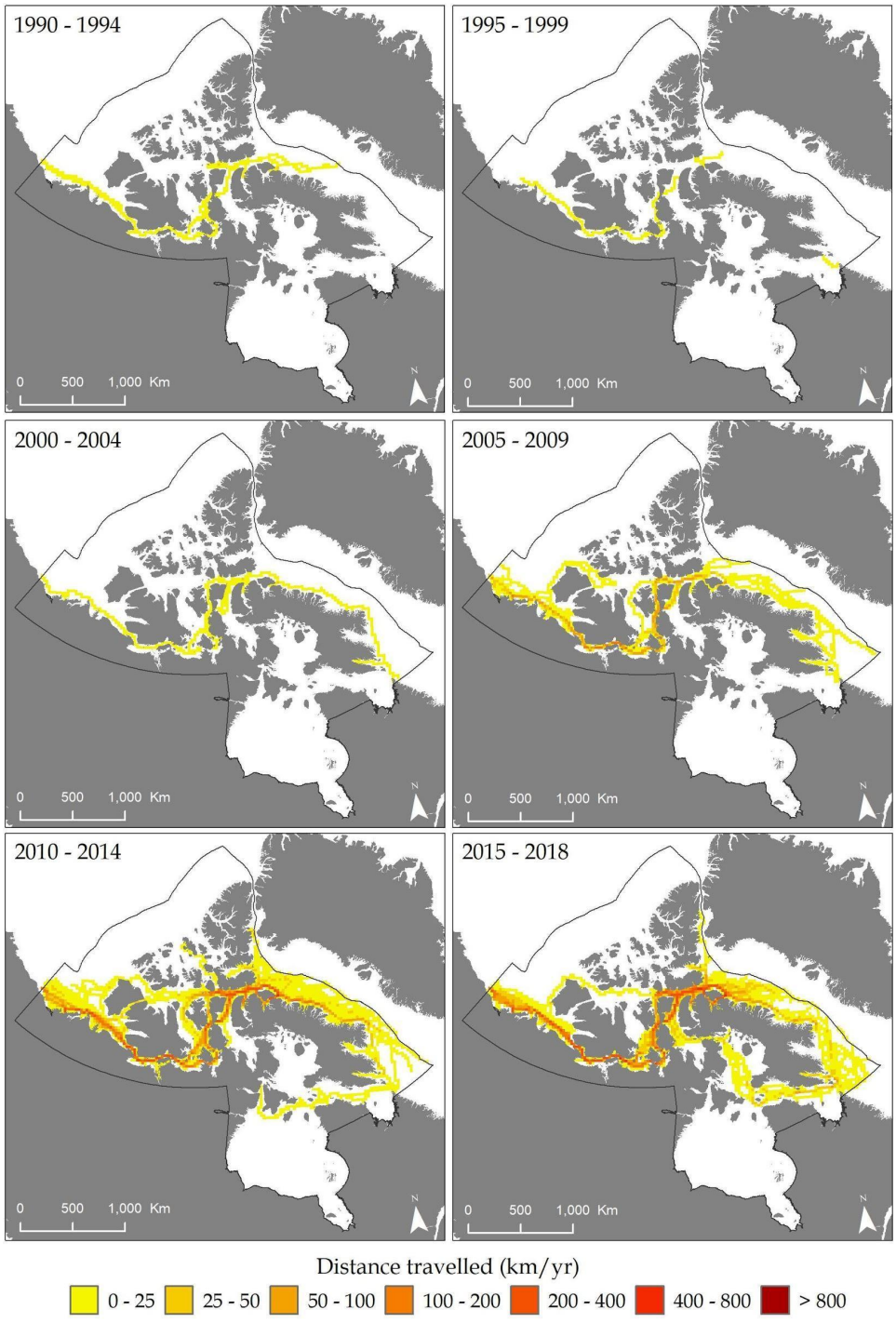


Figure A3: Temporal trends in average annual distance travelled by Pleasure Crafts from 1990 to 2018.

APPENDIX 4. TOURISM VESSEL SHORE LOCATIONS BY REGION

Table A11: Cruise itinerary listings 2014 through 2019.

Communities	Historic Sites	Other Areas	Protected Areas
Manitoba Churchill **ISR** Sachs Harbour Tuktoyaktuk Ulukhaktok **Nunatsiavut** Hopedale Nain **Nunavik** Kangiqsualujjuaq Kangiqsujuaq **Nunavut** Arctic Bay Cambridge Bay Cape Dorset Clyde River Coral Harbour Gjoa Haven Grise Fiord Igloolik Iqaluit Kimmirut Kugluktuk Pangnirtung Pond Inlet Qikiqtarjuaq Resolute Taloyoak	**ISR** Melville Island **Nunatsiavut** Hebron **Nunavut** Beechey Island Terror Bay Skraeling Island	**ISR** Franklin Bay Jesse Harbour Johansen Peninsula Minto Inlet Smoking Hills **Nunatsiavut** Nachvak Fiord Saglek Bay **Nunavik** Erik Cove Ungava Bay **Nunavut** Alexander Bay Alexandra Fiord Arctic Harbour Aston Bay Axel Heiberg Island Bathurst Inlet Beatrice Point Button Island Cape Charles Yorke Cape Dyer Cape Mercy Chapman Glacier Conningham Bay Craig Harbour Croker Bay Cumberland Peninsula Devon Island Diana Island Digges Island Dundas Harbour Edinburgh Island Elwin Inlet Eureka Eureka Sound Feachem Bay Fort Ross Fury Beach	**ISR** Banks Island Mercy Falls **Nunatsiavut** Torngat Mountains National Park **Nunavut** Akpatok Island Auyuittuq National Ppark Bathurst Island Buchan Gulf Bylot Island Cape Hay Coats Island Cobourg Island Jenny Lind Island Kekerten Territorial Ppark Ninginganiq Prince Leopold Island Qausuittuq National Park Sirmilik National Park Tanquary Fiord **Yukon** Herschel Island

		Gibbs Fjord Grinnell Glacier Hall Peninsula Icy Arm Fjord Johansen Bay Jones Sound King William Island Kivitoo Lady Franklin Island Lower Savage Islands Marble island Maxwell Bay Monumental Island Nanook Harbour Niaqornat Point Norwegian Bay Opingivik Island Pasley Bay Peel Sound Philpots Island Pim Island Port Leopold Prince Charles Island Prince Wales Island Radstock Bay Resolution Island Rowley Island Royal Geographic Society Island Royal Society Fiord Sam Ford Fiord Shaftesbury Inlet Smith Sound Somerset Island Sunshine Fjord Victory Point Walrus Island	
Total: 25	Total: 5	Total: 72	Total: 19

APPENDIX 5. TOURIST CODE OF CONDUCT FOR POND INLET, CANADA

Useful Phrases

English: How are you? Inuktitut: Qanuippit? Pronunciation: (k)a-new-eep-peat?	
I am fine *Qanuingii* (k)a-new-een-ngee	What is that? *Inna kisu?* eena-kee-soo
What's your name? *Kinauvit?* Key-now-veet	My name is ..... *Atira .....* a-tee-ra
I don't know *Aamai* aa-my	How much is this? *Una qassiqarpa?* oo-na(k)ass ee (k)a(k)pa
Good morning *Ullaakut* ood-laa-koot	Good afternoon *Unnusakkut* oo-new-sa-kkut
Good evening *Unnukkut* oo-new-koot	Thank you *Qujannamiik* (k)u-yan-na-meek

We ask you to read our suggestions to help make your visit an enjoyable one for you, and for us! This is our invitation to you so that you can gain the most out of your visit.

We invite you to take pictures of our beautiful scenery and our friendly community, but please ask permission before taking pictures of us, our children, and our homes.

We encourage you to explore our community, but please respect our privacy, our belongings, our homes and yards. Treat us the way you wish to be treated at your home.

We encourage you to learn about our Inuit culture and to hear our stories, so come with an open mind to learn how we have survived for thousands of years. Please remember that we are proud of our hunting traditions and use of local food sources. Wildlife products are central in our culture and our subsistence.

Please respect the wishes of our Hamlet that illegal substances and alcohol should not be brought into our community nor traded for local products.

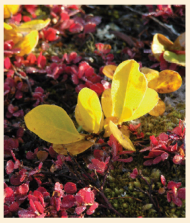
Dog teams are important to hunting, so while we encourage you to watch our dogs please do so at a respectable distance. Please do not interfere with dogs while they are being fed or talk to the owners when they are working with their teams, unless you are especially invited to do so.

We invite you to visit our grocery stores but remember that it takes a lot of effort to fill our shelves with provisions, and fresh items are only re-supplied once a week, weather and flights permitting. So please only purchase what you truly need.

Your spending is important to our livelihoods, so be generous when bargaining and give proper value for locally made arts and crafts. Make sure you know whether you can bring wildlife products such as sealskin, bone or ivory back to your own country.

We want you to have a safe visit to Pond Inlet so please avoid walking in the middle of the road, just as you would at home. Please keep in mind that local people are busy going about their day, and that local vehicles are not taxis unless otherwise arranged for your visit!

We have a young and growing population and our children are curious and fun-loving, but please remember they *are* children, just like your children back home.



While many people under 40 understand English well, our Inuktitut language is strong, healthy and important to our culture, so we encourage you to try a few words in Inuktitut. Try our suggestions on the back of this page. Good luck!

If you venture away from the community, enjoy our scenery and local fauna, but remember that our stones and cultural treasures are not souvenirs, they are part of our ancient history so please leave them where they belong! Avoid littering, too!

You provide us with an important opportunity to share our stories both from the past and the present, so hear our stories and, if you want, share your stories too! Let's embrace our differences and our similarities.

The Arctic is a changing place, so you may wish to consider contributing to the respectful protection of our environment; be creative and bold! Donations are welcome at the Nattinnak Visitor Centre and the Library and Archives.

We hope your visit to our community will leave you with great memories! We encourage you to share your experiences of Pond Inlet with others, so that one day we can welcome you, your family and friends back to our community, and to the Territory of Nunavut.

Travel well!

From your friends in Pond Inlet!

Photos: Emma Stewart Design: Christine Higdon

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Canada

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Margaret Johnston
Emma Stewart
Jackie Dawson

Pronunciation Guide

How to pronounce Inuktitut vowel sounds

i sounds like "ee" in feel
u sounds like "oo" in tool
a sounds like "a" in far
Double (same) vowels are pronounced the same but longer

Vowel combinations are pronounced

ai sounds like "i" in bite
au sounds like "ou" in found
iua sounds like "wa" in water

How to pronounce Inuktitut consonants

j sounds like "y" in yes
jj sounds like "j" in jump
r sounds like French "r" in arrête
q sounds like German "ch" in nacht shown as a (K)

Extract from the Inuktionary II (Compakti Writers)

APPENDIX 6. AECO COMMUNITY GUIDELINES FOR POND INLET, CANADA

COMMUNITY GUIDELINES **POND INLET**

Pond Inlet

Where the modern meets the traditional

Photo: Bruno Cazarini, Silversea Cruises

The Inuktut name for our community is Mittimatalik, which has two competing origin stories. Some of us think it means "the landing place", referring to a large rock on which 'seagulls used to alight and from which they used to fish.' Others believe it means "place where Mittima is buried." No one knows who Mittima was or where he came from.

Thule have lived on the northern tip of Baffin Island through periods known to archaeologists as pre-Dorset, Dorset, Thule, and modern Inuit. Our ancestors lived in sealskin tents (tupiit) in the summer and igloos (igluvigait) or sod huts roofed with skins and moss (qarngmait) in the winter. You can see a recreation of an Igluvigait in our community today. To see an igloo, you'll have to come back in the winter.

Two centuries of continued contact with Europeans has brought us to the present-day, where we now live in modern houses and enjoy modern amenities. We still retain aspects of our traditional lifestyle and our heritage has a significant and meaningful impact on our day-to-day lives. The wilderness is our grocery store and today we still hunt, eat and use parts from seal, narwhal, geese, walrus, bowhead whales, foxes, caribou, and polar bears.

Photo: Ann E. Lennert

Based on template from Association of Arctic Expedition Cruise Operators AECO

Pond Inlet Community Guidelines

- Welcome to Mittimatalik. We encourage you to explore our community, but please respect our privacy, our belongings, and our homes and yards. Treat us the way you wish to be treated in your community and in your home.
- We invite you to take pictures of our beautiful scenery and our community, but please ask permission before taking pictures of us, our children or our homes.
- We encourage you to hear our stories, so come with an open mind to learn about where and how we live. We are proud of our hunting traditions and of our use of local food sources. Wildlife products and subsistence harvesting are central to our culture. With this in mind, you may see harvesting activities taking place. Keep in mind that these animals have lived free and wild and we only take what we need.
- Please respect that illegal substances and alcohol should not be brought into our community nor exchanged for local products or other items.
- Inuit sled dogs are an important resource for our hunters and outfitters, so while we encourage you to observe our dog teams please do so at a respectful distance. Please do not interfere with the dogs while they are being fed or approach the owners when they are working with their teams, unless you are especially invited to do so.
- We invite you to visit our grocery stores but remember that it takes a lot of effort to fill our shelves. Fresh items are only re-supplied once a week, weather and flights permitting. Please purchase only what you truly need.
- Be generous and give proper value for locally made arts and crafts. Make sure you know whether or not you can bring wildlife products such as sealskin, bone or ivory back to your own country. If you can – please see what we create. Pond Inlet has several nationally famous and sought after artists who produce work for galleries in Toronto, Montreal and Vancouver.
- The standard exchange rate for USD to CAD at our community store is 1 to 1. Please try to pay in CAD if you can, if not, we'll accept USD at a 1 to 1 rate.
- We can provide a maximum of 10 minutes of wifi at the library, which is located in our Visitor Centre. Please respect this time limit as our wifi resources are limited.
- We want you to have a safe visit to Pond Inlet. With that in mind, avoid walking in the middle of the road just as you would at home. We are busy going about our days and yes, we do drive. Local vehicles are not taxis unless otherwise arranged for your visit.
- While many people under 40 understand English well, our language is strong and healthy here and we are immensely proud of this. We encourage you to try a few words in Inuktitut. We apologize, but we will not be able to understand German, French or Russian. Luckily smiles are universal.
- We say 'yes' with our eyebrows and 'no' with our nose. If we don't respond verbally, that doesn't mean we are ignoring you.
- If you venture away from the community, enjoy our scenery and local fauna, but remember that our stones and cultural treasures are not souvenirs, they are part of our ancient history. Please leave them where they belong.
- We have a young, growing population and our children are curious and fun-loving. Please don't be alarmed if you see our youth playing outside unsupervised. We are a tight knit community and this is normal - especially in the long days of the Arctic summer!
- Hear our stories and listen to them with an open mind. If you want, share your stories too! Let's embrace our differences and our similarities.

Photo: Elterman, Silversea Cruises

Our ancestors lived in igloos or sod huts roofed with skins and moss in the winter.

Photo: Elterman, Silversea Cruises

Avoid walking in the middle of the road just as you would at home.

Photo: Bruno Cazarini, Silversea Cruises

We are proud of our hunting traditions and of our use of local food sources. Wildlife products and subsistence harvesting are central to our culture.

Nunavut

Based on template from Association of Arctic Expedition Cruise Operators AECO

NUNAVUT

Key Items of Interest

- Pond Inlet receives 24 hours of sunshine from May 5th to August 7th.
- In the 1820s British whaling vessels began to hunt bowhead whales in the area. Just over a century later, in 1921, the Hudson's Bay Company established a post within the present day boundaries of the community.
- In 1960 our community was home to only around fifty people. Today there are around 1700 of us, approximately 95% of whom are Inuit.
- From mid-November to mid-January, there is no sun, just starlight, moonlight, and the Northern Lights reflecting off the ice and snow, with an average temperature of -40°C.
- We refer to ourselves as Tununirmiut, which is thought to mean "people of the shaded place" or Mittimatalingmiut, meaning "people of Mittimatalik."

POINTS OF INTEREST

1. Anglican Cemetery
2. Catholic Cemetery
3. Old Anglican Minister's Residence
4. Old Freezer
5. Air Strip
6. Wildlife Office
7. Northern Store
8. Traditional Qammaq
9. St. Timothy Anglican Church
10. Sirmilik National Park Office
11. Nattinak Visitor Centre
12. Tununiq Sauniq Co-Op
13. Ulaqjuk Elementary School
14. Pond Inlet Hamlet

We invite you to visit our grocery stores but please purchase only what you truly need.

Photo: Bruno Cazarini, Silversea Cruises

URLs for more information:

- A detailed history can be found at https://www.qtcommission.ca/en/communities/pond-inlet-mittimatalik
- Our website is www.PondInlet.ca
- You can find more information about our community at www.destinationnunavut.ca/places/pond-inlet

Nunavut

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NUNAVUT 25

APPENDIX 7. AECO COMMUNITY GUIDELINES FOR SISIMIUT, GREENLAND

COMMUNITY GUIDELINES **SISIMIUT**

Sisimiut

The adventure destination of Greenland

Our beautiful atmospheric museum area is a must-see for any visitor. Please remember that entry into the buildings requires a ticket.

Sisimiut is known for its will to do things its own way. It is the second largest town in Greenland with approximately 5,500 citizens. The town and its surrounding area have a rich history and boast archaeological ruins dating back more than 4,000 years. We are the adventure hub.

Sisimiut is where Greenland's most famous hiking route, the Arctic Circle Trail between Sisimiut and Kangerlussuaq, begins. People have travelled the route from the coast to the hinterlands for thousands of years, which is why an area south of Sisimiut has earned a place on the UNESCO World Heritage list.

Half of all snowmobiles in Greenland are registered here, and we have more ATVs than any other town – simply because we live on the edge of the biggest back country in Greenland. Similarly, the number of boats per capita is among the highest in the world. We are the southernmost location with a tradition of dogsledding, and you will find most of our sled dogs on the outskirts of town in an area locally known as "Dog City".

Our tips for you:

- Public conveniences in town are few and far between. We advise you take advantage of the facilities on board before you disembark. Otherwise, please do not hesitate to ask for the restroom at any public building or private business.
- We do not have a tradition of bargaining but sell our products at the same price to any customer all year long.
- Our Arts & Crafts workshop is of the highest standard, and you will not meet any other Greenlandic workshop with a larger selection.
- The designs and techniques of Greenlandic arts and crafts vary across the country, so do not expect to find the exact same selection of items in other towns. The pieces you find here are unique and more than just souvenirs. They are household items used in any Greenlandic home.
- The old town center, now Sisimiut Museum, is very well preserved and maintains a historical atmosphere. Remember to take a photo of the iconic whale bone gate and learn more about our history and culture.
- Sisimiut has local boat operators offering short boat trips to different key sites nearby. Check the information board at the harbor.
- WIFI is available at several places for a reasonable price.

Nordic Atlantic Cooperation

Based on template from Association of Arctic Expedition Cruise Operators AECO

DESTINATION ARCTIC CIRCLE

PLACES TO GO

1 Sallinguit "Teleøen" (Historical sites, 4000 year old ruins)
2 Kayak club
3 Arts & Craft workshop
4 Sisimiut museum
5 Qiviut (Musk Ox wool shop)
6 J/S Tiggaliorfik (Local baker with the known 'Ribbensandwich')
7 Taseralik (Cultural house of Sisimiut)
8 Panigiit (Local sewing shop)
9 Walk the love circle / walk of love / the love trail
10 Café Naapiffik (Greenlandic café, with free wifi)
11 Nasiffik viewpoint over UNESCO & the Arctic Circle
12 Simuup Aqq view point over the harbor and cruise ship
13 Dog City & Arctic Circle Trail, only a 30 minute walk from the harbor
14 Restaurant Nasaasaq and Hotel Sisimut Greenlandic seafood, Wifi and gift shop.

Sisimiut Community Guidelines

- Please ask before photographing locals; some of us are camera shy.
- Our snowmobiles and dogsleds are cool and photogenic. You are welcome to take pictures but please do not touch them.
- Our dogs are beautiful and engaging but please do not feed them or get too close. They are for work, not play or petting.
- Beware of traffic when you walk around town. Please use the sidewalk whenever available.
- Leave only footprints behind, then we won't have to deal with our ancient spirits.
- Shop and eat locally to experience our culture up close, while supporting our community and traditions.
- Our beautiful atmospheric museum area is a must-see for any visitor. Please remember that entry into the buildings requires a ticket.
- You will find many historical and archaeological remains in and around Sisimiut. Enjoy our past from a respectful distance.
- The harbour is a busy and bustling part of town. Please be careful and, for your own safety, stay out of the way of people working.
- Most shops in Sisimiut take foreign cards and an ATM is available at GrønlandsBanken in the town center. Some places also accept foreign currencies (Euro and US dollars).
- Our shops are very aware of export laws:
  - No restriction for export with products made of Musk Ox, Reindeer and Seal to EU.
  - CITES permit is required for export of Walrus, Beluga and Minke whale from West Greenland. You can easily obtain CITES at all the places that sell these products.
  - Read more at www.naalakkersuisut.gl/cites.

Check www.arcticcircle.gl for more information about Sisimiut and activities.

Nordic Atlantic Cooperation

Based on template from Association of Arctic Expedition Cruise Operators AECO

DESTINATION ARCTIC CIRCLE