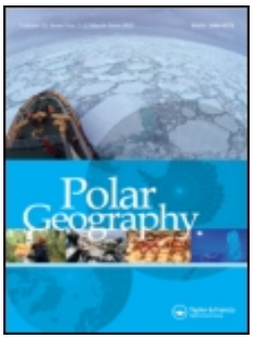

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Policies and practicalities of shipping in arctic waters: Inuit perspectives from Cape Dorset, Nunavut

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Under changing climatic conditions, political and economic interest in accessing arctic waters and shipping potential is increasing, bringing forward opportunities and challenges that need to be addressed. To explore the practical implications of this from Inuit perspectives, we undertook a community-based case study in Cape Dorset, Nunavut, conducting 20 interviews between 2008 and 2009. We also examined three Nunavut Acts and Agreements, three Canadian Federal Acts, and one International Agreement to better understand the regulations and policy positions. For each we sought to understand characterizations of: community uses of the marine environment; impacts of shipping; and monitoring of ship travel. Our objective was to investigate how well (or not) Inuit experiences and observations of arctic shipping were incorporated into policy provisions governing shipping in arctic waters. A comparative analysis of Inuit and policy positions shows shared and unique priorities as well as areas of apparent disconnect related to shipping in arctic waters. Therefore, this article highlights key considerations for arctic shipping from both practical and policy perspectives. We conclude with recommendations relating to undertaking community consultations, establishing the Marine Council, improving emergency response measures, and updating existing Acts and Agreements in an effort to contribute to ameliorate the situation for mutual benefit.

Introduction

The circumpolar Arctic is highly sensitive to climate change, as indicated by recent observations of warming at a rate twice as fast as the rest of the world (ACIA 2004; AMAP 2011; Barber *et al*. 2008; Furgal and Prowse 2008; IPCC 2007; Pharand 2007; Polyak *et al*. 2010). Sea ice is used as an important indicator for climatic changes in the Arctic, because it is particularly sensitive to changes in air or water temperature (Howell and Yackel 2004; Howell *et al*. 2006; Lietaer *et al*. 2008; NSIDC 2007). Over the last 30-50 years, there have been dramatic global reductions in sea ice thickness and extent, and this trend is projected to continue (ACIA 2004; Barber *et al*. 2008; Grumet *et al*. 2001; IPCC 2007; Mahoney *et al*. 2009; Michel *et al*. 2006). Sea ice is forming later in the year and breaking up earlier, resulting in an overall longer ice-free season, as observed by satellite remote sensing (Markus *et al*. 2009; Meier *et al*. 2006; NSIDC 2010; Serreze *et al*. 2007) and across northern

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communities (Ashford and Castleden 2001; Ford *et al*. 2006; Gearheard *et al*. 2006; Laidler *et al*. 2009, 2010; Meier *et al*. 2006; Nichols *et al*. 2004; Nickels *et al*. 2006). Although there continues to be interannual sea ice variability (AMAP 2011; Grumet *et al*. 2001; Michel *et al*. 2006; Pharand 2007), the rate of sea ice melt has exceeded scientific model predictions (Birchall 2006; Ho 2010). Furthermore, the last five years (2007-2011) have been the lowest September sea ice extents in the satellite record, with the 2011 recorded minimum only slightly above that of 2007 (which was a record 39% below the long-term average from 1979 to 2000) (NSIDC 2011). These changing sea ice conditions impact both people and wildlife living in the circumpolar Arctic, as many aspects of northern life are tied to the seasonal cycles and timing of freeze-up and break-up. Diminished ice extent and thickness has also sparked increased international political and economic interest as it opens up new opportunities for arctic marine shipping.

Sea ice has conventionally been viewed as a barrier preventing access and marine transportation in the arctic region, and thus reductions in sea ice are seen to open up arctic waterways, increasing the potential for shipping. In particular, there has been heightened interest in the historically significant Northwest Passage (NWP) routes through the Arctic Ocean (Bates and Alverson 2010; Huebert 2001, 2003; Kubat *et al*. 2005; Stewart *et al*. 2010) (Figure 1). The southern portion of the NWP has now been open for a fifth year in a row, with the entire passage being open for a period during the summer of 2011 (NSIDC 2011). International shipping companies and circumpolar nations are thus beginning to plan around expectations that the NWP will become increasingly more feasible to navigate, and over longer durations (Carnaghan and Goody 2006; Christie 2011; Johnston 2002; Pharand 2007). It is important, however, to acknowledge that less ice does not mean no ice, or necessarily easier navigation. With reduced sea ice extent, ice conditions in the NWP become more unpredictable (Stewart and Dawson 2011), and the increasing presence of multi-year ice may be especially problematic for transiting vessels (Howell and Yackel 2004; Howell *et al*. 2008; Kubat *et al*. 2007; Pharand 2007; Stewart *et al*. 2007). Combined, these recent developments have thrust Canada's arctic region into the midst of an international debate over control and access to the Arctic Ocean. The shipping potential is unprecedented in this area, but also raises unique concerns for ocean management because: (1) mobile and variable ice conditions present considerable shipping hazards; (2) ice charts are poor due to the remoteness of the region; (3) navigational charts are poor and not up to date; (4) the infrastructure for emergency response is minimal due to the remoteness of the region (i.e. less Coast Guard support, longer response times, difficult land or marine access); and (5) icebreakers affect the integrity of the sea ice platform upon which numerous animal species and Inuit communities depend (ACIA 2004; Arctic Council 2009; Bates and Alverson 2010; Birchall 2006; Boileau *et al*. 2010; George 2010; Kubat *et al*. 2006; Pharand 2007; Stewart and Dawson 2011). Therefore, there are many implications for enhanced shipping, including influences on marine environmental safety, animal habitat, and Indigenous peoples' traditions and livelihoods.

In an effort to exert control and regulate shipping (especially with regard to safety and environmental protection), international, and Canadian federal and territorial Acts and Agreements have been developed. While these policies are broad in scope, and vary by jurisdiction, shipping in arctic waters necessitates unique considerations based on the continued presence of variable sea ice conditions. The ice not only

Figure 1. Potential circumpolar shipping routes, including the Northwest Passage, Northern Sea Route, and Transpolar Route.
Source: Griffiths (2009, p. 111).

presents physical hazards to ships navigating through icy waters (whether breaking ice or navigating around moving ice), but it is also an important travel and hunting platform for northern wildlife and Inuit - the indigenous inhabitants of the Canadian Arctic. Therefore, shipping practices can be affected by ice conditions, but ship navigation through ice-covered waters can also have significant implications for the health and well-being of northern wildlife along with the safety and prosperity of Inuit community members. When developing marine policy, the physical and environmental aspects of marine shipping are the main focus, and are often tied directly to economic interests in destinational or transit shipping.

Implications for the well-being of people and animals dependent on the marine environment are captured in concerns for safety standards and environmental protection standards. However, a state-centric view of the Arctic persists with little recognition placed on how increased arctic shipping may impact Inuit communities,

travel safety, and livelihoods. While much research has been undertaken on scientific and Inuit observations of climate and sea ice changes (ACIA 2004; Barber *et al.* 2008; Gearheard *et al.* 2006, 2010, 2011; Laidler *et al.* 2009, 2010, 2011; Nichols *et al.* 2004; Nickels *et al.* 2006), as well as Inuit knowledge and use of the sea ice environment (Aporta 2002; ICC-Canada 2008; Krupnik *et al.* 2002; Riewe 1991), little work has been done to date exploring the links between Inuit perspectives on arctic shipping and related marine policies. Therefore, the objective of this research is to investigate how well (or not) Inuit experiences and observations of arctic shipping are incorporated into policy provisions governing shipping in arctic waters. To explore the practical implications of increased ship transportation in ice-filled waters from Inuit perspectives, we undertook a community-based case study in Cape Dorset, Nunavut, as well as examined several legal Acts and Agreements from international, Canadian, and territorial jurisdictions. For each we sought to understand their characterizations of: (1) community uses of the marine environment; (2) impacts of shipping; and (3) monitoring of ship travel. Through a comparative analysis considering both Inuit and policy positions, it becomes clear that Inuit communities and various policy jurisdictions possess both shared and unique priorities around shipping in arctic waters. However, there is a lack of understanding and communication between the governments who enact the policies, and Inuit community members who live with the shipping practices that result from the implementation of such policies. Therefore, this article aims to highlight the areas of apparent disconnect, and provide recommendations to help policy-makers and community members pursue their interests in working together to improve the situation for shared benefits.

Background

Arctic marine shipping

Shipping is an important global mode of transportation, accounting for the 'transport of 90% of the world's goods' (Bates and Alverson 2010, p. 4), with most trans-oceanic traffic currently going through the Panama and Suez canals. Arctic shipping is not a new phenomenon; however, the Arctic Ocean is said to have had 'relatively modest levels of shipping to date' (Huntington 2009, p. 79). Across the Canadian Arctic, the shipping season begins when the ice starts to break up, usually in July, and closes around October with the onset of freeze-up, with some regional variations (Pharand 2007).

Arctic marine shipping is often described by purpose, being either destinational or transit. Destinational shipping is carried out to reach specific locations, or destinations (e.g. communities, mines, tourist attractions, etc.), whereas transit shipping involves traveling through marine waterways (e.g. using the NWP as a short cut between the Atlantic and Pacific Oceans) (Arctic Council 2009). The majority of shipping throughout the Arctic today is 'destinational, conducted for community re-supply, marine tourism and moving natural resources out of the Arctic' (Arctic Council 2009, p. 5). Ships transiting through the Arctic are not required to follow designated shipping routes/channels, which has been common practice since early arctic marine exploration (George 2010).

With observed reductions in arctic sea ice extent and thickness, and longer open-water seasons, shipping through the Arctic Ocean is becoming an attractive

alternative to southern routes. In particular, enhanced navigational potential of the NWP (Figure 1) is of great interest under future sea ice projections. The Arctic, and the NWP specifically, has been linked to Canadian heritage, identity (i.e. Canada as the 'true north strong and free'), as well as epic journeys of European explorers seeking this historic route connecting the Atlantic and Pacific Oceans (Bilder 1970; Charron 2005; McRae 2007; Shadian 2007; Simon 2007). Therefore, the opening of the NWP is seen to provide many opportunities for expanded northern shipping (saving both time and costs, providing seven alternate routes, etc.), as well as a number of challenges that will have to be considered and/or overcome (limited shipping season, safety concerns, ice presence year-round, etc.) (ACIA 2004; Bilder 1970; Birchall 2006; Charron 2005; Griffiths, 2004; Headland 2010; Howell *et al*. 2006; Huebert 2001, 2003; ICC-Canada 2008; Johnston 2002; Kubat *et al*. 2006; Pharand 2007). Since the early 1900s, there has been a clear increase in ship travel through the arctic region, specifically the NWP, with the most dramatic increase in the last 30 years (Brigham and Ellis 2004). Arctic shipping is also predicted to increase as a result of further industrial development, including potential oil and gas development (Bates and Alverson 2010; Beauchamp and Huebert 2008; Daoust *et al*. 2010). For example, in the Qikiqtani Region of Nunavut there is a proposed iron ore mine and associated facilities called the Mary River Project (Baffinland Iron Mines Corporation 2007). As a result of the highly valuable mineral resources at this site, there are plans to ship the ore to European markets using ice-strengthened cargo ships operating year-round between Baffin Island and Europe (Arctic Council 2009).

A variety of vessels frequent the Arctic including commercial ships (tankers and cargo ships), tourist cruise ships, research ships, coastguard icebreakers, and fishing fleets (Bates and Alverson 2010; Huntington 2009; Stewart *et al*. 2010). In particular, cruise ship numbers have escalated within the arctic region 'from 50 ships in 2004 to 250 ships in 2007, with the most increases seen in Nunavut and Greenland' (Hansen 2008, p. 1; also see Brigham and Ellis 2004). Later, in 2010 it was estimated that 1.5 million cruise ship passengers visited the Arctic (Boileau *et al*. 2010) (Figure 2).

Marine governance and regulation

Because of the various kinds of ship traffic entering arctic waters, marine policies, regulations, and jurisdictions governing use and access of the Arctic Ocean are important considerations when contextualizing the current and potential state of Arctic marine shipping. While in transit, ships can travel through different states' jurisdictions as well as the High Seas, which are subject to international laws – specifically the United Nations Convention of the Law of the Seas (UNCLOS) (1982). According to UNCLOS, the jurisdiction of a state extends from the land to the internal waters, to the territorial sea, to the contiguous zone, and finally to the exclusive economic zone (UNCLOS 1982). Each of these limits is defined in relation to a baseline, and for Canada, this baseline is 'the low-water line along the coast or on a low-tide elevation that is situated wholly or partly at a distance not exceeding the breadth of the territorial sea of Canada from the mainland or an island' (Oceans Act 1996, p. 3). Canada's internal waters are the waters that are enclosed in this baseline (Oceans Act 1996; UNCLOS 1982). Canada's territorial sea extends up to 12 nautical miles from the baseline (UNCLOS 1982). Coastal states have sovereign rights extending from the airspace, seabed, and subsoil of territorial seas

Figure 2. Cruise ships visiting the community of Gjoa Haven, Nunavut in August 2010. Photo: Gita Ljubicic.

(DFO 2010). Canada's contiguous zone extends up to 24 nautical miles from the baseline and acts as a buffer zone where coastal states may exercise control to prevent infringement of its customs, fiscal, immigration or sanitary laws and regulations within its territory or territorial sea, coastal state may also punish such infringements (DFO 2010; UNCLOS 1982). Furthermore, Canada's exclusive economic zone (EEZ) extends up to 200 nautical miles beyond the baseline (UNCLOS 1982). Coastal states have sovereign rights for exploring, exploiting, conserving, and managing living and non-living resources of the water, sea-bed and subsoil within the EEZ (DFO 2010). Accordingly, a number of policies have been developed to regulate shipping within these zones. For the purposes of this article, Canadian Acts and Agreements regulating arctic shipping are of greatest importance. Furthermore, existing governance structures, policies and positions are tied to concerns over the potential impacts of shipping activities.

Potential impacts from shipping activities include: (1) leakages (including contaminants such as bilge water and anti-fouling paints) and spills; (2) black carbon on sea ice; (3) noise pollution; (4) introduction of invasive species from ballast water and on hulls; (5) impacts on marine mammals (including noise, disturbance and ship strikes); and (6) delays in ice formation and accelerated break-up (Arctic Council 2009; Bates and Alverson 2010; Furgal and Prowse 2008; Huntington 2009). However, in the literature there has been minimal consideration given to Inuit community perspectives of what constitutes potential impacts of arctic shipping activities, both current and projected. There are acknowledgements of Inuit use of the marine environment, and that shipping will likely impact arctic communities and lifestyles in various ways, but there is a limited Inuit voice.

One exception is an Inuit Circumpolar Council – Canada report (ICC-Canada 2008), submitted for the Arctic Council's Arctic Marine Shipping Assessment 2009 Report, that outlines Inuit perspectives on arctic shipping. This report shows that increased shipping in the Arctic is receiving mixed reactions by Inuit in Canada. Inuit communities are concerned about the potential release of pollutants, expansion of resource development (i.e. mining and oil), and disruption to wildlife, while on the other hand many see that ships also have the potential to benefit communities through providing supplies and reducing the cost of living (Bates and Alverson 2010; ICC-Canada 2008). Similarly, as reported by Stewart *et al*. (2007), communities such as Clyde River, Nunavut, are questioning whether the potential benefits outweigh the potential costs of cruise tourism, and increased shipping in the Arctic. For the purposes of this article, we sought out a local case study to better understand these concerns and show how they may (or may not) be taken into account in current policies at various scales.

Methods

Community-based research

Case study overview: Cape Dorset, Nunavut

In order to gain insights into Inuit perspectives on arctic marine shipping, we worked with community members in Cape Dorset, Nunavut, as a case study (Figure 3). Cape Dorset is a hamlet with a population of approximately 1236 (93% Inuit; Statistics Canada 2006), located on an island of the same name off the southwest coast of Baffin Island along the Hudson Strait (64°14′N, 76°40′W) (Laidler and Elee 2008). The Inuktitut word for Cape Dorset is Kinngait, which translates as 'mountains' (Laidler and Elee 2008, pp. 52-53) or hills (McElroy 2008) due to the fact that Cape Dorset Island contains a mountain that is part of the Kinngait Range. Cape Dorset is known as the 'Capital of Inuit Art' (Municipality of Cape Dorset 2008a, p. 1) and the principal economic activities include soapstone carving, print-making (stonecut and lithography), and drawing by world-renowned artists (Municipality of Cape Dorset 2008b). However, Cape Dorset was selected as a relevant case study for this project because: (1) we could build on a previously established research relationship, with an ongoing sea ice project being conducted there since 2003; and (2) located on the Hudson Strait, both changing ice conditions and shipping practices are currently impacting the community of Cape Dorset. While landfast ice is still used as an important travel and hunting platform by community members, this has been observed to be diminishing in thickness, extent, and stability, as well as having significant interannual variability in multi-year ice conditions coming down from further North (Howell and Yackel 2004; Howell *et al*. 2008; Laidler and Elee 2008; Laidler *et al*. 2010; Pharand 2007; Stewart *et al*. 2007). The strong currents in the Hudson Strait prevent extensive ice formation, and thus Cape Dorset is also known as Sikusilaaq by local Inuit, which translates into 'where there is no ice' (Laidler and Elee 2008, p. 52). The Hudson Strait is an important shipping route that connects shipping networks in the Labrador Sea to the port of Churchill (with rail access) (Kubat *et al*. 2006). In addition, although not identified as part of the primary NWP route (Figure 1), the Hudson Strait is part of the seventh alternate NWP route which enters from the Labrador Sea, through the Hudson Strait to Foxe Basin, Fury and Hecla Strait and on through to the Bering Strait and Bering Sea (Brigham and Ellis

Figure 3. Map of Baffin Island including Cape Dorset and surrounding communities. Source: Atlas of Canada Basemaps (1:7.5 million scale, Clarke 1866, Lambert Conformal Conic) from GeoGratis, Natural Resources Canada. Created June, 2011.

2004; Headland 2010). These factors combined, Cape Dorset had great potential to investigate community perspectives on the local implications of increased shipping in changing political, climatic, and economic contexts.

Community-research collaboration

This project built on strong existing collaborative research partnerships already established in Cape Dorset. Community priorities and concerns around sea ice uses and changes emerged from ongoing consultations with community organizations, workshops with key local elders and hunters, multiple sea ice trips, and many interviews with a range of sea ice experts (Laidler 2007; Laidler and Elee 2008; Laidler *et al.* 2010). All this initial research was conducted with the help and guidance of community researcher Pootoogoo Elee, and through this process it was identified that despite the year-round community boating and larger scale shipping occurring in the Hudson Strait, we did not have a good understanding of local perspectives, priorities, or concerns related to these issues. Therefore, continuing to work closely with Elee, Kelley spent six weeks in Cape Dorset (May to June 2008) working with community members and organizations to learn more. With the support of local organizations such as the Hamlet Council, Qikiqtani Inuit Association, and Elder's Group, local feedback throughout all research stages was gathered during meetings, workshops, and through regular communication with

Elee. A number of qualitative research methods were employed that could be tailored to individuals' areas of expertise, and researchers shared regular progress updates in the form of trip reports, results summaries, and informal communication. Participatory mapping and experiential sea ice and boat trips were essential to gain valuable spatial, cultural, and experiential context to inform the interpretation of narratives and expertise shared in interviews (Kelley 2009). However, semi-directed interviews were employed as the primary means of gathering more detailed information and enabled a systematic analysis of a broad range of community perspectives.

Semi-directed interviews

Semi-directed interviews are recognized as an effective means of gathering and documenting Inuit knowledge (Gibbs 2001; Huntington 1998; Laidler and Elee 2008). Participants in the community of Cape Dorset were selected based on purposeful and snowball sampling. With purposeful sampling, individuals were asked to participate based on their familiarity with the subject matter and anticipated ability to contribute to the investigation (also see Laidler and Elee 2008; Laidler *et al*. 2009). Then snowball sampling was used when participants recommended other knowledgeable individuals who might be able to contribute, and we followed up with invitations to participate (also see Ford *et al*. 2006; Laidler *et al*. 2009). A total of 20 interviews were conducted, including 17 men and 3 women who ranged from 25 to 92 years of age with the majority falling between 50 and 60 years of age (Figure 4). Elee helped to facilitate the interviews, and wherever necessary helped with Inuktitut-English translations. We worked closely with Elee to clarify the English translations before, during, and directly after the interviews to

Figure 4. Karen Kelley (left) and Turaqtaga Ragee (right) during an interview in Cape Dorset, Nunavut in May 2008.
Photo: Pootoogoo Elee.

minimize any potential misunderstandings or misinterpretations. Interview lengths ranged from 30 minutes to 3 hours and were recorded with digital audio and photographs with appropriate participant consent. All but three participants consented to being identified in research results, therefore, wherever possible individuals who shared the information are specifically cited, while those who wished to remain unidentified are cited as 'Resident of Cape Dorset.'

All English portions (or translations) of recorded interviews were transcribed and systematic content analysis was undertaken using the completed transcripts. Thematic codes were developed based on key topics from interview questions, as well as additional themes that were raised by the interviewees, including: importance of sea ice, use of sea ice, travel, government, impact of shipping, international shipping, and community involvement. This coding process facilitated comparative analysis between participant responses, as well as between interview responses and information derived from the policy analysis of Acts, Agreements and supplementary literature.

Policy analysis

The complementary research component to the community case study was a policy analysis considering how various Canadian and international jurisdictions define and regulate shipping in arctic waters. We selected one International Agreement, three Canadian Federal Acts, and three Nunavut Acts and/or Agreements to be analyzed based on their focus on arctic regions and waters, and considerations of shipping within these various contexts (Table 1). In particular, we were interested in

Table 1. Summary and description of the seven Acts and Agreements examined.

Year	Policy document	Jurisdictional level	Brief summary of policy focus
1982	The United Nations Convention on the Law of the Seas	International	An Agreement settling all international disputes by establishing a legal order for uses of the seas and oceans (including resources) with regard for the sovereignty of all States
1985	The Arctic Waters Pollution Prevention Act	National	An Act to prevent pollution of areas of the arctic waters adjacent to the mainland and islands of the Canadian Arctic
1996	The Oceans Act	National	An Act respecting the oceans of Canada
2001	The Canadian Shipping Act	National	An Act respecting shipping and navigation and to amend the Shipping Conferences Exemption Act, 1987 and other Acts
1993	The Nunavut Land Claims Agreement	Territorial	An Agreement between the Inuit of the Nunavut Settlement Area as represented by the Tungavik Federation of Nunavut and Her Majesty the Queen in Right of Canada
1993	The Nunavut Act	Territorial	An Act to establish a territory to be known as Nunavut and provide for its government and to amend certain Acts in consequence thereof
2002	The Nunavut Waters and Nunavut Surface Rights Tribunal Act	Territorial	An Act respecting the water resources of Nunavut and the Nunavut Surface Rights Tribunal and to make consequential amendments to other Acts

how (or if) any considerations of Inuit knowledge or community priorities were incorporated within their mandates. Systematic content analysis was employed by carefully reading and manually coding each of the Acts and Agreements based on predetermined key words: ice/frozen/sea ice; Inuit/Aboriginal; marine/shipping/ship/vessel; transit/navigation/travel; oil/waste/garbage/dumping; and animal/wildlife (also see Laidler and Elee 2008). This information was then analyzed to investigate key themes of interest including: (1) how control and regulation of ships is outlined; (2) what forms of environmental protection are in place; and (3) how Inuit are included/represented. Unique considerations around the presence or uses of sea ice were also taken into account wherever possible.

Results

Community perspectives on arctic marine travel

Community uses of the marine environment

For Inuit in Cape Dorset, sea ice is an important part of daily life, an integral part of the marine environment, and they use the ocean year-round whether frozen or not. '[N]o matter what you do if its winter or spring time there's ice involved all the time' (Etidlouie 2008) (Figure 5). Cape Dorset is unique in Nunavut, with the strong Hudson Strait currents maintaining the floe edge in close proximity, allowing community members to use boats year-round (Mikigak 2008; Resident of Cape Dorset 2008c). Over half of the interviewees noted the importance of boating in order to gain access to wildlife, including: walrus, seals, narwhal, beluga, fish, and duck eggs. In addition, sea ice is considered a home to wildlife, and a platform to travel, hunt, and live on (e.g. to access the soap stone mine, other nearby

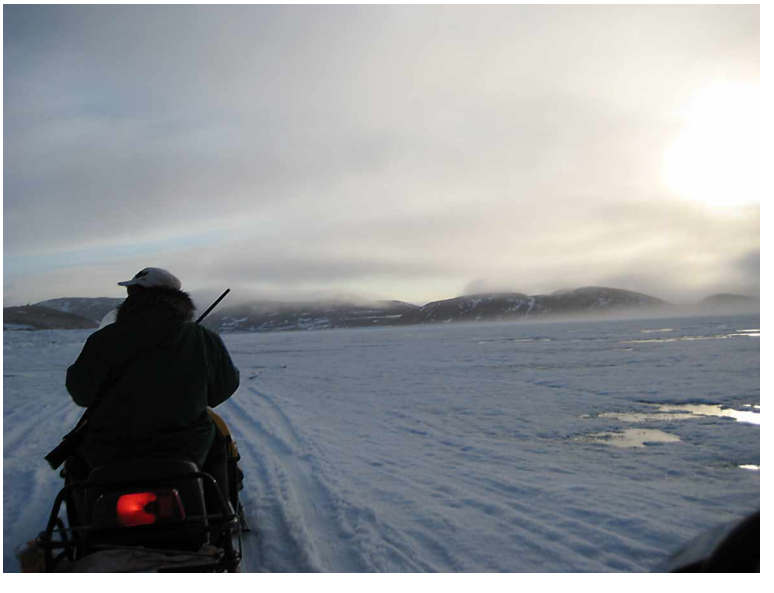

Figure 5. Mangitak Kellypalik on a snowmobile during a trip to the floe edge outside of Cape Dorset, Nunavut, traveling in early June 2008 during early melt stages of the sea ice. Photo: Karen Kelley.

communities, and hunting/fishing spots) (Alasuaq 2008; Ashoona 2008; Elee 2008; Etidlouie 2008; Etungat 2008; Ezekiel 2008; Manumee 2008; Oshutsiaq 2008a, 2008b; Ragee 2008a, 2008b; Saila 2008; Shaa 2008; Takiasuk 2008; Tukiki 2008). Sea ice is described as 'being as important for local travel [around Cape Dorset] as highways are in southern Canada' (Laidler and Elee 2006, p. 158; also see ICC-Canada 2008), because it is often smoother and more direct to travel on sea ice than on land. However, boating is also a beneficial alternative to sea ice travel (depending on the destination or seasonal conditions) in order to travel to areas not accessible via sea ice or land, such as Northern Québec (Alasuaq 2008; Ragee 2008b; Shaa 2008; Takiasuk 2008). Regardless of mode of travel, there are important safety considerations when navigating arctic waters. Whether sea ice or open water, the marine environment is dynamic and potentially dangerous, especially with strong winds or currents or poor visibility (Ashoona 2008; Etidlouie 2008; Ezekiel 2008; Manumee 2008; Oshutsiaq 2008b; Ragee 2008a, 2008b; Shaa 2008; Tukiki 2008). Although community members of Cape Dorset depended on the marine environment and animals to a much greater degree when people were living in camps instead of a permanent settlement, both open water and sea ice remain an integral part of daily life and seasonal cycles (Ashoona 2008; Ezekiel 2008; Laidler and Elee 2008; Laidler *et al*. 2010; Oshutsiaq 2008b; Ragee 2008a, 2008b; Shaa 2008). Therefore, when seeking to understand Inuit community perspectives on arctic marine shipping (i.e. impacts and monitoring), it is first important to gain some historical context as well as community experiences with current shipping practices.

Historic shipping

Historically, ships played an important role in the health of the community. Often ships that visited the community (usually traveling to a number of communities around the Arctic) carried doctors on board to treat people for illnesses (Saila 2008), particularly those with tuberculosis (Etungat 2008; Oshutsiaq 2008a; Ragee 2008a). Sometimes people were taken away on these ships to be treated at sanitariums located in southern cities such as Fort Churchill, Clear Water, and Moose Factory, Manitoba, and Hamilton, Ontario (Alasuaq 2008; Elee 2008; Etungat 2008; Manumee 2008; Oshutsiaq 2008a; Ragee 2008a; Saila 2008). Ships also used to visit the community for assistance (e.g. food shortages, to pick up a guide/crew), to collect furs, and to provide crew and passengers with a break/rest (Alasuaq 2008; Etungat 2008; Oshutsiaq 2008b; Saila 2008; Shaa 2008). In the past, community members would see, at most, a few ships in a year (Etidlouie 2008; Oshutsiaq 2008a). Well-known ships that frequented the community around the 1940s and 1950s were noted in interviews, including: the Nascopie (which sank off the coast of Cape Dorset in 1947), the CD Howe, Baffin Trading Company (BTC) ships, the Avatak, and whaling ships.

Current shipping

The number and frequency of ships visiting Cape Dorset has increased over the lifetime of many of today's residents. 'There's more [ships], usually every year there's a little bit more than the year before' (Ezekiel 2008). Ships that used to only visit once a year are now being seen two or three times a year (Etidlouie 2008). The ships most commonly noted by all interviewees as being seen today include: cruise/tourist

ships, supply ships, fuel ships, icebreakers, Coast Guard/government/military ships, submarines, personal yachts, and fishing/whaling ships. As described in nearly all interviews, community members have become familiar with the annual and seasonal timing of ship visits. With the exception of icebreakers which can arrive any time of year, ships tend to first arrive in Cape Dorset in July (i.e. once the ice is gone), and continue to arrive through to the months of August and September (with the shipping season usually ending by October).

Community members are generally unfamiliar with the routes taken by these ships, their origins, or their destinations once they leave Cape Dorset. Nevertheless, ship routes are observed to follow the northern shorelines, possibly for the same reasons that community members navigate their boats close to the shore (i.e. to minimize influences of currents, winds, etc.) (Etidlouie 2008; Ezekiel 2008). It is also generally understood that ships are coming from 'the south,' in particular Québec, Newfoundland, and Ontario, and that they make stops at other nearby communities (Ashoona 2008; Elee 2008; Pootoogook 2008; Ragee 2008a, 2008b; Resident of Cape Dorset 2008c; Shaa 2008). Through contact with the visitors aboard cruise ships, participants reported having met tourists from Northern Québec, Europe, the USA, China, Australia, and Russia (Elee 2008; Etungat 2008; Oshutsiaq 2008a, 2008b). Despite not knowing much about the origins or routes of ships, community members are concerned with the impacts associated with shipping.

Impacts of shipping

There are a number of impacts that interviewees identified in relation to shipping routes into, or near, the community of Cape Dorset. The potential for ships sinking, dumping, noise, and travel through important wildlife areas are generally regarded as negative impacts, while the possible increase in economic activity and access to goods are seen as positive (Table 2). It is believed that as shipping increases, so will the potential frequency and intensity of these impacts, which will be felt in the community, on the land, and by the wildlife and environment upon which community members rely.

Monitoring ship travel

With the potential impacts of shipping, there is a need for monitoring of ships around the arctic region, and community members in Cape Dorset do not believe that effective monitoring is taking place. Currently, interviewees are not aware of any initiatives to monitor shipping in the area (Alasuaq 2008; Manumee 2008; Ragee 2008a, 2008b; Resident of Cape Dorset 2008a; Saila 2008; Shaa 2008; Tukiki 2008). Within the community there exists some informal monitoring based on people's observations. However, people are not aware of any community- or territory-run systems in place to monitor local shipping practices, and we were unable to find any information indicating otherwise.

Policy positions on arctic marine travel

Community uses of the marine environment

The Nunavut Land Claims Agreement (NLCA) (1993) is the only Agreement, of those examined (Table 1), that recognizes the use of sea ice by Inuit. Legal rights for

Table 2. Impacts of shipping in the Arctic as identified, and experienced, by community members of Cape Dorset, Nunavut.

Activity	Impact	Examples described
Ships sinking	• Negative • Release of damaging substances such as oils and other types of contaminants • Pollutes the water	• Sinking of the Nascopie near Cape Dorset in the late 1940s after hitting a reef • Oil spill near Coral Harbour • Exxon Valdez oil spill near Alaska
Dumping	• Negative • Intentional release of sewage, waste and/or garbage into the environment • Damages to wildlife and waters	• Some community members have found empty barrels of oil on the land that seem to have been left behind by ships • Polar bears spotted with oil marks on them, from nearby abandoned barrels • Garbage left behind on islands that are important eider duck nesting grounds
Noise	• Negative • Sounds emitted from ships disturb wildlife in the area (especially sensitive animals such as walrus and whales)	• Ships and more human presence bring unique and unfamiliar sounds, above and below the water • Disturbs marine wildlife which may influence migration routes (also affecting hunters who rely on these animals)
Traveling through wildlife areas	• Negative • Tourist ships would likely visit areas that wildlife frequented, which could disturb and change wildlife patterns	• General concerns for wildlife impacts in areas frequented by ships • Affects migratory bird habitat • Disruption of wildlife behavior and habitat by seeking out important congregation areas for the purpose of wildlife viewing
Economics	• Positive • Visitors buy carvings and art from the community • Companies hire local guides (although this has been decreasing recently, which is seen as negative)	• Benefits for the community depend on how much tourists invest in local purchasing or hiring of guides and other services • Local interest in exchange of knowledge and culture with cruise ship visitors - does not have to be directly financial benefits, but positive exchanges supporting community capacity and sharing of knowledge and information
Access to goods	• Positive • Ships allow goods to be brought in that would otherwise be too difficult or costly to obtain in remote communities	• Annual sealift brings bulk order and large items into the community • More ships could mean lower cost of goods • More ships in arctic waters could translate into improved access to goods for northern communities

Sources: Alasuaq (2008); Elee (2008); Etidlouie (2008); Etungat (2008); Manumee (2008); Mikigak (2008); Oshutsiaq (2008a, 2008b); Pootoogook (2008); Ragee (2008a, 2008b); Resident of Cape Dorset (2008c); Saila (2008); Takiasuk (2008); Tukiki (2008).

marine areas within the NLCA are based on long-term traditional (and current) Inuit use and occupancy of landfast ice zones (NLCA 1993). In all other Acts and Agreements, sea ice is only referred to as a potential hazard to/impact on ships and the use of ice-filled waters is limited to travel/navigation by shipping vessels with concerns centered on environmental protection and safety. Thus, there is a significant lack of consideration regarding community uses of the marine environment (where on sea ice or by boat), particularly at national and international levels.

Impacts of shipping

Acts and Agreements focused on arctic waters are concerned with the impacts of shipping on the arctic environment (land, marine, and inland waters); however, there are jurisdictional differences. At the federal level, the Canadian government is concerned with marine areas and oceans, whereas at the territorial level, the Nunavut government is concerned with inland waters (i.e. rivers and lakes). The NLCA (1993) and the Nunavut Waters and Nunavut Surface Rights Tribunal Act (NWNSRTA) (2002) explicitly state that the territorial jurisdiction ends once ships are involved. As a result, the Government of Nunavut is not responsible for regulating or controlling shipping in the Arctic.

The Acts and Agreements indicate that there is significant concern over pollutants and waste entering the ocean and inland waters of the Arctic as a result of shipping activities. Under the Federal Arctic Waters Pollution Prevention Act (AWPPA) (1985, p. 4), ships and crew are prohibited from depositing 'waste of any type in the arctic waters or in any place on the mainland or islands of the Canadian Arctic under any conditions where the waste ... may enter the arctic waters.' Similarly, under the NWNSRTA, no person shall deposit waste 'under conditions in which the waste ... may enter waters in Nunavut' (NWNSRTA 2002, p. 7). Protecting the arctic waters is a key concern for both the federal and territorial governments.

In case of an accident, ships entering Canadian arctic waters may be required 'to provide evidence of ... insurance' (AWPPA 1985, p. 8). Those responsible for the depositing of waste (intentionally or unintentionally) must report occurrences to the Canadian Coast Guard (CCG), and are liable for the cost and expenses of the incident as well as actual loss or damages incurred by others as a result (AWPPA 1985). Based on these environmental concerns, there are important policy clauses relating to the monitoring of ships in arctic waters.

Monitoring ship travel

The Canadian federal Acts provide for the establishment of officers and/or inspectors to: (1) enforce the respective Acts and regulations through the monitoring of shipping practices including training and certification; (2) conduct inspections aboard ships; (3) respond to pollution; and (4) maintain broad responsibility over the conduct of vessels travelling through Canadian waters (AWPPA 1985; Canada Shipping Act 2001; Oceans Act 1996; also see NWNSRTA 2002). There are also regulations insisting that individual ships are responsible for reporting conditions (i.e. ice, water, weather, traffic, etc.) when travelling through Canadian waters, for the safety of other ships in the area (Canada Shipping Act 2001).

While both the community perspectives and policy positions on key aspects of arctic shipping are valuable to identify, we are most interested in analyzing how these perspectives intersect (or not).

Discussion

Community uses of the marine environment

Inuit have extensively utilized the arctic environment, including the sea ice, for many generations. However, within government policies there is little recognition of this use by Inuit. The NLCA (1993) is the only policy that explicitly recognizes the importance of sea ice to Inuit. Through the negotiations of the NLCA (1993), Inuit sought to ensure the maintenance of their rights to marine areas, based on their past and current uses of sea ice and oceans, to encompass and protect their way of life (NLCA 1993). By ratifying this Agreement, the Canadian Government has made a step forward in recognizing and defining the rights of Inuit in Canada based on 'their own customs and usage' (NLCA 1993, p. 1). Currently, none of the Acts or Agreements designed for Canada's arctic marine areas or shipping policies acknowledge, regulate, and/or restrict the use of sea ice by Inuit. This is likely due to the fact that these Acts and Agreements were developed for broad jurisdictional scales (i.e. national or international), as well as for different purposes (i.e. regulating marine water usage as opposed to protecting Inuit rights). However, as a result, extensive community usage of the sea ice, and ice-filled waters, may not be considered when developing shipping routes. For example, ship traffic could alter the sea ice platform used by Inuit which would enhance the risks involved with local sea ice or boat travel (Bates and Alverson 2010). Therefore, implementing aspects of arctic marine-related Agreements and Acts other than the NLCA (1993), without acknowledging Inuit use of the arctic environment, seems to indicate little concern for the local impacts of shipping on northern communities (both negative and positive) (Table 2).

Arctic marine shipping

There are substantial differences with respect to community perspectives on arctic shipping and policy positions detailing various levels of jurisdictional responsibility. For remote Nunavut communities, ships are important providers of goods, as well as an important means of transportation. However, for many Inuit community members, ships have also historically represented unsettling colonial encounters, inciting feelings of fear and uncertainty due to lack of understanding or communication related to ships transporting patients to southern hospitals for treatment. Today, ships continue to represent annual resupply and potential financial benefits from tourism, alongside concerns over environmental (ice, water, and wildlife) impacts (Table 2). In contrast, for governments and non-Inuit, arctic shipping mainly represents a mode of transportation to access remote areas (i.e. arctic communities or resources), with potential to facilitate economic development (i.e. transport goods, equipment, or raw materials long distances) (ACIA 2004; Bates and Alverson 2010; ICC-Canada 2008; Resident of Cape Dorset 2008a). The Canadian government is also interested in how shipping can aid in the assertion of sovereignty over marine areas (i.e. CCG ship presence in the arctic region), or

present a threat to state sovereignty (i.e. foreign ships traveling through arctic marine areas close to, or within, Canadian waters) (Bilder 1970; Birchall 2006; Government of Yukon *et al.* 2005; Huebert 2001, 2008; Pharand 2007). Nevertheless, something all parties seem to be able to agree on is that shipping in the Arctic has the potential for a variety of different impacts, both negative and positive.

Impacts of shipping

Environmental impacts. Environmental impacts from arctic shipping are key considerations. The Acts and Agreements examined were designed to ensure safety in the marine environment, and to minimize any potential negative environmental impacts (i.e. oil spills, dumping, noise, etc.) (Table 2). Specifically, some important environmental standards are laid out in the AWPPA (1985) and fall under the responsibility of the CCG (DFO 2010). For example, ships are required to have their hull and fuel tank strengthened, and to be aided by a pilot or an ice navigator when necessary. These standards fall under the responsibility of the CCG (DFO 2010) and its Icebreaking Program; however, at present CCG icebreakers are only stationed across the Canadian arctic marine region from June to early November each year (DFO 2008; Stewart *et al.* 2010). Furthermore, these icebreakers are reaching the end of their operational life and will need to be replaced in the near future (at a great cost to the Canadian government as outlined in the 2008 budget announcement of $720 million for vessel upgrades) (DFO 2011; Huebert 2001). The current age of the fleet makes it more difficult for the CCG to protect the ships and the marine environment, especially with the changing sea ice conditions and increased traffic, because their technology is out of date and their age increases the likelihood for malfunctions (Huebert 2001). In addition, given the vast area of the Arctic Ocean surrounding Canada's Arctic Archipelago, there is a need to increase the number of icebreakers and the duration of their operations (i.e. there are no icebreakers available for assistance from December to May) (DFO 2008; Stewart *et al.* 2010). Therefore, it is currently not possible to guarantee that the CCG fleet will be close enough to respond, and provide search and rescue services to ships in need, as traffic increases in the Canadian Arctic (Stewart and Dawson 2011). It is reported that under normal circumstances (i.e. limited ice, good weather, etc.) CCG response time could be 10 hours or more (Stewart and Dawson 2011).

Even with the precautionary measures outlined in various policies - including the establishment of officers/inspectors and mandatory insurance coverage - shipping in the Arctic has the potential to cause harm to the arctic environment, wildlife, and people. Sea ice, whether as a solid sheet of ice, broken up and free-floating, or in the form of icebergs, poses significant threats to vessels (ACIA 2004; Pharand 2007). In relation to shipping accidents or negligence, the primary concern is the release of pollutants/contaminants into arctic waters (Arctic Council 2009; AWPPA 1985). Similarly, the primary concern over arctic shipping for Cape Dorset community members (Table 2) and researchers (ACIA 2004; Bilder 1970; Charron 2005; Pharand 2007) is the potential for oil spills or the dumping of sewage and other waste into arctic waters. These concerns arise from peoples' understandings of potential damage related to spills, as well as hearing of the consequences of spills that have previously occurred (e.g. the Exxon Valdez spill of 1989). Enhanced concern for accidents in the arctic region results from the combination of global (atmospheric/oceanic) circulation patterns, extreme cold temperatures, seasonal ice

cover, and permanently frozen ground, which means that disturbances that occur are long lasting (ACIA 2004; Bilder 1970; VanderKlippe 2006). There are also concerns regarding the realistic ability to clean up an oil spill in the Arctic and effectively respond in an emergency situation (especially given the previously mentioned limitations of the current CCG fleet).

Canadian policies, including the AWPPA (1985), hold ships traveling through Canadian waters accountable for the cost and expenses of an incident, and any loss or damages incurred by others, by placing the responsibility on ship's crew to demonstrate the necessary standards and training to maintain and run their ships. Nevertheless, if an accident occurred and there were actual damages to the environment, it would be impossible to fully evaluate the costs associated with the cleanup of the spill and rectifying any environmental damage (as they have long lasting effects in the Arctic). Requiring ships to carry insurance in order to transit Canada's arctic waters is helpful in that it may limit the number of ships traveling through these waters, and encourages responsible maintenance and navigation; however, it cannot eliminate the possibility of accidents or spills. Therefore, there is a need for monitoring and enforcement to support this initiative and ensure safe travel in the arctic region.

Visiting communities. There is local interest in Cape Dorset in having ships visit northern communities when traveling nearby to enhance local benefit of their transits (Etidlouie 2008; Resident of Cape Dorset 2008c; Shaa 2008). However, the current Acts and Agreements that regulate shipping in the Arctic provide no opportunity for the Canadian government to regulate, or encourage, international ships' to visit communities - regardless of whether the waters are deemed Canadian internal, or international. UNCLOS (1982) states that ships have the right to innocent passage through other state-regulated internal waters (also see Stokke 2007). This essentially allows all ships to travel directly through Canadian internal waters, without visiting the mainland. Similarly, where waters are deemed to be part of an international waterway, UNCLOS (1982) allows ships to travel through for their own purposes without visiting the mainland or nearby countries (also see Stokke 2007). Although these are two separate provisions, the outcome is the same for the community: the current Acts and Agreements do not provide governing bodies the power to insist on ships visiting the communities to enhance local benefit of their transits. The main visits to communities tend to be cruise ship stops and sealift deliveries for community resupply.

Tourism. Numerous cruise ships visit select communities throughout the Arctic each shipping season. Within the past six years, cruise ships have begun to visit additional locations in the Canadian Arctic that were previously inaccessible - likely as a result of ice conditions (Stewart *et al*. 2010). Of note, the 2005 cruise season in the Canadian Arctic had eleven cruise ships, where in 2006 that number doubled to 22 cruises (of which six visited Cape Dorset), and 2007 season saw 23 cruises - which 'brought approximately 2110 visitors to the Canadian Arctic' (Stewart *et al*. 2010, p. 61).

Each cruise ship that visits a community has the opportunity to hire community members as guides, or other local assistance, as well as to spend time and money in the community (i.e. local tours, meals, arts and crafts purchases, etc.). This has great potential for local financial benefits, as well as valuable knowledge and cultural

exchanges (Elee 2008; Resident of Cape Dorset 2008c), and is strongly encouraged as a positive impact in Cape Dorset (Table 2). Cape Dorset has been a popular destination for cruise ships because of its world-renowned artistry (print-making and soap stone carving) (Elee 2008; Mikigak 2008; Pootoogook 2008; Resident of Cape Dorset 2008c; Stewart *et al.* 2010). However, there are no Canadian or Nunavut policies that require cruise ship companies to hire community members, or spend time and money in communities. A number of interviewees have, at some time, worked directly with cruise ship companies to provide various services during their stopovers (Elee 2008; Pootoogook 2008; Resident of Cape Dorset 2008c). However, within Cape Dorset it is felt that in recent years a trend is emerging where cruise companies, for whatever reasons, are not hiring local guides (Resident of Cape Dorset 2008c). Similarly, there are no regulations that require visiting ships to inform communities of their intention to visit. As a result, there have been instances where cruise ships have arrived unannounced into communities where the people were not prepared, and thus it was a lost opportunity. There is a strong belief in Cape Dorset that cruise ship visits need to result in direct benefits for the community, not necessarily monetary, but some sort of 'positive exchange for developing community capacity and people having goods exchanged with other people ... sharing of information, sharing of knowledge' (Resident of Cape Dorset 2008c). However, in many of these small communities there is limited capacity to handle large numbers of visitors, which could mean that enhanced exchanges are not always positive. As the tourism industry continues to grow in the Arctic, Inuit organizations and corporations are becoming involved, which helps to ensure more community involvement and benefits with policies for hiring Inuit as guides and performers (Fugmann 2009; Stewart *et al.* 2010). Also of consideration are the potential strains tourism can place on communities such as demand on existing infrastructure and services (water, electricity), demand for new and improved infrastructure (docks), and impacts on local wildlife (AMAP 2011).

Interestingly, cruise ship visits to Cape Dorset seem to be declining (with only one visit in 2008 as compared to six in 2006), likely as a result of the increased accessibility of more northern communities, the NWP, and a shift away from visiting communities and moving towards visiting wildlife and 'untouched' wilderness (Huntington 2009; Stewart *et al.* 2010; Stewart and Dawson 2011). Arctic wildlife sight-seeing is becoming the 'raison d'être of expedition cruising in the Canadian Arctic' (Stewart *et al.* 2010, p. 58). However, it is also predicted that climatic changes affecting arctic wildlife and scenery 'may adversely affect the tourism industry in the long term' (AMAP 2011, p. 9).

Community resupply. Ships are an important mode of transport for goods in the Arctic, as they are capable of transporting necessary supplies to remote communities that would otherwise be difficult to obtain (Alasuaq 2008; Arctic Council 2009; Etungat 2008; Ezekiel 2008; Manumee 2008; Oshutsiaq 2008a, 2008b; Pootoogook 2008; Ragee 2008a; Resident of Cape Dorset 2008a, 2008b; Saila 2008; Shaa 2008; Takiasuk 2008; Tukiki 2008). Therefore, community resupply is another way in which arctic shipping benefits northern communities (Table 2). With the creation of the Government of Nunavut (GN), the responsibility of northern community resupply (i.e. issuing appropriate contracts in Nunavut) was passed from the Canadian Government to the GN. Community resupply in most Nunavut communities comes in the form of the annual sealift, which is considered 'the

most economical way to transport bulk goods to the arctic' (GN 2005, p. 1). The number of sealift ships visiting the communities of Nunavut during the shipping season depends on individual orders, and community location in relation to ice conditions (i.e. communities further south with less ice could have more visits than High Arctic communities with a shorter open-water season). Sealift orders can include 'construction materials, vehicles, heavy equipment, house wares and non-perishable items' (GN 2005, p. 1). The GN itself is a primary user of the sealift, and Inuit operated cargo shipping companies are starting to emerge in order to serve the eastern arctic communities in Nunavik (Northern Québec) and Nunavut (Fugmann 2009).

The current challenge for the Canadian government and its operations is to find balance between the benefits and concerns related to the impacts of shipping in arctic waters. Ships that visit the communities and provide some sort of support or service are beneficial and desired by community members (Alasuaq 2008; Etidlouie 2008; Shaa 2008), and potential benefits are seen to extend beyond simply economic implications (Resident of Cape Dorset 2008c). Whether cruise ship visitors or commercial ship crew members, encouraging visits, engagement, and investments (through local economic investment or learning about local cultural practices) in the communities could be a valuable way for ship companies to show respect for Inuit who live in the arctic region, as well as the environment they are traveling through. However, there are also potential downsides of increased community visits such as increased noise and environmental pollution of waters and ultimately animals (Bates and Alverson 2010; Huntington 2009). Any disturbance or accident in the arctic marine environment would be felt strongest by northern communities. Therefore, additional consideration by the Canadian Government needs to be given to the costs and benefits of ships traveling through the arctic region, and how transits can best support social and economic prosperity in these remote communities.

Monitoring ship travel

The monitoring of shipping in the arctic region is limited. The Arctic Council (2009, p. 5) identifies that there are 'serious limitations to radio and satellite communications and few systems to monitor and control the movement of ships in ice-covered waters' (also see Bates and Alverson 2010; Stewart *et al.* 2010). For example, there is no formal tracking or record of the number of ships traveling in the Arctic (i.e. no tracking of cruise ships) (Stewart *et al.* 2010). This is a result of limited marine infrastructure, and the vastness of the arctic environment (Arctic Council 2009). Within Canada, the operations of the CCG have 'the greatest responsibility for monitoring the Arctic region' (Huebert 2001, p. 92). However, until 2009, the CCG did not require ships to report their entrance into arctic waters, such reporting remained voluntary. It was not until 2010 that the Canadian government put in place the Northern Canada Vessel Traffic Services (NORDREG) to track shipping in the Canadian Arctic. Under NORDREG all ships over 300 tonnes, engaged in towing or pushing vessels, and carrying cargo such as pollutants or dangerous goods are required to report their travel plans prior to entering Canada's arctic waters (note: this does not include yachts or small personal boats) (Boileau *et al.* 2010; Transport Canada 2010). This represents the first time it has been made mandatory for such vessels to report while operating in the Canadian Arctic (Stewart and Dawson 2011).

In Cape Dorset it is recognized that extensive monitoring and tracking of ships is critical to prevent detrimental impacts to the environment (land, water, animals) or people in the area. As a result, community members themselves have been undertaking a form of monitoring based on their own observations. In addition, the Canadian Government, led by the Department of National Defense, has been investigating the potential use of surveillance in the Arctic to monitor ships entering its waters through a project called 'Northern Watch' (DRDC 2008). Overall, it is suggested by the Arctic Council (2009, p. 7) that 'a comprehensive Arctic marine traffic awareness system to improve monitoring and tracking of marine activity' should be developed and shared (also see Bates and Alverson 2010).

In the context of diminishing ice extent and variable ice distribution, increased interest in economic development and related higher ship traffic leads to greater potential for accidents and heightened concerns from northern communities. Thus, more extensive, systematic monitoring of Canada's arctic region (i.e. weather, sea ice, ocean currents, etc.), shipping, and consideration of the impacts of shipping is needed. Community members expressed their interests in working more closely with academic and government researchers, to have scientists gain more context and appropriate data based on local experiences and observations (Bates and Alverson 2010; Manumee 2008; Resident of Cape Dorset 2008c). Furthermore, if government operations (e.g. Canadian Ice Services, CCG) can be better informed by, and tailored to, northern community needs and concerns, monitoring practices and resulting products could be enhanced for mutual benefit. Fostering a more collaborative approach between government departments and community organizations might facilitate the development of more comprehensive, long-term community-based monitoring programs, as well as more effective means to address a variety of environmental and social impacts.

Conclusions

The Earth's climate is changing, and thus we are being faced with unique and unprecedented challenges. The arctic region is already being affected by dramatic environmental changes. Changes in sea ice cover, freeze-up and break-up timing, and length of the open-water season are creating both opportunities and challenges for those who live in - and utilize - the arctic marine environment. As such, there are a number of stakeholders that need to be considered in understanding the policies and practicalities of shipping in a changing Arctic, across local to international scales. Generally speaking, governing bodies in circumpolar nations view sea ice as a barrier to movement, and tend to focus on the beneficial aspects of changing sea ice conditions (i.e. enhancing transportation opportunities and access to remote resources for potential development). However, Inuit and their representative organizations, view the sea ice as a platform for travel and hunting, as well as a means to sustain local livelihoods, culture, and marine animals (Aporta 2011). Through a community-based case study in Cape Dorset, Nunavut, as well as an examination of relevant Acts and Agreements related to uses of marine environments, this project has enabled the joint consideration of these unique perspectives.

There are both positive and negative consequences of enhanced arctic shipping under changing ice conditions, and community benefits and/or involvement in monitoring, regulations, and related decisions are not well addressed in current policies. Therefore, a number of recommendations have been identified as potential

considerations for governments and northern communities as they continue to adapt to changing sea ice conditions and increased potential access to arctic marine areas including to: undertake community consultations, establish the Marine Council, improve emergency response measures, and update existing Acts and Agreements.

Recommendations

Undertake community consultations

It is imperative that Inuit communities are involved in the discussions and decisions taking place regarding the future of the arctic environment to increase the possibility of policy up-take of Inuit experiences and observations. Inuit have been thriving in the arctic environment long before there was desire to 'discover' and profit from the NWP, or the establishment of Canada. The arctic region - land, water, and ice - is a homeland for Inuit, and they possess generations of in-depth knowledge of regional environmental conditions. This is outlined as an important consideration in the Nunavut Land Claims Agreement Act (NLCAA) which states that '...the legal rights of Inuit in marine areas flowing from the Agreement are based on traditional and current use ... and there is a need for Inuit involvement in aspects of arctic marine management, including research' (NLCAA 1993, p. 135). Based on responses from Cape Dorset community members, they feel there should be more local involvement in Canadian policy- and decision-making regarding arctic shipping to ensure that the benefits and risks of enhanced arctic shipping are weighed with consideration of community priorities and concerns. At the same time, there are questions about what constitutes local involvement or Inuit representation. For example, residents of Cape Dorset worry that in undertaking community consultations only larger centers such as Iqaluit (the capital of Nunavut) would be consulted, and that smaller Nunavut communities may be left out. To address these concerns, it is recommended that enhanced communication and consultation efforts are made, by federal and territorial governments, to connect with a broad spectrum of northern communities and representatives of diverse stakeholder groups (not to mention improve the comprehensive nature of marine policies or northern economic strategies). However, the challenge would be to ensure effective cross-jurisdictional cooperation to help facilitate this process. Under current legislation, the Government of Nunavut is not responsible for regulating or controlling arctic shipping, yet it is best positioned to promote the needs of communities in the Territory. In this regard, there is a need to raise more awareness in Nunavut communities about international, federal and territorial issues (regulations, jurisdictions and processes), to enhance communication, enable a more informed understanding, and develop appropriate consultative mechanisms for various scales of jurisdiction.

Establish Marine Council

There are provisions in the NLCA (1993) for the establishment of a co-management board - the Marine Council, which would assist in arctic marine monitoring and regulations. The Marine Council is meant to bring together expertise from the Nunavut Planning Commission, Nunavut Impact Review Board, Nunavut Water Board, and Nunavut Wildlife Management Board to deal with marine-related decisions, but it remains in the process of being established (Daoust *et al*. 2010; Griffiths 2009). Currently, 'these existing organizations have been providing

piecemeal and independent recommendations to federal government agencies on marine issues' (Daoust *et al*. 2010, p. 88). Establishing this joint council could benefit Canadian arctic marine management as it 'could become a key Canadian forum for priority setting and analytical input into federal government policy' on shipping issues (Griffiths 2009, p. 26). As such, the Nunavut Marine Council would shift part of the responsibilities for regulating and protecting arctic marine environments from the federal government to the GN, and the GN could then work more closely through these Boards and the Council to ensure Inuit involvement in decisions (also see Daoust *et al*. 2010; Griffiths 2009). The council would thus be in a position to bring forward Inuit insights and concerns related to marine management, and more specifically, to regulating ship travel in the Canadian arctic waters surrounding Nunavut.

Improve emergency response measures

The arctic marine environment presents significant challenges when it comes to emergency response (for people, ships, and the environment) including search and rescue. Currently, some of these challenges include the vast area, remoteness, cold temperature, amount of ice, as well as lack of infrastructure and communications in northern regions (Arctic Council 2009; Bates and Alverson 2010; Stewart and Dawson 2011). Of primary concern internationally, the eight Arctic States signed an Agreement on cooperation in Aeronautical and Maritime Search and Rescue in the Arctic in May 2011 (Arctic Council 2011). In Canada, efforts are underway to increase government presence through its operations, which mainly include the CCG and the military. In turn, this would enhance environmental protection and search and rescue efforts. For example, an annual ice exercise Operation Nanook is undertaken under the authority of Canada Command to exercise sovereignty and presence patrolling in the NWP (Canadian Forces Canada Command 2011; PMO 2010).

To further improve arctic search and rescue it is recommended to investigate making search and rescue assistance mandatory for ships traveling in Canadian arctic waters. Currently, through the Automated Mutual-Assistance Vessel Rescue System (Arctic Council 2009), it is voluntary for nearby ships to provide assistance if requested. In 2007, approximately 450 lives were saved because of this voluntary system throughout the circumpolar Arctic (Arctic Council 2009). With increased ship traffic in the arctic region it would be important to move towards mandatory assistance as well as reporting of incidents. For the most efficient accident response and rescue of personnel, it is advisable to develop a code of conduct that requires ships to provide assistance when requested (so long as it is safe and possible to do so). Such measures would benefit a number of groups in the region, specifically shippers, the CCG, and northern communities. At present, northern community members are often the first responders to emergencies involving search and rescue in the Arctic, and as such, they tend to pay out of pocket for the costs of the search and rescue efforts. In order to improved coordination with local ground, ice, or water emergency response, an investment into community infrastructure (e.g. technology and communications), transportation (e.g. ship, boat, snowmachine, helicopter, etc.), and personnel (e.g. the Canadian Rangers) would need to be made. However, there are financial limitations to these investments, so balance and targeting appropriate jurisdictional scales would be essential.

Update existing Acts and Agreements

With the changing environmental and political conditions, Acts, Agreements and standards related to the arctic marine environment and shipping need to be revised to better protect northern environments and people. At their inception, these policies did not anticipate dramatic changes in sea ice conditions or the related increase in interest to access northern resources and destinations. They also did not include considerations for the impacts and benefits of shipping on coastal communities (specifically Inuit), or community uses of the marine environment (sea ice as a platform).

It has been recommended that a comprehensive arctic shipping regime be established to make routes and navigational resources safely available for ships (Bates and Alverson 2010; Wade 2008). This includes increasing and updating charting and mapping of the Arctic Ocean (Bates and Alverson 2010; George 2010). Less than 10% of Canadian arctic waters are covered in modern navigational charts, and of those charts most information is based on reporting from the nineteenth century (Boileau *et al*. 2010). Compounding this, it is currently the responsibility of ship's officers to update their charts and to note hazards when they are issued by the CCG (Stewart and Dawson 2011). In 2010, two tankers and one cruise ship ran aground in Canadian arctic waters – all incidents have been suggested to be attributed to navigational errors and out-dated charts (Boileau *et al*. 2010; Stewart and Dawson 2011). In the instance of the grounded cruise ship, the rescue ship also experienced hazardous travel because the area in general was poorly charted (Stewart and Dawson 2011). Specific routes throughout the Arctic could be designated based on what is best for ship navigation along with efforts to minimize environmental and social impacts, through consideration of: water depth, concentration of ice cover, prevailing wind strength, proximity to northern communities, and impact on wildlife (AMAP 2011; Boileau *et al*. 2010; Etidlouie 2008; Ezekiel 2008; Kubat *et al*. 2007; Stewart and Dawson 2011). This could help to alleviate some of the concerns discussed both in the literature and in Cape Dorset. Such coordinated efforts would also help improve collaborative emergency response measures through shared information regarding weather updates, ice conditions, and response tactics (also see Bates and Alverson 2010). This would likely involve some level of agreement between jurisdictions, including the nations who are involved in, or impacted by, arctic shipping, to ensure the safety of transiting vessels, as well as the environment, wildlife and communities of the Arctic. Finally, in updating the wording in legal Acts and Agreements, and broader policies, variability in geographic, climatic, and cultural conditions across the Arctic needs to be acknowledged and accounted for.

Moving forward

While this study is based on a limited number of arctic policies, and Inuit perspectives only from the community of Cape Dorset, findings presented here can be used to inform broader territorial, national, and/or international discussions relating to shipping in arctic waters, including governance and sovereignty debates. However, it must be noted that for a more comprehensive understanding of community perspectives, additional arctic communities (across Canadian Arctic

regions) would need to be consulted. Some Nunavut communities that could be the focus of further research include, but are not limited to:

- Pond Inlet – due to its proximity to the site of the Mary River Project.
- Cambridge Bay – the future site of the Canadian High Arctic Research Station.
- Clyde River – due to its inclusion in recent arctic cruise research (Stewart *et al.* 2007).

Furthermore, it would be beneficial to extend the study to communities in other Inuit land claims regions of Canada to provide a more representative Inuit perspective. These communities could include:

- Nain, Hopedale, Postville, Makkovik, and/or Rigolet in Nunatsiavut - located along the Labrador Sea (eastern entry point to the NWP).
- Kangiqsualujjuaq, Aupaluk, Kangirsuk, Kangiqaujuaq, Salluit, and/or Ivujivik in Nunavik – located along the Hudson Strait, similar to Cape Dorset.
- Sachs Harbour, Holman, Paulatuk, and/or Tuktoyaktuk in the Northwest Territories – located along the Amundsen Gulf and near the Beaufort Sea (western entry point to the NWP).

Each community in the Arctic is unique based on their history, culture, and environmental conditions, and would maintain varying levels of interest, and depth of knowledge about shipping policies, opportunities and challenges. This emphasizes the need for broader consultation to ensure that diverse perspectives and expertise are recognized and incorporated into future policy creation and ongoing decision-making. The enhanced cooperation between Inuit organizations and all levels of government, and increased consideration for Inuit knowledge alongside scientific knowledge, would go a long way to protecting the arctic environment in these times of change - along with the people and wildlife who live in and rely on this environment.

> The environment is vital to our entire way of life as Inuit. If something were to happen to our fragile Arctic ecosystem, our way of life would be lost and we as a people would be lost. Therefore, any activity in the Arctic, whether it is resource extraction, tourism, or military-related, must be undertaken according to the Inuit definition of sustainability – it must support the continuation of the Inuit way of life for thousands of years to come. (ICC-Canada 2008, p. 26)

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