

Canadian Arctic Shipping:

Issues and Perspectives

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INTERNATIONAL CENTRE FOR
NORTHERN GOVERNANCE AND DEVELOPMENT

Occasional Paper Series, Vol. 11-01
November 2011



UNIVERSITY OF
SASKATCHEWAN

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International Centre for Northern Governance and Development
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Editing, design, and layout by Heather Exner-Pirot and Colleen Cameron.

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In the fall of 2008, the International Centre for Northern Governance and Development (ICNGD) was established to further research, graduate training, and capacity building around the issues of governance and development in the Canadian and circumpolar North – economic, environmental, social and health – in partnership with Northern and Aboriginal communities, industry, and government.

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EXECUTIVE SUMMARY

GLOBAL WARMING HAS REDUCED THE AMOUNT of sea ice in the Arctic, fuelling speculation about the opening of trans-Arctic sea routes, and the time, money and distance they may save in the near future. In some cases the prospects have been wildly overstated; in others, the future is now. The three papers presented in this edition accept that there is a trend towards a moderate increase in certain types of shipping in the Canadian Arctic, and make policy recommendations based on that assumption.

Adam Lajeunesse provides a broad assessment of Arctic shipping potential in Canada. While he sees an influx of *international* shipping to be unlikely in the short and medium term, the prospects for *destinational* shipping – tourism, community and industry resupply, and transport/export of resources – seem much better. In order to prepare for this increase, Lajeunesse recommends a number of measures to protect the environment and ensure sufficient marine safety. Included in this would be an investment in the surveillance and hardware capabilities needed to effectively monitor and respond to emergencies as they arise. Lajeunesse sees little substantive threat to Canadian sovereignty with regards to an increase in *destinational* shipping. Amongst other measures, however, he suggests that the application of a nominal transit fee, similar in principal but less costly than what the Russians charge in the Northern Sea Route, to help solidify Canadian claims that the Northwest Passage is internal waters.

Will Russell provides a very specific examination of the ways in which an increase in Arctic shipping potential may benefit Canada, identifying the implementation of a tonnage tax system and other financial incentives as an opportunity to both capitalize on northern economic opportunities and promote the stagnant Canadian shipping industry. Russell comes to this conclusion following an evaluation of the prevailing open registry system and its disadvantages, and the successful way in which the EU, and specifically the UK, have addressed the challenge with subsequent benefit to their merchant fleets. His recommendations should be of interest to a government keen on promoting both northern development and high value manufacturing.

Finally, Adrienne Johnston examines the recent growth in Arctic cruise tourism and assesses the degree to which the Canadian government is ready to deal with it. After establishing the trend towards a growing, if still small, cruise tourism industry in the Eastern

Arctic, Johnston interviews stakeholders from Transport Canada, Environment Canada, the Canadian Coast Guard, the Canadian Border Service Agencies, and Parks Canada to examine their challenges in managing this increase effectively. Using Smit and Wandel (2006)'s framework for vulnerability assessment, Johnston finds that while those agencies dealing with issues of safety have been effective in preparing for more cruise tourism, visitor-oriented agencies such as Parks Canada have had difficulties communicating and working with the cruise tourism industry.

The three papers proffered here were first presented at the Circumpolar Graduate Fellowship Symposium in March, 2011. Funded by the Department of Foreign Affairs and International Trade's circumpolar division, and hosted by the ICNGD, the topic of Arctic shipping was chosen specifically by DFAIT in order to generate ideas and scholarship on this issue of increasing importance to Canadian foreign policy. A second occasional paper on this topic, reflecting on local and indigenous views of Arctic shipping, is forthcoming.

November, 2011

A NEW MEDITERRANEAN? ARCTIC SHIPPING PROSPECTS FOR THE 21ST CENTURY

Adam Lajeunesse
University of Calgary

Introduction

IN 1921, VILHJALMUR STEFANSSON FAMOUSLY PREDICTED that the Arctic would soon become a region of great strategic and commercial importance. Crisscrossed by the air and sea traffic of many nations, the region was to be the Mediterranean of the modern age.¹ While Stefansson's prediction was certainly premature, recent economic and environmental developments suggest that a sea change may finally be taking place. The well documented melting of the region's sea-ice and the rush of tourist, oil and resource companies into the area have together created the potential for a radical increase in maritime activity, with all the consequences and opportunities that will go with it. Yet despite these changes, the more modern prophecies of an Arctic Mediterranean remain premature. Rather than a flood of international shipping seeking a shortcut through the Arctic, the next ten to twenty years will likely see an explosion of destination traffic. This new traffic will be led by the tourism, oil and mining industries which have all shown a new and sustained interest in the Canadian Arctic. And, given the investments which have already taken place, it is likely that this form of traffic will increase exponentially in the near future.

This increased activity carries with it both risks and opportunities for Canada. If the country is to be prepared for, and benefit from, future traffic it will have to invest strategically in many of the items which it has deferred for decades. These investments will have to range from improved hydrographic mapping, search and rescue resources, navigational aids and icebreaking

¹ Vilhjalmur Stefansson, *The Friendly Arctic: The Story of Five Years in Polar Regions* (MacMillan, 1921).

and forecasting services to surveillance and law enforcement capabilities. Changes in policy and regulation will also have to be designed to ensure the maritime space is managed in an environmentally sustainable and politically acceptable manner.

If managed correctly Arctic shipping can proceed safely and be a catalyst for economic growth. Just as importantly, from a policy perspective, this traffic need not be the assault on Canadian sovereignty which some commentators have feared. Rather, by developing the region's waterways and working with the growing business interests, Canada will have a distinct opportunity to solidify its title by winning the acceptance of its jurisdiction which is demanded by international law in cases of proscribed sovereignty.

Thinning Ice

As the ice recedes in the Canadian North, the prospect of a navigable Northwest Passage has been increasing fears and hopes – depending on one's perspective – that the region will soon become a commercially viable shipping route. From Japan to the American eastern seaboard, the Arctic route is 8,000 kilometres shorter than the Panama Canal and would seem to offer shipping companies dramatic savings if it could be transited safely. The question of when it will become safe enough to be used seems tied to the rate of ice melt, which has been steadily stripping the Arctic of its barriers. On average, the Arctic has been losing 74,000 km² worth of ice each year – adding up to a loss of over two million km² since the late 1970s.² Various studies have even predicted a seasonally ice-free passage as soon as 2015.³

Yet to assume that this melt will translate into a viable commercial sea-route within the short or even medium term (5-20 years) would be unrealistic. Despite the loss of sea ice, shipping conditions in the Northwest Passage will remain extremely hazardous for the foreseeable future and will likely leave the route an unattractive alternative to existing shipping lanes. While there has been a general downward trend in both ice cover and thickness, the process has been anything but reliable or consistent. While certain Arctic channels may be open for an expanded period each year, those openings are sporadic and largely unpredictable. Winds and currents across the region shift the ice constantly, often into channels which had been clear the week or even the day before. Accordingly, a shipping season of a certain number of weeks will not necessarily mean consecutive weeks.⁴

Of equal importance is the geographic variability which will often see shippers facing easier conditions in certain sections of the passage and very difficult conditions in others.⁵ Certain regions have also experienced far less ice-loss over the past decades than others. For

² David Barber, Louis Fortier and Michael Byers, "The Incredible Shrinking Ice," *Policy Options*, 26:1 2006, pp. 67.

³ Rhéal Séguin, "Scientists Predict Seasonal Ice-Free Arctic by 2015," *The Globe and Mail*, 12 December 2008, pp. A7.

⁴ Franklyn Griffiths, "The Shipping News: Canada's Arctic Sovereignty not on Thinning Ice," *International Journal*, 58:2 (Spring 2003).

⁵ G.W. Moore, for example, has found that from 1969-2004 the western Beaufort Sea has experienced sea ice decreases while the eastern Beaufort has experienced increases; R. Galley et al., "Spatial and Temporal Variability of Sea Ice in the Southern Beaufort Sea and Amundsen Gulf: 1980-2004." *Journal of Geophysical Research* 11:5, (May, 2008).

instance, the northern parts of the Queen Elizabeth Islands, the western areas of Viscount-Melville Sound and the M'Clintock Channel have seen far less melt than the average.⁶ It is important to note that the latter two sit astride two of the three most important potential shipping routes. The third route, the Prince of Wales Strait, remains hazardous. Indeed, studies by Professors Howell and Yackel have shown very little change in ease of navigation there as well.⁷

An alternative to passing through the Viscount-Melville Sound or M'Clintock Channel would be to run through either Peel Sound or the Bellot Strait. The latter route could potentially avoid the multi-year ice in Peel Sound, but its narrowness makes it impracticable for use by larger vessels. Regardless, a choke point remains in the vicinity of Victoria Strait which acts as a trap for multi-year ice.⁸ While Howell and Yackel have showed slightly safer conditions from 1991 to 2002 compared to 1969 to 1990, they attributed this improvement to the anomalous warm year of 1998 that removed most of the multi-year ice in the region. From 2000 to 2005, when conditions began to recover from the 1998 warming, the ice became mobile, flowing southward into Victoria Strait as the surrounding first-year ice broke up earlier.⁹

Ironically, the melting of first-year ice across the region has been allowing winds and ocean currents to drive more old ice from the Arctic Ocean into the narrow channels of the Archipelago. Some of the more important areas (from a shipping perspective) have actually exhibited an increase in hazardous ice levels.¹⁰ This shift is largely the result of an ocean current pattern called the Beaufort Gyre, which regularly shifts multi-year ice from further north into the western channels of the Archipelago.¹¹ As such, many observers believe that even as overall ice cover recedes, conditions will remain extremely dangerous.¹²

Even as far forward as 2040, many climate models still predict high concentrations of multi-year ice within the Arctic Archipelago.¹³ While some predictions have been made of an ice-free summer later in the century – which would eliminate multi-year ice entirely – this scenario remains a questionable hypothetical.¹⁴ However, as long as significant amounts of sea

⁶ Bee Alt et al., “A Case study of Old Ice Import and Export through Peary and Sverdrup Channels in the Canadian Arctic Archipelago: 1998-2004,” *Annals of Glaciology* 44, (2006) pp. 329-338.

⁷ S.E. Howell and J.J. Yackel, “A Vessel Transit Assessment of Sea Ice Variability in the Western Arctic, 1969– 2002: Implications for Ship Navigation.” *Canadian Journal of Remote Sensing*, 30:2 (2004), pp. 205–215.

⁸ S.E. Howell et al. “Application of a SeaWinds/QuikSCAT Sea Ice Melt Algorithm for Assessing Melt Dynamics in the Canadian Arctic Archipelago. *Journal of Geophysical Research*, III (2006), pp. 1-21.

⁹ *Ibid*; Indeed, more old-ice was seen to have accumulated in the important Victoria Strait in the warm summer of 1998 than in the heavy ice summer of 2001; Wilson, K.J. et al. “Shipping in the Canadian Arctic, *Canadian Ice Service and the Institute of Ocean Sciences*, (2004).

¹⁰ Stewart et. al., “Sea Ice in Canada’s Arctic: Implications for Cruise Tourism,” *Arctic* 60:4 (December, 2007), pp. 377.

¹¹ *Ibid*, 376.

¹² Wilson et al.

¹³ M. Holland, “Future Abrupt Reductions in the Summer Arctic Sea Ice,” *Geophysical Research Letters*, 33 (2006).

¹⁴ In 2004 the Arctic Climate Impact Assessment (ACIA) predicted a largely ice-free Arctic Ocean in late summer in 100 years. More recent estimates moved this up to 30-50 years from; Claes Lykke Ragner, “The Northern Sea Route,” *Nordin Association’s Yearbook*, (2008)

ice remain within the Arctic Ocean it will likely continue to enter the shipping lanes of the Canadian Arctic and threaten transiting vessels.

Challenges of Arctic Shipping

For international shippers and underwriters these uncertain and dangerous conditions create a challenge. In most cases international shipping relies on a system of just in time delivery with tight schedules and little room for uncertainty. The Arctic does not lend itself to such timetables, as unpredictable ice and weather will prevent captains from maintaining a consistent speed and course in even favourable conditions. Delays while a vessel waits for icebreaker support or for conditions to improve would also render any savings on distance and time far less attractive.

An icebreaking tanker or cargo ship could transit the region on a more certain schedule;¹⁵ however such ships are considerably more expensive to build than standard ice-strengthened vessels and the additional capital costs would have to be amortized over a far longer period of time. Standard ice-strengthened tankers on the other hand would only be able to operate in the Canadian North for the summer and perhaps spring months. During these windows of opportunity ships would also face serious limitations in size and draft. The most travelled routes through the Archipelago have been Peel Sound and M'Clintock Channel. Both of these routes restrict the draft of a ship to ten metres, meaning that the economies-of-scale provided by larger vessels could not be realized. The largest vessel capable of transiting these straits would be a small Handysize ship of from 15-30,000 tons. The deep-draft routes through the Prince of Wales or M'Clure Straits could handle even the 25 metre draft of an ultra large crude or cargo carrier but these are the areas with the most extreme ice conditions and, even in the summer, are limited to Arctic Class 3 vessels.¹⁶

In addition to the obvious physical difficulties, the dangers posed by ice will also result in extremely high insurance premiums. In the Canadian Arctic prices remain an unknown quantity, however they have been estimated at 150% to 300% more than blue water traffic.¹⁷ Yet, these premiums vary considerably between different underwriters and this lack of consistency presents a serious problem when contemplating regular transits.

Since there has never been a regular commercial voyage through the Northwest Passage a comparison with the Russian Northern Sea Route (NSR) would be useful. Despite the more developed nature of the NSR – in terms of icebreaker support and navigational and port infrastructure – it is still extremely expensive to procure the necessary insurance. There are no

¹⁵ Simulations show that a CAC 3 class vessel could transit year round at a steady 18 knots; Saran Somanathan et al. "The Northwest Passage: A Simulation," *Transportation Research Part A*, 43 (2009), pp. 131.

¹⁶ Canada, Transport Canada, *Zone Date System*, November 16, 2010, available <http://www.tc.gc.ca/eng/marinesafety/debs-arctic-acts-regulations-zds-chart-2014.htm>.

¹⁷ Somanathan, Saran, *Feasibility Study of a Commercial Shipping Route through the Canadian Arctic*, Masters of Science Thesis, University of Alberta, (Spring, 2005), pp. 62. & Franklyn Griffiths, "Pathetic Fallacy: That Canada's Sovereignty is on Thinning Ice," *Canadian Foreign Policy*, 11:3 (Spring 2004), pp. 23.

consistent rates for the NSR and some insurers simply will not provide the necessary coverage.¹⁸ However, a premium of \$125,000 for a GL (or AWPPA Class B) ice-strengthened bulk carrier represents an educated industry estimate.¹⁹

In Canada, insurance estimates published in the mid-1990s by the Canadian Hull Advisory Committee demonstrate the high cost of this uncertainty. To transit the Perry Channel with a 35,000 ton Lloyds ice class I (AWPPA class B) vessel the insurance rate would be approximately \$0.55/ton per day. Assuming a five day voyage, the insurance cost would come to \$96,250.²⁰ A heavy class 'A' vessel would get slightly better rates, however nothing lower than a class 'B' would even be insurable.²¹ Should the voyage last longer because of unpredictable weather or ice conditions, the insurance costs could skyrocket, making accurate expense planning impossible.

In his article "Pathetic Fallacy: That Canada's Sovereignty is on Thinning Ice," Franklyn Griffiths tabulates some of these cost estimates for a tramp cargo vessel and concludes that the dangers and liabilities of an Arctic transit would greatly exceed the minimal savings the route has to offer.²² In a more recent cost simulation for container shipping, Saran Somanathan et al. have estimate that a route from Japan to New York would actually prove slightly more expensive via the Northwest Passage, in the order of \$625/container (TEU) versus \$541/TEU for the Panama Canal route. A port further north, such as St. John's, was found to be slightly more efficient, yet the authors again conclude that any slight price advantage would still be grossly overshadowed by the operational risks.²³

A recent survey conducted by Frédéric Lasserre of Laval University confirms the resistance which these factors have generated in the industry. In 2008, Lasserre contacted firms representing 62% of the world's shipping and found that few of them had any interest in shipping through the Northwest Passage. Most of those that did were already involved in the annual sea lift of bulk supplies to northern communities. Lasserre got similar results from a second, more extensive survey, in 2009 which showed only six out of 46 container shippers would even consider an Arctic route.²⁴

Opportunities for Arctic Shipping

¹⁸ Jérôme Verny, "Container Shipping on the Northern Sea Route," *Transport for a Global Economy: Challenges and Opportunities in the Downturn Forum*, (May, 2009), pp. 13.

¹⁹ Haylon Schøyen and Svein Bråthen. *Bulk Shipping via the Northern Sea Route versus the Sue Canal: Who Will Gain from a Shorter Transport Route?* 12th World Conference on Transport Research, 2010. pp. 17.

²⁰ Inflation would make this \$137,540 in 2009 dollars.

²¹ Diana L. Torrens, INSROP Working Paper No. 9 – 1994 3.3, No. 1, *Marine Insurance for the Northern Sea Route* (The Fridtjof Institute, 1995), Appendix 1, 4-6.

²² Griffiths, "Shipping News."

²³ Somanathan, Saran et al. "The Northwest Passage: A Simulation."

²⁴ "Little Interest in ice-free Northwest Passage," *BC Hydro*, June 29, 2010, available, http://www.bchydro.com/news/articles/conservation/2010/less_arctic_routes.html.

While conditions, costs and a lack of interest seem to indicate that the Canadian Arctic will not soon become Stefansson's new Mediterranean, a dramatic increase in shipping still seems inevitable. Yet, rather than through-traffic, the coming decades will see an explosion of destination traffic; namely vessels travelling to and from points in the Arctic rather than sailing through it. Traffic will be tourist, resource and supply based and the vessels involved will likely be owned or chartered (and occasionally self-insured) by major resource or tourist companies rather than international shippers.

In this sense the Northwest Passage will come to closely resemble the NSR. At its height in 1987 that route carried almost seven million tons of cargo, yet very little of this ever made a complete transit.²⁵ What the Russians found the passage useful for was shipping out coal, timber and other raw materials while moving in industrial equipment and supplies. During the Cold War there were political motivations which kept the passage closed to international shipping, yet even after the collapse of the USSR and the official opening of the NSR, the composition and nature of maritime traffic has not materially changed. This is the type of shipping that the Canadian Arctic is most likely to see develop.

The oil industry will likely lead this move as many of the industry majors have already begun a new round of Arctic exploration, collectively spending billions on exploration leases in the Beaufort and Chukchi Seas.²⁶ The global recession and the Macondo blowout in the Gulf of Mexico have certainly slowed this activity, however recent months have seen a cautious movement back towards Arctic offshore drilling. The U.S. presidential panel reviewing that country's offshore options has reported back and recommended an overhaul of some of the industry's approaches, yet there was no thought of stopping exploration entirely. Canada's National Energy Board has launched its own review of offshore oil drilling in the Arctic and though it has not yet issued its final report, it seems unlikely that it will reverse the movement towards Arctic development. The interests and investment in the region are simply too great to be reversed or delayed for too long.

How this oil and gas will eventually be shipped out of the Arctic to market remains to be seen. Most likely it will be brought south along the proposed Mackenzie Valley Pipeline route, however tanker transportation remains a viable alternative. Regardless, large scale development

²⁵ Ragner.

²⁶ In the summer of 2007 Imperial Oil and Exxon turned heads with a nearly \$600 million bid that won them a 205,321 hectare exploration lease on the Canadian side of the Beaufort Sea. In February 2008 Shell and Conoco Phillips bid nearly \$2.7 billion in a blockbuster competition for drilling rights in the Chukchi Sea – a record for any Alaskan oil or gas lease. British Petroleum also spent nearly \$1.2 billion in a June 2008 auction for oil and gas exploration leases covering roughly 611,000 hectares of the Beaufort seabed north of Tuktoyaktuk. In the same auction two other leases were won by a trio of companies led by MGM Energy and including ConocoPhillips Canada Resources and Phillips Petroleum Canada. These companies spent \$4.3 million for rights to 237,820 hectares of offshore exploration rights. In addition to the initial investment, the five exploration leases come with work commitments totalling more than \$300 million. Shell, despite ongoing difficulties with Alaskan conservation and native groups, expects to start a three year drilling program as soon as it receives government permission. It is understood that Repsol of Spain, Norsk Hydro of Norway and Conoco-Phillips of the U.S. are also ready to follow suit if the drilling proves successful.

will necessitate a great deal of shipping to transport heavy machinery, drilling rigs and ships and the myriad of supplies needed for such complex operations. Since oil platforms will be in operation year round, there will also likely emerge a regular year-round supply capability.

The region's oil and gas potential certainly garners the majority of the headlines, however there has also been a strong resurgence in mining interest. This year ArcelorMittal and Nunavut Iron Ore have jointly announced plans to takeover Baffinland and its rich Mary River iron ore deposits for \$590 million. Once in operation, which is predicted to be in 2015, Mary River is expected to use a dedicated fleet of cape-sized ore carriers and, potentially, some very large bulk carriers (VLBCs) to ship 18 million tonnes of ore per year (for 21 years) from a port near Igloolik into the Foxe Basin.²⁷ In Nunavut, new bulk exports are also expected to include magnetite from Roche Bay and lead, zinc and copper concentrate from Izok Lake, shipped out from Gray's Bay or Bathurst Inlet.

The level of capital now being invested speaks volumes. AcelorMittal's nearly \$600 million dollars suggests that Mary River will certainly be developed. The billions laid out by the oil majors suggest the same is true of the region's hydrocarbons. Shell alone, for example, has already spent \$3.1 billion on lease sales and exploration in the Chukchi Sea.²⁸ Development is thus more a matter of time than anything else.²⁹

In addition to resource development, the Canadian Arctic will certainly see increased shipping from both tourism and community re-supply. Economic development will naturally increase the region's population, which is already growing at a healthy rate, and that population will need to be supplied. At present the annual dry cargo requirements of the North (including the Mackenzie River communities) are 372,500 m³ with an additional 262,500 m³ in petroleum products. This translates into 20 to 22 seasonal vessel trips in the Eastern Arctic and 14 to 15 seasonal tug-barge trips in the Western Arctic.³⁰ By 2020 the Canadian Arctic Shipping Assessment estimates that requirements will increase to 570,250 m³ in dry cargo and 431,600 m³ in oil and lubricants.³¹

Cruise tourism has also increased dramatically in the past decade. By 2008 there were 2,400 passengers traveling through the region on 26 trips and these numbers are only expected to increase.³² These vessels rarely make a full transit but will often spend more time loitering in the region and tend to visit less frequented areas. Destination shipping thus seems certain to increase dramatically in a number of sectors over the coming years. The spring-summer shipping

²⁷ Baffinland Iron Mines Corporation, "Baffinland Iron Mines Corp. Mary River Project: Development proposal," (March 2008), pp. i.

²⁸ Bob Reiss, "Shell Oil's Gamble," *Politics Daily*, (January, 2011) available, <http://www.politicsdaily.com/2010/12/19/shell-oils-gamble-will-it-be-able-to-drill-in-the-beaufort-sea/>

²⁹ While there was a similar level of investment in the Arctic during the 1970s and 1980s much of this was funded by generous government programs and tax incentives.

³⁰ The Mariport Group Ltd, *Canadian Arctic Shipping Assessment*, (June, 2007), pp. 5 & 95- 96.

³¹ *Ibid.*

³² Michael Lück et al. ed. *Cruise Tourism in Polar Regions: Promoting Environmental and Social Sustainability* (London: Earthscan, 2010), pp. 4.

season will certainly become increasingly busy while the winter will see limited but steady year-round traffic.

Preparing for a Shipping Influx

Preparing for this dramatic shift will require significant investments in transit infrastructure, new regulations, hardware and a great deal of study and policy development. Most importantly, Canada must prepare for this increased shipping aggressively and proactively, rather than continuing with the far more reactive approach which has characterized its policy over the past century. Because of the long lead times required to build much of what is required and to conduct some of the research that will be needed, Canada cannot afford to wait until this shipping boom has become a reality before addressing the issue. Prevarication would likely prove costly, economically, politically and perhaps environmentally.

Canada must soon determine what sections of the Northwest Passage will be open to shipping and what sections will be closed, for either safety or environmental reasons. For instance, in 2009 the Harper government began working with Inuit leaders to create a maritime park in Lancaster Sound, an ecologically and culturally important area which is home to beluga whales, walrus and seals and which serves as a migration route for 85% of the world's narwhal.³³ Since Lancaster Sound is also an important passage through the Archipelago, appropriate shipping lanes must be determined and speed and staggering requirements set in order to minimize shipping's footprint in this vital ecosystem.

Lancaster Sound is the most obvious example of a sensitive marine environment since it is the only area currently being considered for special protection. At some point other such areas across the Northwest Passage and in the Beaufort Sea will have to be considered and integrated into a system of ecological preserves around which shipping can be routed or more heavily regulated. Extensive research will be required to gain a better understanding of the region's ecology and, considering the slow pace at which Arctic research is conducted, it should begin soon.

The region's ice reporting system will also require revamping in the near future. In the Arctic the most important element of vessel safety and pollution control is the avoidance of dangerous ice conditions. Transport Canada currently relies on a system called the Zone-Date System (ZDS) which is based on historic ice conditions to provide entrance dates to various control zones across the Arctic. In 1996 the system was updated to include the Arctic Ice Regime Shipping System (AIRSS) which allows for increased flexibility to CAC class icebreaker ships with an ice-navigator able to make on the spot evaluations of ice conditions.

³³ Christopher Debiccki, "Protecting Lancaster Sound," *Nunatsiaq Online*, available, (July 29, 2010) http://www.nunatsiaqonline.ca/stories/article/908789_protecting_lancaster_sound/. This is what the International Maritime Organization (IMO) would consider a particularly sensitive sea area (PSSA). Under IMO rules this body of water can be subject to increased regulation, from vessel re-routing to special restrictions. While Canada does not require IMO approval to regulate internal waters, it would remain prudent to adhere as closely as possible to international regulations.

In general the system has worked well with accident rates falling dramatically over the past three decades.³⁴ The system is, however, predicated on relatively consist ice conditions and does a poor job taking year to year variation into consideration. The Canadian Hydraulics Centre has been investigating the efficiency of the ZDS and an examination of several years of data has shown that the system often allows vessels into potentially dangerous areas while also restricting some ships from entering regions where the ice conditions are favourable.³⁵ The AIRSS system was designed to overcome some of these problems, yet it does not apply to ships without an ice-pilot and only to CAC class icebreaking vessels.

Ship speed was also found to be a significant omission from the AIRSS system. Since speed is an important element in determining how safely a ship can transit any given control zone, it should be included in the regulations. A ship transiting a region of 'open water' infested with bergy bits or traces of old ice could still receive a high ice numeral (the calculation within the AIRSS system which determines whether or not a vessel can transit a zone) yet remain at high risk if it impacts old-ice at high speeds.

Simply put, the system, while good, is still far from ideal. It should be expanded to include factors currently overlooked such as speed, visibility and the experience of the ice-navigator.³⁶ In their 2008 study of the issue, Ivana Kubat and Garry Timco recommended a hybrid system which would use the ZDS as the basis of entry yet would require vessels to use the AIRSS system at all times to improve ship safety while navigating through the zones and to avoid any false sense of security that strict adherence to the ZDS may create.³⁷

Increased emphasis in this system is thus placed on the ability and experience of the ship's ice-navigator. Experience gathered from ice-covered waters around Canada has shown that the presence of an ice-navigator is the most effective and economical way to achieve safe and efficient transit.³⁸ Currently, Canada does not always require an ice-navigator to be aboard a vessel.³⁹ While this may be sufficient with current traffic levels, in dealing with greater ship numbers it would be prudent to expand the requirement, for instance, to vessels of a certain tonnage, carrying certain cargos or within the more hazardous shipping control zones. Vessels transiting the NEP already have to adhere to this requirement. However, rather than assigning an ice-navigator, as is the Russian practice, it would be more efficient to strive for international qualification standards for the profession. Currently, most ice navigation training programs are

³⁴ Brad Judson, "Trends in Canadian Arctic Shipping Traffic-Myths and Rumors," *ISOPE-2010*, (June, 2010).

³⁵ Ivan Kubat et al. "Ice Regimes Options for the ASPPR: The Way Forward," *Arctic Shipping North America, International Conference & Seminar*, (October, 2008) pp. 4.

³⁶ G.W. Timco and Ivan Kubat, "Canadian Ice Regime System: Improvements Using an Interaction Approach." *Proceedings 16th International Conference on Port and Ocean Engineering under Arctic Conditions*, (2001), pp. 769-778.

³⁷ *Supra* Note 35, pp. 6.

³⁸ David Snider, "Ice Pilotage-The Canadian Perspective," *Martech Polar*, (February 9, 2006) pp. 2.

³⁹ Section 26 (1) of the Canadian Arctic Shipping Pollution Prevention Regulations requires any tanker transiting Canadian Arctic waters to carry an Ice Navigator at all times and vessels other than tankers to carry one if they intend to transit zones that would otherwise be closed to their vessel by virtue of the ZDS.

ad hoc and there are no uniform international training standards.⁴⁰ Leading a circumpolar effort to harmonize these skills would be in every Arctic country's best interest.

Accurate and timely ice information is as essential to safe operations as a well-trained crew. In Canada, the Canadian Ice Service is responsible for disseminating ice charts to vessels travelling Arctic waters and opinions of the service's efficiency vary. In a 2007 survey of Arctic captains a general desire was expressed for better information. A recurring theme was that navigators and captains wanted an integration of satellite imagery with meteorological and oceanographic data and better resolution on the images they were given. Many also expressed a desire to have more access to the raw data and not simply a chart processed by someone ashore. It was also opined that information regarding ice strength and decay as well as the location of growlers, old ice and leads was generally insufficient. A more extensive system involving increased ground truthing and field data will therefore likely be needed. More information on specific freeze-up dates for various ports and more raw satellite data should also be provided.⁴¹

At present, the Canadian Ice Service has only one aircraft available for radar ice reconnaissance and, due to budget constraints, this aircraft is limited to 200 hours flying to cover the entire Canadian Arctic.⁴² As a result, ice charts are predominantly based on RADARSAT imagery and secondarily on the direct visual sightings from the Ice Observers on the widely separated icebreakers. This often leads to delays in information as RADARSAT's orbital paths and downloading of data may be several days apart for given areas of interest.⁴³ With an increase in vessel traffic real time raw data transmission will be important. Accurate ice information from around the passage will have to be kept very current and the personnel and infrastructure to process and disseminate this information will have to keep up with demand.

In terms of hardware, Canada is also far behind what will be required. The Russian example is again useful. In 2008 there was 1.5-2 million tons of cargo moved along the NSR. To assist this traffic, Russia deploys a fleet of seven nuclear powered icebreakers and several strong diesel powered craft.⁴⁴ Even with this fleet, Russian companies Lukoil and Norilsk Nickel are already predicting a capability gap and building their own icebreakers. Canada, in contrast, has only two heavy icebreakers remaining. An expanded and modern fleet will certainly be required in the coming decades. Canada is only now in the planning stages of replacing the CCGS *St. Laurent* and the rest of the fleet is aging rapidly. As these expensive vessels require long lead times of from eight to ten years, they cannot be put off until they are required.⁴⁵ The planned Offshore Patrol Craft will be valuable additions to search and rescue (SAR) and law

⁴⁰ Arctic Council, *Arctic Marine Shipping Assessment Report 2009*, (2009) pp. 68.

⁴¹ G.W. Timco and R. Gorman, "Survey of Canadian Arctic Captains: Current Status and Research Needs," *Recent Development of Offshore Engineering in Cold Regions*, Yue Ed. (June 2007)

⁴² *Supra Note 38*, pp. 9.

⁴³ *Ibid.*

⁴⁴ Ragner.

⁴⁵ Canada, Senate, The Standing Committee on Fisheries and Oceans, *Controlling Canada's Arctic Waters: Role of the Canadian Coast Guard*, (March, 2010) pp. 50.

enforcement, however they will not provide the capabilities needed to escort and rescue vessels trapped in the ice.

Surveillance of the region has always been a concern and an expensive proposition and more activity will of course necessitate a more robust surveillance capability. For this task, Canada has traditionally relied upon its small fleet of CP-140 Aurora patrol aircraft. More such craft could be acquired, though a shift to unmanned aerial vehicles would seem a prudent step towards improving situational awareness. While most UAVs lack the staying power and range of an aircraft they have evolved rapidly over the past decade. The widely used Predator drone, for example, has managed a flight of 40 hours and a range of 3,700km.⁴⁶ Prototype solar powered craft have also demonstrated the ability to remain aloft for days or even weeks at a time.⁴⁷ While solar powered UAVs would be inoperable during the winter months they would be highly effective in the summer shipping season. While an Aurora has superior speed and range there would be obvious advantages in capital outlay, fuel consumption and crew costs by supplementing the fleet with drones.⁴⁸

Shipping Safety and Emergency Response

To ensure safe shipping, Canada will also have to invest in more sea route infrastructure such as radio and radar beacons, lighted marks, radar reflectors and various buoys to mark off safe passages. The NSR, as an example, deploys radio beacons in 47 locations, seventeen of which are manned stations. A further 200 radar reflectors are also dotted along the coast. The reflectors are installed because the low surrounding islands make radar navigation difficult. In total, the NSR boasts some 250 lighted marks and 200 unlit marks. In the summer, some 1,000 floating marks are also added.⁴⁹ The Canadian Coast Guard maintains a number of seasonal fixed and floating aids, however this infrastructure will have to be considerably increased and maintained (even at a reduced level) year round.

An essential element in ensuring safe navigation will also be the acceleration of the government's hydrographic mapping efforts. At present, roughly 10% of the total Arctic maritime area is surveyed to modern standards.⁵⁰ The result has been relatively frequent groundings.⁵¹ The 2010 groundings of the *Nanny*, a tanker carrying nine million litres of fuel in

⁴⁶ Airforce-technology.com, "Predator," available, <http://www.airforce-technology.com/projects/predator/>.

⁴⁷ The US Navy has recently awarded a contract for seven QinetiQ's solar powered Zephyr UAVs for \$45 million; Defence Update, "QinetiQ's Zephyr...Soars to New Record," (August 24, 2010) available http://www.defence-update.net/wordpress/20100824_zephyr_solar_powered_uav.html.

⁴⁸ An Aurora unit cost is \$25 million vs. a \$4.5 million predator which can remain in the North and be flown by a smaller team permanently stationed in the South.

⁴⁹ Yohei Sasakawa, *The Northern Sea Route: The Shortest Sea Route Linking East Asia and Europe* (Tokyo: The Ship and Ocean Foundations, 2001) pp. 71.

⁵⁰ "No Spills, Injuries after Fuel Tanker Runs Aground in Northwest Passage," *Canadian Press*, (September 2, 2010) available, <http://www.oilweek.com/news.asp?ID=29688>.

⁵¹ From 1998 to 2008, groundings made up fully 27% of all maritime accidents in the Canadian Arctic; *Supra Note*, 34.

the Simpson Strait, and the *Clipper Adventure*, a cruise ship in Coronation Gulf, are only the most recent examples.

Facilities for waste disposal and collection of oil spills will also see increased demand from regular shipping.⁵² Storage and processing facilities for this waste should be planned for a least two facilities on either end of the passage. One will certainly be needed in the Beaufort when oil development takes place and one at Nanisivik would serve Eastern cruise vessels and the mining interests which will become increasingly important in the Baffin Island/Foxe Basin area.

When oil spills or dangerous discharges do take place there will be a need for a rapid clean-up effort and Canada must enhance its hardware stockpiles, infrastructure and general preparedness in this area. Currently, crew aboard commercial oil tankers and Coast Guard icebreakers carry oil-spill response equipment and are trained in its use. In addition, an inventory of response equipment, such as booms and skimmers, is maintained at ten community depots strategically located throughout the North. Yet, these preparations are designed to cope with the limited activity in the Arctic today and will have to be expanded.

Pollution response is an area in which the Canadian government should be actively seeking partners, both in industry and across the circumpolar world. Currently, there are agreements in place with the U.S. and Denmark, however these are limited regional agreements which should be expanded. The Canada-US Joint Marine Pollution Contingency Plan, for instance, covers only the Beaufort and lacks a specific commitment of resources that either state could or would employ.⁵³ Since the equipment and infrastructure for an adequate reaction to a sizable accident is expensive and the Arctic is a remote area, a more comprehensive and geographically broad agreement should be negotiated between Canada, the U.S. and Denmark. The objective of this would be to build common stockpiles of emergency response equipment and shared infrastructure as the most cost effective way of protecting the entire North American Arctic. Joint training and an alignment of doctrine, plans and procedure between the national coast guards and industry should also be developed to parallel shipping increases. In a similar vein, the Coast Guard and relevant personnel should increase their contacts with the Russian and Norwegian governments as well as industry leaders such as Statoil and the Russian state companies to determine best practices and the most effective means of dealing with oil and pollution in ice-covered waters.

Similar arrangements would also provide for a more cost effective way of covering the Beaufort Sea or Baffin Bay areas with regards to SAR operations, an area where all three states

⁵² For example, the 2004 U.S. Commission on Oceans Policy reported that, while at sea, the average cruise-ship passenger generates about eight gallons of sewage per day and an average cruise ship can generate a total of 532,000 to 798,000 litres of sewage and 3.8 million litres of wastewater from sinks, showers and laundries each week, as well as large amounts of garbage. The average cruise ship will also produce more than 95,000 litres of oily bilge water from engines and machinery a week; Arctic Council, *Arctic Marine Shipping Assessment Report 2009*, (2009), pp. 137.

⁵³ Canada & The United States, Canada-U.S., 2003, *Joint Marine Pollution Contingency Plan*.

are under-prepared. Canada and the U.S. in particular share a long history of cooperation in maritime SAR and, as much of the future activity will take place in the Beaufort, a formal sharing of responsibilities would work well and reduce the burden on both states.⁵⁴

Implications for Sovereignty

In addition to the obvious physical dangers, Arctic shipping has always appeared to present political danger as well. The status of the Northwest Passage remains in dispute; Canada claims it as historic internal waters while the U.S. and many other governments hold it to be an international strait. In the past, fears have arisen that regular shipping might be enough to solidify the position of the Northwest Passage as an international strait.⁵⁵ This concern is based upon the precedent set by the 1949 *Corfu Channel Case*, which determined that one vital element in establishing a passage was regular usage.⁵⁶ In the Canadian context, the voyages of the *Polar Sea* (1985) and the *Northwind* and *Manhattan* (1969) are held up as the sort of dangerous transits which might create this precedent.

Yet, the nature of destination shipping would make regular repetitions of such challenges highly unlikely. While countries, such as the U.S, will continue to openly disagree with Canada over the status of the Arctic waters, businesses will likely prove far less intransigent. While American policy is based upon concern for global freedom of the seas and the negative precedent that recognition of the Canadian claim could bring, oil and resource companies will be far more concerned with the smooth and efficient running of their operations. The operation of the NSR has consistently proven this point. What foreign shipping that has taken place in and out of the Russian Arctic has been done under the laws and control of the Russian government. Vessels have refrained from challenging the legitimacy of the Russian baselines which enclose the key Arctic straits or the right of the Russian government to collect icebreaking and other fees for the use of the passage. It has simply not been in the interest of any company to do so.

In the Canadian Arctic the situation would certainly be similar. In order to transport tourists, oil or supplies safely and efficiently through the Northwest Passage the companies involved would inevitably require the assistance of the Canadian government. Government services, from icebreaking support, SAR, ice and weather reporting services, and perhaps even access to Canadian ports, repair and refueling facilities would be necessary and sought after. A refusal to recognize Canadian sovereignty or jurisdiction would simply invite Ottawa to deny access to any of these vital services. Equally damaging would simply be a Canadian refusal to grant further exploration leases or development permits in the area.

Recognizing Canadian sovereignty would not entail any additional cost or difficulty and it therefore seems unlikely that any industry would find it productive to challenge the

⁵⁴ The need for such cooperation was already highlighted and agreed to at the 2008 Ilulissat summit in Greenland.

⁵⁵ Rob Huebert, "The Shipping News Part II," *International Journal*, 58:3 (summer, 2003).

⁵⁶ International Court of Justice, *Corfu Channel Case: United Kingdom v. Albania* (April 9, 1949).

government's position. There remains the possibility that Washington may pressure American companies into ignoring certain Canadian regulations so as to make a political point. However, American governments have traditionally been as adverse to Arctic disputes as their counterparts in Ottawa. Doing anything to hinder the region's major oil developments would also seem to go against American national energy and security interests. Applying such pressure is also quite unnecessary. Washington has historically had little real interest in maintaining the Canadian Arctic straits as international *per se*. The real concern has always been the legal precedent. Instead, it would make more sense for the U.S. to be content with allowing private firms to recognize Canadian sovereignty while passively maintaining its traditional position on the law of the seas.

What little traffic that has taken place in the Canadian Arctic seems to substantiate this assumption. The private vessels that have used the Northwest Passage over the past few decades have overwhelmingly chosen to register when entering the region and have complied with Canadian laws and regulations. Even the most dramatic challenge to Canadian sovereignty, the 1969 voyage of the Humble Oil supertanker *Manhattan*, was ironically a display of how the Canadian government could leverage its Arctic capabilities and assets to force recognition of its jurisdiction. It was actually the accompanying American icebreaker, the *Northwind* which explicitly refused to request permission to enter Canadian waters.

The *Manhattan* requested Canadian support for its passage, an implicit form of recognition, and in 1970 when Ottawa made it clear that future transits would have to be on Canadian terms and with regard to Canadian sovereignty, Humble Oil chose to comply. The company complied because it needed Canadian icebreaker support and because it was far more convenient than a political battle with Ottawa from which it had little to gain and much to lose. As such, in 1970 Humble complied with Canada's anti-pollution regulations and even ceded ultimate control of the voyage to the captain of the accompanying Canadian icebreaker.⁵⁷

It therefore seems likely that the Canadian government would be able to ensure that such local traffic took place with respect for Canadian sovereignty and shipping regulations. The result would certainly be a strengthening of the Canadian legal position. The acceptance of Canadian control by those primarily affected is one of the fundamental prerequisites to establishing a claim to historic internal waters. Donat Pharand writes: "if there is clear evidence of acquiescence, the title will be deemed to have materialized even if the usage has not been of such long standing."⁵⁸ Indeed, even if the companies involved were not asked to explicitly recognize Canadian sovereignty, but merely to comply with pollution control regulations and Canadian law, the result would be the same.

⁵⁷ John Kirton and Don Munton, "The Manhattan Voyages and their Aftermath," *Politics of the Northwest Passage*, Franklyn Griffiths ed. (Kingston: McGill-Queens University Press, 1987), pp. 91.

⁵⁸ Donat Pharand, "The Arctic Waters and the Northwest Passage: A Final Revisit," *Ocean Development & International Law*, 38:1, (2007), pp. 7.

If the government sought to avoid the potentially awkward situation of demanding explicit acceptance of Canadian sovereignty, a solution might be the application of a transit fee for access to the Northwest Passage. The Russian government charges such a fee for icebreaking services in the NSR (even if icebreaking is not required), however this is a hefty amount and serves to discourage use. A small, almost token fee would not discourage or inconvenience shipping yet, since there are no transit fees to pass through an international strait, would serve to establish a precedent of Canadian control and user recognition of that control. While the United States may persist in viewing the Northwest Passage as international, the use of those waters by U.S. government vessels will be substantially less than the usage by various resource and cruise companies which could be brought to accept Canadian sovereignty – either explicitly or implicitly.

The Russian claim to sovereignty in the Arctic is generally more accepted than the Canadian equivalent largely because it has this history of acquiescence and control. In order to use the NSR, Russia demands mandatory notification and authorization fees, liability, discharge and safety standards, reporting design, mandatory manning and construction standards and reserves the right to inspect, stop or detain offending vessels. Canada also has most of these regulations in place, however in Russia there is an extensive history of their application. This history of acceptance by foreign vessels is precisely what Canada requires to cement its claims should the issue ever reach the International Court. Since destination shipping will require Canadian cooperation and assistance, asserting national jurisdiction will be far easier than it would be over international traffic. Fortunately, it appears this is the pattern that Arctic shipping will take in the foreseeable future. Canada must be ready to ensure that this growth in activity is well managed, safe and takes place with respect for its jurisdiction. A great deal of investment and effort will be required to bring this about and those investments must be made in advance of, rather than in reaction to, the coming flood.

CANADA'S ARCTIC SHIPPING POLICY: ARE WE MISSING THE BOAT?

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Introduction

IN 2010, NEARLY 90% OF WORLD TRADE BY WEIGHT was carried by water (UNCTAD 2010). The importance of shipping to the global economy was captured aptly by Sir Walter Raleigh, who observed in the seventeenth century that “whosoever commands the sea commands the trade; whosoever commands the trade of the world commands the riches of the world, and consequently the world itself” (Baugh, 1985, 33). Yet the world of international trade as it was understood by Raleigh is a far cry from the state of modern shipping, as it is generally agreed that “trade in maritime services is one of the most liberalised industries, and its ‘components’, such as vessels, flag registration, class inspections, insurance and the work of seafarers, are purchased globally” (Kumar *et al*, 2002, 35). Maritime transportation has been identified as “not only pivotal to world trade, but is also the *only* example of a *fully* globalised industry” (Alderton *et al*, 2002, 35).

To that end, this study will discuss the implications of globalisation upon the marine transportation industry, in particular the rise of open registries. Next, the paper will examine a fiscal model which has been developed in an attempt to counter the proliferation of these open registries, namely that of the tonnage tax system. The United Kingdom (UK) will be used as the case study for this project, in order to establish why they have enjoyed a substantial level of success in nurturing a competitive national flag deep-sea fleet. Finally, an evaluation of the UK's

relief measures will be performed in order to determine whether the adoption of such fiscal measures could support increased Canadian participation within Arctic shipping activities.

Given the recent interest in the Canadian Arctic for the purpose of resource development and other industrial activities, which has prompted growing concerns over the use of the Arctic, a renewed discussion regarding Canada's marine transportation policy is required. Addressing the issue of a Canadian deep-sea fleet deserves consideration, particularly due to the potential benefits to be derived from increased tonnage under Canadian flag control and the fostering of a body of domestic maritime expertise. Developing a strong domestic registry may ultimately aid the Canadian government in taking a "robust leadership role in shaping the stewardship, sustainable development and environmental protection" of the Arctic region (Government of Canada, 2010). However, it is necessary to first consider the global trends within the international shipping community, in order to situate any potential changes to Canadian policy within contemporary developments.

Development of Open Registries

In the decades immediately after the Second World War, an ever increasing number of ship owners sought an economic advantage by placing their vessels under foreign, open registries. These registries provided a favourable taxation regime as well as less stringent regulations governing concerns such as labour and safety requirements. A major motivation underlying this development was the glut of tonnage available following the conclusion of hostilities in 1945, coupled with the emergence of developing nations seeking to break into the marine industry to support their burgeoning industrial economies (Llácer, 2002). The scale of this shift within the nationality of ships is most readily demonstrated by the case of Liberia, as in 1939, the country had no shipping tonnage to speak of. By 1958, it ranked third globally in total tonnage (Llácer, 2002). In 2010, Liberia, with 11.14% of global ship tonnage, ranked second only behind Panama which had nearly a quarter of the entire world fleet at 22.63% of global tonnage (UNCTAD, 2010, 55. For the ranking of the top 15 registries in 2010, please see Appendix I).

With the development of open registries, traditional flag states were faced with a new source of competition. Barton characterizes the development of open registries, also known pejoratively as 'Flags of Convenience' (FOC) as a being a:

Complex trans-nation-state phenomenon, marking a shift from national shipping, essentially nationally owned and manned, to globalized shipping via multinational involvement in one ship, aimed at circumventing nation-state legislation and economic controls (1997, 149)

However, the original impetus for the rise of FOC's is located within the economic motivations of the traditional maritime nations. As Anderson *et al* explain, in the post-Cold War era of globalisation, "these persons and/or multinationals required a vehicle which would permit them

to circumvent the strict registration requirements of developed countries,” a motivation which further prompted the rise of open registers (1997, 158).

Development of Flag State Responsibilities

In response to the increasing concern over the use of open registries and the implications of this development, legislation was passed to regulate the nationality of vessels. The *Geneva Convention on the High Seas* in 1958 was the first international agreement to attempt to fix the responsibilities of a flag state, establishing the requirement of a ‘genuine link’ between the vessel and its country of registry.

The 1982 *United Nations Convention on the Law of the Sea* (UNCLOS) further defined the duties and obligations of the flag state. Under Article 94, states are responsible for ensuring safety at sea for vessels registered under its flag through the regulation of items such as proper crew qualification and ship construction standards. In addition, these states are required to verify that all flagged vessels “conform to generally accepted international regulations, procedures and practices” (UNCLOS, 1982, Article 94). However, the definition of a *genuine link* has proven to be difficult, and has done little to dissuade the proliferation of open registries. (For an analysis of the foreign ownership of the Panamanian and Bahamian registries, see Appendix II).

Definition of an Open Registry

The UK *Inquiry into Shipping Report* (1970), provides six key characteristics of an open registry. These are as follows:

- 1) The country of registry allows ownership and/or control of its merchant vessels by non-citizens;
- 2) Access to the registry is easy; ship may usually be registered at a consulate abroad. Equally important, transfer from the registry at the owner's option is not restricted;
- 3) Taxes on the income from the ships are not levied locally, or are very low. A registry fee and an annual fee, based on tonnage, are normally the only charges made. A guarantee or acceptable understanding regarding future freedom from taxation may also be given;
- 4) The country of registry is a small power with no national requirement under any foreseeable circumstances for all the shipping registered, but receipts from very small charges on a large tonnage may produce a substantial effect on its national income and balance of payments;
- 5) Manning of ships by non-nationals is freely permitted; and
- 6) The country of registry has neither the power nor the administrative machinery effectively to impose governmental or international regulations; nor has the country even the wish or the power to control the companies themselves (Rochdale Report, 1970).

Having a concrete understanding of this definition is key, as in order for developed nations to be able to effectively counter open registries; conditions must be such that ship owners are presented with a economically viable alternative. As Anderson *et al* states, the “existence of open registries only reflects the realities of market conditions,” and therefore it remains within the purview of maritime authorities to adopt measures to counter the advantages of open registries with incentives of their own (1997, 170).

The International Trade Federation provides a good summation of the primary cost saving measures of FOC, namely:

Tax avoidance, transfer pricing, trade union avoidance, recruitment of non domiciled seafarers and passport holders for very low wage rates , non-payment of social security contributions for their crews and avoidance of strictly applied safety and environmental standards (ITF, 1999, 72).

The necessity of effective enforcement critical, noted in following that “economic advantage is the most common motivation for noncompliance with international minimum standards. It is again the risk of loss of profit which encourages or forces the ship owner to comply with required international standards” (Ozcayr, 2008). Given the underlying economic motivations, nations seeking to reinforce their domestic fleet must first provide sufficient incentives which establish a financially viable market for ship owners.

International Response to Open Registries

Following the sinking of the M/V *Amico Cadiz* while flying the Liberian flag in 1978, several European nations collaborated to draft the Paris Memorandum of Understanding in 1982, to better coordinate the regulatory efforts of Port States and to ensure that all vessels visiting their jurisdictions were compliant with minimum international standards. While it is difficult to qualify the success of Port State Control initiatives (PSC) globally, it is largely agreed that “this practice shows that port state control systems are going to remain as the most effective control systems for shipping in a progressing world” (Ozcayr, 2008, 239).

The 1999 sinking of the M/V *Erika* off the coast of France highlights the continued issues surrounding the use of open registries and the limitations of PSC. The report to the 63rd UN General Assembly specifically addressed this issue, stating that “many shipping accidents and resulting loss of life and marine pollution are not the result of inadequate regulation at the global level, but are due to ineffective flag State implementation and enforcement” (UN Secretary General, 2008). As such, “All constituents of the maritime community need to take an active role in the maintenance of the highest possible safety and operation standards, with Flag and Port States leading by example” (Llácer, 2003). To this end, the following will examine a financial mechanism which has been credited with stimulating the growth of the domestic registries within the European Union.

The Tonnage Tax System

While legislation differs greatly from jurisdiction to jurisdiction, a particular economic mechanism which emerged in late 1980s within the EU was the tonnage tax system. In response to continual declines in total tonnage under their respective registries and concern over the long-term implications of this decline, several traditional maritime nations with significant marine clusters such as the Norway and the Netherlands sought to revitalize their domestic fleet.

The use of a tonnage tax regime as a relief measure is currently “by far the most popular tax system for the marine industry to be adopted throughout the European Union,” and is one which has now been implemented in national jurisdictions across the globe (Legate and McConville, 2005, 177). The initial success of the regime within these nations is undeniable- from 1995 to 1999 the Dutch shipping industry grew 23%, with a corresponding increase of 43% of tonnage listed on its domestic registry. During the same periods, Norway enjoyed a 7% increase in tonnage during the mid 1990s (Brownrigg, 2005). In 2010, 17 of the 27 member states of the EU employed some variation of a tonnage tax regime within their jurisdictions, and globally more nations are implementing similar regimes, most notably the United States (2004) and Japan (2009).

The following will discuss the basic principles underlying the tonnage tax regime, and consider the effectiveness of this regime, through an examination of the recent development of the marine industry within the UK.

Economics of Marine Transportation

For the marine transportation industry, operating in a zero tax environment is the rule, rather than the exception (Knudsen, 1997). For example, Panamanian tax law stipulate that any ship registered under its flag used for service abroad is required to pay an annual tax of \$0.10 USD per registered tonne, an amount which is incomparable to the corporate tax rates which Canadian companies are subject (Consulate General of Panama, 2011). For this reason alone, any government with designs of strengthening its registry must, to some extent, consider a form of tax relief for corporations in order to encourage these organizations to operate under their flag, in addition to other fiscal measures to offset the economic advantages of using an open registry.

Fundamental Structure

This model is defined within the *British Tonnage Tax Manual* quite simply as an “alternative method of calculating corporation tax profits by reference to the net tonnage of the ship operated, as the tonnage tax profit replaces both the tax-adjusted commercial profit/loss on a shipping trade and the chargeable gains/losses made on tonnage tax assets” (TTM01010, 2000). In other words, the distinct advantage of this system as opposed to other fiscal strategies is that it allows for a low, easily calculable annual rate to be applied annually, one which remains fixed throughout the year and is not subject to variability. It represents a departure from traditional taxation models as it does not tax according to profits earned, but rather according to a notional basis which is determined according to the specific number of ships and tonnage under the control of a specific corporation.

The strategy is described as being party to strict ‘ring fencing,’ referring to the fact that this exemption is made solely for those activities which fall within the purview of the tonnage tax regime- all other activities are treated according to the prevailing corporate tax regulations (HM Revenue and Customs, 2000). It is necessary to clearly delineate the extent to which the regime extends in order to prevent the possibility of the abuse of the system for the purposes of tax evasion. By isolating target activities, it is also possible to include other measures to address the traditional inequities which have drawn ship owners away from traditional registries such as tax reliefs to offset wage discrepancies. Though a voluntary strategy, an additional stipulation is that corporations must agree to a renewal schedule, typically a ten year period. This allows maritime authorities to provide a stable and accountable fleet of vessels operating under the national flag.

Case Study - The United Kingdom

Development of the Tonnage Tax Regime within the United Kingdom

A Shipping Working Group was commissioned by the New Labour government in 1997, resulting in the publication of the *Charting a New Course* report a year later. Appendix III captures the rapid decline in total tonnage under UK control, a decline which was largely responsible for triggering the government response. This report evaluated the state of the domestic maritime industry, identifying key trends and suggested several policy measures focused on the following four objectives:

- facilitating shipping as environmentally friendly transport;
- fostering an efficient UK shipping industry;
- maintaining the skills base by promoting employment and training; and,
- encouraging UK ship registration (Department of Transport, 1998).

Following this report, a further study examining the development a tonnage tax system within the UK was completed by Lord Alexander of Weedon. Released in 1999, this study evaluates both the potential benefits as well as the costs of implementation to the crown. The *Independent Enquiry into a Tonnage Tax* concluded that if the shipping industry within Britain was to be revived, “fundamental” changes to the existing tax structures were necessary.

To this end, the framework of a tonnage tax system, including a Minimum Training Obligation as well as stipulations as qualifying shipping activities and the location of ship management within the UK were outlined. Furthermore, the report indicated that the restructuring of corporate taxes was not sufficient in and of itself to affect a renewal of Britain’s marine industry. For this reason, the report reinforced the necessity to “sympathetically [consider] the case for other potential measures which may improve the competitiveness of the UK shipping industry, such as extending the Foreign Earnings Deduction and expanding the Crew Relief Costs Scheme” (1999). The effectiveness of these secondary measures has been subject to much criticism, a debate which will be explored later in the paper.

Evaluation of the Tonnage Tax Regime

The measures as outlined within the *Independent Enquiry* were introduced within the Finance Bill in 2000, and were largely well received within the British maritime community. A 2004 review of the tonnage tax regime by the Department of Transport recommended that the measures remain in place, concluding that the legislative changes had been effective in supporting the following developments:

- Helped to reverse the decline in the UK merchant fleet;
- Ensured that shipping companies have kept their bases in the UK with further spill-over benefits for the economy;
- Helped to promote the training of cadets and ratings;
- Helped to protect the £1 billion a year contribution made to overseas earnings by the shore based maritime sector (Post Implementation Review of Tonnage Tax, 12).

The findings of the report are reflected within the data collected during this same period and beyond. In 2000 the gross tonnage registered under British flag stood at 7.2 million tonnes, but by 2009, this total tripled to 21.2 million tonnes, reversing a nearly four decades of decline (British Chamber of Shipping, 2010, 6).

In terms of economic benefit, the marine transportation industry within the UK remains a vital sector, as in 2007 it employed well over 200,000 citizens, contributed £9.8 billion to national GDP and provided £2.9 billion in taxes to the Exchequer (Oxford Economics, 2009, 15). According to a report published by Oxford Economics, in cooperation with the British Chamber of Shipping, “the introduction of tonnage tax has enabled the UK industry to expand to between three and five times the size it would have been without it, generating an additional £5.5 billion of GDP a year and about £1.4 billion of revenue for the Exchequer” (2009, 34).

However, the new measures failed to achieve a net gain in the overall employment of British seafarers. Within *Charting a New Course*, the “maintenance of the UK marine skills base required by the shore-based sector of the economy depends on increasing the recruitment and training of British seafarers” was identified as a key concern to be addressed by the corporate tax changes (Department of Transport, 1998). The Tonnage Tax Manual stipulates that “for every 15 posts in the effective officer complement for the qualifying ships operated by the company during a year,” and while most companies have met the Minimum Training Obligation (MTO), many consider the impact of this segment of the legislation to have failed to achieve its intended objective (Department for Transport, 2011; Gekara, 2009). The number of officer trainees entering education programs has improved from 2000 to 2009, increasing from 500 entrants to 930, but there has been a 20% decrease in total UK certified officers, from 12,510 to 11,400 during this same period (Department of Transport, 2010. See Appendix IV and V).

The juxtaposition between the successful gains in domestically flagged tonnage exposes the conflicting interests at play within the UK marine transportation sector. While ship owners

directly benefit from the corporate tax changes, there is little to no gain for these corporations to be derived from employing UK nationals. The maintenance of a strong pool of UK seafarers is primarily in the interest of the central government, not ship owners, for “while the main interest of employers is to reduce costs by employing cheap foreign seafarers, the government and related public agencies wish to boost growth in the national skills base” (Gekara, 2009). Conversely, the unions are caught in a difficult position. In 2006, a union official speaking on the condition of anonymity stated that,

We would have wanted to see a stronger strategy and we are still fighting for the inclusion of an employment link to the MTO. However, we must also acknowledge that if the remaining owners are forced to leave it will mean loss of even the few jobs that we still retain” (Union official, 2006).

Accordingly, in light of the policy failure, the overall effectiveness of the tonnage tax system has been questioned. Upon the publication of the 2004 Treasury Board assessment, a senior government official was quoted as stating that “we will be lying to ourselves to expect that the UK can ever play a major role in staffing the international fleet. That market is gone. However, we cannot give up on the shore-side skills base; that is important else there will be no Maritime London” (Gekara, 2007).

In 2008, there was debate over the proposed changes to the regime, especially regarding the distinctions which were specifically focused upon altering the ‘qualifying shipping activities.’ Mark Brownrigg, the Director General of the British Chamber of Shipping vehemently opposed the changes. He stated that “dividing the shipping industry into operations that carry people and goods from one port to another, and those that engaged in marine transport linked to other maritime activities, such as cable-laying, dredging or surveying, makes no sense,” continuing to claim that these changes will have the “direct effect of undermining some of the fundamental objectives of the guidelines” (2008). Following these alterations, additional changes were made in 2009 with the proposed Equality Act, which resulted in all seafarers on UK flagged vessels receiving the national rate of pay. Once again, the Chamber raised concern over the potential implications of this new legislation designed to promote seafarer employment, but would conversely result in UK flagged vessels being placed at an economic disadvantage, unravelling the gains made by the 2000 tonnage tax regime (Chamber of Shipping, 2010, 20).

Canadian Context

Canadian Transportation Policy post WWII

Early attempts of supporting a publically subsidised fleet within Canada proved costly, as demonstrated by the failure of the Canadian Park Steamship Company Limited. A crown corporation formed in 1943, at its peak the company operated 176 merchant ships under the Canadian flag, only to quickly dwindle within two decades. In 1949, the Right Hon. Louis St. Laurent announced that “we have concluded that we are not justified from an economic viewpoint in maintaining a Canadian flag fleet by artificial means,” establishing the *laissez faire*

ethos which has directed the development of Canada's marine transportation policies (St. Laurent, 1949, 73).

Following this announcement, the Canadian merchant fleet suffered a sharp decline, as two decades later, only a fraction of the post-war tonnage remained. In the early 1970s the Canadian registry held less than 70,000 GRT, with only four ocean going vessels of greater than 1,000 GRT under the Canadian flag (Hodgson and Brooks, 2005, 144). This dramatic decline prompted a flurry of studies such as the 1970 *Summary of Canadian Merchant Marine: Analysis of Economic Potential*, a report which made the critical distinction between the interests of Canadian ship owners and the trading interests of the Canadian public at large, an important differentiation for future policy developments.

Policy Developments

In 1985, the *Task Force on Deep-Sea Shipping* presented its findings concerning the state of the marine transportation industry within Canada. This report suggested that measures be taken to create a fiscal environment "conducive to the establishment and maintenance of international ship management activities within Canada" (Transport Canada, 1985). Briefly considered in 1988 was the establishment of a 'second registry,' which would have allowed for Canadian flagged vessels and crews to operate under a tax umbrella. This proposal, was met with a mixed response, viewed by many shippers as being a 'back-door approach' for the creation of a Canadian deep sea fleet, and as a result plans for a second register were quickly abandoned (Lamson, 1997, 80).

Following upon the recommendation of the *Deep-Sea* report and subsequent studies by the Vancouver based Asia-Pacific Initiative, changes were made to the Income Tax Act through Bill C-18 in 1992. These changes allowed for the creation of International Shipping Corporations (ISC), a model which has enjoyed some measure of success, but whose longer term effectiveness has been questioned (Hodgson and Brooks, 2005, 164). It is important to note that the ISC model is a strategy unique to Canada, as no other closed registry has followed suit with a similar legislative instrument. Rather, most other marine jurisdiction, especially those within the European Union (EU), have instead adopted measures in the form of corporate tax relief in order to reverse the decline of their domestic fleets.

Recent Initiatives

A significant step forward was taken in 2010 with the lifting of the 25% duty which had formerly been imposed upon any foreign built ship which was being transferred to the Canadian flag. This development was celebrated by the Canadian Shipping Federation as heralding a move towards "more forward-looking marine policies in Canada by helping to renew the Canadian fleet and enhancing its ability to tackle new challenges and opportunities" (FEDNAV, 2009). Numerous Canadian shipping companies are currently engaged in extensive renewal initiatives, as evidenced by additions such as the two 2,744 tonne ice-class vessels by Groupe Desgagnes in 2008, part of a \$300 million fleet renewal (Southam, 2010). In many regards the lifting of the

duty was necessitated by the significant capital projects announced by Canadian government, as the multibillion dollar plans to construct new ice-capable naval patrol vessels will occupy much of the domestic ship-building capacity.

Sea Change for Canada's Marine Sector?

There have been numerous agreements made for and against the development of a deep-sea flag fleet within Canada. Certainly for the last fifty years, marine transportation policy has tended away from any direct incentive measures such as tax relief initiatives. One of the key reasons for this lack of government interest is the fact that Canada “is not a maritime state in the true sense of the expression” (Gold *et al*, 2003, 14). It is a nation which largely conceives of itself as a continental country which is bound by the ocean on two sides, despite the fact that shipping plays “an essential element of Canadian trade and economy” (Gold *et al*, 2003, 14).

However, the development of Arctic shipping is reason enough to reconsider this position, as perhaps public perception must shift to not only recognize the immense coastline of the Arctic, but to become increasingly sensitive to the importance of the marine industry should the Canadian North come to play a larger role within the domestic economy. The argument for the implementation of some form of a tonnage tax system within Canada is supported by Kumar *et al*, who state that “there appears to exist a close relation between a country’s endowment of resources and general specialisation in services or industrial production and its specialisation in specific maritime sectors” (2002, 47). The *Deep Sea Shipping Report* noted that “reliable and economic shipping services” were vital for the development of Arctic resources and given the existing Canadian expertise, it was “essential that Canada make a strong and concerted effort to remain on the leading edge of Arctic maritime technology” (Transport Canada, 1985, 58). It is important to realize that though the term ‘ice-free’ is often used to describe the conditions within the NWP, it should be noted that these conditions are more likely to “become similar to those in the St. Lawrence Seaway in winter” (Fortier, 2008). Accordingly, given the existing domestic expertise, further efforts to encourage Canadian participation within Arctic activity should be taken.

Despite the recent activity along the Northern Sea Route (NSR), studies point to the potential use of the Northwest Passage, in particular that “continued thinning of Arctic ice will further reduce the cost relative to a Panama Canal route by three factors: faster transit time, lower fuel usage, and less capital investment for a suitable Arctic class ship” (Somanathan *et al*, 2009). However, it is widely understood that the near term forecast for shipping within the Canadian Arctic will largely be by destination, though the predictions as to the future development of transportation within the region remain unclear. (Brigham, 2010). However, as noted within the *New Wave Marine Safety Strategic Plan 2009-2015* report from the Marine Safety program, shipping activities in support of oil and gas projects will have “a positive impact on the Canadian economy but must be carefully managed from an oversight perspective in order to minimize safety and environmental risks associated with these types of operations” (Transport Canada, 2009). Further emphasizing the need for strict environmental legislation is the Arctic

Maritime Shipping Assessment, which classified the “release of oil into the Arctic marine environment, either through accidental release, or illegal discharge, is the most significant threat from shipping activity” (AMSA, 2009).

Projects such as the Mary River Iron Ore Mine currently under consideration for development on Baffin Island will see a pronounced increase in ship traffic, in the range of 140 voyages each year by a fleet of ten 135,000 DWT vessels (Baffinland Iron Mines Corporation, 2008). The transportation contract has been awarded to FEDNAV, the Canadian corporation which operates the M/V *Arctic*, a 28,000 DWT tanker and the M/V *Umiak*, a 32,000 DWT bulk carrier, the sole vessels which the company operates under the Canadian flag. That only two of FEDNAV’s vessels are domestically registered speaks to the difficulty of operating vessels under the Canadian flag, as ship owners with ice-capable vessels are nevertheless confronted with the additional burden of a short season during which their ships may operate in the Arctic. Due considerations must be made for corporations who do engage in Arctic shipping, particularly for cabotage.

Policy Considerations for the Canadian Arctic

The Canadian government has been responsive to the possible use of the Arctic for navigational purposes, and has implemented strategies such as the mandatory reporting to NORDREG. Further developments such as the Zone-Date System and the Arctic Ice Regime Shipping System (AIRSS) have also served to support shipping within the region. Given the unique environmental characteristics of the region, such measures are necessary in order to forestall a catastrophic event involving sub-standard shipping, such as which have occurred in other jurisdictions. Developments in international maritime regulations are typically reactive, responding to public outcry following high profile accidents such as the M/V *Erika* or the M/V *Prestige*. Yet given the vulnerable, low energy Arctic environment, even a minor incident represents serious cause for concern.

To that end, Transport Canada has played a lead role in the development of a mandatory Polar Code governing the construction standards for ships operating in the northern-most regions of the oceans to replace the existing *Guidelines for Ships Operating in Arctic Ice-covered Waters*. At present, these guidelines are insufficient, as “in their current non-binding form provide an important, but limited, contribution to safe navigation and marine environmental protection of the Arctic” (2007). The further advancement and strengthening of international as well as domestic legislations such as the *Arctic Waters Pollution Prevention Act* are required. Given the pace at which international conventions are ratified, the Canadian government may be forced to find means of providing protection for the Arctic various unilateral means, which may include the development of strong domestic registry.

Therefore, it is recommended that that the current state of Canada’s marine transportation policies be re-evaluated, especially in regards to the possibilities of Arctic shipping. The 1985 *Deep-Sea Shipping Report* was charged with evaluating the “changing conditions

in the international shipping market and the possible need for measures to encourage the expansion of the Canadian deep-sea fleet,” and represents the most recent deep-sea policy review (Transport Canada, 1985, p. 3). It is argued that the emerging Arctic possibilities have fundamentally altered the conditions in which the 1985 report made its recommendation, and as such, a tailored, Arctic specific marine transportation policy should be considered. Learning from the experience of other jurisdictions, some variation of the tonnage tax model should be used to reduce the cost disparities which have long constrained the Canadian registry and to promote the participation of Canadian crews and ships in Arctic shipping activity.

Conclusion

The above discussion has presented an overview of the recent developments within the marine transportation industry, highlighting the struggles of nation states to contend with deregulation and globalisation. The implementation of the tonnage tax regime as well as other fiscal measures have attempted to stem the tide of ‘flagging out’ of domestically owned ships to foreign registers. The case study of the UK demonstrated that changes to the corporate tax regime are effective in attracting ships to a domestic registry, the promotion of marine expertise requires a linkage between employment on domestically flagged ships, rather than simply training.

In regards to developments within the Arctic, the Canadian government, in conjunction with all facets of the shipping industry must work in collaboration in order to proactively address the upcoming challenges of increased activity within the northernmost portions of the nation. A tailored, Arctic specific transportation policy may be necessitated in order to promote the development of the Canadian registry. The implementation of a tonnage tax, in addition to other fiscal measures may promote the involvement of Canadian shippers within the emerging industry. The opening of the Arctic represents an opportunity for the economic development of northern communities and Canada in general. Therefore, a re-evaluation of the interests and advantages of a strong Canadian deep-sea fleet is now necessary.

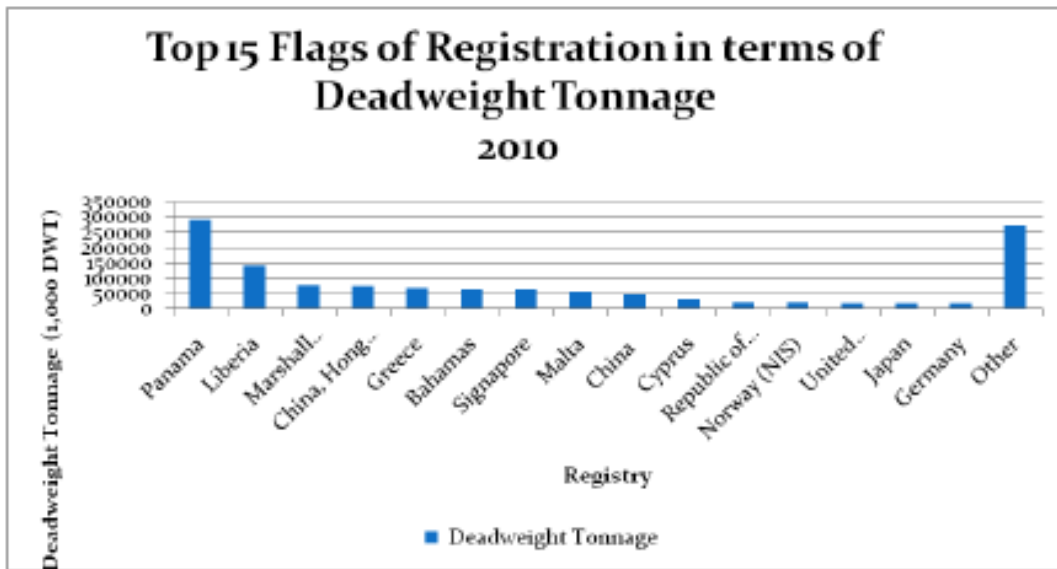
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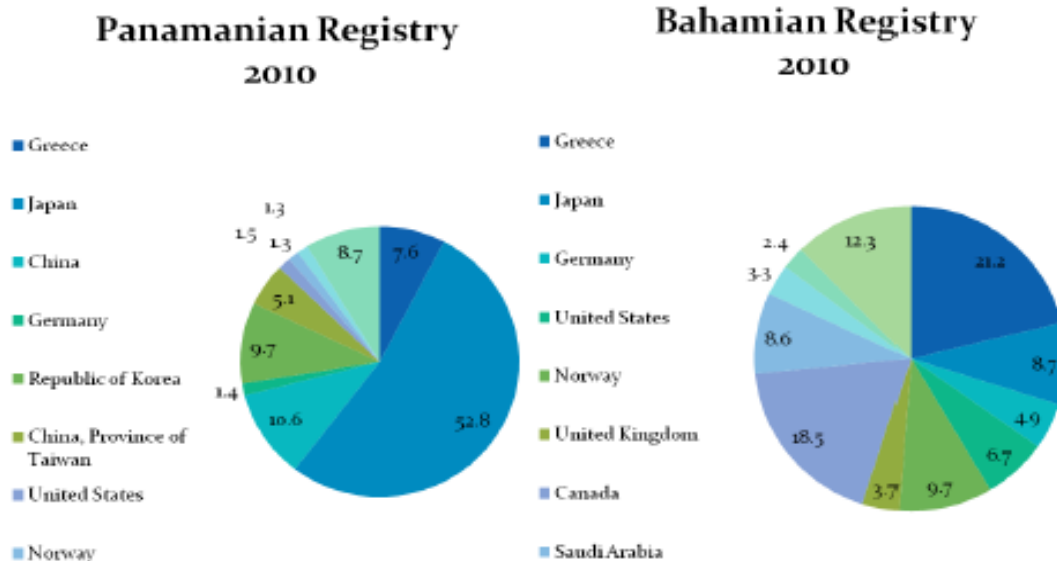
Appendix I



Data from: United Nations Conference on Trade and Development. (2010). *Review of Maritime Transportation*. Geneva, Switzerland. Retrieved from <http://www.unctad.org>

Appendix II

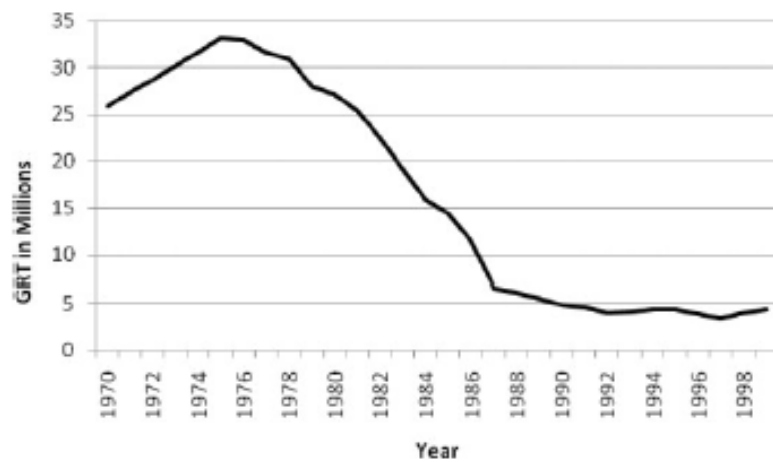
Percentage of Foreign Ownership within Open Registries



Data from: United Nations Conference on Trade and Development. (2010). *Review of Maritime Transportation*. Geneva, Switzerland. Retrieved from <http://www.unctad.org>

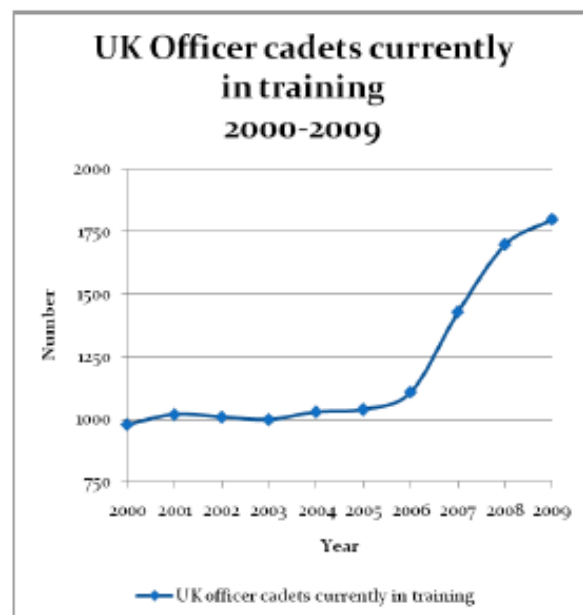
Appendix III

Decline of tonnage within the British registry (1970-1998)



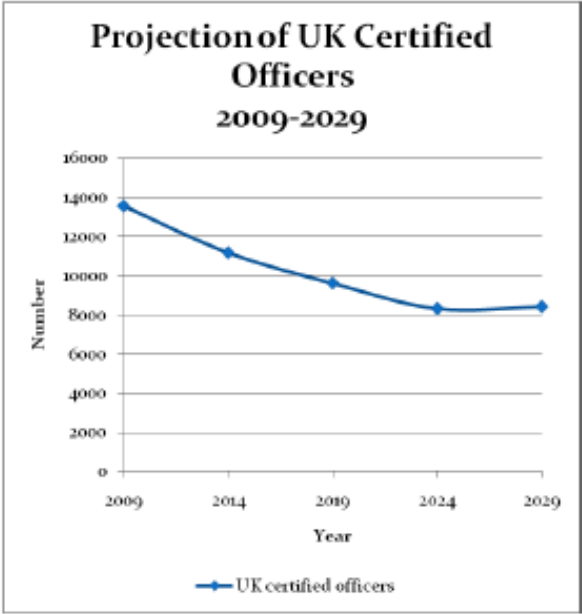
Source: Brownrigg, M. (2001). Developments in UK shipping: The tonnage tax. *Maritime policy and management*, 28(3), 213-223. DOI: 10.1080/03088830110055701

Appendix IV



Data from: United Nations Conference on Trade and Development. (2010). *Review of Maritime Transportation*. Geneva, Switzerland. Retrieved from <http://www.unctad.org>

Appendix V



Data from: United Nations Conference on Trade and Development. (2010). *Review of Maritime Transportation*. Geneva, Switzerland. Retrieved from <http://www.unctad.org>

IS CANADA READY FOR INCREASED ARCTIC CRUISE TOURISM? PERSPECTIVES FROM THE FEDERAL GOVERNMENT

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CRUISE TOURISM, REFERRED TO AS PASSENGER SHIPPING by the Government of Canada, is a growing form of tourism in Canada's Arctic (Maher, 2010; Stewart, Draper & Dawson, 2010). A rapidly warming Arctic climate has been responsible in part for this growth where previously inaccessible Arctic locations are now accessible to cruise ships. Despite growth in this sector, cruise tourism has received little attention at the Federal level of Government (Dawson, Maher, & Slocombe, 2007; Maher & Stewart, 2007; Stewart & Draper, 2010), and traditionally has not been considered in developing Federal-level economic, social and environmental policy. However, Nunavut's cruise tourism industry must be considered in an assessment of the readiness of Canada's north for increased shipping activity as political and economic interests continue to develop in Canada's Arctic. Political and economic interests of the Arctic states will influence cruise tourism in the Arctic; if Canada is not ready for the increase in tourism, there may be economic, social, and political impacts that could influence Canada's Arctic future.

Tourism can be examined geographically, at international, federal, territorial and community levels; while these perspectives are important, tourism can also be studied from a policy and / or governance perspective. This paper, therefore, examines the perspectives of agencies under the auspices of the Canadian Federal Government specifically in relation to cruise

tourism development in Canada's Eastern Arctic. The perspectives of Canada's Federal Government agencies are important as the developers of national policies and guidelines must meet the growing demands of the cruise tourism industry (Marquez & Eagles, 2007). Ideally, national policy development should intersect international boundaries; similar to ship itineraries (Marquez & Eagles, 2007).

Currently the Government of Canada has no specific policies on Arctic cruise ship tourism; however, there is legislation, such as the *Marine Shipping Act*, that does apply to the Arctic shipping industry as a whole. Agencies such as Transport Canada, Parks Canada, and Environment Canada have guidelines which operators are expected to follow within Canadian Arctic waters. These guidelines include the *Guidelines for the Operation of Passenger Vessels in Canadian Arctic Waters* and the *Guidelines for Seabird Colony Viewing by Cruise Ships*. These guidelines, however, are not practically enforceable.

This paper presents an examination of Canada's readiness for increased Arctic cruise tourism from the perspective of the Federal Government of Canada. Though the Government of Nunavut is a stakeholder in Canada's Arctic expedition cruise ship industry, the territory currently does not have specific tourism legislation to assist in cruise-specific policy development. This paper focuses on environmental changes related to climate change and the demonstrated growth of the eastern Canadian Arctic expedition cruise ship tourism industry. It will demonstrate, through an institutional assessment based on Smit and Wandel's (2006) Conceptual Framework for Vulnerability Assessment, that additional policies and regulations may be required to be developed at the Federal level.

Climate Change in the Canadian Arctic

Climate change is an on-going phenomenon; however, the effects of climate change are felt most acutely in the Arctic (Arctic Climate Impact Assessment (ACIA), 2004; Ford & Smit, 2004; International Panel on Climate Change (IPCC), 2007). Regional temperatures have increased at twice the global average (Barber, Lukovich, Keogak, Baryluck, Fortier, & Henry, 2008). The predicted changes resulting from increasing temperatures within the Arctic include decreased sea ice thickness and abundance, permafrost thawing, warmer and shorter winters, glacial melting, changes in snow abundance and texture, increased storms, shifts in vegetation zones, infrastructure challenges, and changes to wildlife population and fauna (ACIA, 2004; IPCC, 2007; Hall, 2010; Johnston, 2006; Lamers & Amelung, 2010; Snyder, 2007). Although these predicted changes have been observed by Arctic residents and researchers (Krupnik & Jolly, 2002), increases in temperature along with the related changes in sea ice thickness and distribution have the greatest influence on the Arctic cruise ship industry.

The past 30 years have presented the greatest rate of Arctic warming, at 1°C/decade (Hall, 2010), and is considered the warmest period in the Arctic history (Hall, 2010). This is a trend that has been observed by Environment Canada (Howell, et al., 2009) through the reduction in sea ice as a result of temperature increases that significantly decreases the abundance and thickness of sea ice, while weakening first year sea ice (Barber, et al., 2008;

Johnston & Timco, 2009; Stewart, Howell, Draper, Yackel & Tivy, 2007; Reidlinger, 2001). Barber, et al., (2008) predict that the decrease is expected to continue; by September 2090, it is predicted that there will be 75% less ice (Figure 1).

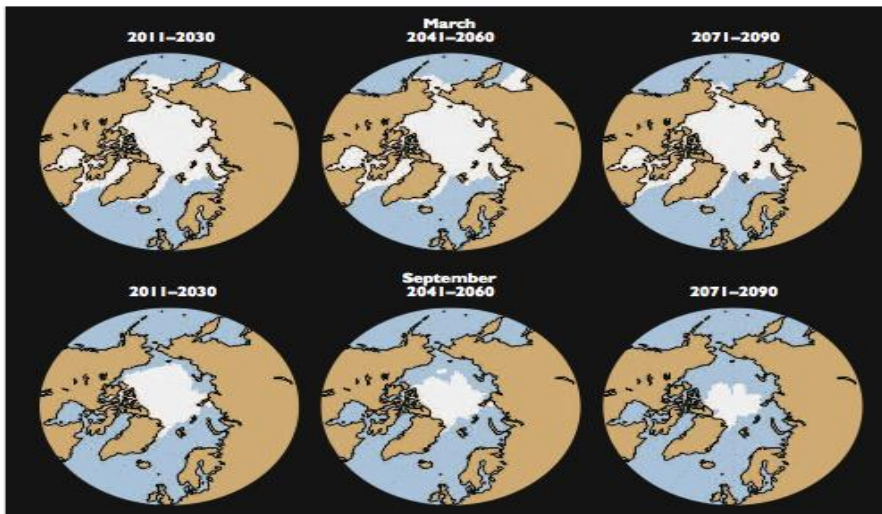


Figure 1: Predicted decrease in sea ice during September from 2011 to 2090 (Barber, et al., 2008).

The reduction in the amount of sea ice from September 2011-2090 has the potential to allow the industry to have easier access to the Arctic shipping corridors. The expected ease of access is also influenced by the seasonal formation of sea ice within the Arctic.

The Arctic consists of first year ice (FYI) and multi-year ice (MYI). First year ice is a seasonal ice formation that is typically 2m or less (Johnston & Timco, 2009; Stewart, Howell, Draper, Yackel & Tivy, 2010). In comparison, MYI is ice that has been through at least a melting season, and whose thickness is generally more than 2m (Johnston & Timco, 2009). The abundance of FYI and MYI varies from eastern to western Canadian Arctic waterways (Stewart, et al., 2010). In the western Canadian Arctic there is a significant amount of MYI due to the influx of ice from the Canadian basin (Stewart, et al., 2010). In comparison, the eastern Canadian Arctic consists mainly of FYI (Falkingham, Chagnon, & McCourt, 2001). The movement of the sea ice as observed in the western Arctic has been observed to occur in the eastern Arctic as well (Howell, et al., 2009; Stewart, et al., 2010); this presents navigational dangers that must be faced by the shipping industry. Reduction in sea ice coverage has yielded an increase in sea level (ACIA, 2004), and the increase of ice movement (Howell, et al., 2009); these trends are expected to continue (ACIA, 2004; Barber, et al., 2008; Howell, et al., 2009; IPCC, 2007). It is predicted that sea ice will form later in the year and begin its annual break up earlier in the spring, and that sea ice will continue to be dynamic (ACIA, 2004; Barber, et al., 2008; Howell, et al., 2009).

Barber et al. (2008) suggests that there has been a 7% to 9% decrease in the multi-year sea ice during the summer months. Further, this decline in multi-year sea ice has been confirmed by satellite observation in which the greatest reduction in multi-year sea ice was observed in the

years 2002 to 2005, with the greatest reduction being observed in the autumn of 2005 (Barber, et al., 2008).

The reduction in the amount of the sea ice from September 2011-2090, as per Figure 1, has the potential to improve industry access to the Arctic shipping corridors. The seasonal formation and movement of sea ice in the Arctic also influence the expected ease of access. Furthermore, these changes in the seasonal formation and melting of sea ice will likely result in a longer expedition cruise ship tourism season, and in recent years has allowed for several cruise ships to successfully navigate the Northwest Passage (ACIA, 2004; Stewart, et al., 2007); however, there are navigational challenges as a result of the now dynamic sea ice.

By the mid-21st century (approximately 2041-2060), it is predicted that the Northwest Passage will be mostly open (ACIA, 2004). The ACIA (2004) predicts that the Northwest Passage and other routes, such as the Northern Sea Route, will be open for approximately 125 days a year and will be covered by 75% less ice. Though the Arctic would open up significantly for cruise ships, the sea ice reduction will most likely result in increased storms and coastal erosion, which has significant implications for northern coastal communities, such as Kimmirut, Pond Inlet, and Arctic Bay as well as for the tourism industry (Barber, et al., 2008; Dawson, Scott, Stewart, 2008; Hall, 2008; Johnston, 2006).

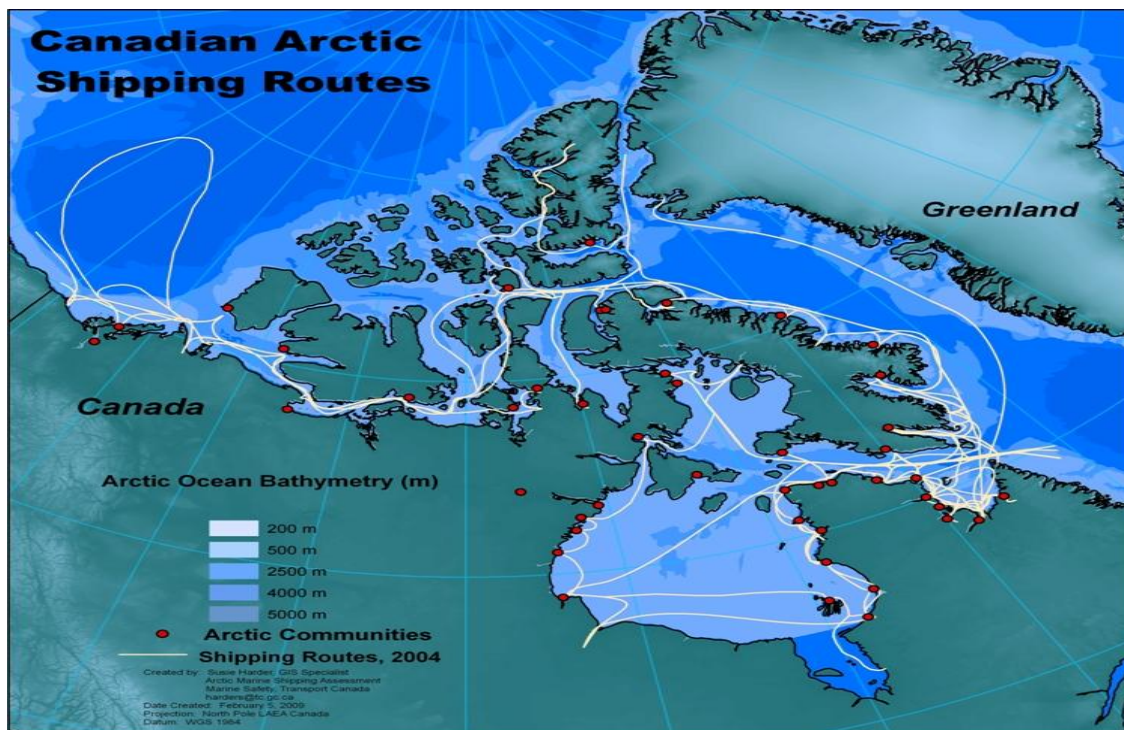


Figure 2: Current Arctic Navigation Routes (Transport Canada, 2010; Retrieved from <http://www.tc.gc.ca/eng/marinesafety/debs-arctic-map-750.htm> January 20, 2011).

The reduction in sea ice has also increased Arctic shipping opportunities by providing access to previously inaccessible Canadian Arctic destinations (Transport Canada, 2010) (Figure 2). It is expected that the Northwest Passage, an expedition cruise tourism ‘hot spot’, will be ice free for at least a month in the near future (Howell, et al., 2009; Snyder, 2007). The opening of navigable Arctic shipping routes is not only beneficial for the expedition cruise ship tourism industry, but also for other industries such as natural resource extraction, particularly, the diamond and other mineral industries and for oil.

Increases in cruise tourism, that may be considered a result of a more accessible Arctic, will be demonstrated in an examination of the eastern Arctic cruise tourism trends.

Eastern Arctic Cruise Tourism Trends

In 1984, the *MS Explorer* traversed the Northwest Passage, establishing Canada’s Arctic expedition cruise ship tourism industry (Stewart, et al., 2007; Stewart, et al., 2010). Since then, eastern Canadian Arctic cruise tourism has increased (Maher, 2010; Stewart, et al., 2007; Stewart, Draper, & Dawson, 2010). This developing industry utilized expedition cruising, a form of cruising that combines brief on shore visits with environmental and historical education (Stewart, et al., 2010; Splettstoesser, 2000). From the mid-1980s to early 1990s the growth of the industry was sporadic (Stewart, et al., 2010); however, after 1992, the availability of inexpensive icebreakers increased and a more regular pattern of Arctic cruise tourism pattern emerged (Grenier, 2004; Stewart, et al., 2010).

From 1992 to 2005 successful voyages were completed in the Northwest Passage, and cruise tourism developed around Baffin Island, Ellesmere Island, and Hudson Bay (Stewart, et al., 2010). In 2004, the cruise ship industry had 11 cruise ships; this number doubled in 2006. Table 1 demonstrates the growth of the industry for the past eight years, and predicts for 2011.

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011
Cruise Numbers	5	11	11	22	23	26	25	25	23*

Table 1: Commercial Cruise Ship Tourism Trends 2003-2011 (based on Stewart, Draper & Dawson, 2010; Personal Communication with Canadian Coast Guard employee; Examination of operator’s website).

The Canadian Arctic expedition cruise ship tourism industry peaked in 2008; since then, it has stabilized. This stabilization is perceived to be the result of the economic downturn (Parks Canada employee, personal communication, September 1, 2010). However, Federal Government agencies predict the industry will continue to develop steadily, doubling the number of commercial cruises (Parks Canada employee, personal communications September 7, 2010). Federal Government employees located in Nunavut have also observed increases in private cruises attempting the Northwest Passage; however, there is currently no method of tracking

them as they are generally below 300 tonnes and are not required to report to Vessel Traffic Reporting Arctic Canada Traffic Zone (NORDREG) (Canadian Coast Guard, 2010 Retrieved from <http://www.ccg-gcc.gc.ca/e0001440> on September 5, 2010).

Shipping in the Canadian Arctic has been occurring from as early as the 15th century (Stewart, et al., 2010) when the commercial advantages of using the Northwest Passage were being explored. Today, travelling through the Canadian Arctic provides tourists with opportunities to visit significant sites of earlier historical exploration, view wildlife, and experience Inuit culture (Loverseed, 2008; Stewart, et al., 2010); these tourism opportunities make the Canadian Arctic an attractive destination. These are the themes that were explored in recent fieldwork that was related to a stakeholder perspective project conducted in Nunavut. The stakeholder study explored the perspectives of stakeholders that have a role in the development of legislations, regulations, and policies for Nunavut's expedition cruise ship tourism industry.

In the summer of 2010, a qualitative study was undertaken to explore the perspective of government stakeholders. The qualitative approach has been used to examine climate change from a northern perspective (Pearce, Ford, Laidler, Smit, Duerden, Allarut, Andrachuk, Baryluk, Dialla, Elee, Goose, Ikummaq, Joamie, Kataoyak, Loring, Meakin, Nickels, Shappa, Shirley, and Wandel, 2009), and has been demonstrated as a useful and the preferred technique for conducting Arctic research (DeSantis, 2008; Flemming, 2009; Ford, et al., 2010). Interviews were conducted with 15 Federal Government employees from Transport Canada (3), Environment Canada (3), Parks Canada (5), the Canadian Northern Economic Development Agency (1), the Canadian Coast Guard (1), and the Canadian Border Service Agency (2). Attempts were made to contact employees from Health Canada, the Department of National Defense, and Foreign Affairs and International Trade Canada; however, no responses were received.

Semi-structured telephone and in-person interviews were conducted from July to September 2010. Interviews explored stakeholders' views of climate change and tourism, what they believed tourists look for and whether climate change is part of that, and what changes or strategies decision-makers and regulators believe need to be pursued to manage the ways in which climate change, and its effects and adaptations to it, are influencing the Arctic experiences of tourists. Through the interviews, an understanding of what decision makers and regulators believe their current exposures and sensitivities and adaptive capacity could be determined; further, their future exposures and sensitivities and adaptive capacity could be predicted. This approach uses the Conceptual Framework for Vulnerability Assessment (Smit & Wandel, 2006) (Figure 3).

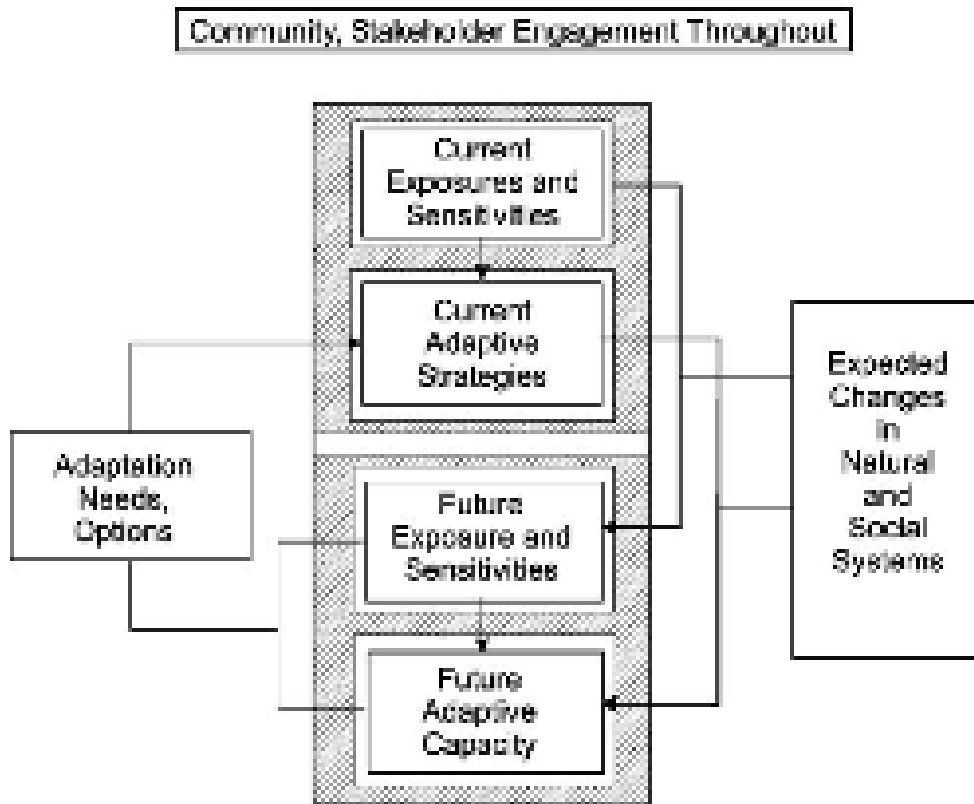


Figure 3: Conceptual Framework for Vulnerability Assessment (Smit & Wandel, 2006).

The Conceptual Framework for Vulnerability Assessment (Smit & Wandel, 2006) allows for the identification of strategies based upon the current exposures and sensitivities, and adaptive capacity of a stakeholder group, and recognizes that the current state of stakeholder group influences the future exposures and sensitivities, and adaptive capacity (Smit & Wandel, 2006). The framework also takes into account the expected social and natural system changes (Smit & Wandel, 2006); these changes include social-demographic changes and climate change. Based upon the current and future state of the stakeholder group, along with the expected changes, decision makers and regulators are able to develop an understanding of their adaptation needs and available options (Smit & Wandel, 2006). Although Smit & Wandel (2006) used their framework for community based vulnerability and adaptive assessment, in this research their framework was applied to the Federal Government of Canada, the Government of Nunavut, and private industry expedition cruise ship tourism decision makers and regulators.

Themes from the Stakeholder Interview

The themes of this research demonstrate that there are similarities and differences within the Federal Government of Canada’s Ministries, and their perceptions of their readiness

for increased expedition cruise ship tourism. This section outlines the similarities and differences within the ministries thematically.

Dynamic Nature of Services

An analysis of the transcripts demonstrated that the policies and regulations governing Canada's north are dynamic and have allowed agencies to provide timely services to Canadians and international visitors to the Arctic on expedition cruises. The timely provision of services is important. All interviewees described that the users of their services have the perception that the Arctic is easier and safer to access due to the decrease in sea ice. The dynamic nature of services has been integrated into management strategies used by Federal agencies, including adaptive management.

Adaptive Management

The Federal Government of Canada's agencies are similar in that the agencies interviewed used adaptive management as a governing technique. Adaptive management is defined as systematic process that involves continually updating policies and regulations based on past experience (Armitage, 2008). Transport Canada participants described their approach as consultative-adaptive management. Participants from Transport Canada explained that the agency regularly conducts strategic reviews of its public services to ensure that customer needs are met. Conducting strategic reviews of their clients and asking what more could be done allows for a consultative management. The adaptive management approach is also used by Parks Canada; however, not in the same consultative manner as Transport Canada.

Parks Canada, within an Eastern Canadian Arctic context, is required to co-manage the five national parks as per the Nunavut Land Claim Agreement. Although the management process was described as adaptive management, the community, Inuit beneficiaries, and Parks Canada must agree upon the policies and regulatory decisions made regarding national parks. Participants described sovereignty as being influential to the development of Arctic policies and regulations.

Sovereignty & Responsibility

For Transport Canada, the Canadian Coast Guard, and the Canadian Border Services Agency, sovereignty was a concern. Participants from these agencies explained that their Arctic presence and regulatory guidelines demonstrate Canada's Arctic sovereignty; that is, Canada has a federal presence in the north, thus it is being used. A Transport Canada participant explained that Transport Canada demonstrates Arctic sovereignty through its role as a marine transportation regulator in national and international areas, and through enforcement of these regulations. A Canadian Coast Guard participant expressed the sovereignty capabilities of the Canadian Coast Guard through the enforcement of NORDREG, which became the official reporting mechanism for ships over 300 tonnes in July 2010. Although Canada's sovereignty was clearly demonstrated by the above agencies, the impacts of international disasters occurring outside of Canada's boundary waters were only discussed by two Federal agencies employees:

Transport Canada and Environment Canada. Employees of Environment Canada were particularly concerned with the clean-up responsibility that would occur if an incident occurred outside of Canada's boundary waters, and the contamination spread into Canada's water. Employees of Transport Canada were concerned about pollution occurring in Canada's water as a result of an international incident.

Industry Growth

The expedition cruise ship tourism industry is expanding due to climate change and its resulting impact on sea ice. Customer service oriented agencies, such as Parks Canada and Environment Canada, were concerned with the industry as it developed. One participant expressed concerns "...about the growth [of the industry] without the community having benefit....and with the impact on the environment" (Parks Canada Interviewee 1). Other participants within Parks Canada expressed concerns about the lack of organized programs and park-related information made available to cruise ship visitors.

In comparison, non-customer service oriented agencies, such as Transport Canada, expressed a lack of concern about the increase in cruise ship tourism. Transport Canada and the Canadian Border Services Agency expressed the opinion that their policies and regulations were robust enough for future developments. Transport Canada participants explained that the agency was a leader in the development of marine policy and legislation and that they work closely with the International Maritime Organization (IMO) to ensure that Canada's regulations are comparable to international shipping standards. Customer service differences were also apparent when participants discussed their agencies ability to work directly with the cruise ship tourism and shipping industries.

Working Relationship with Industry & Communication of Information

Employees of Transport Canada described the Canadian Arctic's expedition cruise ship tourism industry as easy to work with. For Transport Canada employees, working with the expedition cruise ship tourism industry entailed communicating current legislation and regulations to operators, ensuring that those regulations are followed, and communicating safety information to ship masters, such as the designate ice regimes. In comparison, Parks Canada employees reported experiencing difficulty in communicating their message with cruise ship operators. Parks Canada employees described a 'hot and cold' relationship with some cruise operators, where one year operators want to partner with Parks Canada to deliver parks related programs, and the next year, they do not.

The experience of working with the cruise ship industry had a demonstrated influence on the ability of agencies to provide information to the industry. Individuals from Transport Canada and the Canadian Coast Guard expressed ease of communicating information to the industry. While individuals from Parks Canada, and to a lesser degree Environment Canada, experienced a degree of frustration when providing industry-users with information. These similarities and differences will be discussed in relation to Smit and Wandel's (2006) Conceptual Framework of Vulnerability Assessment.

Discussion

According to federal agencies, the expedition cruise ship tourism industry is influenced by the economy. Although also influenced by the economy, the similarities and differences between Transport Canada, Environment Canada, the Canadian Coast Guard, the Canadian Border Service Agencies, and Parks Canada present challenges and opportunities that influence the readiness of Canada for the predicted increased growth with the marine tourism shipping industry.

Currently, Government of Canada agencies have very different focuses. For example, Transport Canada and the Canadian Border Services Agency are focused on the safety of Arctic marine users, whereas Parks Canada focuses on providing visitor experiences. The differences in agency focus influence Canada's overall readiness for increase shipping in its Arctic waters; this is a concern that decision makers and regulators must plan for. On one hand, agencies are preparing for these increases, and on the other, they do not have the human capacity to develop a full tourism program for visitors.

The differences in the ability of federal agencies to communicate their regulations, policies, and agency message to communities and to the expedition cruise ship tourism industry was demonstrated as a concern for employees of the Federal Government. The difficulty in communicating and working with the expedition cruise ship tourism industry has the potential to influence Canada's ability to enforce the legislation and to influence Canadian sovereignty over the Canadian Arctic.

Federal government employees demonstrated that work has been conducted to minimize the frustration of delivering information and working with the expedition cruise ship tourism industry vulnerability. Parks Canada, although with two cruise ship focus staff, continue to work extensively with the industry. An example of this dedication is Parks staff who go to the communities hosting cruise ships, and provide information regarding the visited national park currently, assist with the cultural shows, and make attempts to find out what visitor programs cruise ship operators require.

Transport Canada employees are able to increase their adaptive capacity by continuing to work with communities and the industry ensuring that the services provided are required by their customers. This customer service orientation enables Transport Canada to maintain their position as enforcers of the legislation and to demonstrate some sovereignty control. For Transport Canada this may be greater than for other agencies such as Parks Canada because Transport Canada does have an international role in the development of marine transportation policies.

Federal agencies also were asked what the future vulnerabilities are predicted to be. The vulnerabilities discussed included the dynamic sea ice (Transport Canada, Environment Canada, and the Canadian Coast Guard), continually changing policy regulations requirements for adapting to social and natural changes (Transport Canada, Parks Canada, Canada Border Service Agency, Canadian Coast Guard). Parks Canada employees suggested that the greatest influence

on the future vulnerabilities was going to be the social changes that have occurred in the Canadian Arctic. Although climate changes were described as affecting national parks, Parks Canada employees explained that the agencies mandate is not to deal with climate change, but to monitor and work with the effects of climate change; this affects the future adaptive capacity of the agency to natural changes.

Based on the current vulnerabilities and adaptive capacity and the expected future vulnerabilities and adaptive capacity, it appears as though non visitor oriented agencies are more prepared for the predicated increase in the Canadian Arctic cruise ship tourism industry than visitor focused agencies. This readiness may be the result of the small percentage that the expedition cruise tourism industry represents in comparison to other industries such as natural resource extraction (Dawson, et al., 2007; Maher & Stewart, 2007; Stewart & Draper, 2010). The unpreparedness demonstrated by visitor-oriented agencies may be the result of limited personal capacity and the lack of cruise specific programs. The industry has been on a slow upward growth pattern that has currently stabilized, but, if the predictions of increased growth to approximately 40 cruise ships a year are realized after the economy has bounced back, then the need for suitable policy will be even more critical.

Conclusion

The Canadian Arctic is the new 'hot' spot for the expedition cruise ship tourism industry. This growth has been facilitated by the reduction in abundance and thickness of sea ice level, a result of climate change. The changes to sea ice have allowed for an increase in the number of expedition cruise ships traveling through the Canadian Arctic, in addition to increase shipping from other industries. These shipping increases require that Canada has highly developed Arctic marine policies that assist in ensuring Canada's safety and sovereignty within the Arctic context. Although the cruise ship tourism industry is a small component to observed shipping increases, it is a growing trend. This trend needs to be taken into consideration when developing marine shipping policies for the Canadian Arctic.

This paper has demonstrated that not all of Canada's federal agencies are ready for the anticipated increase in tourism shipping. This paper has demonstrated that agencies that are visitor oriented, such as Parks Canada, have been competent thus far in their readiness for the expedition cruise ship tourism industry; however, the agency is not ready for the predicted increases. The main reason for the lack of readiness is the difficulty that employees experience in working and communicating with the industry and developing appropriate programs for cruise tourists. In comparison, this paper has demonstrated that federal agencies that are focused on the safety of marine users within the Canadian Arctic, such as Transport Canada and the Canadian Coast Guard, are ready for the predicted increase in marine tourism shipping. This paper demonstrated that the readiness displayed by these agencies is the result of in situ regulations and policies, and the agency's role in developing international marine shipping policies and regulations. In conclusion, Canada is not comprehensively ready for the anticipated increases in Arctic cruise ship tourism due to significant gaps in agency's regulations and

policies. In order to be comprehensively ready for the anticipated increases in Arctic cruises, Canada needs to have regulations and policies firmly in place within all federal agencies.

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