

ICEBERGS DEAD AHEAD: ANTICIPATING INCREASED MARITIME SHIPPING IN THE
CANADIAN ARCTIC

by

ALAN JON GROVE

B.A., University of Cincinnati, 2007

M.A., University of Cincinnati, 2009

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

in

FACULTY OF GRADUATE AND POSTDOCTORAL STUDIES

(Geography)

THE UNIVERSITY OF BRITISH COLUMBIA

(Vancouver)

February 2017

© Alan Jon Grove, 2017

Abstract

Shipping is a fundamental feature of life in the Canadian North. Climate change is opening waterways between the Atlantic and Pacific Oceans, introducing the possibility of new vessels plying these waters as a transitory space. Furthermore, community growth and economic development activities have increased domestic maritime traffic in the region as well. The regulation and support of shipping in the region has come under question as sea ice retreat reveals open waters. This thesis examines the question of how are the present and the prospective future of shipping in the Canadian Arctic managed and governed. I situate my work in the fields of critical polar studies, anticipatory geographies, and Arctic geopolitics. I use expert interviews with policy makers in Transport Canada, Fisheries and Oceans Canada, Environment Canada, the Canadian Ice Service, the Government of Nunavut's Department of Economic Development and Transportation, along with perspectives from officials at the World Wildlife Fund and the Centre for the North to answer these questions. I argue that the perception and anticipation of a well-managed and well-supported maritime space guides the actions of Canadian officials. Officials view shipping as a holistic activity where meaningful government intervention is limited. I further argue that the logic of prevention is most useful in understanding policy makers' activities in this forum, and the effective presence in the region through management and support of shipping demonstrates the Canadian state's sovereignty. Canada is at the forefront of regulations, support, and techniques to manage and support shipping in the Arctic, offering a perspective on present shipping, and how anticipating future shipping has shaped actions of the domestic agencies, the Arctic Council, and the International Maritime Organization.

Preface

This thesis is original, unpublished, independent work by the author, A. Grove. The fieldwork interviews reported throughout the thesis were covered by the UBC Behavioral Research Ethics Board certificate number H12-00198.

The research was supported financially by the Canadian Embassy in Washington DC's Understanding Canada Doctoral Research Grant. Travel assistance was graciously provided by the Conference Board of Canada's Centre for the North.

Table of Contents

| | |
|--|-----------|
| Abstract..... | ii |
| Preface..... | iii |
| Table of Contents | iv |
| List of Tables | vi |
| List of Figures..... | vii |
| Acknowledgements | viii |
| Chapter 1: Introduction | 1 |
| 1.1 Context | 1 |
| 1.2 Research question and objectives | 4 |
| 1.3 Anticipatory futures..... | 10 |
| 1.3.1 Anticipation..... | 11 |
| 1.3.2 Anticipatory practices | 14 |
| 1.4 Arctic geopolitics | 25 |
| 1.4.1 Critical polar studies and Arctic geopolitics | 25 |
| 1.4.2 States, territoriality and effective sovereignty | 29 |
| 1.4.3 Sovereignty in the Canadian Arctic | 34 |
| 1.4.3 Governance | 37 |
| 1.5 Policy studies and northern regions | 40 |
| 1.6 Methodology | 45 |
| 1.7 Chapter outline..... | 53 |
| Chapter 2: The difference between a good ship and a bad ship: shipping in the North | 58 |
| 2.1 Vessels in the Arctic | 59 |
| 2.2 Regulations in the Canadian North..... | 65 |
| 2.2.1 Arctic Waters Pollution Prevention Act | 65 |
| 2.2.2 Arctic Shipping Pollution Prevention Regulations | 68 |
| 2.2.3 Zone/Date System..... | 70 |
| 2.2.4 Arctic Ice Regime Shipping System | 72 |
| 2.3 Shipping infrastructure in the North | 78 |
| 2.3.1 Nautical charts | 78 |
| 2.3.2 Ice reports..... | 79 |
| 2.3.3 Weather and wave information | 80 |
| 2.3.4 Marine aids to navigation..... | 82 |
| 2.3.5 Crew training | 82 |
| 2.3.6 Ports | 83 |
| 2.3.7 Places of refuge..... | 84 |
| 2.4 Icebreakers | 85 |
| 2.4 Conclusion | 88 |
| Chapter 3: Maritime support and infrastructure in the Canadian Arctic..... | 90 |
| 3.1 Navigation infrastructure: a beacon of light | 91 |
| 3.1.1 Navigation services..... | 92 |

| | |
|---|------------|
| 3.1.2 Navigation infrastructure and effective state presence | 97 |
| 3.2 Weather and ice..... | 105 |
| 3.2.1 Weather and ice information and the state’s effective presence..... | 106 |
| 3.2.2 Effective presence and the Canadian Ice Service | 111 |
| 3.2.3 Canadian Ice Service and changing demands | 117 |
| 3.3 Conclusion | 122 |
| Chapter 4: Governance and regulations..... | 125 |
| 4.1 Canada’s regulations | 127 |
| 4.1.1 Arctic Waters Pollution Prevention Act | 128 |
| 4.1.2 Arctic Shipping Pollution Prevention Regulations | 136 |
| 4.2 Applying regulations to vessels | 141 |
| 4.3 International regulations: the IMO’s guidelines and Polar Code | 148 |
| 4.4 Conclusion | 160 |
| Chapter 5: Idealistic futures of shipping and economic development..... | 162 |
| 5.1 Political economy of shipping..... | 164 |
| 5.1 Nunavut and Canada economic futures..... | 169 |
| 5.1.1 Mining in Nunavut..... | 170 |
| 5.1.2 Mary River Mine project | 176 |
| 5.2 Postmodern ocean space: crossing the blank ocean space | 182 |
| 5.3 Conclusion | 192 |
| Chapter 6: Anticipating future Arctic shipping..... | 194 |
| 6.1 Anticipatory action and future studies..... | 195 |
| 6.2 Anticipatory futures of the AMSA 2009 Report | 197 |
| 6.2.1 Arctic Race..... | 201 |
| 6.2.2 Polar Low | 202 |
| 6.2.3 Polar Preserve | 204 |
| 6.2.4 Arctic Saga..... | 206 |
| 6.2.5 Future “Areas and issues for research” | 209 |
| 6.3 Preventative logics and shipping regulations | 215 |
| 6.4 Conclusion | 224 |
| Chapter 7: Conclusion..... | 226 |
| 7.1 Epilogue..... | 226 |
| 7.2 Conclusion | 228 |
| Bibliography | 239 |

List of Tables

| | |
|--|-----|
| Table 1. Effective sovereignty regimes of monetary policy..... | 31 |
| Table 2. NORDREG Vessel Type Classifications 1990–2012..... | 64 |
| Table 3. Vessel Size Limits for Panama Canal Expansion..... | 185 |
| Table 4. Reduction in fuel use by vessel speed..... | 188 |

List of Figures

| | |
|--|-----|
| Figure 1. Zone/Date System..... | 6 |
| Figure 2. Arctic Ocean and Surrounding Seas..... | 7 |
| Figure 3. Shipping Control Zones..... | 71 |
| Figure 4. Example of AIRSS Ice Numeral Calculation..... | 75 |
| Figure 5. Equivalency table of classification societies..... | 151 |
| Figure 6. Two-by-two grid of the primary drivers of future shipping in 2050..... | 200 |

Acknowledgements

I offer thanks to my co-supervisors Dr. Merje Kuus and Dr. Matthew Evenden for their considerable time, effort, insight, and assistance through my time in the department and the research process.

I would also like to thank the support of Dr. Greg Henry, the external reader of this thesis for his comments and guidance on issues in the Arctic, and Dr. Jim Glassman, who also provided feedback and guidance at times through the process.

I offer immense thanks to Amanda Bidnall for her diligent work as copy-editor. She provided valuable feedback and assistance to make the draft the best possible draft it could be.

I thank the wonderful and incredible staff in the Geography Department through my time. Suzanne Lawrence has been a confidant and an outlet for many of my joys and frustrations throughout the process. Sandy Lapsky is an amazing administrator and colleague. Jeanie Yang, Mimi Yu, Stephanie Ickert, and Connie Chung in the main office have provided me with a sympathetic ear and support for my time in the department.

I likely would not be in this position without the considerable help of Dr. Patricia Mirwaldt, whose care and attention put me back on track to not only finishing, but coping and functioning at UBC and beyond. Caroline Kingston's fantastic advice and help overcoming the hurdles and gremlins of writing proved to be valuable in finishing the work.

I want to thank my numerous graduate student colleagues in the Geography Department and on campus who I have had the pleasure and privilege to work with and around, especially Jon Luedee, Mark Stoller, Genevieve Parente, Sarah Brown, Katie DeRego, and Michael More.

I like to thank my close friends Spencer Huvers, Josh Kretzer and Dan Romanski for their love, support, and distractions to keep me grounded through this process.

I give special thanks to my brother Dr. Kevin Grove. His comments and thoughts on the field and the thesis process have been invaluable, despite our sibling rivalry. Also, special thanks to my sister-in-law Jody and my nephew Rhen for their love and support.

Finally, I give special thanks to my parents, Larry and Pati Grove for their continued love and support through this long endeavor, and for inspiring me to continue my education.

Chapter 1: Introduction

1.1 Context

What is the importance of the Northwest Passage? This historical “holy grail” of exploration from the 16th to 19th centuries was envisioned as a viable link between Europe and Asia across the north of the Americas, rather than the route around the southern tip of Africa. The Northwest Passage route would have greatly shortened the distance and time, if only the ice had not gotten in the way. Today, the Arctic is poised to join this international network of shipping routes due to the dramatic effects of climate change. According to *The Economist*, the open waters of the Arctic, held still for millennia by ice, act as a mirror—different actors are able to see what they want reflecting in it: “Resource companies see new access to oil and gas, traders see handy routes from Europe to Asia, governments see possible new borders and military leaders see the need for new equipment and troops” (The Economist, 2009b).

The Northern Sea Route has already become a new link between Asia and Europe across the northern expanse of Russia and Norway. The Northern Sea Route, which opened to international traffic in 1991, became a symbol of openness under Gorbachev (The Economist, 2012c). Others have seen the route indicating a softening of Russia’s confrontational posture towards the west, because developing the ‘northern route’ for shipping requires wider consensus among Arctic states (The Economist, 2013a). The route cuts days off the transit time for those vessels as it offers a more direct path between ports in East Asia and Northern Europe than the Suez Canal. With an increase from four transits in 2010, to 34 transits in 2011, to 46 in 2012 (The Economist, 2012b, 2013a), and 71 voyages in the summer of 2013 (Balmasov, 2013), the route’s importance grows as each summer leaves more and more open water along the northern coast of Russia. What of Canada’s northern coast and the Northwest Passage? How is this route,

with its fabled origins firmly rooted in historic British naval explorations, evolving with the region's fast-changing conditions?

On September 25, 2013, the *Nordic Orion*, carrying 73,000 tons of coal, exited Davis Strait between Greenland and Baffin Island and then onto the front pages of newspapers across Canada and the world. It was the first commercial voyage across the Northwest Passage, and the speed of change in the Arctic was on full display. The Northwest Passage route was ice-free in 2007 for the first time since 1970; some 6 years later, a 75,000 deadweight ton bulk cargo ship sailed through the open waters. The significance of the voyage was clear: the Northwest Passage was finally a real option for international shipping. Only recently had voyages been possible by smaller vessels such as private yachts, cruise ships, research vessels, and government icebreakers. Yet a 225-metre bulk cargo ship was now able to travel through the Northwest Passage, the first voyage of its kind (McGarrity & Gloystein, 2013; Oskin, 2014; Stueck, 2013b).

The voyage of the *Nordic Orion* through the Northwest Passage touches on many themes: the impact of climate change in the Arctic, the future of ships travelling through the Canadian archipelago, the ability of the Canadian government to control who is allowed in its Arctic territorial waters, and even the national identity of Canada. Byers (2013) argued this voyage comes at “at no little risk to Canada’s environment and sovereignty”. Stueck (2013b) further suggested that “with a commercial bulk carrier now having passed through the route, discussions about Arctic sovereignty and marine infrastructure have become more than theoretical”. As *The Economist* puts it, “When Canadians think of the north nowadays it is often to worry about the changing climate bringing interlopers. The melting ice cap looks almost certain to create a navigable Northwest Passage and unleash a scramble for undersea resources” (2009a). Byers (2013) further argued that “other ships will follow, and their compliance with Canada’s domestic

laws – and therefore our ability to ensure safety and environmental protection – cannot be assumed.” With the inevitable melting of the polar ice cap, commentators point towards more ships straining at their mooring lines to race through the remote Canadian north.

Shipping is a key way non-Arctic littoral states relate to the Arctic. For example, Singapore, one of the largest shipping powers in the world, is keenly interested in Arctic shipping (The Economist, 2013b). The 1.2 million tons of cargo on 46 ships that travel through the Northern Sea Route is viewed as a challenge to Singapore’s position as a global shipping hub (The Economist, 2013a). In addition to Singapore, states such as China, South Korea, Japan, and Italy have applied for observer status in the Arctic Council. These states are “seeing the potential” of Arctic shipping routes to shorten the distance between major ports (The Economist, 2012a). The Economist (2014) suggests that other ports along the equatorial route were “worrying about their future” at the potential opening of the Northern Sea Route as a trans-Arctic route, despite the fact that the number of ships taking that route is a small fraction of the number that venture through the Suez Canal. Shipping also links the Arctic region to existing legal frameworks. The UN Convention on the Law of the Sea provides a legal framework for governing maritime activity. States and vessels use these legal rights throughout the world today.

Shipping in the Canadian Arctic is like an iceberg: while the part above water attracts great attention, the wider structure remains under the surface. An official at Transport Canada said “shipping is seen primarily as a support service to all activities” (2012a) A World Wildlife Fund official elaborated on this statement, seeing shipping as “a proxy-indicator for the wider amount of activity in the region, whether oil and gas exploration, the mining operations at Mary River, the transshipment of goods along the passages, and the sea lift operations” (2012). A focus

on the Northwest Passage obscures the multiple present and actually existing alternative uses of Canadian Arctic waters by ships, very few of which are concerned with the Northwest Passage route. Other shipping activities are outside the frame of this discussion, such as the annual sealift bringing almost all goods, local fishing operations, and support activities of government icebreakers.

1.2 Research question and objectives

The importance of these alternative activities leads to the central question of my research: how are the present and the prospective future of shipping in the Canadian Arctic managed and governed? This question addresses many of the wider questions that emerge from the *Nordic Orion's* voyage. Significant shipping activity exists in the Canadian Arctic to support communities and economic development. This shipping is more mundane and quotidian than a Northwest Passage voyage, but it has a significant influence on the supporting and regulating presence of state agencies. As I will discuss below, a specific vision of the future relates to the changing region: a melting ice pack leads to open waters, which increases the likelihood for large container and tanker ships to ply these waters between ports. This is not the only perception of future shipping. There are more plausible and important futures that Canadian and international officials and agencies employ to justify action in the present.

My work engages with how government, intergovernmental and nongovernmental organizations understand different scenarios and possible futures for the Arctic region with regard to the issue of shipping. Government officials expect increased shipping in the region, though a certain kind of shipping and for specific purposes. To do so, we must examine how government officials conceive and understand the future, and how these perceptions justify their actions in the present. Much of the commentary surrounding the opening of the Northwest Passage is on the lack of infrastructure in the region to support these trans-Arctic voyages (e.g.

Arctic Council, 2009; Byers, 2013, 2014; Kikkert, 2012a; Lajeunesse, 2012; Lasserre, 2011; Lasserre & Pelletier, 2011). Although there is indeed a lack of basic infrastructure in the Canadian North, this is not the whole story. Some infrastructure is present. Nautical charts, weather and ice information, navigation infrastructure, and the NORDREG vessel reporting and monitoring program all support the present use of the Canadian Arctic waters rather than the potential future uses of the region, such as the Northwest Passage.

My study area encompasses the Canadian Arctic waters, situated in the wider Arctic Ocean. It includes the waters surrounding Nunavut, and the Beaufort Sea in Canada. Canada has the world's largest coastline, and 40 percent of that is in Nunavut. The area of my study within Canada encompasses the area in the Zone/Date System found in the Arctic Shipping Pollution Prevention Regulations, seen in Figure 1 below. This region covers the areas designated in the relevant Canadian law as Arctic waters. I further use the Arctic Council's definition of the Arctic Ocean found in the *AMSA 2009 Report*, which uses the International Hydrographic Organization's 1957 official definition for the central ocean, as well as the surrounding coastal seas, seen in Figure 2 below.¹ These coastal seas see "most maritime activity, such as fishing, offshore hydrocarbon development and ship transits" (Arctic Council, 2009, p. 16).

¹ The Arctic Ocean is defined as the area northward of these surrounding seas: Greenland Sea, Norwegian Sea, Barents Sea, White Sea, Kara Sea, Laptev Sea, East Siberian Sea, Chukchi Sea, Bering Sea, Beaufort Sea, and the Canadian archipelago, along with Hudson Bay, Hudson Strait, Lincoln Sea, Baffin Bay, Davis Strait and Labrador Sea. A 2002 proposed revision to IHO would see the Arctic Ocean's boundaries expand to encompass these surrounding seas and straits.

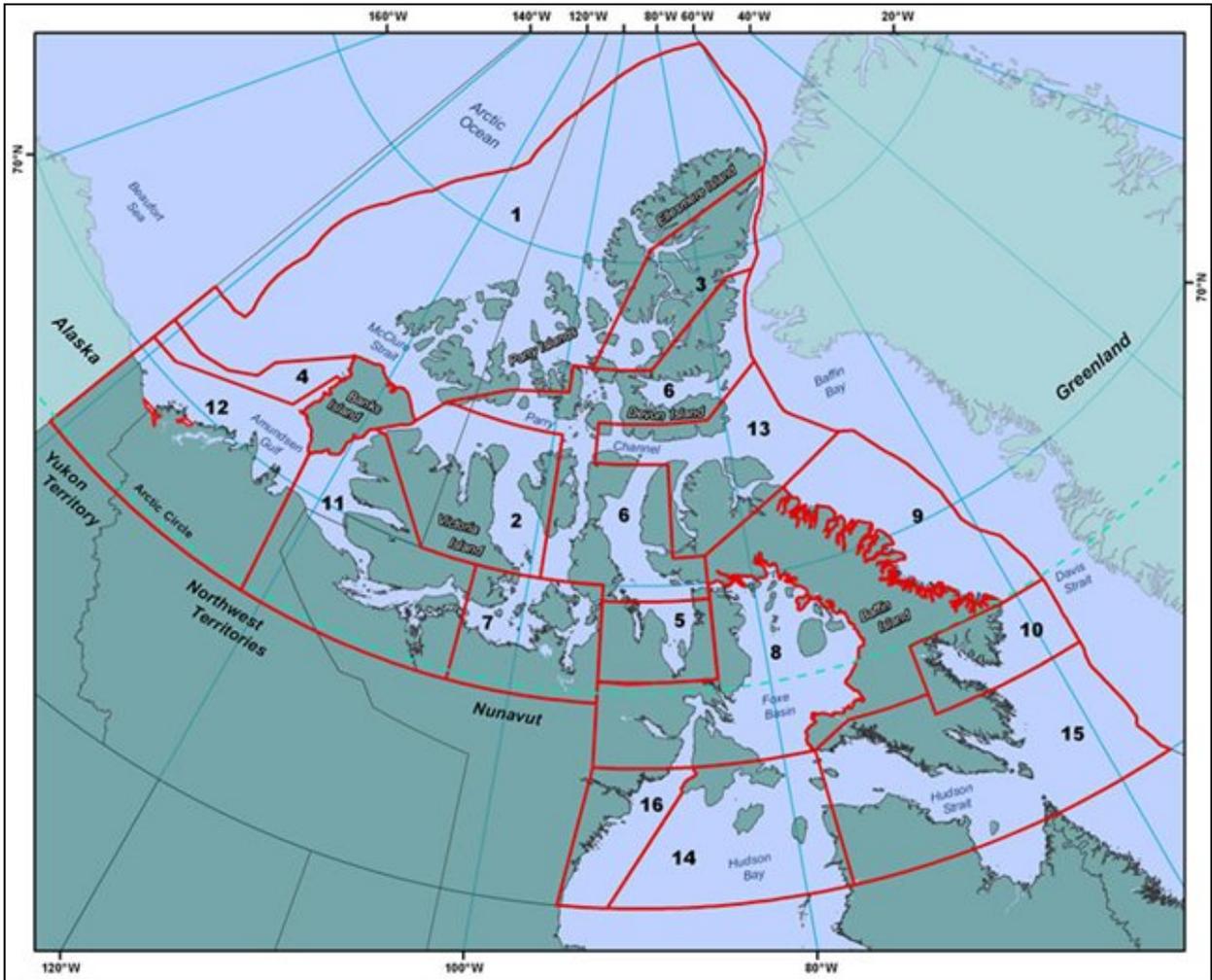


Figure 1. Zone/Date System (Transport Canada, 2012)

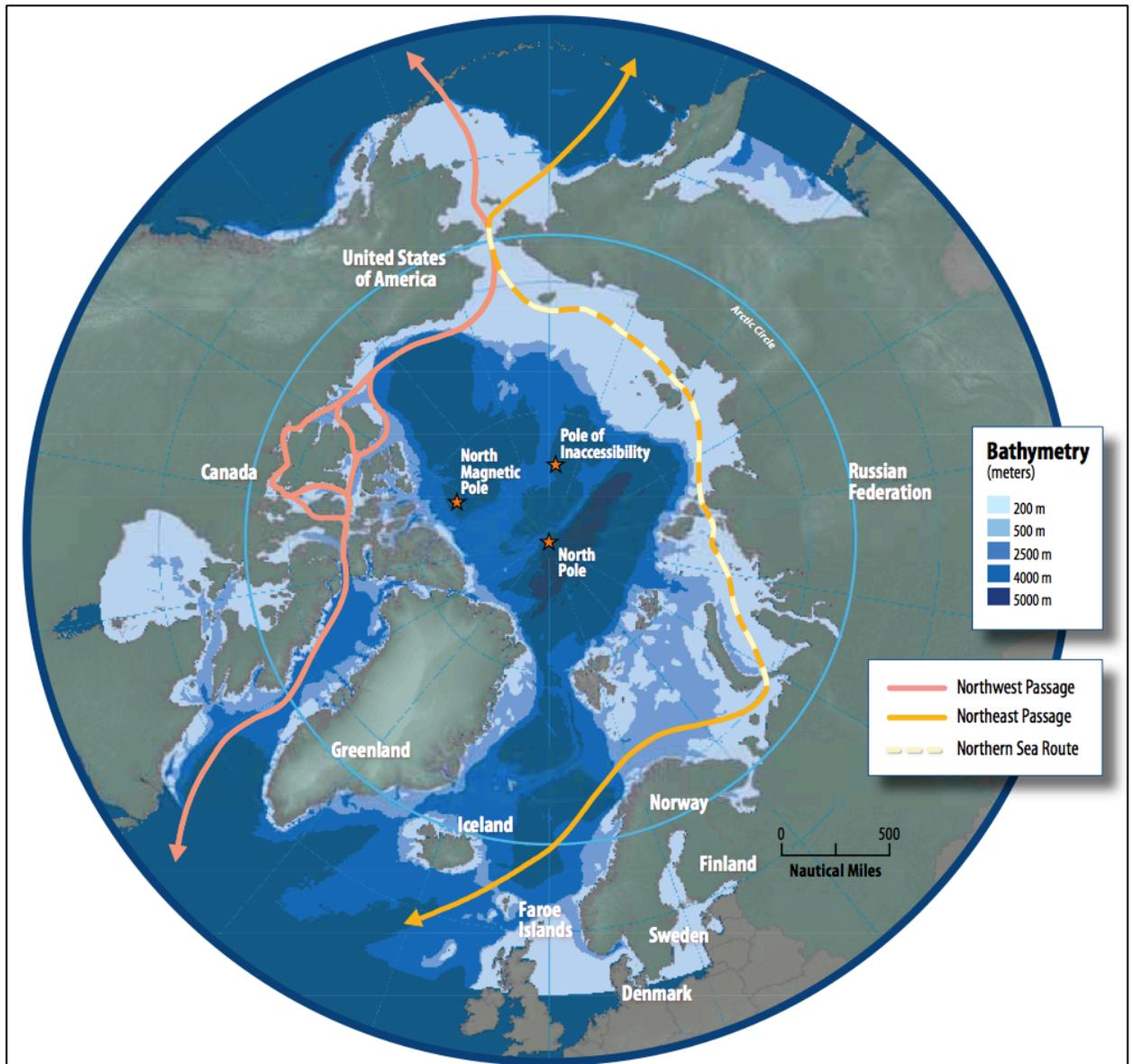


Figure 2. Arctic Ocean and Surrounding Seas from the *AMSA 2009 Report* (Arctic Council, 2009, p. 17)

Canada is an important actor in Arctic shipping. Its coastline touches three oceans. Its major maritime transportation lifelines of the St. Lawrence River and Great Lakes are seasonally affected by ice, in addition to its Arctic waters. Canada developed the first regulatory policies for shipping in the Arctic, and these have been used as blueprints for international regulations and laws. The Arctic Waters Pollution Prevention Act was the basis for Article 234 in UNCLOS, and the Arctic Shipping Pollution Prevention Regulations were the basis for the

International Maritime Organization's 2002 *Guidelines for Ships Operating in Arctic Ice-Covered Waters*. Furthermore, Canada's 1995 Arctic Ice Regime Shipping System became the basis for IMO's forthcoming Polar Operational Limit Assessment Risk Indexing System. Thus, Canada is a significant actor in ice-covered waters shipping due to its historical regulatory framework and its geographical situation.

I argue that the perception and anticipation of a well-managed and well-supported future Canadian Arctic maritime space guides the work of Canadian policy makers. Shipping is a holistic activity. Designing, constructing, inspecting, crewing, training, regulating, and supporting activities must all come together for shipping to happen. Only the regulations and support of these areas are open to government agencies and policy makers. These are key areas where the industry relies on government agencies to regulate ships and provide support infrastructure for safe travel. The government's role—and in particular how policy makers anticipate future shipping—is key to the direction their policies and activities will take.

I build on this argument through two supporting substantive pillars. The first of these arguments is that government intervention along the logic of prevention steeps shipping, particularly in the Arctic region. This preventative logic is part of an anticipatory policy-making framework in which government actions and policies aim to head off negative futures of specific events. These actions and policies operate outside of the regular functions of shipping. Shipping is a significant global commercial activity. Any policies or actions from the government thus come from outside of this activity. Governments provide key infrastructure and regulatory frameworks that cover shipping's many parts, from design requirements to the training of crews. The specific demands on ships operating in the region mean that government support and regulation are essential to safe operations.

My second supporting point is that *governance* adds to the understanding of the Canadian state's presence in the region, complementing the work on effective *sovereignty* to understand how the Canadian state operates in the region in regard to shipping. The Northwest Passage route cuts through Canadian territorial waters. A significant body of scholarly and public literature highlights the Northwest Passage's connection to sovereignty. This focus limits the scope to one specific route and policy analysis focuses more on Canada's *Arctic Waters Pollution Prevention Act* (AWPPA) than alternatives. The *Arctic Shipping Pollution Prevention Regulations* (ASPPR) emphasizes the role of the state better within shipping's framework than the AWPPA. The ASPPR provides regulation of an international activity from within the framework of international shipping, allowing for alternative analysis to emerge. The alternative is to focus instead on how government agencies manage and regulate shipping. There is considerable state presence in the region that operates *in concert with* the movement vessels rather than rigidly against them. I argue that governance and effective sovereignty highlights a more nuanced understanding of the state's presence in the region.

Governance also draws our attention to the relations between state agencies and intergovernmental and nongovernmental agencies. Nongovernmental agencies such as the International Maritime Organization and the International Association of Classification Societies play, along with the international agencies for weather and navigation, a particularly important role in shipping. How specific government agencies interact within these relational and networked frameworks of a truly international activity like shipping highlights the importance and value of governance to understanding the state's actions.

My research works to dispel misconceptions around shipping in the Arctic. Despite claims that connect the shrinking sea ice cover with ships straining at their mooring lines to race

through a Northwest Passage that lacks a considerable state presence, shipping already exists in the Canadian Arctic. It is highly regulated and supported, and government agencies play key roles in the national and international structure. The material presented in the following chapters highlights these points in detail, from both written policies and interviews with those working in government agencies.

1.3 Anticipatory futures

The future of the Arctic is a significant question for scholars today. Arbo, Iversen, Knol, Ringholm, and Sander (2012) identify over fifty works produced between 2003 and 2013 that address the socio-economic or political future of the Arctic on some scale. These come from a range of political bodies such as the Arctic Council (2004, 2009), businesses and commercial interests (see Det Norske Veritas, 2010; Norshipping, 2007), independent initiatives (see Emmerson, 2010; Fairhall, 2010; Smith, 2011), or scientific and technical works (see G. P. Peters et al., 2011; Stephenson, Smith, & Agnew, 2011). Arbo et al. (2012) identify four overarching topics for the future: climate change and social impacts; resources and economic development; politics, governance, and security; and holistic studies. The Arctic, they suggest, is widely situated either as a new frontier for exploitation, or as a space to be preserved and protected.

The Arctic is a site of significant change in the present. Young (2011) reasons that the key drivers of this change are climate change and globalization. He expects this to lead to increased human activity in the region from oil and gas developments, commercial shipping, fishing, and ship-based tourism (2011). There is “an explicit sense that the geographic transformation is a driving force,” when scholars discuss the future of the Arctic (Dodds, 2013, p. 193; e.g. Nuttall, 2008; Stephenson et al., 2011; Young, 2012). Dodds (2013) argues that a number of issues grab the attention of policy makers and urge action: climate change, thinning

sea ice, pollutants, aircrafts, and ships. He suggests that these are best understood as issues government officials anticipate occurring in the future. Focusing on these allows us to examine “how and why such things are enrolled to make claims about particular future visions of Arctic governance become framed and legitimated” within debates and government actions (Dodds, 2013, p. 196). An analysis then shifts to the particular visions that are given legitimacy through these processes, rather than the systematic deduction of trends, as examined by Arbo et al. (2012) (B. Anderson & Adey, 2012).

1.3.1 Anticipation

I turn to the concept of anticipation, and how scholars employ the concept to investigate the role of the future. I employ a similar definition to what B. Anderson (2010b) uses. He defines and mobilizes anticipation as “a performative process of rendering the future actionable” (2010b, p. 229). Anticipation “implies a heightened attentiveness” to what might come, while denying the “otherness, mystery or unknowability of things to come” and actively “striving to control the future” (B. Anderson, 2010b). As a subject of study, anticipation is a way of investigating the role the future plays in the decision-making processes in the present.

The attempted control of the future is the key distinction between anticipatory action and other methods of studying the future. Future studies, such as those produced by Arbo et al. (2012) above, and planning emphasize a distinct separation between the present and the future. Furthermore, anticipation deals with specific events and triggers that create moments that demand intervention. Anticipatory action is a very specific form of planning that focuses on “call-to-action” issues, and their associated outcomes.

These “call-to-action” issues operate on a similar terrain as other widely known and significantly impactful events. Climate change, thinning sea ice, pollutants, and aircraft and ship disasters are all high-profile events in the Arctic, and they have ripple effects outside of the

region. These issues are all driving events that organize and demand action from governments. Climate change, terrorism, trans-species epidemics, nuclear annihilation, and volcanic eruptions are significant but unclear threats to life today that not only shape political action and commercial innovation, but define the lives valued by liberal democratic societies (B. Anderson, 2010a; B. Anderson & Adey, 2012; de Goede & Randalls, 2009). De Goede and Randalls (2009) argue that “managing the global future is legitimated under conditions of extreme uncertainty with these ‘total threats’ that are, for Swyngedouw (2007) vague, ambitious, but homogenous” (p. 859). These total threats direct government and societal actions that attempt to manage their occurrence and impact. How these threats are articulated “objectifies events, disciplines relations, and sequesters an ideal of the identity of people said to be at risk” (Campbell 1992, p. 2 in de Goede & Randalls, 2009). Focusing on terrorist annihilation and climate change, de Goede and Randalls (2009) suggest that these threats can “be articulated in terms of simultaneous uncertainty and catastrophe, incalculability and potential apocalypse.” These threats require a near-constant state of anticipation to manage and mitigate their wider effects within liberal democracies (B. Anderson, 2010a).

I situate my work in the conceptual framework of anticipatory actions and the potentiality of the future. Anticipatory action is a “paradoxical process whereby a future becomes cause and justification for some form of action in the here and now” (B. Anderson, 2010a, p. 778). Anderson argues that human geography has long taken the future for granted; to think critically about the formation of the future should puzzle us. The future is assumed to be either a blank space open for human action and creation (Koselleck, 2004), or the future is the perfection of progress from actions taken by states, organizations, or individuals (Zinn, 2008). Rather than assuming the linear temporality of past-present-future, the future and the past are effectively

folded together (B. Anderson, 2010a; B. Anderson & Adey, 2012). This relational configuration of temporality directs attention to the way that the future becomes the cause and justification for action in the present (Massumi, 2005). The future is made present and is constantly produced by these relational aspects (B. Anderson & Adey, 2012). The desired future is thus both a spur towards this idea (B. Anderson, 2010a), as well as “an effect of specific relations and acts” (B. Anderson, 2010b).

Anticipatory action is different from other forms of thinking about the future. Anticipatory action functions as “an ontological and epistemological status of ‘what has not and may never happen’” requiring us to understand the presence of the future (Massumi 2007 in B. Anderson, 2010a, p. 778). The presence of the future is understood as how specific futures are made known and actionable in the present. The future is not a blank space upon which one can imagine anything, nor is it an ultimate aim towards which we are heading. Rather, the future becomes the cause and justification for present actions that then creates new futures to interpret and act on. The focus of anticipatory action is “how geographies are made and remade as futures are brought into the present and take on some form of presence” (B. Anderson & Adey, 2012). Thus, the presence of the future affects actions in the present—to either steer actions towards positive outcomes or mitigate and avoid negative outcomes.

Anticipatory action aims to both govern and secure the existing social-spatial order from potential disruption (B. Anderson, 2010a). Thus, geographies are “made and lived in the name of preempting, preparing for, or preventing threats to liberal democratic life” (B. Anderson, 2010a, p. 777). Anticipatory actions are thus a significant part of the power relations through which liberal democracies govern and secure their population (B. Anderson, 2010a; Dean, 2007; Dodds, 2013). B. Anderson (2010a) suggests that three ideas link anticipatory actions with

wider social spatial conditions necessitating governance and action. First, the life threatened is irreducibly complex, a function of today's globalized world and transnational flows and connections. Second, the bad is within the good; we must act before the threshold when threat has had sufficient time to incubate. Third, he cites Beck (1992)'s notion of the de-bounding effects of disasters that change as they circulate. Anticipatory action is caught up within liberalism's characteristic production/destruction relation (Foucault, 2008). Threat and opportunity, danger and profit are at the centre of life's contingency, from which anticipatory action emerges (B. Anderson, 2010a). Anticipatory action values certain lives and spaces more than others. To save and protect a valued life or space means that we abandon, destroy, or allow others to be degraded: the Alaskan coastal community at Shishmaref imperiled by impacts from storms and storm surges (Dodds, 2013); or the traditional ways of Canada's Inuit population affected by the changing climate in the Arctic (Inuit Circumpolar Council Canada, 2007, 2014; Watt-Cloutier, 2006, 2015; Shelley Wright, 2014).

1.3.2 Anticipatory practices

How can we know and investigate this process? Anticipatory inquiry has a different focus than other methods of making the future known. B. Anderson (2010a) suggests that this frame of inquiry "attends to how futures are: disclosed and related to through statements about the future; rendered present through materialities, epistemic objects and affects; and acted on through specific policies and programs" (p. 779). He defines these as styles, practices, and logics respectively. Styles are the ways that the future is made known; practices give content to specific futures and render them in the present; and logics are actions taken in the present that aim to "prevent, mitigate, adapt to, prepare for, and preempt specific forms" of the future (B. Anderson, 2010a, p. 779). I turn my attention to the ways Anderson addresses practices and logics.

Practices are a significant way that specific futures are made present. Practiced futures are defined by B. Anderson and Adey (2012, p. 1531) as “specific acts and constellations of diverse acts [that] enable the achievement of particular relations with the future.” Practices present the paradoxical moments when specific futures are made known and relatable in the present. The future becomes an influential factor in the present time. Furthermore, the presence of certain futures influence the “composition of specific geographies” (B. Anderson & Adey, 2012, p. 1532). The specific geographies relate to how spaces are conceived and how ideas about the way they are threatened by activities need to be anticipated. Anderson further suggests that practices are inherently political. We can question the “forms of authority and expertise that enable certain futures to appear, gain, and retain presence” (B. Anderson, 2010a, p. 787). Certain futures are more influential in the present. How these futures circulate within spheres of authority and power, and how expertise is valued in these circulations, are worthy subjects of study. An anticipatory politics attends to the specific futures that have retained presence within decision making circles, rather than attempting to discern trends that emerge from multiple futures.

Practices can be broken down to calculations, imaginations, or performances of specific futures. The calculation of futures stems from the unknown future combined with “non-linear or stochastic calculations of relations, associations or links” (B. Anderson, 2010a). The future is made present through “the domain of numbers, which are then visualized in forms of ‘mechanical objectivity’—tables, charts and graphs” (B. Anderson, 2010a). The calculation of futures in the Arctic primarily focuses on topics such as “temperature rises, shipping frequency, and/or levels of resource extraction, which can then be mapped and ranked in terms of likelihood and possible severity” (Dodds, 2013, p. 198). Dodds argues that “numbers have a visceral

impact and contribute to a particular neoliberal and rationalist strategies [*sic*] of rendering spaces such as the Arctic governable.” Calculations of the future and their output—graphs, tables, charts, and maps—become powerful forces making the future known in the present. Suggestive futures, such as the link between climate change and human activity (see Stephenson et al., 2011), emphasize the way that specific future events are related and discursively made known through calculations. Stephenson et al. (2011) highlight changes in accessibility for transportation from a baseline to 2059. They observe an expected increase in accessible maritime area, as there is a decrease in accessible overland areas. A calculated future of the Arctic is one where maritime access grows in certain areas while affecting overland travel. Calculated increased maritime access highlights the potential for greater vessel activity that requires significant government intervention.

Imagined futures differ from calculated futures in how the future is made present. Imagined futures are “acts of creative fabulation, including techniques such as visioning, future-basing, link analysis and scenario planning” (Anderson 2010, 784). Thinking through an imaginary lens constructs the future as if it were going to happen. Imagined futures give value to participants’ knowledge and expertise in creating plausible and actionable futures. They are produced in scenario planning, envisioning, narrating, and story-telling exercises.

Scenarios are a useful tool to encourage thought and direct strategic action towards specific interventions (B. Anderson, 2010a). The imaginary future of a nuclear war with Russia became a haunting presence that shaped American politics and discourse with significant political and social consequences (Masco, 2006 in de Goede & Randalls, 2009). Imagined futures are therefore an important practice of how specific futures are made present. One Arctic example is the AMSA section on futures scenarios in the Arctic, which I discuss in detail in

Chapter 6. Dodds finds that its scenarios work not only to lay out and order possible futures, but also to offer a “roadmap forward” (Brigham 2011, 318; Dodds 2013). Dodds argues that scenarios matter in the sense of underpinning a call to arms, within the AMSA report, with regard to developing a mandatory polar code of navigation, an Arctic SAR [Search and Rescue], a circumpolar response capacity agreement among the Arctic 5 states in particular, and the implementation of an Arctic Observing Network designed to share knowledge about Arctic marine infrastructure and scientific knowledge (2013, 198).

Imagining futures thus allows many different futures to emerge and strategically direct intervention. The mandatory Polar Code and search and rescue agreement are interventions into the imagined future activity in the north. One addresses the expected increase in shipping; the other regulates the mobilization of people and resources in the event of disasters in the remote space. Both operate in an *as-if* construction of the future, an Arctic as if it were a maritime superhighway, or an Arctic as if a cruise ship or passenger plane or cargo ship had distress. Imagined futures thus embrace the expert knowledge of participants to make potential futures present.

Performances of the future embody futures even further than imagined futures do. The performance “stages an interval between the here and now and a specific future through some form of acting, role-play, gaming or pretending” (B. Anderson, 2010a). Anderson suggests that exercises (B. Anderson, 2010b), war games (Der Derian, 2001), and simulations (Budd & Adey, 2009) have “their origins in theatre, drama, and play” (2010a). We see performance in the exercises conducted each summer by the Canadian Forces to generate experiential knowledge and enhance preparedness (Dodds 2013). Operation Nanook has taken place every year since

2007 and simultaneously practices future scenarios and promotes Canadian sovereignty in the region, by showing the flag and state capacities (see Dodds 2012). Canadian Forces and other agencies responded to oil spills in 2007, maritime vessel evacuations in 2008, anti-sub warfare in 2009, a petro-chemical leak near Resolute in 2010, an air disaster scenario near Resolute Bay in 2011², a vessel of interest in 2012, a wildfire threatening Whitehorse in 2013, and a fishing vessel in distress that required search and rescue in 2014 (Government of Canada, 2015). These exercises make the future present through an embodied experience for the participants. Additionally, those in command are able to assess how things might play out by observing the responses of participants. The future is made present through an embodied reaction, the participants actually taking part in a potential future scenario.

Practices such as calculation, imagination, and performance are an important part of anticipatory action. They give specific futures content, rendering them present. Dodds argues that all of these practices are significant in the Arctic:

Each of these elements, calculation, imagination and performance, plays an important role in understanding Arctic futures. The role of the graph, the scenario and the experience in the form of the exercise all contribute to bringing forward ‘the future’. The articulation and experience of particular futures (for example dominated by rising marine traffic, resource exploitation and/or disaster) contributes to demands, justifications and implementation of particular actions in order to secure the ecosystems and peoples of the Arctic. (2013, p. 199)

Practices establish a material future, which allows a directed response or intervention, can be mobilized against in the present. For my work, the public narrative of increased shipping is one

² A First Air Boeing 737 crashed outside of Resolute on August 20, 2011, two days before this exercise was to take place (see George, 2011; Nunatsiaq News, 2011).

issue that demands an attentive and anticipated reaction. Shipping is part of the calculated future of a more accessible region, the imagined future of economic and community growth, and the practiced future of search and rescue responses.

Actions in the present are rationalized and justified through specific logics. B. Anderson (2010a) defines logics as “a coherent way in which intervention in the here and now on the basis of the future is legitimized, guided and enacted” (p. 788). Interventions are particular to the different futures that are made present, and they rationalize the action which values certain lives and spaces over others (B. Anderson, 2010a). Anderson further stresses that logic refers to the ways that these decisions about specific futures are “constantly reassembled in attempts to govern different domains of life” (B. Anderson, 2010a, p. 788). Specific logics mobilize action to guard against specific futures. A temperature threshold is set and greenhouse gas emissions legislated; an airstrike launched at mountainous caves in a far away land; an emergency medical centre established through city planners. Actions such as these in the here and now aim to prevent, preempt, and prepare for particular futures. Officials justify these acts through the specific ends of mitigating or securing life against events that may never happen.

Logics such as prevention, precaution, preemption, and preparedness have become important rationalized actions in the present against an uncertain future. These logics reflect the distinct perceptions of the future that individuals have related to, made present, and now demand action to address. Two such logics, precaution and prevention, are similar in their operation. Both work to stop the “occurrence of an undesirable future” (Dodds, 2013) when an “identified threat reaches a point of irreversibility” from happening (B. Anderson, 2010a; Massumi, 2007). The precautionary principle, according to Ewald (2002), has two key features: a scientific uncertainty and a threat that has serious irreversible damage. De Goede and Randalls (2009)

suggest that this leads precautionary logic to have a “self-conscious recognition of radical uncertainty” that can only lead to the search for more knowledge to address the uncertainty (Massumi, 2007). These precautionary and preventative logics presuppose that a preventative action can be taken that is outside and separate from the processes that it acts upon (B. Anderson, 2010a). The action must work on that process’s or object’s terrain, rather than establishing its own field of operation (Massumi, 2007). Adey and Anderson (2011) highlight the example of the Icelandic volcano’s eruption in 2010. The volcano’s ash cloud forced European governments to take precautionary measures to prevent damage to passing airplanes and the lives onboard. This precautionary measure to prevent loss of life caused significant disruption to travel across the Atlantic and Europe, forcing airlines and passengers to adjust their schedules. In the Arctic, Aslaksen, Glomsrød, and Myhr (2012) highlight the significant uncertainties around climate change and the importance of taking a measured precautionary approach. Precaution in the Arctic is necessary because of significant interrelations present between social and ecological systems and the growing push for economic development. They argue we must gather more knowledge in certain ways and on certain topics to be able to proceed.

Preemption, like precaution and prevention above, is another logic that operates before the event happens. Preemptive action is inciteful and justified based on the potentiality of “high impact, low probability” events (B. Anderson, 2010a). Preemption is highlighted by futures that identify and relate situations that are not yet determined to have significant impact: the unknown unknowns (Massumi, 2007). Massumi (2007) argues that preemption is prolific, operating in “the element of vagueness and objective uncertainty.” This logic was the defining power of the recent political age. The United States’ War on Terror was the quintessential example of this logic in action. In order to defend the valued lives of Americans in the wake of the September

11, 2001 attacks, US and coalition forces launched military strikes against al-Qaida targets in Afghanistan and later against the Saddam Hussein-led government in Iraq. These preemptive interventions occurred to stop significantly negative events from happening in the United States. Preemptive interventions secured lives in America and to a lesser extent the western world, at the cost of those living in targeted spaces.

Preparedness differs from the three above in that it happens after an event has already occurred. Preparedness aims to “stop the *effects* of an event disrupting the circulations and interdependencies that make up a valued life” (B. Anderson, 2010a, pp. 791, emphasis in original). This logic has been a fundamental part of the scholarship on adaptation and resilience that addresses how communities and states react to these significant events (see Dalby, 2013; Grove, 2013, 2014; IPCC, 2007, 2013). There are a number of studies that address issues of resilience and adaptability in the Arctic. Academic studies range from those produced by Ford, Pearce, Duerden, Furgal, and Smit (2010) who examine the opportunities of climate change for the Inuit, to Cameron, Mearns, and McGrath (2015) who address the ways translating notions of adaptability and resilience from English to Inuktitut are important political acts.

Intergovernmental panels made by the Arctic Council, like the Arctic Climate Impact Assessment (2004), add circumpolar regional perspectives to issues of vulnerability and resilience, while governmental agencies produce similar works from a state perspective (Furgal & Prowse, 2008). Research centres like the Centre for the North focus on similar issues for both communities (Fournier, 2012) and maritime transportation (Fournier & Caron-Vuotari, 2013), while Emmerson and Lahn (2012) highlight how international research houses approach the Arctic’s resilience and adaptation potential. As Dodds relates adaptation to the Arctic, the emphasis “is on stopping the impact of an event such as a disaster from disrupting the

circulations and interdependencies of the Arctic region” (2013, p. 199). The logic of preparedness that exists within the domain of resilience and emergency planning does not always translate directly to the Arctic. The Arctic is a distinct location that requires an emphasis on its vulnerability:

The dependence on infrastructures (often modest and dispersed) and interconnections between human and non-human communities and processes (for example the role of sea ice and permafrost in shaping animal distribution) needs thus to be recognized explicitly. But the Arctic is not just ‘vulnerable’, it might also as a consequence of processes such as sea ice thinning actively resist and undermine attempts to action specific future visions. (Dodds, 2013, p. 199)

An overall lack of infrastructure compared to other regions challenge the applicability of resilience actions in the north. Add to this the complex impacts of climate change, and the level of preparedness implemented today may not be applicable or, even worse, possible to enact in the Arctic. The region, in this case, is changing too fast and too dramatically for logics of preparedness to suitably address the circulations and interdependencies that are disrupted.

Logics and practices address how thinking about the future is an inherently political act. As B. Anderson and Adey (2012, p. 1532) suggest, “particular orientations to the future is central to the operations of forms of power.” De Goede and Randalls (2009, p. 874) further argue that deconstructing these logics—by focusing on banal rather than apocalyptic futures—opens new spaces for critical political inquiry that address a “frequently absent politics of how to live in the world.” They further suggest three political outcomes that happen through deconstructing these logics of how the future is made actionable in the present: policies become performative, bringing into reality what they try to protect against; debates become depoliticized,

allowing other policies to be ‘smuggled in’ under their rubric; and positions within a debate become delegitimized (de Goede & Randalls, 2009). The narrow focus on the environment as an externality, for example, depoliticizes and limits debates on climate change. There are no “legitimate grounds to even question the overpowering assumptions delivering up these apocalyptic scenarios” (de Goede & Randalls, 2009, p. 874). Debates are further delegitimized such that basic assumptions and connections are unquestionable; to question is to distract from the real issue or to be a skeptic (de Goede & Randalls, 2009). Thus, not only are these logics part of a wider network of power, but they are also working to achieve political goals that we can make apparent through a focus on anticipatory policies. By focusing on how futures are related to, made present, and acted upon, the political foundation of these styles, practices, and logics becomes clearer.

In the Arctic, actions to secure a specific future are inherently political acts. Citing Massey (1995) on relational spaces, Dodds (2013) questions the focus on creating a shared vision of the Arctic at the Arctic Council. How can a region as complex and different as the Arctic have a single vision of its future? Whose vision is articulated and circulated as the “shared” vision, and whose is not? What actions secure this future, and who benefits as a result of this vision? Dodds argues that “the manner in which the future is assembled and anticipated depends on the manner in which the Arctic (as a place) is taken as a given or indeed self evident” (2013, p. 201). Thus, as potential futures are invoked, our attentions should turn to how mobilizing knowledge informs and reveals the Arctic as a specific space (Dodds, 2013). Dodds argues that taking the Arctic’s futures seriously means “addressing inter alia the role of anticipation and the way in which liberal-democratic states (and other actors including

indigenous organizations) prepare and preempt uncertainties, and even threats to life in general” (2013, p. 194).

The Arctic has, until recently, been outside of the work of the scholars above. The focus on key events happening in the mid-latitudes—The War on Terror, climate change, Natural disaster responses—that drive these intellectual developments have only recently turned to the Arctic. As I mentioned above, there are significant “call-to-action” events occurring in the Arctic, which fit this conceptual and analytical framework. Dodds (2013) is the lone work to apply anticipatory geographies to the Arctic. Thus, my work furthers this connection between anticipatory geographies and the Arctic region through the specific case of shipping.

I employ the conceptual framework of anticipatory actions to address how policy makers imagine, make present, and act upon the future potential of shipping in the Arctic. My focus on shipping is a prominent feature of ‘future of the Arctic’ studies (see Arbo et al., 2012). The retreating cover of sea ice creates a vision of new transit routes to link global economic centres together, but these futures assume that shipping is not presently occurring in the region. My focus on policy makers who have knowledge and experience in the region allows me to examine how their position and knowledge allows certain futures to be made present, and the techniques of power that support and manage vessel activity in the region.

I develop this anticipatory framework throughout this thesis. I discuss the formation of specific futures of the Canadian Arctic in Chapter 5. The promotion of mining activities in Nunavut, and the Northwest Passage as a shortcut between the Atlantic and Pacific Oceans are two constructions of the Canadian Arctic that relate to shipping. I explore these futures through policy documents and public perceptions about the region, and how shipping is an essential activity. However, these perceptions of futures often do not come to pass. I address the role of

practices and logics the found in the Arctic Council's *AMSA 2009 Report*. I focus on the practice of imaginative futures that come from specific scenarios employed by the key actors to shape the understanding of future maritime activity. I further examine the preventative logic that government activities use in regulating shipping activity. The probability of the loss of life and the environmental damage that can happen in the event of an accident, combined with the lack of available immediate response is key to regulations aiming to prevent negative futures. I examine particular anticipatory work of Canadian agencies Chapters 3 and 4 around support and infrastructure and regulatory development respectively.

1.4 Arctic geopolitics

The state is a primary actor in geopolitics. I situate my work within the emerging field of critical polar geopolitics. I pay particular attention to how this developed from the previous work on Arctic geopolitics. Next, I expand my focus to the framework of political geography and specifically theories of the state and territory. I begin with a focus on how the state presents a specific territorial form and how this territorial form has influenced a specific understanding of sovereignty. I suggest that an alternative geopolitical conception linking governance and effective sovereignty and best fits the specifics of Arctic shipping. I address how past discussions of de jure sovereignty over the Northwest Passage created a well-worn path that limits potential alternatives. I draw attention to more nuance and specific forms of state power enacted through a combination of governance and effective sovereignty. These alternatives to the sovereign nation-state's territorial foundations open up possibilities to the overarching features of state presence in the Canadian Arctic.

1.4.1 Critical polar studies and Arctic geopolitics

I begin with a survey the field of Arctic geopolitics. Heininen (2014) suggests that the Arctic has been primarily viewed through the lens of security and the military, political, and

economic interests of the nation-state. Classical and realist geopolitics envisioned the North as “a vast reserve of natural resources and a military space for the performance of sovereignty, national security and economic interests of Arctic states” (Heininen, 2014, p. 242). This perception of the region often ignored the considerable reach of globalization and the development of the world economy that reached into the polar regions (Cameron, 2015; Dodds & Nuttall, 2015; Eber, 2008; Heininen, 2014; Heininen & Southcott, 2010). The Arctic has been imagined in the 20th century as either a resource periphery, or as a complex mosaic of peoples with “unique and pre-modern identities” (Heininen, 2014, p. 241). The cold war turned attention to the region as a space for security and the military (Farish, 2006; Heininen, 2014; Lackenbauer & Farish, 2007). The Arctic is spatially constructed in two ways: as an exceptional space with its own properties—an indeterminate zone of particular environmental, imaginative and affective characteristics—and as a space of and for nation building (Dittmer, Moisio, Ingram, & Dodds, 2011; see also Koivurova, 2010 for second point).

The 21st-century Arctic is imagined in relatively similar frames. Heininen (2014) argues that while the cold war structured attention around the military, the states in the region have exhibited a degree of stability and peacefulness. At the same time, he argues that the race for resources challenges this idea of peace and stability. Further, two other perspectives emerge in the 21st century: an Arctic “boom” resulting from new and significant changes such as the loss of sea ice and global warming, and a growing securitization impulse (Heininen, 2014). Powell and Dodds (2014) suggest that the Arctic has been resurrected again as a “bonanza frontier” (from Slotkin, 1992) in the 21st century, “inviting flows of people, equipment and investment in search of ... immediate and impressive economic benefit on the basis of low capital outlay.” The promise of economic resources waiting to be exploited draws on the idea of extractive

colonialism (Dodds & Nuttall, 2015). Scientific research and economic and political development focus on remote places as a space for economic gain (Cameron, 2015; Dodds & Nuttall, 2015; Heininen, 2014). The scramble to delimit and claim the continental shelf highlights the construction of state territory in the Arctic Ocean as a site of vast resources potential (Brekke, 2014; Dodds, 2010; Powell, 2010; Rothwell, 2014).

The above work on the region has attracted much attention in political geography. Dittmer et al. (2011) suggest four potential avenues to recast geopolitics and thicken regional knowledge of the Arctic beyond the state and beyond community ethnography. First, they argue for a more gendered approach to the work, highlighting the distinctly masculine nature of state-based international relations and historical exploration in the region (see, for example Ridanpää, 2010). Second, they push for a greater connection between the scientific work done in the North and the state-territorial projects found in the region (see Numminen, 2010; Powell, 2010). Third, they call for an examination of the relations between “Arctic space, state and international affairs,” questioning how space and political order are established in the Arctic (212). Finally, there is an overall call for methodological diversity to unpack Arctic geopolitics from the textual and institutional engagements of critical geopolitics, from “ethnographic explorations of practice, to archival research, to interviewing and networking in policy communities, to examinations of the kinds of epistemologies at work in military exercises, scenario planning and ‘Arctic futures’” (212). This overarching call is part of critical studies’ wider focus and attention on the North. My work on shipping allows me to address the final two issues: the anticipatory futures of the north, as well as the relations between space, state, and international agencies.

I turn now to the field of critical polar studies. Powell and Dodds (2014, p. 9) explain that a critical understanding attends to “the intersections between territories and non-territories,

legal regimes, knowledges, resources and public culture that combine to construct and represent the Arctic and Antarctic as spatial entities.” Critical polar geopolitics is a “messy spatiality,” as it works to account for “contextual, conflictual, consensual” realities of the regions. Space is not a background, but rather “the very medium through which the polar regions are subject to multiple representation” (Powell & Dodds, 2014). Dodds and Nuttall (2015) further clarify the field to suggest an “emphasis on the manner in which these regions are represented, but also subject to a range of performances and practices including what is a mixture of statecraft and stagecraft” (2015, p. 7). Dodds and Nuttall (2015) use the term *scramble* to orient and draw attention to the interest in the region from a number of groups inside and outside of the region. They identify six key drivers of scrambling: globalization, securitization, polarization, legalization, perturbation, and amplification. The poles, they suggest, have been and will continue to be part of the wider flows of people, things, and capital (see also Heininen & Southcott, 2010); are subject to significant power/knowledge relations and issues of anticipation and preemption to secure the space; are contested by regional organizations, sub-national governments (see Inuit Circumpolar Council, 2009), and expanding interest from extraterritorial actors; are increasingly complex geographic and governed spaces; are the source of significant disturbances such as climate change and tipping points; and are a growing intensity reverberating activities of environmental change and political statecraft: “The Arctic emerges less as an isolated frontier region, but as a transnational and neoliberal space connected to global flows, markets, risks and networks—the idea of either ‘frontier space’ or ‘final reserve’ is inadequate in the face of such complex interconnections” (Dodds & Nuttall, 2015, p. 28).

I situate my work within critical polar studies. The case of shipping offers a key approach to the future of the region through the drivers of globalization, securitization, and

legalization. Shipping is a key part of globalization and international flows. The idea of a scramble, Dodds and Nuttall (2015) suggest, focuses our attention on the changing accessibility of the region. The Arctic is becoming a blue space. The white of annual sea ice retreats, opening blue spaces ready for transpolar shipping routes to transect it (Dodds & Nuttall, 2015; see also: Anderson & Peters 2014; Aporta, Taylor, & Laidler 2011; Steinberg 2001; 2014). Shipping is thus a key activity motivating anticipatory action in the Arctic. Dodds and Nuttall suggest that navigation rights “might well be a far more divisive issue in the future” (2015, p. 62), suggesting the importance of legislation and governance, but also that shipping is caught up in the practices of anticipation and preemption. Shipping is an inherent part of the Arctic’s future that is made present and relatable through anticipation and the securing of particular spaces.

1.4.2 States, territoriality and effective sovereignty

Jones, Jones, and Woods (2004) suggest a state is a form of political organization and institutions that exercises a monopoly over decision-making and coercive power and control over a bounded space (see also Mann, 1984). Jessop (2003) suggests that the state is a relational ensemble embedded in social processes—activities where collective and binding decisions are made for the entire political community. He further argues that the state can be thought of as an object that is reformed and reconstituted as government practices change (2007). Jeffrey (2015) presents a more recent definition, in which states are a geopolitical and biopolitical project where governance is central and the maintenance of territories and human communities intersect. The state is thus a structuring device for political thought. I use a definition of the state closer to those of Jones et al. and Mann. A state consists of four parts: bounded space, a central authority, a monopoly of power, and a means to administer or govern the territory.

A state is inherently spatial. The power of the authority must act somewhere. Painter (2015) traces geopolitical thought from Ratzel, Haushoffer, Mackinder, and Bowman to argue that power and a relation to territory is central to political geography. Paasi (2008) argues that no matter the scale, “territories are always manifestations of power relations.” Jones et al. (2004) suggest that power, domination, and control steep the notion of territory. Murphy argues that territory is important to government because “it provides a locus for the exercise of political authority over a range of interests and initiatives” (Murphy, 1996). The connection between the state, sovereignty, and territory leads to an understanding of territoriality. Territoriality is defined as domination to control or maintain the borders of a rigidly bounded territory (Kuus & Agnew, 2007) and as “sovereignty’s primary mode of geographic orientation” (Agnew, 2005, p. 438; see also Novak, 2011). Governing territory is thus a fundamental form of ensuring the physical form of the state (Jones et al., 2004).

Sovereignty is a judicial-political term in that it combines a legal and political framework for the world. The concepts of sovereignty and states have significant overlap, so much so that we see the terms sovereignty, state, and nation used nearly interchangeably (Walker, 1993). The state, as Walker (1993) would say, is the only potential political form in the world today. Claims of sovereignty suggest a permanence: an unchanging territorial space occupied by a state through temporal changes, or a spatial construction filled by the aspirations of a specific people (Walker, 1993). The fact that sovereignty directly brackets territory has played a significant role in our understanding of the concept. Borgerson (2013) argues that a modern understanding of territory relates to the legal concept of sovereignty, implying one final authority in the political community. Agnew (2005) argues that claims to state sovereignty restrict our understanding of the world to a specific territorial scope, that of the modern nation-state. Scott (2009) argues that

this conception of the sovereign nation-state is “now busy projecting its power to its outer-most territorial borders and mopping up zones of weak or no sovereignty.” The imminent logic, he argues, is a complete elimination of non-state spaces. A political map of the world is thus a picture of effective state control (Murphy, 1996; Walker, 1993). Sovereignty is also a relational concept—an authority’s control within its borders must be recognized to be legitimate, and recognize other authorities as the legitimate actors (Agnew, 2005). Sovereignty thus operates as a principle governing relations among states, while also being a territorial idea (Murphy, 1996).

Agnew (2005) there should be attention paid to the different degrees of political authority and state territoriality within each state. Agnew offers an example of this by discussing the different forms of states and their monetary regimes in relation to understandings of sovereignty. The table of effective sovereignty regimes is seen in Table 1 below. The interesting outcome here is that while still working within the constraints of traditional understandings of sovereignty as territoriality and a central authority, Agnew shows the differences that can exist as we think about sovereignty as a collection of territoriality and the control of the central authority.

| | | State Territoriality | |
|-------------------------|--------|--------------------------------------|-------------------------------------|
| | | Consolidated | Open |
| Central State Authority | Strong | Classic (China) | Globalist (United States) |
| | Weak | Integrative (European Union Members) | Imperialist (Latin American States) |

Table 1. Effective sovereignty regimes of monetary policy. Reproduced from Agnew (2005)

The primary concern here is to highlight how one conceptualization of sovereignty cannot produce the same understanding that the multiple conceptions do here. While the United States and China might both have strong central authorities, the difference between the two lies in how they exercise that control over their territory and boundaries. The United States is more open to global processes, while China has opted to be more consolidated and act as what Agnew

termed 'Classic' states with its monetary policy. The members of the European Union, while having weak central authority due to their association with the EU, still have more consolidated monetary power within the discussion of territoriality. The states in Latin America have a weak central authority and are more open to global processes leading to the lack of sovereign control of their monetary policies, as they are reliant upon other currencies to a certain degree. By understanding these alternatives within the confines of traditional concepts of sovereignty, the potential exists for a more nuanced conception to take hold that accounts for the potential alternatives.

The form of the state and its role is thus questionable. The modern state does not have one single form (Walker, 1993). It is different when viewed from the inside and the outside. The internal dynamics of a state governing the day-to-day activities of the subject are fundamentally different from those positioning it within the inter-national system. Two key assumptions permeate ideas of the state and sovereignty: first, that states are autonomous subjects that strengthen the territorial conception; and second, that states as territorial units bolster assumptions that states are the lone subject of international politics (Kuus & Agnew, 2007, p. 95). Political authority operates above, below, around and through territorial boundaries. State sovereignty, thus, is an effect or outcome of both territorial and non-territorial practices of the state.

The state, however, remains a central focus of the international system. Dalby suggests that there are no alternative conceptions of territory in the system or alternative realities. States are, for all intents and purposes, containers of international politics dividing inside from outside (Dalby, 1990; Walker, 1993). Murphy (1996) further argues that the modern territorial state has co-opted our spatial imaginations to restrict it to the one specific form.

James Scott's (2009) work on non-state spaces in Southeast Asia is informative, relating to the concept of effective state power in the Arctic. The *mandala* system was one of effective rule, rather than the clearly defined and demarcated spaces of the modern nation-state system. Power extended outwards from a central authority, encompassing the surrounding rice plain, and then dispersed into the countryside. There were spaces of overlapping influence and spaces that remained outside of a central authority's influence. These spheres of power did not remain constant, but ebbed and flowed based on the ruling authority's ability to enforce their control.

Scott defines non-state space as "locations where, owing largely to geographic obstacles, the state has particular difficulty in establishing and maintaining its authority" (2009, p. 13). Difficult or inaccessible terrain challenges effective state control in a region. Early states were easily accessible on plains and plateaus. Euclidian conceptions of space not only place boundaries between territories, but also influence our understanding of sovereignty within states (Walker, 1993). Citing the work of Braudel (2001) and Wheatley (1975), Scott notes that "in general, political control sweeps readily across a flat terrain, running out of breath at a geographic obstacle" (2009, p. 54). Scott suggests that there is a disjuncture between modern sovereignty and territory in Burma and the historical form of power: the historical idea of Burma should be limited to a small slice of territory encompassing rice-growing areas below 300 metres of elevation and within reach of the court. Scott further argues that governing was a seasonal phenomenon, such was the inaccessible terrain found in Burma.

I find Scott's framework to offer a useful perspective on the role of authority and the ability of a state to actually enact this authority. The Arctic's environment is a challenging one, no matter the force that operates in the region. The environmental conditions often thwarted the search for the Northwest Passage by Britain in the 19th century. More recently, the Canadian

military has had problems with snowmobiles and uniforms in sovereignty patrols as they attempt to put boots on the ground (Brewster, 2013). The conditions found in the Arctic test the ability of the state to maintain total and effective control of its territory at its furthest extent. Thinking through the effective control, however, the state can muster specific responses as needed or demanded. Vast spaces of the Arctic territory remain beyond the scope of weather forecasts; however, agencies provide full coverage of maritime areas, as I will address in Chapter 3. We expect a state's agency to supply weather information, but it does so only where necessary because of the region's size. Furthermore, as I will highlight, state support of navigation aids, Coast Guard, and ice information is a seasonal activity. Even the planned ice breaker only offers a three-season presence in the North (Fisheries and Oceans Canada, 2013b). Canada's northern waterways coexist with two other major maritime regions that demand more attention from these agencies.

I do not suggest that the state's territorial form is non-existent in the Arctic. Rather, I suggest here that the emphasis on effective control in the mandala system is a worthwhile exercise in understanding the effective extent of the Canadian state in the region. Agencies direct their resources to provide directed and focused attention where human activity demands it. Effective presence is the ability of the state to support activity in the region—in particular, shipping and vessel activities. There is no need to maintain a watchful eye for a vessel that will not come.

1.4.3 Sovereignty in the Canadian Arctic

I turn to the overarching issue of sovereignty in the Arctic. Sovereignty is a key way that people in the south understand the Arctic. “In truth, sovereignty is the first language of southern Canadians as they consider Arctic affairs. Say ‘Arctic and Sovereignty’ and an entire field of meaning is assessed without effort. Until we evolve and get used to a new idiom, the old

vocabulary will be with us” (Griffiths, 2004, p. 13). The challenge, as Christie writes, of incorporating the term *sovereignty* into studies of the region is the context and associations that the term brings with it:

Quietly residing in the background, [sovereignty] provides a certain kind of conceptual structure to be applied to the very acts of investigation, assessment, and planning. Not only are certain parties simply assumed to be vested with the proper authority making decisions that will affect all of those who live in the Arctic, but how these parties think and act are assumed to be the only vehicles or mechanisms by which legitimate actions are first imagined and then instantiated. Here forms of language and action outcomes are linked together in a way that seems to preclude the sensibility of other ways of thinking and acting. (2011, p. 332)

As Rose and Miller (1992) argue, “inter ‘national’ relations are part of a military-diplomatic complex, through complex processes that empower certain agents and forces to speak and act in the name of the territory.” Sovereignty, as a concept, “aggressively constrains both diversity and creativity”, restricting actions to certain agencies (Christie, 2011, p. 339). These agencies are primarily those of military, diplomatic, and constabulary forces. .

The Northwest Passage is a key framing lens of Arctic sovereignty. In a series of articles, Huebert and Griffiths debated the potential sovereignty challenges to Canada in the Arctic that the melting ice would pose as the Northwest Passage becomes a route for international shipping (Griffiths, 2003, 2004; Huebert, 2002, 2003). I side with Griffiths in regard to the importance of the very issue of sovereignty over the passage:

Sovereignty talk lends itself to a rhetoric of alarm and exaggeration aiming to ‘energize’ others. Say the words and our problem or concern is immediately located in a shared understanding that implies significant stakes, honor at risk, and the public good. Speak of sovereignty over the Northwest Passage and still more meaning is assessed. Since the cause is noble, the appeal to sovereignty tends to be heartfelt. People are more inclined to believe what they hear when it comes to alarming ice condition forecasts, shipping danger ahead in the passage, and so on all the while the essence of a rhetorical appeal to sovereignty is to pass the significance of our views beyond what might otherwise be achieved. Fertile grounds for error are created when attentive observers exaggerate together in an alarmist discourse of sovereignty to make their case to inattentive others. In shared exaggeration we see the herd starting to form. (Griffiths, 2003, p. 276)

Griffiths (2003) argues at length that we must think of shipping as an assemblage that relies on more than an open shortcut through the Arctic waters. Rather, the basis of the unease over the Northwest Passage lies in the limited infrastructure to support ships or respond to any potential issues. Yet, the Northwest Passage remains a key source of discomfort or danger in the discourse of Arctic sovereignty. Gerhardt, Steinberg, Tasch, Fabiano, and Shields (2010) suggest that the debates over control and sovereignty of the Northwest Passage are one way climate change is affecting the region’s perception and future. Lajeunesse (2012) suggests that the Northwest Passage is a political danger to Canada due to the route’s vague legal title (for a detailed examination of this point see Pharand, 2007). He argues that Canada has a “distinct opportunity to solidify title by winning acceptance of its jurisdiction in the Arctic waters” (Lajeunesse, 2012). Others equate shipping in the Arctic only with the Northwest Passage route.

Under the heading of knowing and defending the North, Coates, Lackenbauer, Morrison, and Poelzer (2008) identify the opening of the Northwest Passage as a chance to “know the region better and defend its military capacity” (p. 202). Not doing anything related to the Northwest Passage route delays “the country’s ability to protect the region, capture economic benefits for the north, and ensure that an appropriate level of control is exercised over navigation in the area” (Coates et al., 2008, p. 203). Those who suggest that trans-Arctic passages are the only means of shipping in the North demonstrate a limited knowledge of the reality of shipping in the region. The only potential economic benefit to the region of shipping through the Northwest Passage would be to charge for icebreaking escort services like those along the Northern Sea Route (see Lajeunesse, 2012; Liu & Kronbak, 2010). The ongoing framing of the Northwest Passage as a de jure sovereignty issue continues to detract from productive ways of demonstrating effective control through effective sovereignty.

1.4.3 Governance

I focus on governance as a productive approach to augmenting effective sovereign presence shipping in the north. Dodds and Nuttall (2015) define government as “the public and state institutions vested with authority by the state to make decisions on behalf of an entire community, country, or nation.” Governance takes this process one step further to incorporate “other social forms, practices, institutions and non governmental organizations” in formal and informal practices (Dodds & Nuttall, 2015, p. 96). Governance shifts the focus from promoting sovereignty as ownership of space (Byers, 2009; Coates et al., 2008; Huebert, 2005) towards a wider understanding of government actors in relation to other actors in the area. Grant (2010) argues that an effective occupation “achieved through acts by government such as provisions of basic services, administration and regulations” is sufficient in demonstrating a de facto sovereign state presence. Grant’s argument is framed in a similar way to Agnew’s argument on effective

sovereignty, but I find shipping's international frameworks suggesting a wider perception. Canadian agencies are significant players in international forums and work closely with nongovernmental agencies to govern and support shipping. These networks and relationships are important to understanding the holistic picture of shipping in the Arctic.

Dodds and Nuttall (2015) argue that governance in the polar regions demands attention to both topographic and topological features: not only the fixed locations and spaces, but also the relations and relationships. Rose and Miller (1992, p. 172) suggest that political power is “exercised today through a profusion of shifting alliance between diverse authorities in projects to govern a multitude of facets of economic activity, social life and individual conduct.” The relations between actors and authorities are important for understanding how and where power operates. This relational aspect is especially important within liberal societies. Liberalism and liberal societies demand that governments define where political space may operate, and spaces where it may not. Governments now act at a distance from their subjects, defining areas and domains not included in traditional understandings of “politics,” such as health, managers, planners, and parents (Rose & Miller, 1992). These fields are a part of the wider governance structure that seeks to manage and support daily life, even if they are not a part of the immediate institutional framework of governments. The focus in the Arctic must be on the many relationships between state agencies and other organizations. My work addresses the relationship between regulatory agencies and nongovernment actors such as the classification societies, as I discuss in Chapter 4. Classification societies are an important part of maritime shipping. Working with these classification societies are productive ways to guide conduct and regulate vessel activity in the region.

Governance attends to how governments operate. An analytics of government “marks out a space to ask questions about government, authority and power,” making explicit characteristics of government actions that are often taken for granted (Dean, 2010). In essence, this operates to make power visible and explicit, rather than concealed (Dalby, 1990; Ó Tuathail, 1996). Furthermore, an analytics of government focuses study on power where it operates, rather than how it is legitimated from the centre of government (Jessop, 2007). The framework addresses the different practices, techniques, regimes, and formations that governments use to establish and maintain control while directing conduct to a specific end. This is best addressed through questions of government that break with characteristic assumptions of legitimacy, ideology, possession, and source of power (Dean, 2010; Foucault, 1991). Assumptions of legitimacy, possession, and the source of power lie at the heart of sovereignty as a concept and as a framework for study. A state must maintain legitimacy through certain activities: a territory owned, a sufficient force demonstrated. Governance, on the other hand, establishes how states approach problems, make these known and operational, and incorporate specific knowledge and expertise. The focus on regular practices, rather than efforts at legitimacy, ownership, and the source of power opens more avenues for investigation.

Governance is a key part of the state and state actions. Functional practices of the state are more important to understanding power and rule than the idea of sovereignty. Sovereignty, as mobilized in the previous section in the Canadian Arctic, is the archetypal concept that draws attention to the region. This legal conceptualization of sovereignty does not consider the relational aspect and pay attention to practices of key agencies when presented with a specific case like shipping. Governance, combined with a focus on effective sovereignty offers a nuanced

framework to understanding how these agencies operate to support and regulate shipping while both protecting the environment and supporting economic activities.

My work thus situates itself in the realm of state practices and form and the field of critical polar studies. A focus on governance and state practices for effective control changes the focus to specific agencies that highlight the flexible territoriality of state practices over remote spaces. Paying attention to the important relational aspects of governance and understanding how and where power operates further clarifies the functions of the state's agencies. The field of critical polar studies frames the dynamic region in a more complex and detailed way. Arctic shipping and the potential of the future thus offer a key framing device for approaching this region.

1.5 Policy studies and northern regions

Shore and Wright argue that policies “outline the course of action to be taken” and “fix that course within the framework of a wider and more universal set of goals and principles” (1997, p. 11). Policies are a key organizing concept of governance that allow examination of “social and political space articulated through relations of power and systems of governance” (Shore & Wright, 1997, p. 14). Governance, as defined above, encompasses the formal and informal policies and processes that impose and influence an order on society from the central governing body.

One important consideration is the difference between where policies are made, and where they direct action. Nicol (2005) identifies a distinct spatial dislocation in policies that are developed in the south but meant to act in the north. Policies originally developed for rural or remote regions are not always applicable in the Arctic region, whether they address economic development, education, access to health care, or infrastructure (Nicol, 2005). The unique conditions of the Arctic complicate the simple transfer of policies to the northern regions

challenging the perceived unity of state actions. Policies developed in the south need to be attentive to the differences in the region.

The shift in state attention to specific northern policies comes with a change in the needs of those who live in the region. Northern policies focus less on political and military control, and more on the multilateral dimensions of environmental protection, indigenous cultures, health, education and economic development (Heininen & Nicol, 2007). One such example is *The Northern Dimension of Canada's Foreign Policy* (2000), which focuses on enhancing the security and prosperity of Canadians, specifically northerners and indigenous people; promoting and ensuring Canadian Sovereignty; establishing the Circumpolar region as a geopolitical entity in a rules-based system; and promoting human security and development in the Arctic region. The mechanisms identified by the policy include the Arctic Council as a forum for discussions, and the University of the Arctic to educate the people of the region, both in traditional knowledge and economically viable skills (Heininen & Nicol, 2007).

Recent Arctic policies have addressed the Arctic Ocean in particular. Brosnan, Leschine, and Miles (2013) examine national policies from the five Arctic states: the United States (2009), Canada (2009), Norway (2006), Russia (2008), and Denmark (2008, 2011). The authors argue there is great opportunity for cooperation in the region. The different policies offer possible cooperation around six common themes: sovereignty, scientific research, resource development, shipping, environmental concerns, and governance. Of particular interest to my work are the issues of sovereignty, shipping, and governance. On sovereignty, all but Norway expressed the need to submit continental shelf claims to the UN Convention on the Law of the Sea. Further, these states specify sovereignty as comprising a fixed human presence, military exercises, and some policing activity to enforce national laws (Brosnan et al., 2013). Governance – defined as

the need for international and regional organizations – is part of all other themes in these documents: resource development, shipping, environmental issues, and scientific research. Shipping is a prominent feature of the state policies, with governance and infrastructure the two overarching issues that emerge from the different policy documents. Brosnan et al. (2013) distill individual policies that address transportation needs in the US, critical infrastructure in Canada, transportation and integrated management in Norway, developing the Northern Sea Route in Russia, and developing infrastructure—particularly ports and monitoring activities—in Denmark and Greenland. Through these policies, opportunities exist for shipping cooperation in the region according to Brosnan et al. (2013). Cooperation has happened in regards to search and rescue (see Arctic Council, 2011a), vessel trafficking services, and the international ice patrol, while other activities have remained strictly national, like port development, aids to navigation placement, and weather and navigation services. The last example might be changing with the introduction of Met-Nav areas, discussed in Chapter 3, to collect and produce weather and navigation services and iceberg and sea ice information. Further cooperation could happen with regard to vessel activity monitoring, standards for ships through the International Maritime Organization’s guidelines (2010) and the forthcoming Polar Code, and environmental response. Shipping is a significant feature of the Arctic Five’s policies. Opportunities for cooperation exist by focusing on particular areas of shipping that governments can influence and support.

The most recent Canadian policy document on the North is the 2009 Northern Strategy. The Northern Strategy identifies the far north primarily as the three territories north of 60, without including Nunavik, Labrador, or the northern sections of each province or (Government of Canada, 2009). Other agencies have a wider definition of the north; the Centre for the North includes the northern expanses of the provinces to draw more groups to the organization’s efforts

(Centre for the North, 2011; Centre for the North official, 2012). Statistics Canada examined the relationship between sixteen different factors to identify a transition zone and a more relational difference between northern and southern regions according to social, economic, biotic and climate differences (McNiven & Puderer, 2000).³ The Northern Strategy creates a divide between the provinces and territories that is linked to the political relationship between these territories and the central government.

The Northern Strategy addresses the North as a central feature of Canada's identity. The North is "a fundamental part of Canada—it is part of our heritage, our future and our idea of a country" (Government of Canada, 2009). It is a central part of Canada's national identity: "The longstanding presence of Inuit and other Aboriginal peoples and the legacy of generations of explorers and researchers are fundamental to our history" (Government of Canada, 2009). The policy lays out a clear vision of the future with "self-reliant individuals" in "healthy and vital communities" who can "manage their own affairs and shape their own destinies," a "northern tradition" of respect for the land and the environment, and "strong, responsible, and accountable governments," that "patrol and protect our territory" (Government of Canada, 2009). The Northern Strategy includes four "equally important and mutually reinforcing priorities: exercising our sovereignty, promoting social and economic development, protecting our environmental heritage, and improving and devolving northern governance" (Government of Canada, 2009). The report articulates each of these pillars in greater detail: sovereignty with respect to the territorial waters and a federal presence; resource extraction, skills training, and education; producing scientific knowledge and protecting lands; and shifting land and resource

³ The sixteen factors are the boreal forest, heating degree-days, growing degree-days, discontinuous permafrost, agroclimate resource index, Thornthwaite summer concentration of thermal efficiency, population ecumene, all-season road and rail transportation networks, accessibility index, living cost differential, resourced areas and native north, OECD rural north, Revenue Canada Northern, and Intermediate Income Tax Zones. See McNiven and Puderer (2000)'s discussion for their use and limitations.

management to the territories while encouraging stable governance (Government of Canada, 2009). The policy document concludes that “Canada’s future is intimately tied to the future of the north” (Government of Canada, 2009), suggesting that as the North goes, so does the rest of the nation-state.

The Northern Strategy came up many times in the interviews as a way that agencies organized their work to fit under the mandate of the strategy. The vast majority of interviewees from the federal government had experience working in the Arctic, either in another government agency or through private companies. Their approach to the strategy was not, as Steinberg (2010) would illustrate, like the southerner pointing to the north, but came, rather, from years of experience in the region. At the same time, however, there was a distinct difference between the view from Ottawa and the view from Iqaluit, due not only to their different perspectives, but also to particular issues that will be explored in greater detail in the Chapter 3 on support and infrastructure, Chapter 4 on regulations, Chapter 5 on the future of economic growth, and Chapter 6 on the anticipatory future of the Arctic.

I situate my work on shipping within discussions of sovereignty and economic development policy. Shipping’s importance to the Canadian Arctic and the circumpolar region suggests that it is a valuable lens through which to observe particular policies. Shipping is a fundamental part of the perceived and expected economic development of the future, and it is a source of discomfort for promoters of sovereignty. Each littoral Arctic state sees shipping as a critical part of its policies; cooperation is possible between these states to address the issues of governance and infrastructure support. I focus on governance through the regulations in Chapter 4. I focus on the development and implementation of domestic and international regulations and standards to highlight present and potential future options for governance. I address the

infrastructure and support for shipping in chapters 2 and 3 respectively. I discuss the potential futures of economic development in chapter 5, with particular respect to shipping. I explore the support role shipping plays in mining activities in Nunavut and in the transportation of people to the region for tourism. Furthermore, I examine the shipping industry itself regarding the unlikelihood of trans-Arctic shipping. The industry's present formations and technological advancements highlight the challenges to assuming that an ice-free Northwest Passage will automatically increase shipping in the region.

1.6 Methodology

I use three sources of information in my study. The first is sixteen expert interviews conducted in Ottawa and Iqaluit in the summer of 2012. The second is a collection of policy documents and reports on the subject of shipping in the Arctic region. The third is archival news sources collected between 2007 and the present. The news stories offer another context for the interviews I conducted. I employ a mixed-method analysis, using material from the semi-structured interviews and conducting a discourse analysis on the policy documents and news reports.

I conducted expert interviews with officials from Transport Canada, the Department of Fisheries and Oceans, Environment Canada, the Canadian Ice Service, Aboriginal Affairs and Northern Development, the Department of Foreign Affairs and International Trade, the Government of Nunavut Department of Economic Development and Transportation, the Conference Board of Canada's Centre for the North, and the World Wildlife Fund. I requested interviews with officials in other agencies and organizations, but they did not respond to these requests. I selected interviewees based on their position in agencies relevant to my work. I began with officials in departments and portfolios directly related to my work and then asked for referrals to other individuals they thought might be able to provide interesting perspectives. This

method revealed several people whom I might not have thought of; in particular, officials from the Centre for the North and the World Wildlife Fund were valuable referrals that I would not have contacted without the suggestion of interviewees. This referral method was a productive way to network among policy makers, NGO advocates, and think tank researchers and to establish the wider terrain of my subject matter.

The interviews lasted between 50 and 60 minutes, and I recorded them with the permission of the interviewees. I transcribed these interviews and combined them with the notes I took during the interviews and the reflections I recorded after reviewing my notes. I used the semi-structured interview techniques to ask directed questions and to allow for open discussion and follow-up questions. I was able to cover the major topics of my research in a forum that allowed the interviewees to share their expertise with me from their perspective within specific agencies.

I approached these as intensive interviews, paying particular attention to the background and context of my subject. Intensive interviews, according to Wright, highlight the way researchers are able to be “aware of the active concerns, everyday concepts and political understanding of at least some of the sets of people involved in the issue under study” (2011, p. 28). Wright constructs interviews as part of an either/or dichotomy with participant observations to highlight the distinction between the two research methods in anthropology. Kuus, however, argues that interviews require observation, and that

all interviews that are context sensitive could be called intensive because they all require in-depth knowledge of and attention to the contexts and relations studied. If the researcher does not make a concerted effort to engage the interviewee, it is not an ‘unintensive’ interview, but a bad interview. (Kuus, 2013, p. 127)

Interviews with policy makers or experts require as much attention to the context and relations as participant observations do, even though these are not as readily apparent in the methodology. These interviews require concentrated engagement because of the lack of availability and the time constraints of the officials. One example of this highlights the context needed for interviewing these officials. When confirming an interview time, one official sent along a PDF copy of the Arctic Council's *AMSA 2009 Report* in case I had not seen it. Before our interview officially started, I had a chance to thank him for sending along the report and to mention that it was one I had encountered and read previously. Our conversation was more productive because I was able to demonstrate my familiarity with the report through my questions and he was able to offer specific comments about his role and perception of the topics, knowing my familiarity with the area. Not only did it give us a common background, but it also reinforced the importance of that document to my research project—he was not the only interviewee to explicitly reference the work.

My knowledge of contextual background and common technical language allowed me to keep the interview from being too general and boring for the interviewee. The interviewee granted their time, and often space, to engage in a conversation that satisfied “little incentive other than their personal curiosity to talk to a researcher” (Kuus, 2013, p. 119). I was able to establish a rapport with the officials by demonstrating my contextual knowledge of the topic as I laid out my research goals before starting the official recorded interview. As I moved into the official interview, I found that this rapport carried over through our shared language, knowledge, and, in many respects, perceptions of the world. Furthermore, I focused on questions that would allow interviewees to reflect on their role in the policy-making process and the overall structure of governance.

I set out to foster an environment that mixed professional and creative interview styles. Professional interviews, as Goode and Hatt note, are a relationship where the researcher introduces “himself [sic] as though beginning a conversation, but from the beginning the additional element of respect, of professional competence, should be maintained . . . He is a professional in this situation and he must demand and obtain respect for the task he is trying to perform” (in Dunn, 2005, p. 91). This professionalism is necessary when interviewing government officials who have a certain expectation of their working relationships. I needed to engage with them on a professional level to ensure they took me seriously and had not wasted their time.

On the other hand, interviewing government officials inverts the typical power dynamic in interviews in which the researcher has the power. I hence found it effective to employ strategies from creative interviews. One way I accomplished this was through my dress for each interview. A suit and tie would have been out of place with many officials I spoke with. I hoped to give the interviewees the perception of someone who was professional and interested in their work, but by dressing in business casual, I hoped to remove a layer of formality and encourage a more conversational rapport with them. Another way I attempted to remove the layer of formality was through my approach to each interview. Douglas (1985) suggests a model of creative interviewing in which “each informant must be treated as a ‘Goddess’ of information and insight . . . researchers [should] humble themselves before the ‘Goddess’” (in Dunn, 2005, p. 91). I found that this strategy worked for me in moments that were more reflective for the interviewee. I was able to gain insight by being humble about my situated knowledge and offering them a chance to give me their insight and professional expertise. I found that this mix of professional and creative styles worked best for my interviews.

The above approach was important on two levels. First, the interviews with officials usually took place in their government offices—spaces usually operating from behind closed doors. According to Kuus, bureaucracies “designed to guard information and foreign policy institutions do so explicitly, with little allowance made to transparency or public engagement” (2013, p. 113). Bureaucracies aim to keep those who are not supposed to be there on the outside. A typical interview of mine would require stopping at a security desk to check in, where I would meet the interviewee or an office assistant who would sign me in and escort me to their office or an empty conference room. To identify myself as a visitor, I had to wear a tag or sticker at all times; each of these warned that I had to be accompanied by an employee at all times during my visit. Additionally, most offices were behind doors with electronic locks that needed a keycard or key fob to open them. However, I found the people very accommodating and engaging despite the structure and security in place to maintain this separation. Mixing professional and creative interview styles allowed me to fit in when I was there and look the part of a graduate researcher but also to engage my interviewees in conversation around the topics I was researching.

The other important approach comes from the discipline of geography itself. Never has the disciplinary ambiguity of geography as an academic subject proved to be more an asset than during these interviews. Many times the subject of the interviews ranged from environmental issues, to technical and engineering regulations, to international negotiations and the domestic political scene. If the interviewee thought these topics were the most important ones, they were important for my work. The ambiguity of geography meant that it was more difficult for interviewees to easily situate what I was asking from my own background. This meant that the responses were around their expertise and my research topic. Other disciplines offer more

concrete understandings of their subject matter outside of academia. Reflecting on my bachelor's degree in political science, there was a distinct air of professionalism that was required in how one presented oneself in these settings and a restricted framing of questions that I could ask and responses that I could receive. It was more difficult for my current interviewees to pin down the discipline of geography and thus I felt it created a more open dialog around their specific expertise. The scope of this dissertation testifies to the multiple subjects that one can incorporate through an empirical lens; the wide range of topics covered by my interviewees informs many of these points.

The second source of my research is policy documents and papers from official agencies. The many policy documents and reports consulted here come mostly from the Canadian government and the Arctic Council. The most significant document to my work is the Arctic Council's *Arctic Marine Shipping Assessment (AMSA) Report*, and its overview of past and present shipping in the region. The report is part of the *Arctic Maritime Strategic Plan*, developed under the Arctic Council's Protection for the Arctic Marine Environment committee. The report captures both historical and present data to measure future growth, address environmental impact, discuss human dimensions, clarify the infrastructure, and create future scenarios for regions and the circumpolar Arctic, human dimensions, environmental impact and infrastructure. The report also includes 17 recommendations for the future, around the topics of enhancing Arctic marine safety, protecting Arctic people and the environment, and building Arctic marine infrastructure. Since the 2009 report, there have been three reports released reviewing the status of these recommendations (Arctic Council, 2011b, 2013, 2015).

Further government documents come from the federal and territorial agencies. These documents include the guidelines for ships operating in polar waters (Canadian Coast Guard,

1999) and the pictorial guide to ice conditions (Timco & Johnston, 2001). Additionally, many interviewees mentioned the federal government's 2009 Northern Strategy as a key document that focuses the wider government's attention on Canada's Arctic (Government of Canada, 2009). Territorial government documents include the mining and exploration strategy (2007) and the transportation strategy (2010). The former examines mining activity as economic growth opportunity, while the latter addresses the role of transportation in the territory's present and future.

In addition to government documents, I examined documents from agencies with a Northern or Inuit focus, in particular the Inuit Circumpolar Council's (ICC's) *Sea Ice is Our Highway* (2007) report on the perception of sea ice and transportation. This report was included in the AMSA report after the authors held community meetings to inform the human dimension of the region. The ICC report also serves as a collection of historical reflections on sea ice and the role it plays in their culture. Further, the Inuit Circumpolar Council released a declaration on Inuit sovereignty (2009) and a declaration on principles of resource development in their lands (2011) to highlight the important voice the Inuit have in the activities of their land. Since then, the Inuit Circumpolar Council has produced two more reports. The first was a 2013 report on a workshop it hosted on shipping in the Arctic. This report touches on a number of issues, including the role of the Arctic Council and its AMSA report, the legal framework of the Law of the Sea, challenges and opportunities of shipping activities to the communities, the role of the International Maritime Organization, and the shipping industry's perspective of the region. The ICC's most recent report is *The Sea Ice Never Stops* (2014). It is a contribution to the Arctic Council's Sustainable Development Working Group and Protection of the Arctic Marine Environment. The report includes many direct quotations from Inuit across ICC regions in

Russia, Alaska, and Greenland, situating their everyday experiential knowledge within their changing homeland in the Arctic. It is a wider study than the 2007 report that only focused on the Canadian Inuit.

The fourth source for this research is a collection of news articles. I incorporated information primarily from the CBC North news reports, *Nunatsiaq News*, *The Economist*, *The Globe and Mail*, and the BBC News. I used two collection methods. The first collecting method was through an RSS feed aggregator that searched for key terms such as “Arctic shipping,” “northwest passage,” “sovereignty,” and “Canadian Arctic.” I reviewed and cataloged these articles in an online reference manager and saved them as PDF files. These files covered a broad spectrum of sources, from local papers to trade publications and blogs. I also conducted specific searches on specific sites, in particular national news agencies in Canada such as the CBC and *The Globe and Mail*, as well as the regional paper *Nunatsiaq News*. For international media, I focused on the BBC and *The Economist*, including *The Economist*’s special report in 2012 on the melting north, which included a specific reflection on shipping. These articles add context to this dissertation’s exploration of the interviews and policy documents.

In addition to the interviews, I employ discourse analysis to work within and between these three different sources of material. Discourse analysis is an effective tool for working between multiple texts and sources (Waitt, 2005). Discourse, in a Foucauldian sense, is conceptualized by Waitt (2005) as “a theoretically informed framework that investigates the rule about the production of knowledge through language (meanings) and its influence over what we do (practices).” Waitt suggests that discourse analysis offers clarity between these multiple sources. Discourse analysis encompasses three features:

(i) to explore the outcomes of discourse in terms of actions, perceptions or attitudes rather than the [*sic*] simply the analysis of statements/texts; (ii) to identify the regulatory frameworks within which groups of statements are produced, circulated and communicated within which people construct their utterances and thoughts; and (iii) to uncover the support or internal mechanisms that maintain certain structures and rules over statements about people, animals, plants, events, and places in existence as unchallengeable, ‘normal’, or ‘common sense’ rather than to discover the ‘truth’ or ‘origin’ of a statement. (165)

Discourse analysis is a means to approach structures or formations which “refer to a relative rule-bound set of statements that impose limits on how we construct our thoughts and statements” (Phillips & Jørgensen, 2002; in Waitt, 2005). The structure forms from the relations, production, consumption, and circulation of multiple texts and sources that produce a pattern that can be analyzed (Waitt, 2005).

I employ discourse analysis to address many of the fundamental features of my work. As I will show below, establishing a perception of the future is inherently a discursive project. One must articulate perceptions and visions of the future before making the future present and acting upon it. Without attention to this initial part of the process where the future is articulated the foundation of anticipatory action is no longer applicable. Furthermore, how government enacts and justifies policies is a discursive product. Focusing on how government frames the Arctic discursively in the present allows me to examine the specific futures that are valued and re-circulated within agencies that have power to enact that vision.

1.7 Chapter outline

I develop my arguments in detail through the following six chapters. Chapter 2 is an overview of shipping in the Arctic. I address the present conditions as a necessary backdrop to

the potential futures of shipping. I focus particularly on the qualitative differences between Arctic and non-Arctic shipping. I address the different types of vessels in the region; understanding the purpose of these vessels is necessary to frame how government agencies identify the changing combination of vessels in the future. I present an overview of the Canadian regulations that govern ships in the region. Following this, I identify the region's infrastructure and government support, which establishes a direct link with the work from Brosnan et al. (2013) above. The two overarching issues in shipping in policies that needed attention are support and infrastructure and governance. I position these sections within the specific region of my study while pointing to wider trans-polar trends.

I next explicitly engage with the issues of support and infrastructure, and the governance and regulation of shipping. These are the two key issues for the future of shipping, and they deserve more detailed explanation in the Canadian case. I use these next two chapters to further my argument that governance, and not sovereignty, is the most beneficial framing device when discussing shipping in the Arctic. I focus on the role of support and infrastructure to assist shipping operations in Chapter 3. I use interviews with officials from the Department of Fisheries and Oceans, Environment Canada, and the Canadian Ice Service to highlight how these agencies support vessel activity in the region—they establish aids to navigation, weather, ice, and environmental protection in the north. Their activities draw a clear picture of present shipping and economic development support activities. The changing mix of vessels and captains in the region present ongoing challenges to these government agencies to support shipping to the expected level.

I turn to the case of the governance and regulation of shipping in Chapter 4. Here, I focus on Transport Canada's work as the regulatory agency. I use the interview data to demonstrate

how domestic and international agencies regulate shipping in the north. I focus first on the domestic regulations, highlighting the way they work within the framework of vessel classification. I present two examples of the application of Canadian regulations to ships—the commercial voyage of the *Irbus*, and the ice trials of the USCGC *Healy*. The former addresses how regulations work with the potential for commercial transit on the Northwest Passage route. The latter focuses on how the US icebreaker willingly complied with Canadian regulations despite the overarching tension that exists between these two countries over the Northwest Passage route. The *Healy* case also gives a glimpse into the workings of Transport Canada as a regulatory agency. It further examines how agencies and actors not vested with geopolitical influence operate (Rose & Miller, 1992). I turn then to the work of Canada at the International Maritime Organization to develop and implement the 2010 Guidelines for Ships Operating in Arctic and Antarctic waters. I highlight here the way that Canadian perceptions of Arctic shipping as a holistic operation informed the process drafting the guidelines with the members of the International Association of Classification Societies. These regulations highlight the role of classification societies and how officials at Transport Canada work within shipping's framework to influence and apply regulations. A focus on governance, rather than sovereignty, makes these state activities clear.

Having examined the case of infrastructure and governance, I turn my attention to the role of shipping in the future of the Arctic in Chapter 5. I begin with an overview of shipping, focusing on the differences between bulk cargo shipping and intermodal container shipping. These major types of shipping represent prominent features of future activities in the Arctic. Resource extraction, and the bulk shipping that supports it, is the most prominent future economic activity made known and present by policy makers and political commentators. I

address the importance of mining and extractive industries to Nunavut's future. In particular, I focus on the potential of the Mary River Iron Ore mine with respect to shipping. The connection of the mine to international commodity markets challenges the prospective future impact and development of the mine. As the market changes, so does the viability of the mine itself. I turn next to the case of the Northwest Passage and international shipping, understood as container shipping. I argue here that the historical perspective on the Northwest Passage clouds the reality of the commercial shipping industry. Arctic routes may shave days off voyages between Asia, Europe, and North America, but this singular focus ignores particular developments within the industry. Speed is no longer the lone concern of today's neoliberal global economy. Logistics, capital investments in trans-shipment ports, and engine modifications for slow steaming have shifted the industry's focus towards accuracy and just-in-time delivery of goods. Speed no longer is the top concern, negating the perceived advantage of shipping through the Northwest Passage. The changing mix of vessels and captains in the Canadian Arctic is the most important focus for the future of shipping there.

I turn my attention to the process of anticipatory politics and the logic of prevention in Chapter 6. I address the way the Arctic Council's AMSA report forms the future of shipping, makes the future present through scenario planning, and justifies present action in the logic of prevention. The logic of prevention is necessary in this case because of the structure of international shipping. I highlight the role of preventative logic within Canada's regulatory and support agencies, but also within the Arctic Council and the IMO. I argue that applying an anticipatory framework to shipping in the North makes explicit the way that a preventative logic operates to secure a particular valued life and space in the Canadian Arctic. The focus on regulatory and support agencies is thus the best way to address the future of the Arctic, rather

than the focus on sovereignty. I argue that if the future of the Canada is intimately tied to the future of its north, the government must redirect a considerable focus not only to address the concerns of those in the north, but a new relationship must emerge in which the North is at the heart of Canada's future.

Chapter 7 is both an epilogue and a conclusion. I present two key voyages of the 2014 summer season to highlight the opportunities and challenges of the changing Arctic maritime space. First, I present the *Nunivak's* voyage, loaded with nickel concentrate from the mine in Deception Bay, Québec, to the processor in China through the Northwest Passage route. I contrast this smooth mobility with a failed sealift deliveries to Kugaaruk and Cambridge Bay. The presence of sea ice and the amount of goods needed in the communities meant the Coast Guard and Northern Transportation Company did not deliver the last loads of the season. One voyage ties nicely with the future vision of the region as a shortcut for faster shipping. The other shows that environmental conditions disrupt even present and seasonal activity in the region.

Shipping in the Canadian Arctic is best understood as a holistic system that accounts for the technical and regulatory standards and support infrastructure. This holistic approach carries forward into the anticipated future of shipping in the region. These anticipated futures highlight how perceptions of the future influence present-day decision-making processes. The importance of these standards and infrastructure carry forward into the future as a key organizing principle.

Chapter 2: The difference between a good ship and a bad ship: shipping in the North

While the Northwest Passage grabs public and academic attention regarding the future of Arctic shipping, a wide variety of maritime activity and infrastructure already exists in the region. But before examining anticipatory geographies, existing shipping, regulations, and infrastructure must be examined. The present offers a baseline for the projections of the future. I suggest that by understanding the background of regulations and infrastructure in the Canadian Arctic, the anticipated future becomes sharper.

Canada has been at the forefront of the international development of regulatory regimes of Arctic shipping. It was the first country to implement specific regulations over its Arctic waters in 1970, the first to approach shipping regulation in the Arctic as a holistic activity, and the first to develop a regime linking a ship's construction to its intended route (see American Bureau of Shipping, 2016; Government of Canada, 1985). Therefore, it is important to understand what these regulations consist of. At the same time, the Canadian Arctic remains a space that lacks complete coverage for maritime infrastructure. Officials acknowledged this reality in interviews and their critical contribution to Arctic Council's *Arctic Marine Shipping Assessment Report* (2009). The work of Canadian officials and policies reflect a nuanced understanding of the region, even as it undergoes significant environmental change.

I present a background profile of Arctic shipping in three parts. I first examine the different types of vessels and their voyages. I next review specific Canadian regulations, in particular the two sets of regulations developed to ensure safe navigation. I focus as well on classification societies, because ship classification is a key facet of one set of regulations. I then examine current infrastructure in the region, from both a Canadian and an Arctic-wide perspective.

2.1 Vessels in the Arctic

Ships are as much a part of life in the North as in the south. According to Inuit Circumpolar Council (ICC) President Duane Smith at a workshop held by the ICC on Inuit responses to shipping, “It is not just about a tsunami [of ships and development] coming; it is already here and increasing in magnitude” (Inuit Circumpolar Council, 2013, p. 63). Both the increasing number and size of vessels signal the magnitude of shipping. When asked about shipping, Paulusie Novalinga, an Inuk from Puvirnituk, NU, gave the following quote to the Inuit Circumpolar Council for their 2014 report on circumpolar sea ice use:

In one way, [ships are] good for us. We need material, we need housing, we need goods, of course. But in another way, when it comes to hunting and fishing, there are less animals that come around our shores if there’s a big boat offloading, with its big lights and so on. That scares off some of the marine mammals that do come here. Therefore it affects the hunting when there’s a big boat anchored in the middle of the bay. (Inuit Circumpolar Council Canada, 2014, p. 29)

Shipping is the proverbial double-edged sword. It is necessary to bring materials and goods to communities, but it has negative effects on the surrounding areas, such as scaring marine mammals away and disrupting Inuit transportation over the sea ice by opening leads in the ice or setting hunters adrift on an ice floe after an icebreaker passes (Inuit Circumpolar Council Canada, 2014).

There are four main types of voyages happening in the Arctic, according to the Arctic Council’s *AMSA 2009 Report*. *Destinational shipping* occurs when a vessel goes to the Arctic to perform a duty and then leaves. The bulk shipping of iron ore from Mary River or nickel concentrate from Voisey’s Bay is an example of this type. The vessel’s route begins outside of

the Arctic region, enters it to pick up material, and then transports it to processing centres in the south. *Intra-Arctic shipping* happens when the entirety of a ship's voyage is within the Arctic region. The Arctic Bridge route linking Churchill, MB, with Murmansk, Russia, is an example; the ship's route stays within the region while linking two ports in the Arctic. *Cabotage shipping* is a form of intra-Arctic shipping, where the voyage happens within the waters of a single Arctic state. Community resupply by the annual sealift in Canada is an example of this voyage type. Finally, *trans-Arctic navigation* occurs when ships use the Arctic Ocean as a link between the Atlantic and Pacific oceans. In reality, the first three types of shipping are all destinational, because there is at least one stop in the Arctic for each voyage. The fourth type is the only transitory mode of shipping. An official from Transport Canada remarked that the key distinction is between destinational and trans-Arctic shipping:

Shipping does not happen for the sake of shipping... Almost all shipping is destinational. People, if they thought about it, would consider trans-Arctic and non-stop shipping as slightly different from destinational shipping. [Trans-Arctic shipping] does not happen to any large degree, so it is not even a consideration at this point. The perspective, if you are in the Arctic, of a ship going through without stopping anywhere is different from one [of a ship] that comes to your community. I had an Inuk say that to me one time, "What's the difference between a good ship and a bad ship in your mind? The one that stops is a good ship." (2012a)

This is an important perspective. The Mediterranean Sea, for example, is simultaneously a destination for cruises, a location of important ports, and part of a longer network between the Atlantic and Pacific oceans (see also Mack, 2013; Steinberg, 2014). While much public

attention is on the Arctic Ocean as a transitory space, the reality for policy makers is that most ships in the region will stop somewhere rather than continuing through.

There are a number of different types of ships that conduct these voyages. The Arctic Council's *AMSA 2009 Report* identified the following types of ships in the region: bulk carriers, container ships, general cargo ships, government vessels, oil and gas service and supply ships, passenger ships, pleasure crafts, tanker ships, tug and barge combinations, and fishing vessels. Container ships were the most numerous group; they follow the Great Circle Route between North America and Asia through the Aleutian Islands off the coast of Alaska. Container shipping engages in transitory journeys that pass through part of the Arctic. These ships are some of the largest in the world, and their voyages originate at major ports outside of the region. Austin Ahmasuk, a resident in Nome, gave an interesting perspective on trans-Arctic shipping:

I know from reports that trans-Arctic marine traffic has increased substantially, but you rarely ever see them because the shipping lanes are so far out there over the horizon... The fact I don't see them is even more of a concern, the fact that the ships are so huge that they can't come to the port of Nome because Nome's port is too shallow. These deep draft vessels that are enormous and are carrying who-knows-what kind of commodity from whatever corner of the world. (Inuit Circumpolar Council Canada, 2014, p. 28)

The route between Asia and North America takes ships through the islands, but it is still over the horizon from Nome, AK. Ahmasuk's perception of shipping echoes the comments of the Transport Canada official above. Trans-Arctic voyages do not fit with past perceptions of maritime activity in the region. Container ships that travel these routes are designed to carry the most containers possible to improve their economies of scale in the wider trans-modal shipping

network. Their size limits where they can sail, and they need specialized infrastructure to offload their containers, as discussed above.

In addition to identifying types of shipping, the *AMSA 2009 Report* identifies four key vessel types in the Arctic: community resupply, fishing, bulk cargo, and tourism. Community resupply vessels act as primary lifelines between settlements in the Canadian Arctic and the rest of the world. They are the main category of vessel in the Canadian Arctic, Eastern Russia, and Greenland, but the exact type of ship differs based on prevailing conditions in the region. Canada's western Arctic and the coast of Alaska are best served by tug and barge combinations due to the easier sailing conditions along the route north and the nature of the communities that dot the coastline and major rivers of the western Arctic. The eastern Arctic resupply requires seaworthy vessels to cope with the ocean conditions. Typically, these vessels are mixed-cargo and roll-on, roll-off ships capable of handling everything from containers and sea cans to crates or a new automobile. Additionally, these ships must be ocean-capable vessels to handle the sea conditions in the eastern Arctic and North Atlantic.

The second key ship type, fishing vessels, make up over half of the survey in the *AMSA 2009 Report* once container ships are removed. Fishing vessels differ from other types of ships because they often "meander in search of a catch," so the report groups their activity into regions rather than routes (Arctic Council, 2009, p. 78). The regions with the most activity were off the Norwegian and Icelandic coasts, while the least activity is in the Arctic Ocean and the Canadian Archipelago. Fishing activity in the latter two regions was still present, but not to the same degree as in the other regions.

The third main type of vessels in the Arctic is bulk cargo ships, which comprised 20% of all vessels in the Arctic in 2004. Most of the cargo material, such as zinc, nickel, oil, and gas,

can be stored on site at the mines and then transported when the sea lanes open in the summer. Bulk cargo activity is primarily seasonal; the ships used in this form of transport are not ice-strengthened. Two exceptions are nickel mines in Dudinka, Russia and Deception Bay, QC, that must ship product year round to prevent degradation. There is also a potential for year-round shipping from the Mary River Iron Ore mine on Baffin Island if it is economically viable.

The fourth type of ship is vessels for passenger service and tourism, including ferries and cruise ships. Cruise ships appeared in the 2004 survey, but there were no ferries operating in the Canadian Arctic. Cruise ships make entirely different demands on maritime traffic in the Arctic. While nearly all vessels travel in ice-free waters—save for the Russian nuclear icebreakers that take tourists to the North Pole—many cruise ships travel along the floe edge, because sea ice is one of the attractions in the region. Cruise ships also operate in less charted areas in order to see wildlife and nature. For example, the *Clipper Adventurer* cruise ship ran aground on a submerged rock in Coronation Gulf, NU, in August 2010, because it was travelling along a route not normally used; rock had only recently been placed on an updated chart as a hazard to navigation.

Icebreakers and government and research vessels are other vessel types in the Arctic; they represent a small portion of the overall traffic. These vessels provide surveying, research, icebreaker escort services, salvage, pollution response, and search and rescue (Arctic Council, 2009). Most of their voyages for surveying and research are conducted in the summer when the ice is less thick, or when icebreaking and escort services are necessary to support other activities.

Pizzolato, Howell, Derksen, Dawson, and Copland (2014) offer a more direct perspective on vessel types in the Canadian region. Their work focuses on a statistical analysis of ship voyage records from 1990 to 2012 combined with data on sea ice change. The Canadian Coast

Guard records vessel route data and ship types and activities through the Vessel Traffic Reporting Arctic Canada Traffic Zone (NORDREG), reproduced below.

| AMSA classification | Reporting records (number of voyages) | Unique vessels (by IMO Call number) |
|------------------------------------|---------------------------------------|-------------------------------------|
| Bulk carriers | 7932 | 291 |
| Fishing vessels | 10817 | 171 |
| General cargo | 12904 | 53 |
| Government vessels and icebreakers | 23093 | 105 |
| Oil/gas exploration/exploitation | 80 | 8 |
| Passenger ships | 4632 | 36 |
| Pleasure crafts | 1898 | 110 |
| Tanker ships | 8565 | 100 |
| Tugs/barges | 12622 | 102 |
| Other (cable laying ship) | 12 | 1 |
| Totals | 82555 | 977 |

Table 2. NORDREG Vessel Type Classifications grouped into 10 categories, 1990–2012 (from Pizzolato et al., 2014).

General cargo ships, tanker ships, and tugs/barges conduct the community resupply activities discussed above. These activities combined made up more than 40% of all voyages, while government vessel voyages made up more than 27%, and fishing vessels 13%, in the study period. Even though the data covers 12 years, the number of voyages highlights an incredibly active maritime space within Canadian territory alone.

The different types of vessels that use the Arctic have different purposes for being in the region. The container ships that pass through the Aleutian Islands do so as part of the Great Circle Route between ports along the west coast of North America and East Asia. Other ships, such as cargo ships, provide a much-needed lifeline between small communities and major centres of population and industry. Without those lifelines, the lack and expense of supplies would threaten these communities' existence. Government vessels conduct many tasks that other ships cannot, such as icebreaking, scientific missions, or search and rescue operations.

There are vessels currently operating in the region. While the traffic is lower than in the rest of the world, the Arctic region is quite active during its relatively short shipping season.

2.2 Regulations in the Canadian North

I turn now to the two distinct pieces of legislation that cover shipping in the Canadian Arctic: the Arctic Waters Pollution Prevention Act and the Arctic Shipping Pollution Prevention Regulations. I also discuss two systems—the Zone/Date System and the Arctic Ice Regime Shipping System—established to guide vessel movement in the region, and touch on the role and importance of classification societies to the Arctic Shipping Pollution Prevention Regulations. I focus on these two systems in detail because they construct the Arctic waterways into specific techno-geographic regions that reflect ice conditions and ship classification. The two pieces of legislation establish standards for vessels operating in the region, and the two systems create spaces that allow or restrict navigation based on the ice conditions and the classification of the ship. This section provides an overview of existing regulations in Canadian waters that I explore in greater critical detail in Chapter 4.

2.2.1 Arctic Waters Pollution Prevention Act

Canada's Arctic Waters Pollution Prevention Act (AWPPA) was the very first regulation to govern shipping in the Arctic. It governs by connecting a geographic region with a ship's structural capabilities. The Canadian government drafted and passed the AWPPA in response to the *Manhattan*'s voyage in 1969, signalling the potential for commercial shipping in the North.

As an official from Transport Canada (2012c) told me during an interview,

I'm sure you know the story of the US flaunting its use of the Northwest Passage by the *Manhattan*. The Canadian policy makers were not keen about the Americans not letting the Canadians know, although eventually they did, and it

was accompanied by a Canadian icebreaker. However, this did not sit well, and the Arctic Act came into place in 1970.

The *Manhattan*'s voyage between the East Coast and Prudhoe Bay with a token barrel of oil spurred Canadian politicians to pass the AWPPA. The act uses environmental protection as a means to govern shipping in two main ways: by regulating waste from ships and establishing shipping control zones in the region. These controls are based on a number of factors, such as hull and fuel tank construction, the ship's machinery and equipment, the motive power unit and steering, the ship's crew, the cargo, freeboard and load lines, the quantity of fuel, and the presence of maps and charts to aid navigation (Government of Canada, 1985). The AWPPA also grants officers power to board vessels in Canadian waters to verify their compliance.

The AWPPA is over 40 years old. Though the Canadian government has passed a number of acts since then, it remains an important framing document for officials in Transport Canada:

The one thing I always recommend is that it is really old English, but I think the preamble of the Arctic Act is a beautiful piece and withstands the time. That is what I was always guided [by] for whatever we were doing. I still think the preamble could be updated in language, but not in principles. It should stay the way it is. (Transport Canada official, 2012c)

Its preamble reads:

WHEREAS Parliament recognizes that recent developments in relation to the exploitation of the natural resources of Arctic areas, including the natural resources of the Canadian Arctic, and the transportation of those resources to the markets of the world are of potentially great significance to international trade and

commerce and to the economy of Canada in particular; AND WHEREAS Parliament at the same time recognizes and is determined to fulfill its obligation to see that the natural resources of the Canadian Arctic are developed and exploited and the Arctic waters adjacent to the mainland and islands of the Canadian Arctic are navigated only in a manner that takes cognizance of Canada's responsibility for the welfare of the Inuit and other inhabitants of the Canadian Arctic and the preservation of the peculiar ecological balance that now exists in the water, ice and land areas of the Canadian Arctic. (Arctic Waters Pollution Prevention Act 1985)

The government could update the preamble's language, but it could certainly still apply to any legislation created today. One might be forgiven for thinking the act was more recent, addressing as it does the "scramble" for the Arctic (see Dodds & Nuttall, 2015). It mentions all the features of present-day discourses of how people engage with the Arctic: the exploitation of natural resources in the Arctic, the transportation of these resources to the global market, the responsibility of the government to protect the waters for the Inuit and other inhabitants, and the delicate ecological balance.

The preamble strikes a challenging balance between the promotion of economic activity and the protection of the environment. The question of how to balance economic opportunity with environmental protection was also present in my conversations with officials, in particular how to balance what is feasible with what industry wants. At the same time, a recognition of the Inuit, other residents, and ecosystems are included in the preamble's description of shipping. Modern concerns of economic activity and environmental protection are a refrain from the Arctic's recent past.

2.2.2 Arctic Shipping Pollution Prevention Regulations

The Arctic Shipping Pollution Prevention Regulations (ASPPR), devised in 1978, are more detailed and expansive than the AWPAA. The ASPPR represents a shift from the strict application of pollution prevention activities to the governance of vessels operating in state waters. The ASPPR are enforced for ships over 100 gross tonnage that may be operating in the region, and it exempts smaller ships from all regulations, save for those on sewage and oil loss (Arctic Shipping Pollution Prevention Regulations 2012). The government targeted the ASPPR at larger vessels—not river crafts, small lake crafts, or crafts involved in moving goods from larger vessels to shore. The regulations address standards of sewage and oil loss, crew provisions, and specifically the role of the ice navigator. I discuss this key role in detail below, in my discussion of the two specific systems that emerged from the ASPPR. According to the ASPPR, vessels must start their voyage with enough fuel and water to last the entire voyage, or until they reach a stopover point to refuel or resupply.

The ASPPR delegates inspection and certification to a key actor in shipping: classification societies. Classification societies “provide classification and statutory services and assistance to the maritime industry and regulatory bodies” for “safety and pollution prevention, based on the accumulation of maritime knowledge and technology” (International Association of Classification Societies, 2015a). A society is an “independent, self-regulating, externally audited body...[with] no commercial interest related to ship design, ship building, ship ownership, ship operation, ship management, ship maintenance or repairs, insurance, or chartering” (International Association of Classification Societies, 2015a). Their particular focus is on a ship’s hull and appendages (the keel, bulbous bow, or trim lines), propulsion and steering, and auxiliary systems to ensure that essential services are operational. Societies do not guarantee the safety or seaworthiness of a ship—they have no control over manning, operation, or maintenance. They

only certify that a ship, upon construction and periodical inspection, meets the rules of the society issuing the certificate (International Association of Classification Societies, 2015a).

These are verification agencies. They develop their rules through “empirical experience gained from classing a wide variety of ship types over many years...with appropriate research that contributes towards the on-going development of relevant, advanced technical requirements” (International Association of Classification Societies, 2015a). Classification societies offer “independent impartial assessment” of a ship’s condition and compliance with whatever rules they set out (International Association of Classification Societies, 2015b). Their independence and impartiality is key in providing their inspection service to the maritime industry: “Classification Societies live on their reputation. Acceptance of their work can only be maintained by continuously demonstrating integrity and competence” (International Association of Classification Societies, 2015b).

Classification societies are a significant part of the maritime safety regime, which includes owners, builders, flag state administrators, port state authorities, underwriters and insurers, financiers, charters, and seafarers (International Association of Classification Societies, 2015a). These societies are the heart of technical knowledge and expertise in the maritime industry. In 2007, for example, Lloyd’s Register maintained a staff of 5,400 people in 240 offices, and the American Bureau of Shipping employed 3,000 people at 80 offices. They are massive when compared to the IMO’s permanent staff of 300, or many companies’ on-shore staff, which number less than 100 (Stopford, 2009, pp. 660-661). There are over 50 classification societies worldwide, and they play a significant role in providing inspection services for the industry (Lagoni, 2007).

The owner and builder, of course, maintain more responsibility than societies for the construction and operation of the ship, as classification societies only conduct periodical inspections (International Association of Classification Societies, 2015a). It is the owner's responsibility to report any damage or change in the ship's operating faculties between inspections. Lagoni (2007), nonetheless, argues that these societies have an important role in the maritime industry, despite their external position, because they are a key part of insurance mechanisms. Insurers often require a certificate of classification before insuring a vessel's hull and machinery. Protection and Indemnity groups who insure ships against third-party risks such as acts of war, cargo damage, and oil spills or environmental pollution often refuse to insure ships if they are not in class. Cargo insurers can revoke or deny coverage if a ship is not classified or falls out of class. Lagoni concludes that while societies have limited powers, they are effective operators in their role.

The ASPPR situates Canadian-specific vessel standards within the overarching international framework established by the classification societies; it creates the rules, applied by each individual classification society, that determine if a ship meets the standards set out in the act. It creates equivalencies between Canadian classification standards and other standards, and its regulations pay special attention to the construction and inspection of the hull and the machinery on board. Classification societies can issue compliance certificates to ships that meet requirements, or pull the certificate if a vessel is no longer in compliance.

2.2.3 Zone/Date System

The ASPPR further established the Zone/Date System. This system uses a ship's class to determine where and when it can operate in the region, and it controls vessel movement in the different regions of the Arctic Archipelago. The Zone/Date System (ZDS) originally regulated shipping in the Canadian Arctic by creating sixteen geographic zones "based on the premise that

nature consistently follows a regular pattern year after year” (Transport Canada, 2012). The regulations assigned dates of entry for each vessel classification based on historical knowledge of ice conditions in the regions. These dates regulated when and where each classification of ships could be in the region.

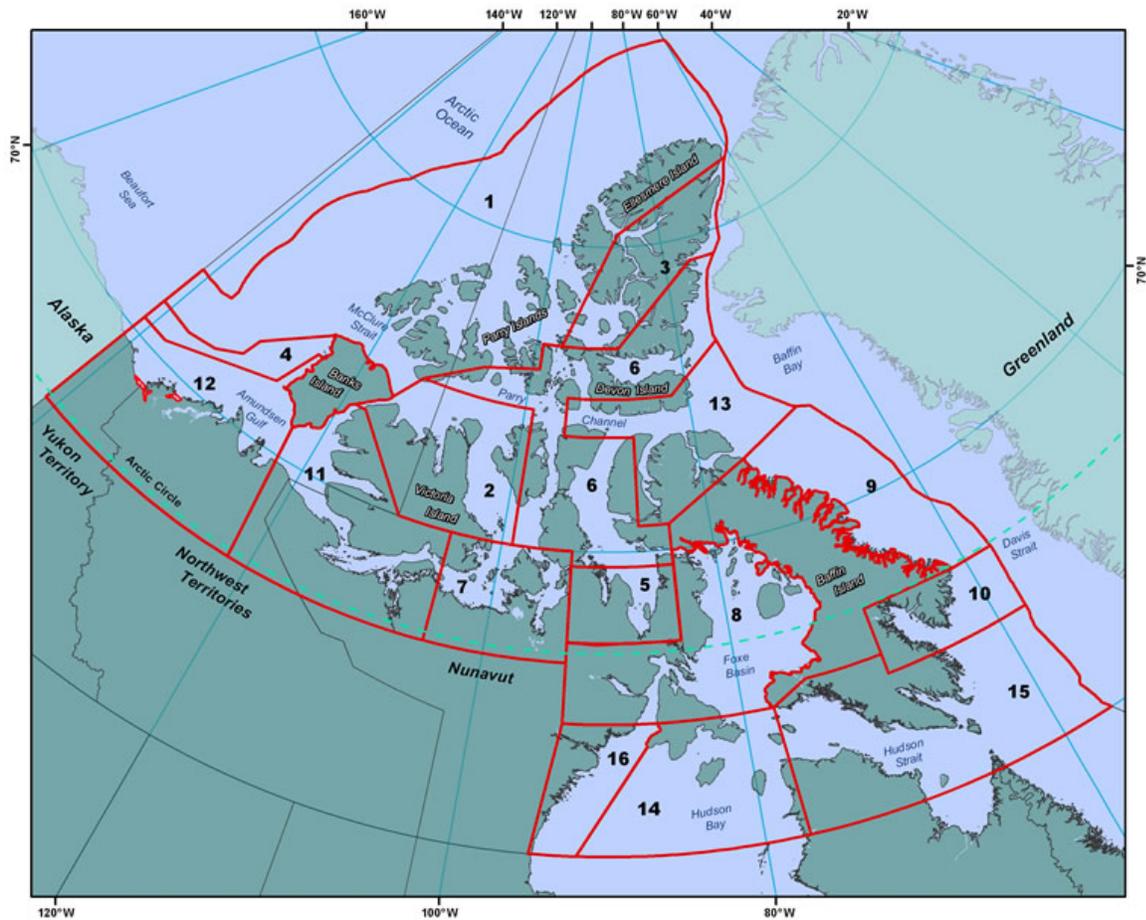


Figure 3. Shipping Control Zones (Government of Canada, 2010)

The map in Figure 1 shows the location of the zones detailed in the Shipping Safety Control Zones Order (CRC C 356). The zones are numbered from 1 to 16 based on historical ice conditions. (Zone 1 is located among the high Arctic islands around the northern coast of Ellesmere and the Arctic Archipelago.) The best conditions for navigation are located on the western coast of Hudson Bay and along Hudson Strait in zones 16, 14, and 15 respectively.

The Zone/Date System contains two main ship classification types. The first is the Arctic Class classification, which ranges from Arctic Class 10 (the strongest) to Arctic Class 1 (the weakest). The second type consists of Baltic Ice Class vessels, which operate in the Baltic Sea areas. The Zone/Date System assigns a date to a specific region based on two factors: the historical trends of sea ice and the ship's classification. Under this system, all a captain needed to do was to compare the ship's classification to the date listed for the specific region it would be operating in to see if it could proceed. The Zone/Date System did not take into account any specifics of immediate conditions, so the captain would still have to navigate through the ice. It was a simple, if restrictive, system to prevent vessels from going into regions that were too dangerous, based on historical environmental conditions.

This geographic construction of the Canadian Arctic highlights a key environmental truth: the more north and west one goes, the older and thicker the sea ice. This is true in part because of the temperatures, but also because of ocean currents in the Arctic. As shown in the work of the Arctic Monitoring and Assessment Programme, the currents at the surface funnel the ice into the Canadian archipelago (Arctic Council, 2004) and push any mobile ice at the pole towards the waterways of the northern Canadian Arctic, where they are compacted and ridged against the land and other ice. Creating and numbering regions highlighted the link between the environment and our knowledge of both ice and shipping technology at a particular time. The changes in sea ice concentration meant that this system was outdated in the mid-1990s.

2.2.4 Arctic Ice Regime Shipping System

The Arctic Ice Regime Shipping System (AIRSS), written in 1996, replaced the Zone/Date System. This is the current system used in the Canadian Arctic. The environmental changes occurring in the Arctic mean that there are times when ships encounter sea ice differently than historical observations, the foundation of the Zone/Date System, would dictate.

The AIRSS “enhances safety and efficiency of shipping operations in Canadian Arctic” by characterizing “the relative risk which different ice conditions pose to the structure of different ships” (Timco & Johnston, 2001). This new system allows operators and captains more control and freedom to operate in the Canadian Arctic, in the process shifting responsibility for the safety of the vessel and all onboard to the captain. The system also creates “a flexible framework to assist in decision making,” but increases the captain’s responsibility to make use of ice information from the Coast Guard and the Canadian Ice Service (Timco & Johnston, 2001). This requires more experienced ice navigators:

The ice navigator is a key role in the AIRSS. To be qualified, an ice navigator must have fifty days of experience as either the master or in charge of the deck watch on ships operating in ice conditions that required the ship to be escorted by an icebreaker, or perform maneuvers to prevent the ship from coming in contact with ice concentrations beyond the ship’s structural capability. Of these fifty days of experience, at least thirty days must have been obtained in the Arctic. (Arctic Shipping Pollution Prevention Regulations 2012; Timco & Johnston, 2001)

Note the specific requirements for the number of days in charge of a ship in the Arctic. The Canadian Arctic experiences different ice conditions than other regions such as the Baltic Sea or the Antarctic, which have only first-year ice or possible land ice, respectively. These requirements indicate that government officials and scientists have developed more knowledge of ice forms and ship capabilities in the Canadian Arctic. The AIRSS puts the responsibility for the ship’s safety on the captain, navigation officers, owners and proprietors, and crew to ensure that they have the best information available to complete their voyage. This does not mean that the government forgoes its responsibility. The government still “retains duty to intervene to

prevent dangerous situations,” but “the Master as an Ice Navigator or with the assistance of one will be responsible for interpreting the existing and forecasted ice conditions for safe navigation” (Timco & Johnston, 2001). Following maritime tradition and practice, the captain is ultimately responsible for where their vessel goes; this responsibility includes having the most up-to-date and correct information available for the voyage.

The AIRSS encourages more shipping because it relies on the actually existing ice regime the vessel encounters. I offer this overview as an example of how the regulations and system work. The AIRSS is more involved than the Zone/Date System’s chart. The AIRSS lays out four steps critical for safe navigation. I provide a visual example and walk-through of this system in Figure 2. First, the captain assesses and characterizes the ice regime by using ice charts from the Canadian Ice Service—which present an overview of conditions in specific regions—and by observing immediate conditions in front of the boat. The captain assesses the overall concentration of ice and gives it a rating: 0/10 is open water and 10/10 is consolidated or compact ice. In the top image in Figure 2, the conditions are 5/10 open water and 5/10 ice (i.e., 50% open water, 50% ice). The captain then further divides the 5/10 according to its age and thickness. The image shows 4/10 thick first-year ice and 1/10 medium first-year ice. The older and thicker sea ice is, the more hazardous it is to vessels.

The second step of the AIRSS gives the ship’s an ice multiplier based on the ship’s classification. There are seven different classifications in the AIRSS: two Canadian Arctic classes and five Baltic (or Finnish–Swedish) classes. The AIRSS assigns ships a positive or negative number based on the class and the age or thickness of the ice. The greater the number, the less risk the conditions pose to a vessel; a smaller or negative number connotes greater risk to the vessel.

The third step is to calculate the Ice Numeral for the vessel and its route by multiplying the concentration of ice from step one by the ice multiplier for the ship's class in step two. The captain or navigator adds these to produce the Ice Numeral. Step four is the decision process. If the Ice Numeral is positive or zero, the ship may proceed. If it is negative, the ship must wait for better conditions, find an alternate route, or ask for icebreaker.

How does this system work in practice? I highlight the example in Figure 4 from Timco and Johnston (2001) of a Type B ship designed and classed to operate in thin first-year ice 50–70 cm thick. In the top image, the ice concentration is 4/10 thick first-year ice, 1/10 medium first-

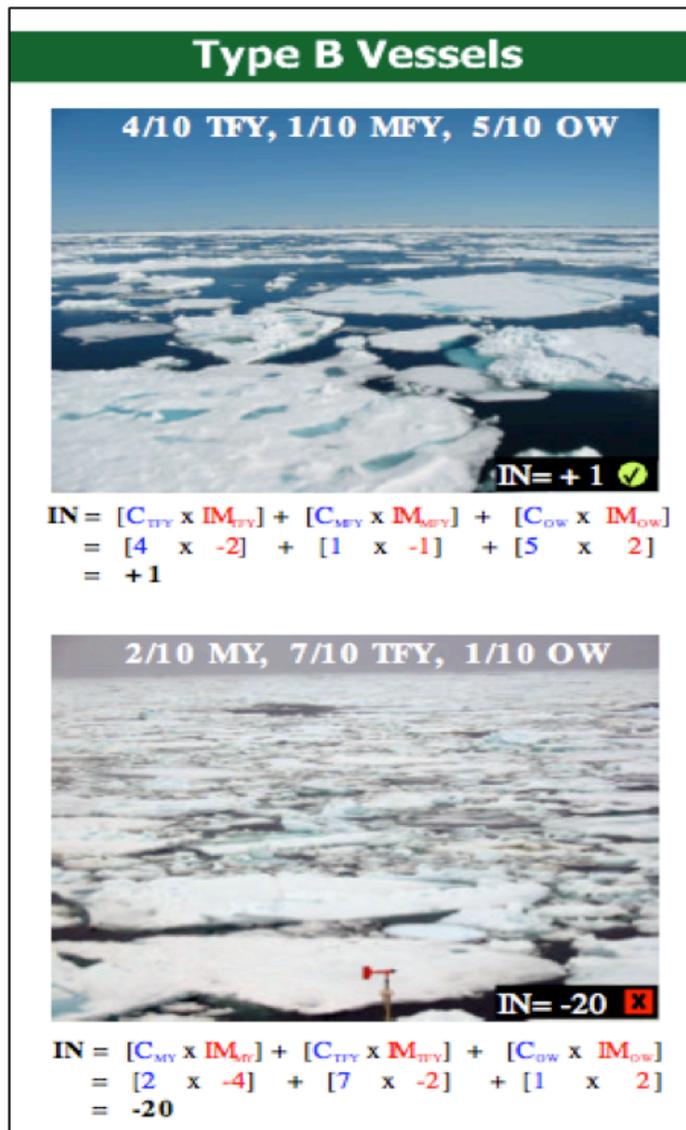


Figure 4. Example of AIRSS Ice Numeral Calculation (Timco & Johnston).

year ice, and 5/10 open water. The ship's multipliers as a Type B vessel are -2, -1, and 2. When the ice parts and vessel multipliers are combined, the Ice Numeral is +1. The ship is able to continue on its route. This numeral will change as the ship continues, so it is imperative for the captain and the ice navigator to pick a route between the thick and medium floes. In the bottom image, we see a different setting: 2/10 multi-year ice, 7/10 thick first-year ice, and 1/10 open water, with corresponding ship's multipliers of -4, -2, and 2. The Ice Numeral is -20. The ship cannot proceed because it is unsafe and either has to wait for conditions to improve or request icebreaker assistance.

As with the Zone/Date System above, the AIRSS has a specific geographic characteristic. The AIRSS controls navigation based on the actual ice regime in which the ship is operating and forbids the ice navigator to "define regions more locally than is warranted by ice conditions and the maneuvering characteristics of the ship" (Timco & Johnston, 2001). This creates a system in which the captain and navigator must know their vessel's capabilities and judge the appropriate route based on the conditions. And the ice regime may not be consistent: a vessel's Ice Numeral in the cleared track of an icebreaker, for example, is significantly different from the numeral for the sea ice around the ship. The AIRSS creates a specialized and localized geography of ice conditions while still applying a technical calculation to the ship and surrounding waters to gauge suitable passage.

The AIRSS highlights an improved system developed through knowledge of ice conditions and changing vessel technology. The ZDS was a restrictive system that limited route-planning options based on historical ice conditions. Changing sea ice concentrations make the ZDS unsuitable for providing more than a basic guideline. The AIRSS is an immediate spatial system that leaves the final decision to the captain and ice navigator. Their knowledge of a

ship's classification and abilities in ice, and their ability to identify ice conditions, are the defining factors of this system.

Canada's regulations and systems were the first of their kind in the global maritime framework. The AWPPA became a foundational part of maritime law in the development of the UN Convention on the Law of the Sea. Article 234 allows states to make laws for the environmental protection of their maritime territory partially covered by ice during the year. What emerged from a response to US commercial interests became enshrined in international law. Furthermore, The ASPPR's focus on classification societies as shipping verification and inspection agents highlights the relational aspect of governance. Transport Canada does not have to employ surveyors but can use the framework already in place to inspect and regulate shipping. I explore the relationship between the government and classification societies in detail in Chapter 4, in my discussion of the development of Polar Class standards.

The AWPPA preamble still applies to Canada's Arctic today. The foundation of regulations in the Canadian Arctic ensures navigation while protecting the environment. Ships themselves pose the most likely source of environmental hazards to the region. Regulations aim to prevent negative outcomes by ensuring that vessels are sound and functional within the wider framework of international shipping. These regulations are just one part of the infrastructure that supports maritime activity around the world. Three oceans border Canada, two of which see significant traffic and use. One might assume that a similar support infrastructure exists in the Canadian Arctic to those found in the Great Lakes, along the Pacific coast, or on the St. Lawrence Seaway. This is not the case. The lack of infrastructure in connection with the presence of sea ice highlights the need for these regulations.

2.3 Shipping infrastructure in the North

The maritime infrastructure found in the region varies widely even as the states bordering the Arctic Ocean are all developed. This lack of infrastructure in the region “challenges the growth of shipping as well as capabilities [of states] in the region” (Arctic Council, 2009). The gaps in infrastructure that appear as its users change have far-reaching consequences: “Arctic Nations, both individually and collectively are legally responsible for providing infrastructure in order to prevent loss of life, property and environmental damage” (Arctic Council, 2009, p. 102). Operators expect a minimum level of service from governments. I will discuss this in detail in Chapter 3 by looking at the role of state agencies within this shipping support network. The major contributing factors to the lack of infrastructure are Canadian Arctic’s expansiveness, along with two major maritime traffic areas far closer to population and economic centres. Providing infrastructure in the Canadian Arctic is more challenging because of the cost and lack of users compared to these other regions. This section explains how infrastructure in the Arctic functions and affects ships operating there. The individual parts of the infrastructure addressed here are numerous: the charting of waters; the provision of ice, weather, and wave information; marine aids to navigation; communications; crew and navigator training; ports; places of refuge; salvage and support; and icebreakers. The *AMSA 2009 Report* sets out these issues, and I follow its lead, discussing the regional scale before delving into specific cases and examples.

2.3.1 Nautical charts

Nautical charts are a key component of maritime infrastructure for safe navigation. A chart is the graphical representation of the maritime area (and the surrounding coastline, as a point of reference). Charts are always corrected to the lowest water level. Modern charts highlight “recommended shipping routes, harborages and anchorages for cargo operations using an instrumental area survey by special hydrographic equipment” (Arctic Council, 2009, p. 154).

Charts assist captains by identifying the depth of the water, certain underwater features, and coastline features that offer reference points. Charts are constructed using echo soundings and GPS readings, but they also take into account shoreline locations, navigational aids such as buoys, place names, and land-based features such as power lines, bridges, or even underwater pipes. The complication comes in producing the charts themselves. The charts are made from hydrographic surveys, which are quite expensive to conduct in the North for a number of reasons: the equipment involved, the logistics required to gain accurate results, the ever-changing weather, and the prioritization of more southerly routes. It is easy to understand how charting in the Arctic lags behind charting in other regions.

The case in the Canadian Arctic is stark. According to the Canadian Coast Guard (1999), of 245 charts in the region, 55 were adequate to allow for positioning with GPS assistance, while 49 charts came with the warning that relying on GPS could lead to positioning errors of up to 4 nautical miles. Of the total, 141 “did not have any information about the horizontal datum of the chart,” meaning that GPS could not solely be used to give an accurate position of the ship relative to the chart’s features (Canadian Coast Guard, 1999, p. 123). Government ships tasked with sounding operations—usually icebreakers—are only in the Arctic for a small portion of the year and have other duties and responsibilities as well.

2.3.2 Ice reports

Ice conditions and reports are another key part of the infrastructure specific to polar regions. The presence of sea ice makes the Arctic Ocean distinct from other ocean spaces. I was reminded numerous times by officials that for all the talk about the ice-free Arctic, the reality is that ice-free summers do not mean ice-free conditions year round. In the summer, it is primarily the first-year ice, formed over the winter, that melts. When this happens, the compacted, rougher, and more dangerous second- and multi-year ice becomes mobile and exposed to

shipping routes. The increased frequency and duration of voyages in the North exacerbates the need for accurate ice information. Operators' needs are expanding spatially and temporally. As such, they require information about where the ice is, how thick and strong it is, how difficult it is to manoeuvre around, or if it is necessary to go through it (Arctic Council, 2009). In more southerly Arctic waters, ships have started venturing into the region earlier, with the spring melt, and this trend is expected to hit the wider Arctic (see Pizzolato et al., 2014). Environment Canada's Canadian Ice Service has seen its workload increase along these temporal lines to provide ice information to ships in the "shoulder seasons" of spring and fall (Canadian Ice Service official, 2012). Operators require ice information for safe navigation; this requirement expands their spatial and temporal demands on the infrastructure in the region.

2.3.3 Weather and wave information

Weather and wave information is also a necessity for all vessels around the world.

Weather information is based on numerical models that produce regional results. These models require observation sites that are spotty in the Canadian North and the rest of the Arctic (Arctic Council, 2009). The sheer size of the Canadian North has a significant impact on the availability and quality of information. As one official at Environment Canada told me when discussing forecasting and their use of computer models,

That is again a way that we deal with the challenge of having to provide a service in a country as vast as Canada compared to other countries, [and] limited resources. You've got the United States, for instance, just to the south that is providing those services to a smaller geographic area with 10 times the resources we've got. You could say the same about Météo France. They've got more people in their met service than we do, they've got more resources than we do, and they've got a lot smaller area to deal with. So the way we've met that

challenge is through supercomputing, technology, and automation of a lot of stuff (Environment Canada official, 2012a).

In a conversation about forecasting, an Environment Canada official said that real-time data awareness of the conditions was non-existent in many parts of the Arctic. There are no people and no power sources to operate the weather stations needed to collect the data (2012a). The extent of Environment Canada's ability to forecast reflects this point while also highlighting the demand for forecasts over maritime areas:

Right now in the Arctic there are, in fact, on land anyway, big areas that we do not do forecasts for. Right now, we do point forecasts for communities in the Arctic. On the marine side, it is a bit different. We do cover all of the marine areas within domestic waters, and we've actually just received support and resources from government this last year [2011] to extend, in both space and time, our marine forecasts right into international waters (Environment Canada official, 2012a).

Environment Canada provides weather information for locations where people are: communities and waterways. The lack of people and resources means that the agency has invested in technology to make the most use of the information they do have.

In addition to weather information, there is a new concern for wave information. Sea ice is a buffer to larger waves, dampening their physical impact. But without the cover of ice, larger waves are potentially an issue to ships as well as Arctic coastlines. The region lacks many of the sophisticated buoys that capture and transmit wave information south of the Arctic. Questions exist if the buoys could withstand the conditions in the Arctic, such as contacting a moving ice floe, or if they are economically feasible for the level of activity in the region. The remoteness

and conditions create challenges for infrastructure. Environment Canada provides this information in the rest of the country, but the technology is lacking in the North.

2.3.4 Marine aids to navigation

Marine aids to navigation are another important part of the infrastructure. The buoys lining waterways and coastlines indicate the proper channel for navigation and alert captains to dangers along the route. These aids are the equivalent of lane markings and roadside signs to an automobile driver, and the information must be in multiple formats to allow captains to navigate safely. In Canada, there are floating aids such as buoys, fixed aids such as lighthouses, and radio aids such as GPS and radar beacons. In the Arctic, the Canadian Coast Guard is responsible for placing floating aids and activating fixed aids when they arrive to Ungava Bay, Hudson Strait, and Frobisher Bay (in June) and the western Arctic (in July). Then Coast Guard staff pick up or deactivate them when they leave the region in late October (Arctic Council, 2009). The temporal availability of these aids is significant when compared to the near-constant flow of information available in southern regions. Captains can navigate without these aids by relying on the ice information noted above, but it means they must rely on their own knowledge of the waterways. As one Transport Canada official told me, without aids available year round, “navigation in the North is as much an art as it is a science” (Transport Canada official, 2012c).

2.3.5 Crew training

Training and crew certification is the human face of infrastructure. In the past, ice navigator training was gained on the job, because so few people had the experience to be certified. Now there are training courses for navigators in Canada. The Marine Institute at Memorial University in St. John’s, NL, has a course which “introduces the student to the essential information and tools required to conduct effective, safe, and economic voyages through ice-infested waters” (Centre for Marine Simulation, 2010). It is a one-week intensive

course covering ice regimes, regulations and publications, vessel characteristics, manoeuvring and navigation in ice, icebreaker operations in Canada and the Baltic, and the effects of extreme low temperatures, with 22 hours of lectures and 8 hours in a simulator (see also Centre for Marine Simulation, 2003 for a review of the simulator; Centre for Marine Simulation, 2010). The course and simulator offer students an intensive education in the operation of vessels in ice-covered waters. This is just one example of a course aimed at improving the education and knowledge of mariners captaining or navigating a vessel in the Arctic. There is a need for this training, with the number of ships projected to increase in the future.

2.3.6 Ports

Ports are a significant part of maritime infrastructure as the key link between the land and water. In general, the Canadian Arctic lacks deep-water ports to support large vessels. The main locations of interest in the Canadian Arctic, highlighted in the Arctic Council (2009) *AMSA 2009 Report*, are Tuktoyaktuk, NWT; Resolute Bay, NU; Churchill, MB; Iqaluit, NU; Nanisivik, NU; and Steensby Inlet, NU. Tuktoyaktuk is the only deep-water port in the western Arctic. It suffers from a shallow approach channel to reach the port due to runoff from the nearby Mackenzie River Delta. Resolute Bay on Cornwallis Island may be on the Northwest Passage route and a communications centre in the High Arctic, but the port has a sunken barge as a dock, which means that ships with a draft larger than 5 m must anchor in another location. Churchill is the only deep-water port in the Canadian North, located on the southwestern shores of Hudson Bay. Churchill has four berths for general cargo and bulk ships, and promotes its location and facilities as a part of the Arctic Bridge Route with Murmansk, Russia. The shipping season is limited, lasting from mid-July to November. Iqaluit is the most populous site in the Canadian archipelago, but its port requires barges to bring their goods onshore because of the shallow approach and because the tides in Frobisher Bay are some of the largest in the world, with typical

daily ranges of around 25–30 feet (7.6–9.1 m). The final two port locations are responses to government and mining activities. Nanisivik is the proposed site of a Department of National Defense deep-water port, located at the site of a closed lead and nickel mine off Admiralty Bay and Lancaster Sound. Steensby Inlet, located to the north of Foxe Basin, would act as the main port for the Baffinland iron ore mine at Mary River. All of these sites have challenges that affect their suitability as deep-water ports in the Canadian Arctic.

2.3.7 Places of refuge

Places of refuge are another aspect of the support infrastructure, defined as “location[s] where a ship in need of assistance can take action to enable it to stabilize its condition and reduce the hazards to navigation, and to protect human life and the environment” (Arctic Council, 2009, p. 179). Any ship using a place of refuge is in a condition where loss of the vessel or environmental or navigational hazard would otherwise result (Arctic Council, 2009). Port authorities define these locations in consultation with members of industry and local groups, as these sites may have natural or cultural significance. Additionally, places of refuge are sites of localized assistance to both repair ships and tow them for repair. Salvage and rescue operations are important as well; ships needing refuge are damaged, sometimes beyond saving the vessel and its cargo. The North American Arctic lacks these sites and associated services for ships. The *AMSA 2009 Report* cites the *Selendang Ayu*, which lost power and subsequently broke apart on the northern side of Unalaska Island in Alaska, as an example of this issue. The U.S. National Transportation Safety Board accident report concluded that part of the cause of the accident was the inability of the responding vessels to establish tow lines between the stricken vessel and the responding ships due to the conditions and the stricken vessel’s size (National Transportation Safety Board, 2004).

These different components of Arctic infrastructure are present in any region of the world to ensure that shipping operates smoothly. The Arctic waters reveal the necessity of this infrastructure largely because of the distinct gaps in its provision. At the same time, the infrastructure of shipping in the North contains at least one unique feature: icebreakers are critical and distinctive support vessels to maritime activity and development in the region. These specialized ships therefore require special attention.

2.4 Icebreakers

Icebreakers, predominately government owned and operated, serve a number of significant purposes in the region. These ships break the ice to support shipping activities. They escort ships in convoys, free vessels beset in ice, and keep the shipping lanes open. Icebreakers also break out harbours if they become stuck with ice, whether at the wharves and port terminals themselves or near anchored ships in danger of being crushed by the ice's pressure. Icebreakers support sovereignty activities, maritime security, search and rescue operations, environmental response and monitoring, flood control measures (by breaking up ice jams), and science and research activities. Icebreakers, particularly the Canadian Coast Guard fleet, also offer detailed information on ice conditions in their immediate area, facilitate medical evacuation in remote areas, and assist in the resupply of dry goods and fuel in the region (Arctic Council, 2009; Fisheries and Oceans Canada, 2013a).

Icebreakers are specialized vessels. Their hulls are doubled in width and have more watertight compartments. The steel is thicker and designed to handle colder temperatures. The horizontal and vertical construction members are stronger to handle the force of breaking ice. The ice belt area, covering one metre above and below the water line, is reinforced to handle the pressure of operating in ice. Also, the ships have more built-in redundancy because of their operational requirements (Arctic Council, 2009). The shape of the bow and hull is specialized,

allowing the ship to ride up on the ice and use its weight to break it. The superstructure of the ship is concentrated at the front half of the ship to maximize this process. This layout makes these ships unstable on the open ocean. The important propellers and rudders are protected by the hull design while moving forward, and by an ice horn that protrudes over the rudder when moving astern. Additionally, some icebreakers, such as the *Louis St. Laurent*, have a compressed air bubble system that blows broken ice clear of the ship, reducing friction with the ice. All of these critical features signify an icebreaker's difference from the rest of the shipping fleet.

The U.S. Coast Guard surveyed global icebreaking capabilities, identifying 78 icebreakers with over 10,000 horsepower operating in the world, with a further 13 planned (U. S. Naval Institute, 2013). Of these, 18 operate only in the Baltic Sea region, and 4 are listed as unavailable for service. The number of ships, however, has increased from 50 in their 2007 report (U. S. Naval Institute, 2013). Russia's fleet is the largest in this categorization, followed by Finland's and Sweden's, reflecting the economic needs and ice condition requirements along rivers, the Baltic Sea, and the Arctic coast. As mentioned above in the discussion of ship classification, local ports set their own ice conditions in the Baltic; there is thus a greater demand for ships that do not need assistance from icebreakers to enter and leave the ports. Canada and the US have a number of smaller vessels because their economic focus is on the Great Lakes and the St. Lawrence Seaway, which have easier ice conditions (U. S. Naval Institute, 2013).

The Russian fleet is the largest in the world, with 37 ships, a further 4 under construction, and 8 more planned (U. S. Naval Institute, 2013). The 4 nuclear-powered *Arktika* class icebreakers are the largest and most powerful (75,000 hp) in the world. The Russians plan to build a new *Arktika* class icebreaker at the cost of 15 billion rubles (about C\$4.64 billion in

2012), currently estimated at around C\$260 million. The Canadian Coast Guard operates the second largest total fleet of icebreakers in the world. Only the heavy and medium icebreakers have over 10,000 hp, and they are included in the U.S. Coast Guard report cited above. There are 18 icebreakers under the command of the Canadian Coast Guard, with 2 heavy icebreakers, 4 medium icebreakers, 7 light high-endurance multi-tasked icebreakers, 3 light medium-endurance multi-tasked vessels and 2 air-cushioned vessels. On average, the Canadian fleet is over 30 years old. The flagship and largest current icebreaker in the fleet is the CCGS *Louis St. Laurent*, constructed in 1969 and retrofitted in 1993, powered by five diesel electric motors and producing 30,000 hp. Its replacement is the \$1.3 billion CCGS *John G. Diefenbaker* Polar Class 1 ship to provide Canada a “three season presence” in the North (Canadian Coast Guard, 2013, p. 18). The government awarded Seaspan Marine the contract in 2011, with construction scheduled to begin in 2013 and expected delivery in 2017. However, the government made building the Arctic offshore patrol ships a priority in 2011, thus delaying construction on the icebreaker (Pehora, 2016a). Furthermore, the icebreaker is scheduled to be built after “the Coast Guard’s offshore fisheries and science vessels, the navy’s joint supply ships and the Coast Guard’s offshore oceanographic science vessel” (Pehora, 2016b). Pre-construction engineering is only beginning in 2017, while actual construction is slated to begin in 2019, and the ship is scheduled delivered to the Coast Guard in 2022 (Pehora, 2016a, 2016b).

The icebreaker fleet is important because of the services it provides to maritime activities in the North. Their specialized designs give icebreakers a unique role in the infrastructure that supports Arctic shipping. The Canadian Coast Guard also at times provides icebreaking services in the Maritimes, the St. Lawrence Seaway, and the Great Lakes. The economic importance of these other locations to the Canadian economy demands more support throughout the year.

2.4 Conclusion

Shipping in the North is an ongoing activity. Vessels plying the Northwest Passage route will not be the first, or only, in the region. Shipping is a required activity for community growth and development because of its resupply operations each summer. A distinct set of regulations governs vessels operating in the North. The Canadian government passed its regulations mindful of the importance of shipping to economic activities while also recognizing ships as the greatest potential danger to the environment and people in the region.

These regulations further address the infrastructural deficit evident in the Canadian North. The support infrastructure is inadequate compared to the rest of the country. A lack of up-to-date and accurate charts, navigation aids, weather and ice information, crew training and icebreakers are all significant problems in the North.

Future policies must address regulations, support, and infrastructure for shipping. I have presented the empirical descriptions of shipping regulations and infrastructure in the Arctic in this chapter. The potential future of shipping is an outgrowth of this present-day activity, and any policy agenda will use this activity as a baseline. Officials familiar with this activity provide important insight into the status of regulations and infrastructure and the possible futures of the region. They recognize and understand both shipping activity and government operations in the region.

I turn now to the first of two chapters that address the role of government in the North. I address government support of vessel activity through navigation aids and weather and ice information. I situate these activities within a wider framework of governance by highlighting the relational aspect of government activities. These officials work with industry and international colleagues to integrate the region into the wider maritime network. The work of

Canadian agencies highlights the effective control and flexibility of the state's operations regarding a seasonal activity such as shipping.

Infrastructure and regulations are a critical way to anticipate future shipping activities. The ongoing conversation between officials, industry, and international agencies highlights the creation and casting of particular futures that become actionable in the present. Their responses and actions today to support prospective shipping in the region are a key aspect of anticipatory politics. They direct action, expecting and responding to specific futures.

Chapter 3: Maritime support and infrastructure in the Canadian Arctic

I turn now to one of the two key issues facing shipping in the North. Support and infrastructure, along with regulation, are the areas of shipping most in need of attention, according to the review of Arctic state policies by Brosnan et al. (2013). I focus in this chapter on infrastructure and support as an example of the relationship between governance and effective sovereignty, and flexible territoriality—the way the state’s spatial form changes with the physical and technical support of the agencies. I apply these concepts to Fisheries and Oceans Canada and Environment Canada actions that support shipping. I further emphasize the role of anticipating future shipping activities to these agencies’ work. I suggest that solely focusing on sovereignty does not fully capture the value and effectiveness of these actions. Their work demonstrates the state’s effective presence assisting vessels within a relational framework and takes a detailed approach to the anticipation of future of shipping in the Arctic.

I argue that governance as a means to understand relations between states adds value and international context to a state’s effective sovereignty to understand Canadian government activities in the North. As Chapter 1 explained, I employ governance to examine the relations between government agencies and non-government actors to manage formal and informal day-to-day practices. Following from Dodds and Nuttall’s suggestion (2015) that we approach governance in the Arctic as both topological and typological, I pay attention to relations between the key agencies that support shipping in order to highlight governance’s relational focus, and demonstrate substantial government presence in the region by linking it to effective sovereignty. I further extend this relational concept to understand the state’s form in the Arctic. The state’s response to shipping demonstrates the flexibility of the state’s effective presence and control over an object in motion in the remote region.

I focus on two agencies in particular. First, I look at the role of Fisheries and Oceans Canada in the deployment of infrastructure and support for navigation in the region. The physical presence of the infrastructure depends on the Canadian Coast Guard, and it represents past and present users of the region. The Canadian system is part of a wider international system regulated for best practice and easy use by mariners. The changing mix of vessels and captains in the Arctic creates a situation in which the demands on infrastructure are always changing. I extend this analysis to argue that governance plays a key role in addressing the anticipated future of shipping in the region.

The second agency that forms the focus of this Chapter is Environment Canada, along with its subsidiary, the Canadian Ice Service. These agencies provide weather and ice forecasts and reports that ensure safe activities in the region. Such activities are not limited to shipping, but include any activity that takes place near sea ice. I address governance and sovereignty through due diligence and effective presence. I argue that through the MET/NAV programs and the many ice information agencies and users of the services, these agencies demonstrate the state's crucial relationships in the region. In addition, the availability of information addresses the seasonality of both weather information and shipping in the region. The flexibility of the state's territorial form allows this nuanced approach linking governance with effective sovereignty to activities that offer effective presence and support.

3.1 Navigation infrastructure: a beacon of light

One of the key areas of maritime support and infrastructure is aids to navigation. The Canadian Coast Guard, an agency under the auspices of Fisheries and Oceans Canada, maintains these systems. The Coast Guard defines aids to navigation as “devices or systems, external to a vessel, which are provided to assist mariners in determining position and course, to warn of dangers or obstructions or to advise of the location of the best or preferred route” (Canadian

Coast Guard, 2012, p. 3). Canada employs a system of visual, aural, and electronic aids in all waters, including the Arctic. Navigation infrastructure is present in the Arctic, but not to the same degree as in other ocean spaces. I examine the overall structure of aids to navigation in the North and look at how these relate to a specific mix of vessels and captains. Next, I focus on how anticipation of these changes places demands on infrastructure. I argue that the way these officials imagine the future configuration of vessels is fundamental to the decision-making process of anticipating the future use of the waters. Following this, I examine Fisheries and Oceans Canada activities from the perspective of governance by the state, examining the networked relations and flexible territorial forms that emerge from these activities.

3.1.1 Navigation services

The perceived lack of navigation infrastructure discussed in Chapters 1 and 2 might suggest that significant thought or planning has not been applied to these issues in the region. However, this is not the case. As an official told me,

We have a system of navigation services. A kind of marine infrastructure, if you want to call it that: the charts, the aids to navigation, and the environmental response equipment. All of those were designed many decades ago for very specific purposes. When you design a system to assist navigators, you have to meet the needs of the actual mariners. (Fisheries and Oceans Canada official, 2012).

The system in place in all parts of Canada aims to meet the needs of those who use aids to ensure the safe and efficient navigation of the ships they pilot. The volume of ships has a direct effect on the extent of infrastructure. As an example, the official offered a hypothetical situation to convey the changes happening in the Arctic:

Picture yourself thirty years ago. You had a few small vessels—about 200 feet long—that used to navigate the Arctic. They did not have that much [support] when you compare to the south where it is essentially a highway, with lights and buoys everywhere, and with GPS: it is easier to navigate. Of course, the volume of ships has an impact on [those services]. Go in the North where the winds are changing, the conditions are changing, and getting power is much different with darkness. [Northern captains] rely on very basic levels of support. You get the navigator thirty years ago: the captain goes there [once] successfully.

Everything's fine. Next year does it again, next year does it again, and [the captain] becomes very accustomed to that [level of service]. (Fisheries and Oceans Canada official, 2012)

The infrastructure served the users of the maritime spaces when the government implemented the system. In this example, the northern regions had less traffic and a very specific mix of vessels using the waters. The southern maritime infrastructure is more developed and updated, because the greater use of these waters demands greater infrastructure and support. The captains developed their own knowledge of the region's conditions that worked around the infrastructure's gaps. There was a stable mix of vessels and captains year after year.

The changing mix of vessels and captains highlight the infrastructure gaps. “What is [in the Arctic] is getting increasingly obsolete,” an official told me (Fisheries and Oceans Canada official, 2012). As House (2007) details, a significant number of factors determine a ship's handling characteristics. A single, right-rotating fixed propeller will affect a ship's manoeuvrability differently than one-twin screw propellers with variable pitch angle or one with azimuth thrusters at the bow. Environmental factors like tides and their direction, under-keel

clearance, and wind and currents further influence a vessel's manoeuvrability. Even how the ship is loaded, or its ballast and draft in the water, will influence a ship's handling. Infrastructure designed to support a 200-foot vessel does not easily transfer to a 400-foot long vessel:

Ten years ago, that 200-foot vessel no longer worked. We [now] need a 400-foot vessel. When you take a turn with a 200-foot vessel, you can turn easily using the range⁴ designed for turning a 200-foot vessel. If your vessel is longer and wider, and [if] there are some shoals in here and there, then the ranges may not necessarily align well. (Fisheries and Oceans Canada official, 2012)

Ranges are an essential part of navigation systems. They indicate when a vessel is on the right path and heading, or when a vessel needs to turn. Ships with different lengths and drafts need different support infrastructure for safe navigation, unlike an on-land system where Smart Cars share the same roads and signals as tractor-trailers. Designing ranges and other navigation support infrastructure for a mix of ships is a key part of providing effective support to navigation in the region.

The people involved are changing in addition to the vessels. Those captains who were used to navigating with less overall navigation support are retiring. With them goes their experiential knowledge of the specific conditions:

What is even more interesting in the Arctic, what we are being informed by the shipping industry, is that the cadre of captains that have been there and used to the Arctic [are retiring]. Now there are new navigators coming in that are fresh from school, and they are used to computers, bells, and whistles. When they go up [to

⁴ Ranges are also known as leading lights. They assist with navigating and directing ships through channels. Two lights and structures are placed in a line, the closer one to shore being shorter than the farther one. When the ship is on the correct bearing, the lights are aligned. The structures can be painted as well for daytime use. Lights can be used to maintain a proper heading, but in this case, the interviewee referenced the way the lights can be used to direct the vessel—once the lights align on the proper heading, it is safe for the vessel to turn.

the North], they say, “I’m not navigating there. That is the Wild Wild West... They didn’t teach that in school.” There is a problem because the needs of the navigators in the North have never been a preoccupation. There has never been a safety issue because they managed the risk and managed to navigate safely. As these captains retire, new navigators come in. They look at [the Canadian North] and say, “That’s not a safe area for me to navigate in.” ... There are some doubts about how safe the system is to some extent. (Fisheries and Oceans Canada official, 2012)

The changing cadre of captains means that there is a considerable gap between what infrastructure is expected and what exists. The government used to rely on the knowledge of captains to fill in the spaces where infrastructure was lacking. With the change of captains, there is now a greater focus on demands for aids to navigation.

These needs and demands do not change at the same time or rate. An official recalled demands on the system could change over time, because they come from external sources that change vessel traffic:

Sometimes the needs only evolve over decades: they are stable for years and years and years and all of a sudden, something new happens. Even in southern Canada, you could have a case where you’ve got a company who is attracting significant business of type A in a given port area and so the design, the aids, the charts, all of that is designed to meet these requirements. Then for reason X, that business goes down, and for years, nothing goes on in that area. Then something new comes in, like wind energy comes in, and now there is a new LNG carrier: brand new, different vessels that come in. Well, what do you do if the infrastructure you

had does not fit that anymore? You have to adapt. (Fisheries and Oceans Canada official, 2012)

The navigation infrastructure is a compilation of both the historical and present-day demands of vessels and captains in the region. When these change, there are increased demands and strains on the infrastructure. These changes can happen at any location, since the users of the system, rather than the builders, drive them. The official described the government's role in respect to these changes in the Arctic as

to ensure the safety of the water or to facilitate maritime commerce in a safe way.

That whole discussion is starting to take place. It never was an issue before because it was a stable mix; it was not a focus. There was ice there for decades.

People recognized that there was a small ice-free period, the same kind of cohort went up there and observed whatever is needed, but now it is changing. The game is changing and what the government essentially needs to do is to adapt its services to ensure it meets the evolving needs of the users.

Adaptation is key. Understanding the change of vessels and the captains is important to addressing the future of support in the region. The government cannot replace the navigation system currently in place, but rather must adapt and update it to fit changing demands.

This focus on change demonstrates how potential future users of the Arctic region influence policy makers in the present. The changing mix of users and vessels draws attention to the gaps in infrastructure. In the past, these gaps were recognized and accounted for from within the system. As captains retire, and the vessels grow larger, the system no longer accommodates and facilitates easy navigation.

The future of Canadian Arctic shipping is envisioned as a change in the mix of vessels and captains. Fisheries and Oceans Canada can better allocate its resources to address the above mix of users, rather than focus on the Northwest Passage and trans-Arctic shipping. The official quoted above was aware of the need to adapt to the changing users and vessels, thus highlighting a key way the future influences work in the present. Knowledge of the changing users and vessels, along with the current infrastructure in the Arctic and other regions, plots a course to address these infrastructure gaps. Thus, the anticipation of the changing vessels and their needs directs specific action in the present. The official's knowledge and expertise addresses the systemic responses possible from their position, and justifies policy action in the present with these specific futures and knowledge.

3.1.2 Navigation infrastructure and effective state presence

I turn now to the role of governance and effective sovereignty and navigation infrastructure to demonstrate an effective state presence. I emphasize here the importance of relations between government and non-government actors in governance. I further emphasize the flexible territoriality that emerges in the arctic region when navigation infrastructure is a part of the question. The question of de jure or legal sovereignty and control is a significant part of the public narrative of the region. Governance and effective sovereignty are better suited to address the functions of state agencies like Fisheries and Oceans Canada. When asked about sovereignty, one official responded,

[Sovereignty] does not change anything for me. [Northern Canada] is part of the Canadian territory. I have to look after navigation. Yes, we have a harsh environment to manage, but similar to the Atlantic Ocean we do not put transportation marine infrastructure over the Atlantic Ocean. We do in our inland [waters]. That is the same [in Northern Canada]. It is no different from anything

else. As much as Canada is the sovereign on the west, on the east, and on the North, that is for Foreign Affairs. I am looking after the means of navigation.

(Fisheries and Oceans Canada official, 2012)

This official's focus is on the means of navigation, but it has a deeper contextual meaning for this work: that sovereignty—in particular *de jure* sovereignty—is reserved for specific agencies that can speak for the state and its political community (Rose & Miller, 1992). Foreign Affairs and International Trade is one agency that can speak; Fisheries and Oceans can not. Thinking of operations in terms of sovereignty limits debate around which agencies can and should be included. Governance, as I argue here, allows more agencies into the conversation. How these agencies operate informs wider questions about a state's presence. Governance reinforces a state's operations.

How the state supports navigation in the North is an important question. There is no requirement for the government to implement aids to navigation:

We do not have to put aids; we do not have to put that kind of infrastructure.

Mariners are the masters of their own destiny. They want to go somewhere, they go somewhere no matter what is there. The safest way is you go very slowly, and if you want to be sure there is [enough] water you put the lead line up front and go forward. You will not be efficient, but you can navigate very safely. (Fisheries and Oceans Canada official, 2012)

There are ways that mariners can navigate without the wider infrastructure present. Mariners used lead lines in the past to measure the depth of the water. A sailor would throw a weight at the end of the rope with markings off the bow of the ship in the direction of its intended path. The thrower counts the markings as the weight hits bottom, before they pull the line in and repeat

the process. It is an inefficient and laborious system, but ensures that a vessel can navigate safely in waters without navigation infrastructure present.

The role of the state, and in particular Fisheries and Oceans and the Coast Guard, facilitates vessel movement for navigation and trade. The Canadian Coast Guard focuses primarily on the “safety, security and accessibility of Canadian waters” (Fisheries and Oceans Canada, 2013a). Laying out aids to navigation is one Coast Guard responsibility that falls under the headings of safety and accessibility. The Coast Guard maintains the navigation system in the Arctic, setting up and removing the aids from the region when its support service ends each fall, as mentioned in Chapter 2. How and where the Coast Guard deploys these aids depends on the workings of the agency:

The Minister of Fisheries and Oceans has the authority to put aids of navigation services within Canada to facilitate navigation and trade. As far as I am concerned, the Canadian archipelago is within Canada, so the minister has the authority to put it there. We have directives to guide where we provide services. The minister has the authority to put the infrastructure there to ensure the safety of navigation to the degree they want. If doing that sends a signal to others that we are serious about our own waters and that we are doing our due diligence [so be it]. (Fisheries and Oceans Canada official, 2012)

The operation of the Coast Guard to support and facilitate navigation and, more importantly, trade, comes from the minister. The exercise of power works through this mandate to establish and maintain a system of navigation aids. The minister tasked with this work has a mandate to make Canada’s waters accessible to mariners. State power extends to the Coast Guard to

establish these aids to navigation. This demonstrates an effective state presence in the region that relates to day-to-day practices.

The full suite of aids to navigation in the Arctic is seasonal, demonstrating a flexible territoriality of existing state presence. The Coast Guard sets up fixed and floating navigation aids in the summer, and takes them down in the winter as its icebreakers and other vessels return to southern waters. They replace these lighted aids with spar buoys that can withstand the winter conditions, but sea ice can submerge or move the buoys as it forms and flows each winter. The 2016 *Notice to Mariners* states that “in general buoys are commissioned in the spring (or during the summer in the Arctic) as early as ice conditions will permit and are lifted during the fall prior to the winter season” (Canadian Coast Guard, 2016). Furthermore,

many buoys are lifted, while others remain in the water in an unmaintained status during the winter. Mariners, who use channels before the official opening of the navigational season, are cautioned that these buoys may or may not be in their advertised positions and may or may not be displaying proper characteristics.

After the position and status of the floating aids have been verified, a Notice to Shipping will be issued advising mariners that the aids have been checked and are in a maintained status. (Canadian Coast Guard, 2016, p. 2)

Although the waters remain open, the individual aids that are a part of the system may not be applicable or showing the proper signals. Mariners rely on the government to ensure these aids are in the correct position. Alternatively, mariners are aware that aids might not be in the right location or form, and they must account for this potential situation. This is the important knowledge of conditions the official talked about above.

I argue that setting out and removing navigation aids demonstrates one characteristic of governance's flexible territoriality in the Canadian Arctic. Flexible territoriality is the physical manifestation of state presence and control over a space of territory. It is not by choice. Environmental conditions force this system on the agency. Agencies tasked with ensuring safe and efficient navigation must consider the dynamic essence of maritime space (see J. Anderson & Peters, 2014). Sea ice presents an even more challenging operating environment. Similar to the seasonal nature of effective government control in present-day Burma (see, Scott, 2009), the seasonal formation and movement of sea ice affects the ability of a government agency to enact constant presence. As the Coast Guard sets out and turns on aids to navigation, it creates an effective state presence in the region. This state presence, however, requires active maintenance and attention to remain stable. Only when mariners report an issue can the Coast Guard react to and rectify it. The state's presence waxes and wanes through the flows of water, wind, rain, snow, ice, and ship contacts, and weathering of the colours and lights all affect the system's precision and information. The minister directs the Coast Guard to assist navigation through their mandate, but the Coast Guard, with its finite resources, can only ensure safe and efficient navigation for a certain time of the year. The state thus awards power over vessel activity, but it can only exercise it at certain times in the Arctic. The state's territorial form in the region is not a defined line, but rather one that fluctuates with the seasons and its access in the region. Governance, rather than sovereignty, fits better with the flexible territoriality that exists in the Arctic.

Governance's attention to relations between states and non-state agents is another significant part of the state's presence in the region. Canada's aids to navigation in all three

oceans fit within a wider framework of international norms and standards, and they assist mariners from other countries, not just Canada. As an official told me,

I look at it from the needs of the mariners. Mariners are not necessarily domestic, but international as well. When I look at the needs of the St. Lawrence River, I do not look at the vessels only from Canada. I look at the international vessels that are coming in. (Fisheries and Oceans Canada official, 2012)

It is not only mariners from Canada or Canadian-flagged vessels that use these services. It is important to ensure that Canada's system fits the wider framework of international navigation.

The global and multi-faceted aspect of shipping demands a similar approach that builds a response that situates Canada's aids to navigation within the international framework. As the official told me in response to a question about sovereignty and state presence in the North,

If somebody wants to navigate in our waters, they are going to do it according to our rules, which work in line with international organizations. We would not do something crazy. We work with IALA⁵ [and the] IMO in order to align everything we do. If that gives the perception or helps to fulfill some government objectives then so be it, but to me, it is no different to what I would do in Newfoundland, or in BC: it is the same. The perception that [this] serves some other purposes is their prerogative, not mine. I look at it as the safety of navigation, the needs of the mariners, and making sure that we are doing our due diligence. (Fisheries and Oceans Canada official, 2012)

⁵ International Association of Lighthouse Authorities. This is a non-profit, technical association focusing on aids to navigation for vessel safety and environmental protection (IALA, 2014).

Canada's systems work within the international system to ensure safe navigation for all vessels.

At one time, the International Association of Lighthouse Authorities (IALA) estimated that thirty different national systems operated in the world (2010).

Two key examples from the history of navigational aids highlight the difficulties of coordinating these systems. The first issue was whether red buoys and lights should mark the right or left (starboard or port) boundaries of a channel. The second issue was whether states should use lateral or cardinal marks in their maritime space. Lateral marks line the outside or middle of a channel, while cardinal marks are placed around the four cardinal directions of a point of interest (e.g., a North mark signals that safe water lies to the north of the buoy).

Neighbouring countries did not always use the same systems. The IALA initially created two systems based on whether the red buoys were on the left or right of a channel, Regions A and B respectively. They merged these systems in 1980, and mariners with training in the Netherlands, South Korea, China, or Canada should have no difficulty understanding the system of operations in Canada's waters. These waters include the Arctic, since it is primarily an ocean, even if ice covers it for part of the year (Fisheries and Oceans Canada official, 2012).

Governments are required by the International Maritime Organization's (IMO) Safety of Lives at Sea Convention to provide navigation infrastructure that the "volume of traffic justifies and the degree of risk requires" (in IALA 2010). As the official mentioned above, this relates to the issue of due diligence. When I asked him what *not* maintaining due diligence would look like, he responded,

If we let go of what we have there and let it decrepit to where it no longer works?

Say you have vessel X from country Y that decided to come in. It starts to get into "Canada is not looking after this space, this environment" and then "Oh my

god, who's going to look after this?" That is where the attention from the international authorities will descend. If an accident happened, it could send a strong signal. You cannot tell them "Don't navigate here." The captain will come in; you cannot arrest him because he is navigating in Canada. There are some regulations to be met, but at some point the captain navigates where he wants. (Fisheries and Oceans Canada official, 2012)

The expectation from mariners and international authorities is that someone will maintain the system of navigation aids. There is an expectation that the government of Canada will provide these services in its waters. The question is less about sovereignty than the way that government power operates in this particular situation. As the official told me,

I do not expect that the US or Russia will come to put buoys in the Canadian archipelago. If they do not do that, we will need to do that. If another country wants to come and put some services there, then yes, I will start to question myself and I will talk to DFAIT⁶, but I take for granted that northern Canada is northern Canada. (Fisheries and Oceans Canada official, 2012)

There is an expectation that there will be state provision of aids to navigation in the region. Since other states are not going to do that, it is up to Canada to install and maintain these aids. Already collaborative work has been done to address the challenges of operating a system in the polar regions, with the five littoral states working together to establish best practices and technical knowledge with the IALA, IMO, and Arctic Council (International Association of Marine Aids to Navigation and Lighthouse Authorities, 2013). Establishing aids to navigation demonstrates the effective sovereign presence of the state, while the international framework and

⁶ Department of Foreign Affairs and International Trade

cooperation signifies the relational aspect of governance at the same time. Users expect Canada to maintain these aids within its territorial waters; there is not a question about other states providing these aids in Canada's northern waters. Combining these two concepts allows for a better understanding of Canada's actions within this internationally standardized system that aims to maintain safe navigation and protect the marine environment.

Providing aids to navigation demonstrates the state's effective presence in the region. The agency's relations on behalf of the Canadian state with other states, international agencies, and mariners focuses our attention on the network within which the Department of Fisheries and Oceans operates. The environmental conditions in the North and the shipping season dictate a flexible territoriality that asserts the state's presence at different times. Additionally, the expected and anticipated change in users and vessels draws attention to how the future is related to and made actionable in the present. The changing mix of vessels and users identified by the official focuses our attention on how services can be adapted to these users—now and in the future.

3.2 Weather and ice

Aids to navigation are not the only kind of support infrastructure that vessels and captains need. Weather and ice information are just as important in the Arctic. I turn my attention now to the work of Environment Canada and one specialized agency in it, the Canadian Ice Service. I suggest that these agencies' activities highlight the effective presence of the state. I begin with an examination of the role of Canada in the newly created meteorological and navigation areas before looking at the Canadian Ice Service as an example of a state's expertise. I address governance through the service's relations with users and other government agencies. The agencies' operations within international agreements and provision of their expertise demonstrate

the relational aspect of governance. Furthermore, I demonstrate how Environment Canada's response to the changing mix of users and vessels mentioned above changes the state's territorial formation through these activities. Anticipating changes in users and vessels demonstrates how the imagined future use of Arctic waters directs policy decisions in the present. The territorial presence of the state changes as the vessels moving through its waters, because vessels use the state's provided weather and ice information.

3.2.1 Weather and ice information and the state's effective presence

The relationship between shipping, and weather and ice information is an important focus of Canadian governance in the region. As I mentioned in Chapter 2, Canada has taken on two of the meteorological and navigation (MET/NAV) areas in the Arctic region, providing weather and ice information across an area that covers parts of American and Danish waters. Ships that operate in the Canadian archipelago are obliged to use the weather information from Environment Canada. These services draw attention to the effective state presence in a similar way that navigation infrastructure from the Coast Guard does. The state exercises its power within an existing international framework to support safe vessel operations.

MET/NAV areas are delimited sea areas where a designated country assumes responsibility for disseminating meteorological information and navigation warnings under the Global Maritime Distress and Safety System. The system is a joint operation of the IMO, International Telegraph Union, World Meteorological Organization (WMO), and COSPAS-SARSAT (a satellite-based search and rescue alert detection service). MET/NAV broadcasts take place over the Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM). This joint commission (between the WMO and the Intergovernmental Oceanographic Commission) aims to "respond to interdisciplinary requirements for met/ocean observations, data management and service products" (JCOMM 2016). Individual states are

tasked with preparing and broadcasting the weather and navigation reports over the Inmarsat satellite service. While one state broadcasts the information, other coastal states in the designated region may contribute to the reports.

Russia spearheaded the creation of five new areas north of 67 degrees beginning in 1999. Canada and Russia have responsibility for two areas each, and Norway the remaining area. Environment Canada, including the Canadian Ice Service, is responsible for “a full suite of meteorological information, including sea state and freezing spray forecasts, observational data, and weather and ice information services,” with \$26.5 million budgeted from 2010 to 2015 (Environment Canada, 2011). Fisheries and Oceans received a budget of \$8.3 million over the same period to cover the navigational services of lights, buoys, warnings and other aids (Environment Canada, 2011). Canada collaborates with the United States to broadcast across the western Arctic for Metarea XVII⁷ and with Denmark for the eastern Arctic Metarea XVIII (World Meteorological Organization, 2016b, 2016c). Environment Canada takes the information from the US and Danish services for their waters and transmits them, along with Canada’s information, over the international system. A similar, if reversed, approach is taken in Metarea IV, where Canada provides the information for the Hudson Bay area to the US, which broadcasts the information on the northwest part of the Atlantic Ocean, to the Arctic Circle (WMO 2016a).

How, then, does this relate to the effective state presence in the region? An official from Environment Canada explained that while taking responsibility for these Metareas is not a requirement, it does show the initiative needed to promote the state’s presence, and thus effective sovereignty, in the region through these international agreements:

⁷ Metareas are the name given to the specific MET/NAV spaces.

When you provide these basic government services in an area where they are needed, you are *de facto* demonstrating sovereignty. So that is where [sovereignty] comes in. It's interesting because I describe the slice of pie that we are responsible for [as a part of MET/NAV], part of it is the waters north of Alaska, and you might think the US might take exception to that kind of thing. We knew darned well that if we didn't step forward and take responsibility for that slice of the pie in international waters, the US was standing right behind us ready to do it. There was no huge controversy or competition between us. They were happy to have us do it, and we cooperate with them very closely. They do forecasts for north of Alaska, it only makes sense for us to take their work and translate it into these international products, and that is what we do. At the same time, I think it was key for Canada to step up to the plate, take that responsibility and that *de facto* is kind of supporting your claim of sovereignty in the Arctic: that you are the one providing these services to meet the needs. (Environment Canada official, 2012a)

The official's use of *de facto* sovereignty demonstrates an understanding of the state's effective presence in the region. Some agency has to provide the information, but it should be clear that there was not a competition between the agencies to provide the information for the Metareas. Rather, the official emphasizes the cooperation between the US and Canada over these areas.

The importance of working within the international framework and with the US and Danish agencies demonstrates the contribution of governance to understanding these relations. This relational aspect of governance highlights how power operates between agencies and over spaces. As another official stated about these programs and their relationship,

[Sovereignty] is going to come up in another international agreement on the recently established meteorological and navigational areas in the Arctic. Canada has taken responsibility, but this is by international agreement. It only comes up under sovereignty by people who do not know anything. We have taken responsibility for two of the new MET areas and NAV areas, which are coincidental. We issue information for American and Danish waters, but it is not an exertion of sovereignty. What we do is take information from both of them, we meld it into our formatting, and then we put it out. (Canadian Ice Service official, 2012)

The comments highlight how easily commentators and the public apply sovereignty to MET/NAV areas. The remark of “who do not know anything” refers to a specific conceptualization of sovereignty that is not aware of the cooperation and coordination between the numerous agencies. Sovereignty, as a concept, limits what can be discussed and who can speak for the political community within its boundaries (Rose & Miller, 1992). Thus, shifting towards a combined understanding of the effective presence of the state with the international framework creates a synergy between effective sovereignty and governance that emphasizes other agencies’ roles.

The work of agencies like Environment Canada and the Canadian Ice Service is entrenched in these international and even bi-lateral agreements between states. The compilation of data from the US and Danish agencies means that there is no need to duplicate the work at Environment Canada. This allows agencies to be more specialized, as an official from the Canadian Ice service explained:

Some people tend to look at “Oh you’re doing ice charts for the Beaufort, and Chuchki Sea, and Bering Strait.” That is an arrangement we have with the US National Ice Center (NIC). Some people think that’s exerting our sovereignty over American waters, when it is not. It is not. We are doing their charts for the NIC in cooperation with them. It is the same with the Danes: the Danes asked us to do charts in their specific area because we do charts a certain way that they do not. Some people will take that and say, “That’s us exerting our influence,” but it is not. (Canadian Ice Service official, 2012)

The Canadian Ice Service is one of the most recognized and respected agencies in the world on the subject of sea ice. Other agencies, the Danish Meteorological Institute in particular, work with the Canadian Ice Service to prepare and distribute the relevant information. While Denmark provides information to areas of Greenland, they have asked the Canadian Ice Service to prepare charts for their waters because of how the Canadian Ice Service does its charts. The specialization of individual agencies makes clear the transactional work of these two international agencies. In the context of sovereignty, this work could be interpreted as a threat to the US and Denmark, but the reality is that collaboration and cooperation are more important. The relations between agencies and actors reflect the exercise and operation of state power within an international framework and a broader understanding of how states operate in the Arctic and wider world.

The expertise and information of the Canadian Ice Service indeed leads it to support other agencies. As the official explained,

The way sovereignty comes up is generally as a supporting function; in this particular case is DFAIT [Foreign Affairs and International Trade]. When they

need to make a decision or they need Justice to have a look at the legality of something, we will provide our part of the background information and science information, climatology. For instance, that is particularly relevant when you look at Article 234 of UNCLOS. It's important to know when is [the Arctic Ocean] going to be ice covered, when is it going to break up, when it's going to do what it's going to do. When DFAIT is making their decisions that the Northwest Passage is not an international transit [passage], then they need the historical information. That is how sovereignty usually comes up. (Canadian Ice Service official, 2012)

The Canadian Ice Service's expertise is used by agencies that speak for the political community, such as the Foreign Affairs and International Trade and Justice, but it does not promote Canadian sovereignty. It is interesting to note that both the official above and the one from the Department of Fisheries and Oceans named the Department of Foreign Affairs and International Trade as the main agency dealing with sovereignty. This suggests administrative separation and discrete mandates for each department. It was common in interviews for officials to talk about not overstepping their area of expertise or speaking for someone in another agency. They feel that only personnel at certain agencies, like the Department of Foreign Affairs and International Trade and Department of Justice, can legitimately speak of sovereignty in the context of the Arctic.

3.2.2 Effective presence and the Canadian Ice Service

As I address below, these relationships with other agencies and clients are key to the Ice Service's operations. They extend far beyond other Canadian agencies to domestic and international actors. Through the expertise of the agency, we can see the different networks and

relationships that emerge from the Ice Service's work. The official laid out the number of groups that they provided ice information for:

Primarily, our main client is the Canadian Coast Guard. Having said that, our products are used or retransmitted by the Canadian Coast Guard, or we send them directly to an FTP [file transfer protocol] site for a shipping company.

Commercial mariners, fishing fleets, and northern residents use it. Riparian interests usually want to know what is going on on the shoreline—like along the St. Lawrence River. Anybody who lives along the St. Lawrence River needs to know what is going on with the ice. On a greater, rather a strategic level, our information is used by regulatory agencies in order to construct [their regulations]. For instance, Transport Canada uses it in reference to the AWPPA, specifically the establishment of the Shipping Safety Control Zones in the Arctic. They use historical ice information, plus current ice information in the development of the AIRSS. [It is used] by National Research Council and Canadian Hydraulic Centre. Construction regulations use historical and current ice information. Classification societies like Lloyds or DNV [Det Norsk Veritas], they use them again for construction regulations and cold-weather advice and guidance. [The] IMO, same thing: mandatory Polar Code and ice navigator qualifications, so training institutions use that. The oil and gas [interests] will use it for tactical and strategic planning for their drill operations, both for exploration and exploitation, and for construction of their drilling platforms. So there is a whole host of people. (Canadian Ice Service official, 2012)

These users extend from government, to regulatory agencies, to classification societies and private business interests. This highlights the reach of the agency's activities and reposts.

Specific voyages and special interests use the Canadian Ice Service's expertise and assistance. One example of how the Canadian Ice Service has changed its products to address commercial demands is the flash freeze warnings it now offers:

For instance, [the Baffin Fishing Fleet ships] were caught a number of years ago in a flash freeze that damaged a lot of their ships and they had no warning of that because Environment Canada weather does not give that warning for the coast. We decided that, "Well that is what we can do." We have now concentrated on giving that flash freeze warning for ice and for weather. (Canadian Ice Service official, 2012)

The Canadian Ice Service can operate for both weather and ice conditions in the North, making it easy for the agency to provide information on weather conditions in its regional coverage. The conditions for freezing spray are important to smaller vessels like fishing boats, because ice accretion affects them more than it does larger vessels like container and bulk cargo ships. Only certain conditions can produce these flash freeze and freezing spray warnings: sea temperatures below 6C, air temperatures below freezing, and ice conditions of less than 6/10 surface coverage. Meteorological technicians at the Canadian Ice Service support users on the water; these technicians are, as the official described,

[the] same as what is in the storm prediction centres, same as who do the weather. We do not only ice, but we also can do weather. That came to be an advantage, for instance, in a number of cases illustrated last year [2011]. We supported a number of ships singly; one being the new Martin Bergman that is with [the

Arctic Research Foundation] in the search for Franklin ships and we are doing it again this year [2012]. We assign an analyst to that ship and he gives the ice information but also keeps a watch on the weather and gives the weather forecast. We were contacting the ship and giving them advice such that, “You might want to get out of this area because there’s this ice [type] in there, but there’s also this weather coming and there’s this alternate route.” We also supported the National Science Foundation for the US in the Chuchki Sea, and we did the same thing: we did weather for them and we did ice for them. (Canadian Ice Service official, 2012)

Having both ice and weather forecasts allows the Canadian Ice Service to be a one-stop location for those needing this support. This expertise and service has allowed the agency to become a key part of these international relationships. Providing services to supranational interests, private companies, and other governments highlights how specific agencies operate and exercise power.

Another specific consideration of the Canadian Ice Service is northern residents. The Canadian Ice Service provides a number of services to northern residents, a user base that has grown recently:

Northern residents is [*sic*] a growing one because if you recall over the last number of years there have been some mobility issues in the ice in Barrow Strait off Resolute, and it has been stranding people. They need to know where the ice edge is and what it is going to do during not only the navigation season, but also more importantly year-round. That is a growing part of our business. (Canadian Ice Service official, 2012)

I asked the official a follow-up question on the agency's relation with the Inuit in particular, mindful of the multiple perceptions of sea ice that are present (see Inuit Circumpolar Council Canada, 2007, 2014):

The services and information we provide augment what [the Inuit] want to do. They need to know where the ice is and where it is not and what it is going to do. Primarily over the last number of years, we have been looking at ice edge. That is what they initially wanted. Now that ice is starting to change and break up suddenly, they need to know more. In addition, they want to know more detail: more surface detail in where the ridges are, where the pressure parts are, so we have attempted to provide that. We now need to go a step further in establishing a near-shore ice advisory and ice info service which we proposed under a couple of R&D money pots within the Canadian government. That is really the next step.

My next follow-up question related to that program's details and if it was in the planning stages:

First off, it is in preliminary proposal stage and it looks like we are going to be getting money this year [2012] for the next 3 years to develop that, because the territories all support it. The Inuvialuit Game Council, for instance, supports it, which is again one of our fortes because the Inuit Council, Inuit Tapiriit, and Inuvialuit Game Council all support our work because we support them. We are very lucky in that regard to be very well thought of by them. I would expect this is a three-year project, which is being defined by us in cooperation with territories and the Inuit councils. (Canadian Ice Service official, 2012)

This important relationship with the Inuit highlights how different groups work together to create better knowledge of ice. At the same time, the relationship shows how governance operates

through expertise and agencies like the Canadian Ice Service. Currently, the eastern and northern Arctic are the only regions to get year-round ice bulletins from the Ice Service (Environment Canada, 2015); it addresses needs and demands from citizens and clients. Near-shore ice advisories and year-round reporting of the Arctic only came with the assistance of other agencies that needed these services.

I was curious at the beginning of my work about the perception of those in the policy world of media coverage on the Arctic. I asked the official what his thoughts were on the media, and he gave an insightful answer:

The Ice Service tends to be the doyen of the media. We are always responsive, give good interviews and we give balanced interviews, and I have seen that reflected in how they then transcribe that into their news reports. Generally, they get it right. It is a great help to us because it reinforces our premiership in Canada and the world, and it reinforces the perception of the Ice Service and its people. Sometimes they are not helpful in the way they present some data, but I think what ends up happening is that even when presenting the right data, which is the majority of the time, people will take from that who don't know. So for instance, treasury board analysts, when they are talking to the Coast Guard, sometimes the prevalent version has been—although it is changing—has been, “Well, why do you need icebreakers? Because there will be no ice.” You still have to reinforce it with some people that there is still winter, that ice builds up rapidly, it is rather thick, and there is still ice. But now, yes, in the summers it could be ice free and that's fine too, but at the same time ice free does not mean completely free of ice. There is still a certain percentage of very dangerous multi-year [ice] in the Arctic

that is, by every model available and every observation technique available, is pressed up against the Canadian side by the currents and the wind. So if anybody is trying to make the Northwest Passage into a superhighway, you've still got this to deal with, that the last remnants of multi-year will be against the Canadian archipelago, and with earlier break-ups and later freeze-ups, that multi-year becomes much more mobile and comes into areas which it never historically frequented. It mostly helps us, but then hinders us in that we have to spend time explaining that. (Canadian Ice Service official, 2012)

The agency has to work to dispel the overall myth that there is going to be no ice in the region by emphasizing the technical expertise that has made it one of the world leaders in ice information and forecasting. Losing sea ice means that it is the same year-round as other oceans. Often, the wider public and other officials forget the reality of winter in the Arctic. It is too easy to relate to the Arctic seasonally; the region draws attention each summer, and then, as the ice closes in and darkness settles, it is easily forgotten (see Cameron, 2015). The expertise of the Canadian Ice Service allows it to dispel perceptions of an ice-free Arctic while drawing attention to the issues that matter: that multi-year ice becomes more mobile, that sea ice patterns are changing, and that “ice free” does not mean free of ice year round. The media mediates the state’s presence and expertise to the public.

3.2.3 Canadian Ice Service and changing demands

Governance and effective sovereignty further illustrate the flexible territoriality of the state through the work of the Canadian Ice Service. The agency’s activities divide the state’s effective presence among the Arctic, the Gulf of St. Lawrence, and the Great Lakes region. This is similar to the Coast Guard setting out aids to navigation and then pulling most of them as it

leaves the region. As the Canadian Ice Service official told me, one major challenge facing the agency is the temporal expansion of the Arctic shipping season:

We are already starting to cross the period where we traditionally left for training. The Arctic used to end—the Arctic season—in the mid- to end of October, and the gulf season in the south did not generally start until mid-December to the end of January. We have [*sic*] a period of downtime we used for training, revision, validation, and this type of thing. Then in the spring, there was a comparable period. Now because the spring shoulder of the Arctic season is earlier and earlier and the winter season is later and later in specific areas now, we are starting to see those two seasons crossing. The last couple of years the Coast Guard has had a ship going up on Arctic operations while the gulf is still going on. We have to support both in the gulf because there is still ice in certain areas, and we have to support the Arctic ships at the back [end of the gulf season] and that is happening too in November. Whereas the Coast Guard has now extended its season until mid-November, we still have ships up there, mainly Woodward's tankers are still up there. They still need ice information. We are providing them and the Baffin Fishing Fleet ice information well into the end of November, beginning of December, and now we've got to turn around and support the gulf ships, so that [training] period is now virtually gone. (Canadian Ice Service official, 2012)

The effective presence of the state is changing as the demands for ice information are changing. The Canadian Ice Service supports vessels operating on the margins of the Coast Guard's physical support in the Arctic region. The Canadian Ice Service can respond to the changing

demands for its information in two or three spatial regions. Whereas sovereignty would dictate the provision of information year round to all regions—a waste of time and money—or the closure of the Arctic from shipping, the Ice Service has historically been able to focus on specific regions at different times. But as users change when they are sailing in the region, so too does the agency's scope of coverage.

The change, however, is not just temporal but also spatial. This spatial change relates to the changing mix of vessels and captains in the region, discussed above by the Department of Fisheries and Oceans official. The Canadian Ice Service must provide increased spatial coverage and more details in specific areas for these vessels:

We now have ships going to places where they never went before. You have different types of ships, not only cargo ships and specially strengthened icebreakers. You've now got unprotected armed forces, Canadian forces ships, you've got passenger vessels—granted it's the adventure size, but a life's still a life—and you've got many different types of ships now going into the Arctic. You are looking at heavier cargo ships going in, and they are going into non-traditional areas. Our responsibilities are expanding temporally and spatially.

(Canadian Ice Service official, 2012)

The changing mix of vessels in the region means that the agency must be attentive to the needs and capabilities of each type of ship. As the users change, so too do their spatial locations and distribution in the region. The Canadian Ice Service extends its support infrastructure beyond what mariners have used in the past. The changing users include Canadian Forces ships. An agency whose work fits within the framework of governance ensures the safety of an agency directly related to traditional state sovereignty promotion. This highlights how focusing on

governance identifies more state agencies involved in the day-to-day actions supporting shipping. Canadian Forces ships are not ice-strengthened and must avoid ice for their Operation Nanook exercises. While these sovereignty promotion activities happen on specific dates, the Canadian Ice Service and other agencies operate throughout the shipping season, providing a state presence to those vessels and users that rely on it.

How the Canadian Ice Service provides these ice information services has changed in recent years with this expansion of users and the shipping season. Providing information directly to users and clients is not something the agency has direct experience with due to the organizational structure within the government:

Usually what had happened, up until about 2 to 3 years ago [2009/2010], was that all of our information from ice analyses was fed to Coast Guard as a result of our partnership agreement. The Coast Guard would make available, distribute, and disseminate. We found that to be inadequate from the point of information timeliness. The Coast Guard was making decisions under policy guidance from headquarters; what they were deciding to do was to not disseminate the information unless there was a Coast Guard ship in the specific area. What has changed is that ships are now going up earlier, ahead of the Coast Guard, and they are staying later after Coast Guard leaves. We cannot afford to have Coast Guard stopping that information, from a safety point of view. We decided to take that out of their hands and deliver that information directly to the clients that need it. That is a new thing for the Ice Service. We have to continue that as more activities happen in the Arctic. (Canadian Ice Service official, 2012)

The organizational change within the Canadian Ice Service emphasizes a key change in the presence of the state in the region. Information distribution had resulted from Coast Guard ships' physical presence in the region. This may have made more sense when the shipping season was shorter and captains and ships had been operating in the region for many years. But changing users and a growing shipping season means that there is more demand for the Canadian Ice Service's information.

This demonstrates the flexible territoriality of the state through the governance provided by its agencies. The Coast Guard, which is not a constabulary force as the US Coast Guard is, still requires significant input to operate icebreakers and support vessels in the region. These vessels were taking the ice information with them as they left the region. The solution to work more directly with users highlights how the effective presence of a state can change the territoriality of its formation. Mariners in the region can rely directly on the Canadian Ice Service for their operations, since the Ice Service distributes its work electronically, extending the state's territorial presence. The state's territorial limits shift and change based on where mariners are operating. Governance thus highlights a more effective and productive form of state action in the Arctic, where weather and ice distribution are necessary information, and relational considerations from above are changing the effective territorial extent of the state.

The work of Environment Canada and the Canadian Ice Service demonstrates the synergy of governance and effective sovereignty. These agencies offer direct support to agencies such as Foreign Affairs, Justice and Defense that promoting sovereignty; however, *they* exercise state power through networked relationships at international agencies and by providing services to protect the environment from people and people from the environment. Moreover, providing services demonstrates how the Canadian Ice Service effectively promotes the state's presence

when physical services are not present. This demonstrates the state's flexible territorial form in the region. New users direct the changes taking place in these agencies, such as the provision of more detailed and specialized services. The new users come from a larger network than those that would need navigation infrastructure from Section 3.1. The need for information from a wide range of groups demonstrates how agencies adapt and develop their capabilities in response to what users need in the present and their perceived needs in the future.

3.3 Conclusion

Policy statements from the five Arctic littoral states identified support and infrastructure as key areas of attention that they must address in the future. I have examined two key elements of shipping support and infrastructure: aids to navigation and weather and ice information. This chapter built on Chapter 2's discussion of the basic infrastructure present in the region. These agencies designed and deployed this infrastructure to meet the needs of a relatively stable mix of vessel types and users. With climate change, this mix is changing and stressing the present support system.

The officials quoted in this chapter make a key distinction about the perception of future shipping. Government officials perceive the future of Canada's Arctic waters as a manageable and knowable set of vessels and captains that need specific support from aids to navigation and weather and ice information. The need to address infrastructure gaps is present, but they are working to adapt the infrastructure that currently exists to the anticipated changing demands of users and vessels. The future users of the Arctic waters are perceived to be in the region for the same reason as the vessels that have always been there, and not only to use the transitory route through the Northwest Passage. The agencies direct their attention to support and infrastructure decisions that address the needs of these mariners and users.

The activities of these agencies complement a synergy between effective sovereignty and governance. Governance, in the work of critical polar geographies, must pay attention to the relational aspects of agencies. The relationships between users and international groups are important to both of these examples above. Fisheries and Ocean's relationship with the International Association of Maritime Aids and Lighthouse Authorities and the IMO ensures that navigation happens safely and efficiently in Canadian waters within the international framework. Environment Canada's relationship with the World Meteorological Organization and Intergovernmental Oceanographic Commission for the MET/NAV areas supports timely delivery of weather information to mariners. The varied users of ice information highlight the degree of Canada's expertise on the subject. These agencies thus demonstrate the relationship between a state's effective presence and the relationships between the state and other actors.

I have argued that the state's existing form in the Arctic reflects the effective presence of the state. The way that Environment Canada and the Canadian Ice Service provide weather and ice information is one vision of the state's effective presence in the region. Coverage shifts and bends with each user's intentions and paths, but all users rely on the state for information. Furthermore, the state's physical presence in the region changes as the Coast Guard sets out aids to navigation each spring and summer but then removes them as the sea ice re-forms in the winter. The state's effective presence is seasonally dependent, shifting with the needs of mariners and the ability of the state to provide support in three separate ocean spaces. It is still Canadian waters, but the presence of the state shifts along with the vessels and other users in the region.

I turn next to the issue of governance, the other area that state policies identify as an area of attention for shipping. I extend the above points on anticipatory futures and relationships and

flexible territoriality to Transport Canada's work. I focus on the work at the agency itself, as well as the important role officials at Transport Canada undertook to spearhead the creation of the international polar guidelines at the IMO. This next chapter explores the relationship among Transport Canada, the international regulatory framework of the IMO, and individual classification societies. This will further my overarching focus on the role of government officials in an anticipatory framework.

Chapter 4: Governance and regulations

The previous chapter examined support and infrastructure as one frame through which to examine present and future Arctic shipping. Brosnan et al. (2013) identify governance as a key link between the policies of different Arctic littoral states. The Arctic Council's *Arctic Marine Shipping Assessment 2009 Report* devotes an entire chapter to the topic. Its implied definition focuses on the legal framework of shipping, such as the UN Convention on the Law of the Sea (UNCLOS); the International Maritime Organization's (IMO) legal regulations, such as the Safety of Lives at Sea and the Pollution Prevention conventions; and others. The report broadens the scope of governance to address the multitude of actors in shipping: "In addition to governments, ship-owners, cargo owners, insurers, port authorities, trade and labor union associations, among others, may be involved in determining when and where shipping in the Arctic should occur and under what conditions" (Arctic Council, 2009, p. 50). Governance is, according to the Arctic Council's working definition, a mosaic of all these different actors engaged in "efforts to promote safety, security, protection of the environment from damage by accident, as well as harmonization and uniformity in international maritime law and standards" (Arctic Council, 2009, p. 67).

The Council's approach to governance recognizes that shipping is "essentially an international tool in the service of global trade," and draws attention to "the complex range of actors that affect shipping law, policy and practice in the Arctic" (Arctic Council, 2009, p. 67). This focus is in line with my work and the work of critical polar studies that pay particular attention to the relations among actors in the region (see Dodds & Nuttall, 2015). Moreover, focusing on the role of the state within this activity offers an understanding of how and where state power operates with regard to an international activity such as shipping.

The two main Canadian acts governing shipping represent two distinct state approaches and mentalities of governing shipping. The Arctic Waters Pollution Prevention Act (AWPPA) reflects the territorial state's project demonstrating sovereignty over a specific territory. This act does not address how shipping is actually governed. The Arctic Shipping Pollution Prevention Regulations (ASPPR) addresses how shipping in the Arctic can be, and is, governed. The ASPPR direct our attention to how state agencies operate with international actors, in particular classification societies and the International Maritime Organization. The ASPPR also convey the flexible territoriality of the state—ways that state power is enacted beyond the expected boundaries of the state itself—through its technical standards and regulations, which are built into the ships operating inside and outside of Canada's Arctic waters. The regulations emphasize a flexible territorial approach, with state power acting over the vessels not as they cross a boundary, but through their construction and inspection. I argue that a conceptual framework that attends to state regulations of shipping through governance is more useful than a lone focus on sovereignty. A comparison of the AWPPA and the ASPPR show us this distinction emphasizing the former's focus on territorial definitions and the latter's subject. The AWPPA, as I will argue below, has been a main focus of academic work because of the question and importance of sovereignty in the region. The ASPPR is more relevant to present discussions of maritime activity in the Arctic. The ASPPR creates a direct link between a state's regulation, the classification societies inspecting and graving vessels, and the ships themselves.

I proceed in three steps. I first examine Transport Canada's establishment of the national regulations, returning to the AWPPA and ASPPR that I discussed briefly in Chapter 2. I focus on those details of the AWPPA and ASPPR that are related to sovereignty and governance and pay particular attention to how the ASPPR apply to ships in the region. I argue that this is an

extension of state power and a demonstration of both the flexible territoriality and the relational aspect of governance in the Arctic region. Second, I provide two examples of the work of Transport Canada. The first is an account of a tug-and-barge combination that sailed along the Northwest Passage route, which emphasizes the role of the state in international commercial voyages. The second example, that of the U.S. CGC *Healey*, demonstrates the application of Canadian regulations but also makes clear the relational aspects of Transport Canada's work. Third, I examine the role of Transport Canada officials in forming the IMO's 2010 *Guidelines for Ships Operating in Polar Waters*. I pay particular attention to its work with the classification societies to establish the technical foundations for the guidelines. I argue that the framework of governance adds significant understanding to Transport Canada's work that improves our perception of state actions in the Arctic. My focus on international agencies and non-state actors highlights the value of this concept in framing state actions.

4.1 Canada's regulations

I now present a brief review of the AWPPA and the ASPPR. I touched on the basic information from each piece of legislation, and the associated Zone/Date system and Arctic Ice Regime Shipping System, in Chapter 2. The AWPPA, passed in 1970 following the voyage of the *Manhattan*, addressed primarily waste from ships, established the Shipping Safety Control Zones, and established Port State Control to board and check vessels. The ASPPR, passed in 1977, were more explicit about the regulations over ships, and involved classification societies in the inspection and grading of the hull and machinery. Additionally, the ASPPR created the position of ice navigator and two systems to manage vessel movement. I discussed the importance of knowledge and experience in Arctic conditions in Chapter 3 in the context of the changing profile of captains aboard vessels sailing in the region.

The AWPPA epitomizes a rigid territorial understanding of sovereignty. Canada established regulations over pollution waste from ships in response to one ship sailing through its archipelago. The act was both territorial and a solitary state's legislation. It defined an area under state regulation, while other states disputed the legal framework of the act. Only later was it included in the international maritime legal regime. The ASPPR, however, were the opposite: a cooperative effort beyond a single state's boundaries. The understanding of shipping as a holistic activity frames regulation and state activity more broadly, showcasing both the conceptual limits of sovereignty in such a case, and the conceptual value of governance in the Arctic.

4.1.1 Arctic Waters Pollution Prevention Act

The AWPPA is dated and has not kept up with technological advances since its creation, as noted in Chapter 2. While framing Transport Canada's actions in the North, the act gives power to three different ministries, as one Transport Canada official argued:

Nobody wants to update the Act because three ministers manage the act. It is not a Transport Canada [initiative]. The Minister of Transport Canada has responsibility for shipping, the Minister of Natural Resources has responsibility for offshore [pollution], and the Minister of Aboriginal Affairs has responsibility for pollution from land and sea. There are three ministers on that Act. If you are going to change anything in this town, it is difficult when there is one minister, never mind having three ministers. Therefore, nobody has touched it. (Transport Canada official, 2012c)

The response to the *Manhattan's* voyage was of great importance. An act written in 1970 to respond to a specific voyage remains on the books. The AWPPA became the guideline for

Article 234 of UNCLOS⁸. Canada and the then-USSR led discussions to recognize the distinct maritime spaces that exist in the Arctic. Rothwell (2014, p. 26) argues, “This was a particularly symbolic development as it provided some international recognition for the legitimacy of [Canada’s] actions in adopting the AWPPA.”

Academics cite the *Manhattan’s* voyage and the creation of the AWPPA as key framing devices for sovereignty concerns in the North. Byers (2009) argues the AWPPA is just one of many processes and actions of Canadian Prime Ministers claiming sovereignty in the North. He describes the act’s passage as the government “seizing the moment,” reaching far beyond the limits of international law at the time:

The Canadian government effectively admitted that the act was inconsistent with international law when, shortly before adopting the statute, it modified its pre-existing, general acceptance of the jurisdiction of the International Court of Justice in order to block the matter from being litigated there. (2009, p. 46)

English (2013) emphasizes Prime Minister Pierre Trudeau’s response to American concerns that the act was meant to regulate oil tankers, not submarines: “If you send up a tin can with paper-thin hull filled with oil, we will not only stop you, we’ll board you and turn you around.”

English argues that the act “asserted Canada’s right to establish tight environmental safety standards upon tankers or other ships within 100 miles of the Arctic coast” (2013). This 100-nautical mile limit effectively establishes a boundary in the water, even though it is incredibly

⁸ “Coastal States have the right to adopt and enforce non-discriminatory laws and regulations for the prevention, reduction and control of marine pollution from vessels in ice-covered areas within the limits of the exclusive economic zone, where particularly severe climatic conditions and the presence of ice covering such areas for most of the year create obstructions or exceptional hazards to navigation, and pollution of the marine environment could cause major harm to or irreversible disturbance of the ecological balance. Such laws and regulations shall have due regard to navigation and the protection and preservation of the marine environment based on the best available scientific evidence.” (United Nations, 1982)

difficult to pinpoint exactly where that is (see K. Peters, 2012). It is an example of the territorial state form extending out into the ocean (see also Steinberg, 2001).

The environmental focus of the AWPPA was key. Rothwell (2014) rightly argues that Canada has placed “significant constraints on the passage of vessels through its Arctic waters on environmental grounds.” Grant (2010) argues that “the AWPPA was ‘the most significant unilateral action on the international marine environment ever taken’” (M'Gonigle, 1976 in Grant, 2010). McCannon (2012) further argues that “since 1970, Canada’s stratagem for enforcing its will in these waters has been to do so on behalf of the ecosystem” and that the AWPPA is best viewed as an “environmental safety code.” Meren and Plumptre (2013) argue that the AWPPA represents heightened environmental concerns in Canada at that time through its extension of territorial seas to 12 nautical miles. Byers (2009) argues that combining Article 234 of UNCLOS with the “environmental imperative” of the AWPPA suggests that the Northwest Passage is not an international strait, but part of Canadian territorial waters. He goes on to argue that “an international strait in ice-covered waters that was not subject to strict environmental regulation by the coastal state would undermine the purpose of both Article 234 and any parallel customary rule” (Byers, 2009, p. 48).

The foundation of the act remains entrenched in sovereignty. The Canadian Forces were preparing to monitor and perform constabulary duties in 1971. One communication within the department said, “Even though arrest is likely to be rare, legislation authority for permitting direct enforcement action of this kind by the Canadian Armed Forces should be determined in advance and should not wait for the occurrence of a particular incident” (Interdepartmental Committee on the Law of the Sea, in Lackenbauer & Kikkert, 2010). Despite the role of the military, opponents accused Trudeau’s government of diminishing Canada’s overall sovereignty

claim in the Arctic because the AWPPA offered only functional control (Coates et al., 2008; Lackenbauer & Kikkert, 2010). In an April 16, 1970 House of Commons debate, Opposition leader Robert Stanfield rose and said,

We would like some information as to why this limit of 100 miles was chosen and we would like to know how the government proposes to enforce these regulations... The government is redefining our territorial waters in such a way as to, in effect, abandon the Canadian claim of sovereignty of waters between the islands as well as some of the water surrounding the islands; the abandonment of this claim will likely haunt governments for many years to come. (In Lackenbauer & Kikkert, 2010, p. 131)

Paul St. Pierre, a member of Trudeau's Liberal party responded, "We can charge ships for providing icebreaker services. Without it, ships maybe left stuck, such as was the case with the *Manhattan* yesterday or the day before." St. Pierre offered a follow-up question: "What would the honourable member suggest we do if American troops marched into Saskatchewan? That question is about as sensible as the honourable member's [question]" (in Lackenbauer & Kikkert, 2010, p. 132). While addressing the limits of the state's claims, St. Pierre did not address how to enforce the act. The act and the government framed ownership and control of these waters in a similar way as it did for land-based territory.

Canadian actions to pass and enforce this legislation created tension with the United States. The act complicated the joint security arrangement between the two countries within NATO:

The status of the Arctic Archipelago Waters is a subject of dispute with the USA, particularly as it regards the assertion of jurisdiction to prevent and control

pollution of these waters. We would also suggest that the reference to the legal effect of an expansion of the present level of forces in the Arctic might be modified to bring out the possibility of a contribution by the Canadian forces to the effective enforcement of the AWPPA, while at the same time stressing the need to avoid a possible conflict between any such enforcement role and the inter-forces relationship required by collective security arrangements with the USA. (DEXAF Legal Division Memo to North American Defense and NATO, in Lackenbauer & Kikkert, 2010, pp. 208-209)

The United States did not recognize or support Canada's governing the waters in this way. Byers argues that the United States "has accepted the AWPPA, insofar as it recommends that US flag merchant vessels follow the statute's provisions," while "it is unclear whether this recommendation constitutes an acceptance of Canada's *legal* position" (Byers, 2009 emphasis in original). Merchant vessels are different from state-owned and operated vessels. As I will show below, U.S. Coast Guard ships operate under Canadian regulations, challenging Byers' merchant-only statement above.

The AWPPA represented a specific approach to sovereignty. It was a "functional" approach, aimed "to regulate and control future tanker traffic through the Northwest Passage" (Coates et al., 2008, p. 99; Lackenbauer & Kikkert, 2010, p. 24). Canadian legal counsel to External Affairs J.A. Beesley suggested, "The provisions of both the AWPPA in the recent amendments to the Canada Shipping Act, of course, go far beyond a simple prohibition of the discharge of pollutants and indeed make it an offense for vessels even to enter certain areas unless they meet Canadian safety standards" (in Lackenbauer & Kikkert, 2010, p. 286). Coates et al. (2008, p. 118) argue that the AWPPA was important because "if [Canada] knew of foreign

transits and did nothing about them, it would not be demonstrating credible authority and control.” Grant (2010) posits that the act is one example of the wider efforts to demonstrate effective state control and presence in the Canadian Arctic. Lajeunesse (2016, pp. 174-175) further suggests that

a more active assertion of Canadian control would gradually strengthen Canadian sovereignty. The AWPPA lay at the heart of this policy. By design, it reinforced implicit Canadian claim by enabling the government to exercise many powers normally attributed to a sovereign state within the archipelago waters, even when the government did not articulate it as sovereignty.

The AWPPA defined a territorial scope, despite challenges from other nations like the United States. The act emphasized Canada’s broad interpretation of the international legal framework at the time; the government removed the country from international jurisdiction until after UNCLOS and Article 234 were constructed. Moreover, agencies like Foreign Affairs, National Defense, and the Department of Justice had authority to speak and act on behalf of the state about the act. The government did not articulate the act as a sovereign claim, but it certainly enabled sovereign action.

Beneath these debates on sovereignty in the 1970s, there were key moments of anticipatory action. First, the government anticipated opening the Northwest Passage route to international traffic. Some scholars suggest that the Canadian government wanted to use the legislation to restrict transit and deny access in the region. (see Byers, 2009; Coates et al., 2008; Rothwell, 2014). The government had a different view. Mitchell Sharp, Secretary of State for External Affairs, addressed this point in a June 10, 1970 House of Commons session: “The government intends to open the Northwest Passage as a waterway for passage by ships of all

states subject to necessary conditions required for the preservation of the Arctic environment. That policy is reflected in the AWPPA” (in Lackenbauer & Kikkert, 2010, p. 144). The AWPPA does not, in fact, restrict vessel movement. It encourages navigation, so long as ships meet the conditions set out by the government. As one Transport Canada official told me,

I do not care who comes to the Canadian Arctic as long as they comply with the regulations. The more ships that come to Canada, let them come. There is some idea that people [have]: “Wow, we have to make it difficult for them to come,” or, “You have to make them get a letter from Foreign Affairs.” I said, “On the basis of what? What authority do you have to ask anybody for anything?” There is no authority to ask for anything, but there is an authority to ask them to comply with the regulations. (Transport Canada official, 2012c)

The official went on to say that the only ship that knowingly flaunted the regulations in his time was a Canadian vessel chartered by the Department of National Defense (Transport Canada official, 2012c). The future of shipping in Canadian Arctic waterways was not closed off to international vessels when the AWPPA was passed in 1970. Rather, ships were, and still are, able to come, so long as they comply with Canada’s regulations. As I will discuss below, the regulations in the ASPPR are more international, cooperative, and relational in their application. It is surprising that only one ship disregarded regulations, compared to the amount of scholarly work on the issues and interpretations of sovereignty in the AWPPA.

Questions remained about how to enact the AWPPA to govern shipping to protect the environment. The government’s focus turned to the international community for advice and consultation. This is after unilaterally declaring sovereignty over the Arctic waters. Mitchell Sharp, Secretary of State for External Affairs under Trudeau at the time, addressed the

international focus of the government intending “to consult with other countries regarding the safety regulations to be adopted under the AWPPA” (in Lackenbauer & Kikkert, 2010, p. 144). He was emphasizing a relational approach to the governance of shipping. The government was looking internationally for help with its regulations, while the AWPPA was a sovereign action (without directly admitting it). The question thus turned to *how* a government can regulate shipping with an ultimate aim towards protecting the environment.

In 1971, the changing discourse addressed this question. International concern to develop regulations reduced the importance of the military considerably, as documented in a Department of Defense Report on Consultations with Other Government Departments and Agencies:

At the present time apart from certain prohibitions regarding the discharge of oil or oily waste over the side, there are no specifications concerning anti-pollution standards of ships. Such regulations are now being prepared for ships in the Arctic waters and the ministry officials think it reasonable to expect that, in due course, these will be followed by regulations for more southerly Canadian waters and by international agreement on standards of construction and operation to decrease the risk of oil pollution. (in Lackenbauer & Kikkert, 2010)

A state governs and regulates pollution from shipping by focusing on the ships themselves rather than imposing laws. As the IMO recognizes, ships themselves are the most likely source of pollution in the Arctic (International Maritime Organization, 2016). It is therefore reasonable to turn now to how the Canadian government, and in particular Transport Canada, put these regulations in place.

The wider academic discussion of shipping in the Canadian Arctic begins and ends with the AWPPA. The focus on this act limits potential scholarship. Only one source discussed

above mentioned Canada's ASPPR (see Grant, 2010, p. 451). I argue that this is a significant oversight in the academic literature. As I have discussed above, there is significant attention to the AWPPA as it relates to state sovereignty. This has resulted in a literature that covers numerous details and specifics about these cases above, while overlooking the same problem that Mitchell Sharp identifies. Declaring sovereignty is one act, but regulating ships with the aim to protecting the environment requires a different focus. Thus, while the AWPPA creates rigid territorial boundaries in the model of a sovereign state, the Act does not address specifics of regulating shipping. Following on this, the academic focus on Arctic sovereignty also neglects the process of regulating vessels. For example, Byers (2014) calls for an oil spill prevention treaty to protect the Arctic environment, without mentioning the current regulations that attempt to ensure spills do not happen. Thus, I turn to the ASPPR as the mechanism of regulating vessel movement to address this academic deficiency. The ASPPR address how Canada and other states regulate shipping. The regulations, their application, and their updates highlight the state activities that do not fit in the narrow focus on sovereignty's rigid form in the Arctic. Rather, they should encourage the perception of flexible territoriality where the regulations move with the vessels.

4.1.2 Arctic Shipping Pollution Prevention Regulations

The ASPPR are a Transport Canada initiative. Transport Canada is an agency that does not have the authority to speak on behalf of the political community on matters of sovereignty (Rose & Miller, 1992). When asked about sovereignty, one Transport Canada official said the following:

Transport Canada does not have a particular role to play in sovereignty. That is the Department of Foreign Affairs and the Department of National Defense. Our

interest is in efficient transportation, and safety and security, but [security's] not my area either. We are frequently asked what impact will this [have], or how is this going to impact sovereignty. Generally, I say practically none, if any. What we are interested in are things that increase or decrease safety. (Transport Canada official, 2012b)

Another Transport Canada official concurred:

Transport Canada continues to be concerned with the safety, pollution prevention, equipment, et cetera. There is nowhere in the mandate of Transport Canada that says it has anything to do with sovereignty. That is not in the mandate and therefore we never ever had anything to do [with it]. Nobody from Foreign Affairs told us anything [about sovereignty]. If they tried to, I would have told them to go fly a flag somewhere, because the issues had nothing to do with any of that. (Transport Canada official, 2012c)

Like the officials I quote in Chapter 3, both of these officials explicitly named the Department of Foreign Affairs as the one agency allowed to speak for the state on matters of sovereignty. Transport Canada's mandate, primarily focused on safety, has nothing to do with sovereignty.

An official further stressed:

The Arctic Shipping Pollution Prevention Regulations are incredibly technical in nature—very dry, technical standards and regulations. [They] have absolutely nothing to do with sovereignty except to say you come into these waters, you comply with these regulations. (Transport Canada official, 2012c)

Thus, Transport Canada's only connection with sovereignty is the area that it covers. The ASPPR relies on the AWPPA's shipping zones for its spatial reference. The government passed

these regulations in 1978, eight years after the *Manhattan's* voyage. The shadow of sovereignty had waned in the intervening years, and less public attention was paid to these regulations at the time. As I will demonstrate below, my focus instead on the ASPPR emphasizes a relational framework and furthers the flexible territoriality of the state in the Arctic.

Transport Canada has updated the ASPPR a number of times to address the changing technologies and materials used in shipping. An official clarified the number of changes that happened in 1995 and in 2010:

We did many changes in 1995 by putting the equivalent standards for [ice classifications], which are modern, and we did very few changes in 2010, which was to take [the regulations] to 200 miles offshore.... Nobody has challenged that. That was of course done by Foreign Affairs when they put the baselines around the Arctic Archipelago. For us, it actually made no difference whatsoever because the Arctic Act applied up until 2010 to 100 miles offshore, and then 200 miles offshore. We did not care whether there are baselines or no baselines. You are in these waters, you [must] comply with these regulations. Here is the set of regulations. That is it. Where the lines are, whether you or somebody wants to call it an international strait, I do not care: here are the requirements. (Transport Canada official, 2012c)

The 1995 revisions spurred the development of the Arctic Ice Regime Shipping System (AIRSS), which replaced the Zone/Date System. The wording in the AIRSS addresses the change in standards and technology that influenced the new system. The old classifications of Arctic Class ships in the Zone/Date System are no longer compatible with the new system. Those ships needed to apply directly to Transport Canada's Marine Safety division on a case-by-case basis to

get their ice multiplier for use in the then-newly developed Arctic Ice Regime Shipping System (Timco & Johnston, 2001). The 1995 revisions to the ASPPR began the process of standardizing the classification of ships, which I address below.

The ASPPR focus especially on ships and training for onboard crew. As an official told me,

[The ASPPR] established standards for all pollution prevention–related [activities], and for the construction, for the operation, and for the crewing—the qualifications of the crew—the equipment, which is related to the operation, and the construction. That is unique. The regulations are unique in the world in that respect. (Transport Canada official, 2012c)

The uniqueness of these regulations comes from the holistic framework of shipping. These regulations did not only focus on pollution prevention, emissions, construction, or training, but took them all together under the same act. Addressing particulars of maritime operations, like these above, shifted the focus of governance and state action to the classification societies. As discussed in Chapter 2, classification societies offer expertise and person power to grade the vessels in operation around the world (see International Association of Classification Societies, 2015a; Stopford, 2009).

Canada does not have the resources to inspect every ship coming into its waters. The government relies on classification societies to issue certificates of compliance to vessels so they can operate in the region. As an official told me about this process of applying the ASPPR and classification to ships,

We looked at [it] entirely from the technical perspective: “Do you comply with this?” It is a very flexible regulation. I think if you are outside of the country, we

[still] allow classification societies to issue the certificate that says that you comply with the Arctic Shipping Pollution Prevention Regulations—something that many people do not know. That certificate is not mandatory. What is mandatory is that you comply with the regulations. You could arrive at 200 miles offshore and say “I comply with the regulations,” but then of course it becomes the [responsibility of the] Canadian government to say, “So are you complying with this or with that.” Theoretically, that is possible. Then we can go on board, and if they do not comply, we can apply the sanctions and penalties of the law in which they would not comply with the regulations. That is what we exercise.

(Transport Canada official, 2012c)

The flexibility of the ASPPR is threefold. Compliance is a technical question, and classification societies are the primary source of expertise on technical matters in ship construction and operations. The regulations rely on the classification societies to grade the ships. This ensures that the vessels meet the standards for operating in the waters. These standards are an integral part of the Zone/Date System and the AIRSS to guide safe vessel activities. The ice numerals, produced by calculating the ice conditions and the ship’s ice multiplier, in the AIRSS depend on a vessel’s classification within the Canadian system of regulations. The ASPPR are significantly relational, relying on the work and knowledge of classification societies.

The application of the ASPPR demonstrates its second flexibility. Classification societies can issue the certification of compliance. Since compliance is a technical calculation, societies can say vessels comply with Canadian standards without Transport Canada’s involvement. Transport Canada has updated its standards in the past to keep up with changes in technologies and materials. These updates rely on the technical expertise of the classification societies

working with the government regulators to assess the changes and stay on top of the latest innovations. This process is one I address below. The relational aspect is key here to highlight how the state operates in the realm of governance and shipping to regulate an international activity.

The third way the ASPPR exhibit flexibility is in relation to the territorial extent of the state. The ASPPR move with the ship, whereas the AWPPA enforced regulation at a strict boundary. A vessel's construction, equipment, operations, and crew training certify it as complying with Canadian regulations. These standards and regulations are relevant and binding at all times, whether or not the ship is in the Canadian Arctic. They thus govern shipping holistically, extending wherever a compliant vessel travels rather than operating at 200 nautical miles from shore. The effective control of the state moves and changes on a day-to-day, hour-to-hour basis; a map of this control would be in constant motion.

The ASPPR illustrate how state power operates in the world today: shipping is a global activity, and classification societies use their expertise, inspections, and grading mechanisms to enable regulation. Furthermore, these regulations expand the territorial imperative of the state. The state's regulations are a part of the vessel's basic form and construction. The vessel takes its certificate of compliance with Canadian regulations into non-Canadian waters, drawing attention to the particular flexibility and changing the shape of the state's effective power.

4.2 Applying regulations to vessels

I turn now to two particular cases of ASPPR application to vessels in the Canadian Arctic. A government official explained both examples to me to emphasize the effective presence and importance of the Canadian state in the region. The official believed that the first example, the tug *Irbis* and its barge, was the first commercial transit of the Northwest Passage, one filled with less fanfare and spectacle than the *Nordic Orion* voyage, recounted in the

introduction. The second example is the U.S. Coast Guard cutter *Healy's* ice trials and subsequent Northwest Passage journey. These two examples highlight the application of Canadian regulations to shipping. The former contextualizes the regulations within the overall acceptance of freedom of navigation. The latter addresses the application of regulations to a vessel that is outside of a classification society's remit.

The *Nordic Orion's* voyage, discussed in Chapter 1, grabbed much media attention in October 2013 due in part to the context of climate change in the region. Yet, this was not the first commercial voyage through the Northwest Passage. According to one Transport Canada official, the only commercial voyage that had ever been taken (at the time of my interview with him in 2012) was in 1999 by the *Irbis*, a Russian-flagged ocean-going tug with a barge carrying accommodations for an offshore drilling operation in the Bahamas:

I still say there has been one of these [commercial] transit passages. It was a tow of a barge with an accommodation platform on top of the barge that came from Russia through the Northwest Passage and was on its way to one of the Caribbean Islands. The reason why they chose to come through the Northwest Passage that I thought was fascinating, was because they feared going through the Pacific and going through storms [on the Panama Canal Route]. They had an ice-capable tug and they wanted the calm of the Northwest Passage because it was a very big load on top of this [barge]. They got into trouble when they got into the Strait of Belle Isle between Newfoundland and the mainland. They got into a storm and they went partly aground, and they got off and eventually got to the Caribbean. That to me was the first and so far [in 2012] the only one that was a commercial transit of the Northwest Passage. (Transport Canada official, 2012c)

Additionally, the *Admiral Makarov*, a Russian icebreaker, escorted the tug and barge in the event they encountered any ice. The *Irbis* was an ice-capable tugboat, so the combination met Transport Canada's standards. As mentioned above, Transport Canada does not care where the ships are from, so long as they follow the regulations when they are within Canadian waters. The interesting feature of this journey is that the Northwest Passage was preferred over the Panama Canal, but not for the reason one would expect. As discussed in the Introduction and Chapter 3, the Northwest Passage is most commonly perceived as a shortcut for commercial shipping, decreasing a voyage's time and distance. However, the distance had minimal impact on route choice in this example. The presence of sea ice offered a much smoother voyage for the tug-and-barge combination. Sea ice acts as a natural buffer, dampening waves and making the surface of the ocean more level and predictable for vessel operations. A barge with a housing unit for an offshore drilling platform is incredibly top-heavy, requiring relatively calm seas to prevent the barge from capsizing and losing the cargo. The operator prized stability over speed or a shorter distance. The routing decision was an easy one, since the vessels met the required standards to sail through the archipelago.

The example of the *Healy*, on the other hand, demonstrates regulations as a relational concept, furthering the importance of governance as an important framing concept for this study. The United States questions Canada's *legal* claims to sovereignty over the waters of the Northwest Passage route, arguing that it is an international strait (see Byers, 2014; McDorman, 2009; Pharand, 2007). The United States and Canada established the 1988 Arctic Cooperative Agreement following the *Polar Sea's* voyage through the Northwest Passage in 1984. This agreement allows United States government icebreakers to operate in Canadian waters, but U.S. ships have to comply with all Canadian regulations while in those territorial waters. There is a

diplomatic notification for each icebreaker voyage through the waters, and a reply that allows it entry. However, the actually existing arrangement between both Coast Guards and Transport Canada demonstrate the importance of flexible governance and relations between these agencies and actors.

The U.S. Coast Guard commissioned the *Healy* in November 1999 and planned to conduct ice trials in Baffin Bay in early 2000. Experts at Transport Canada and the National Research Council reviewed the *Healy*'s relevant information for compliance with Canadian standards: "Each transit is preceded by negotiations under which Canada obtains evidence of the equivalency of the US icebreaker to the Canadian standards" (Santos-Pedro & Timco, 2001). The Trudeau government envisioned public naval vessels using the waters back in 1970. Then-Secretary of State for External Affairs Mitchell Sharp stated, in a House of Commons debate, that the AWPPA allowed "the government to exempt from regulation the public naval vessels of other states which substantially complied with Canadian standards" (in Lackenbauer & Kikkert, 2010, p. 144). In the *Healy*'s case, the vessel's "plans, calculations and operational details were submitted in late November 1999, and were reviewed and accepted by Order-in-Council by mid-March 2000" (Santos-Pedro & Timco, 2001, p. 6). The proposed trials in Baffin Bay required community consultations in Clyde River and Qikiqtarjuaq to address the concerns and questions of local residents, in particular Hunters and Trappers Organizations, as part of these requirements. One official recalled their involvement with the process:

[The Americans] had to do a lot of work to show they complied with the Canadian regulations, because they did not listen to me when they were building the *Healy*. I told them, "Why don't you take a look at the Canadian regulations?" and, "Make it comply with the Canadian regulations," and they paid no attention

to me. When they came, we made them go through hoops to show that they [were] in compliance with the Canadian [regulations or an] equivalent compliance—because that is what the regulations call for, including the 1988 Agreement. We did an extensive review of their submission of compliance. We put conditions on them. They complied with every condition, and everything went fine. (Transport Canada official, 2012c)

The *Healy's* review ensured that the vessel met the standards of the ASPPR. In general, classification societies do not rate or inspect public naval vessels. Therefore, the U.S. Coast Guard needed to submit *Healy's* specifics to Transport Canada for its equivalency in the regulations.

One significant feature of the *Healy's* design required action. The official recalled the U.S. Navy's involvement in financing and designing the vessel:

The *Healy* is a fine research vessel, but one of the ugliest aesthetic [vessels] in the world that I have ever seen; and the most uncomfortable. You can hit your head when you go down the stairs. The reason for it being uncomfortable is that the U.S. Navy put money into it. They want to see that the sailors are suffering because they would not put any money into luxury: like having the right height for the stairs for crying out loud! I mean the politics; they go down to the design of the vessel.

Unfortunately, the influence of such politics required Canadian regulators to step in:

They have a crazy design. They should never have had fuel in the forward end of the darned vessel! They have fuel tanks against the shell in the forward end of the *Healy*. We told them, “You can't use those tanks in Canadian waters,” and they

did not. I think this was part of the Navy's money. I am just telling you this to illustrate the fact we are talking about very straightforward regulatory requirements that have the side issue of where it infringes on the policy.

(Transport Canada official, 2012c)

The regulatory requirements are found in the 1988 Agreement between the United States and Canada. United States icebreakers must still comply with Canadian regulations when in Canada's waters. The placement of fuel tanks against the shell violates Canada's regulations because icebreakers run into sea ice with their bows. Sea ice is much less of a concern on the more southerly, open water where U.S. Navy vessels usually operate. The fuel tank's location may seem like a small issue, but putting it in the forward end of the vessel means that there is a greater potential for damage to the tank. Not all icebreakers are suited for the thickest sea ice. Furthermore, the Canadian Coast Guard suggests that *any* land ice—like icebergs, growlers, or bergy bits—be given a wide berth because of the hazard they pose to vessels (Canadian Coast Guard, 1999). Thus, to meet Canadian regulations, the *Healy* cannot use its forward tanks for fuel in Canadian waters. The example of the forward fuel tanks indicates the relational aspect of governance in shipping. There is a definite reason *not* to have fuel compartments against the shell of an icebreaker. The U.S. Coast Guard accepted and adhered to these regulations in Canadian waters in the ice trials and for the subsequent journey to Seattle, the *Healy's* home port.

The relational aspect of governance highlights the state's ability to enforce regulations across multiple agencies. An official highlighted the degree of communication they had with the U.S. Coast Guard:

I talked directly with the U.S. Coast Guard. The official communication, the exchange of letters, was at the top because of the agreement. That is the proper way to do it. Now, did we talk to them about the technical advice? Of course. We talked on the phone, we talked on e-mail, but the official stuff was done, as it should be, through the protocol. Otherwise, that was about it. They invited a representative of the Canadian Coast Guard [and] someone representing the Coast Guard went on board with them. (Transport Canada official, 2012c)

There was considerable communication between the Transport Canada official, members of the Canadian Coast Guard, and the U.S. Coast Guard. This communication emphasized the relations between these agencies that happened below the diplomatic level. The official explained the different mandates at work:

Just to show you the difference between what Transport Canada mandated and Foreign Affairs mandates: the communication I insisted on because of the circumstances. The official communication between the U.S. Coast Guard and Canada was through the State Department to our Foreign Affairs to say that the *Healy* was coming, because in this case that is under the 1988 Agreement. That...is not a Transport Canada agreement, that's a Foreign Affairs sovereignty issues agreement. The official communication was through that, but that was it. All the work, including going to Qikiqtarjuaq and Clyde River...[was between Transport Canada and the Coast Guards]. It has nothing to do with anything other than the requirements of the regulations. (Transport Canada official, 2012c)

The official communication was between agencies that could speak for the political community of the state. Everything else occurred at ministerial levels beneath the state. Nothing of the

regulations and their application overstepped the mandate of Transport Canada. The framing of “all the work” emphasizes the difference between these agencies and their mandates.

Sovereignty sends communications and recognition (see for example Agnew, 2005; Biersteker & Weber, 1996; Murphy, 1996), but the actual work of enforcing the regulations happens in other agencies. Because these are Transport Canada’s regulations, that agency’s involvement was significant to the process.

The case of the *Healy*’s ice trials emphasizes the process of applying regulations to ships. Transport Canada’s involvement was more direct because no classification society graded the *Healy*. The official described the process as

a classic case of the U.S. not listening in the first place. They did not build the vessel taking into account our regulations, then [did] everything according to what we require them to do. There [were] no ifs, buts, or arguments. They just complied with everything, applying the regulations, and it was all dealt with from a technical perspective and through protocol because of the standards. (Transport Canada official, 2012c)

The example of the *Healy* highlights the relational process of regulating shipping. The United States ignored the Canadian regulations until the *Healy* needed to go into Canada’s waters. The submission, review, and conditions emphasize the process of applying these technical standards. The work between the agencies below the level of Foreign Affairs emphasizes the key role governance can play in the operation of state power both in the Arctic and over shipping as a global activity.

4.3 International regulations: the IMO’s guidelines and Polar Code

I turn now to the international regulations that govern Arctic shipping. The lack of international regulations, as discussed above, spurred the creation of distinct Canadian

regulations in that country's Arctic waters. The main international regulations have been applied through existing IMO conventions to regulate pollution and the safety of lives at sea. None of these regulations specifically address polar shipping. The push for international regulations has been recent; the first IMO guidelines were adopted in 2002 and the subsequent mandatory Polar Code in 2016. I rely on one official's first-hand knowledge and experience developing the 2002 guidelines with International Association of Classification Societies (IACS) members and contributing to negotiations at the IMO regarding the implementation of the regulations. I argue that the relational aspects of the state in this forum prioritize governance, as officials from Transport Canada played a leading role within shipping's framework to develop the guidelines and Polar Code. I emphasize how this conceptual framework of governance draws our attention to the process behind these guidelines and how they affect shipping.

The *Manhattan* voyages in 1969 were the beginning. Shipping and offshore activities in the Arctic increased throughout the 1970s and 1980s (see Kikkert, 2012b). The patchwork national and regional framework of shipping regulations was a concern for industry, flag, and coastal state administrators (American Bureau of Shipping, 2016). Furthermore, no international regulations addressed the "unique safety and environmental risks [that] existed for operations in the Arctic region" (American Bureau of Shipping, 2016, p. 3). A working group was established in 1993 and tasked with "developing the framework for an international polar code" that would expand standards to "mitigate the elevated risks of polar operations" (American Bureau of Shipping, 2016, p. 3). This working group, as I will highlight below, was a particularly novel approach to the topic that ensured the expertise was given significant influence and consideration when the regulations were drafted.

The patchwork framework that existed at the time was partially due to the influence of different classification societies. As explained in Chapter 2, classification societies set the standards for the design, maintenance, and repair of everything on a vessel. These societies compete with each other for customers, but the largest societies joined together in the International Association of Classification Societies (IACS) in 1968 to attempt to standardize their classifications (see International Association of Classification Societies, 2015a).⁹ As the official told me about the IACS and the individual societies,

There are twelve of them, and they had each had their own Arctic rules from their own technical corner. None of them was compatible with each other. At IACS, [each society] used to develop their rules among themselves and then they would give it out to the interested people: the members of the classification societies who would comment or not comment. (Transport Canada official, 2012c)

The equivalencies among these societies' rules required attention from regulatory agencies like Transport Canada. Figure 3 highlights the different standards for vessels from those societies included in the 1978 ASPPR. Note the ten specific classification societies mentioned in each column, each with their own terminology and symbols. Column one is the Canadian Ice Types, with the remaining columns the equivalent notations and grades for the individual societies. The most ice-capable ships are in Type A, and then decreasing to Type E.

⁹ IACS member societies are the American Bureau of Shipping, Bureau Veritas, China Classification Society, Croatian Register of Shipping, Det Norske Veritas, Germanischer Lloyd, Indian Register of Shipping, Korean Register of Shipping, Lloyd's Register, Nippon Kaiji Kyokai, Polish Register of Shipping, Registro Italiano Navale, and Russian Maritime Register of Shipping

| Item | Column I Type of Ship | Column II American Bureau of Shipping | Column III Bureau Veritas | Column IV Det Norske Veritas | Column V Germanischer Lloyd | Column VI Lloyd's Register of Shipping | Column VII Nippon Kaiji Kyokai † | Column VIII Polski Rejestr Statkow † | Column IX Register of Shipping of the USSR | Column X Registro Italiano Navale | Column XI Registru Naval Roman |
|------|--------------------------|--|------------------------------------|---------------------------------|--|---|---|---|---|--------------------------------------|-----------------------------------|
| 1. | Type A | A1 Ⓢ Ice Strengthening Class AA AMS | 1 3/3E glace I-super | 1 A 1 ICE A* | 100 A 4 E 4 MC | 100 A1 Ice Class 1* LMC | NS* (Class 1A Super Ice strengthening) MNS* | *KM YLA | KM Ⓢ YAA | 100A-1.1 RG 1* | RNR ⚓ M CM O G 60 |
| | | or A1 Ⓢ Ice Strengthening Class 1AA AMS | or 1 3/3E Ice Class 1A Super | or 1 A 1 ICE 1A* | or 100A1 Ice Class 1A Super LMC | or NS* Class AA IS MNS* | or *KM YL | or KM Ⓢ YA | or 100A-1.1 1AS | or RNR ⚓ M CM O G 50 | |
| 2. | Type B | A1 Ⓢ Ice Strengthening Class A AMS | 1 3/3E glace I | 1 A 1 ICE A | 100A 4 E 3 MC | 100A1 Ice Class 1 LMC | NS* (Class 1A Ice strengthening) MNS* | *KM L1 | KM Ⓢ A1 | 100A-1.1 RG 1 | RNR ⚓ M CM O G 40 |
| | | or A1 Ⓢ Ice Strengthening Class 1A AMS | or 1 3/3E Ice Class 1A | or 1 A 1 ICE 1A | or 100A1 Ice Class 1A LMC | or NS* Class A IS MNS* | or 100A-1.1 1A | | | | |
| 3. | Type C | A1 Ⓢ Ice Strengthening Class B AMS | 1 3/3E glace II | 1 A 1 ICE B | 100 A 4 E 2 MC | 100A1 Ice Class 2 LMC | NS* (Class 1B Ice strengthening) MNS* | *KM L2 | KM Ⓢ A2 | 100A-1.1 RG 2 | RNR ⚓ M CM O G 30 |
| | | or A1 Ⓢ Ice Strengthening Class 1B AMS | or 1 3/3E Ice Class 1B | or 1 A 1 ICE 1B | or 100A1 Ice Class 1B LMC | or NS* Class B IS MNS* | or 100A-1.1 1B | | | | |
| 4. | Type D | A1 Ⓢ Ice Strengthening Class C AMS | 1 3/3E glace III | 1 A 1 ICE C | 100 A 4 E 1 MC | 100A1 Ice Class 3 LMC | NS* (Class 1C Ice strengthening) MNS* | *KM L3 | KM Ⓢ A3 | 100A-1.1 RG 3 | RNR ⚓ M CM O G 20 |
| | | or A1 Ⓢ Ice Strengthening Class 1C AMS | or 1 3/3E Ice Class 1C | or 1 A 1 ICE 1C | or 100A1 Ice Class 1D LMC | or NS* Class C IS MNS* | or KM L4 | or 100A-1.1 1C | | | |
| 5. | Type E | A1 Ⓢ AMS | 1 3/3E | 1 A 1 | 100 A 4 MC | 100A1 LMC | NS* MNS* | *KM | KM Ⓢ | 100A-1.1 | RNR ⚓ M CM O |

† The mark * in these columns is optional."

Figure 5. Equivalency table of classification societies. (From Government of Canada, 2012)

Developing unified standards across the range of societies was an important step for polar shipping. The IACS played a key role, creating standardized notations for classifications. One of the main reasons for this association's foundation was the 1930 International Load Line Convention that stressed the need for collaboration and "as much uniformity as possible" (in International Association of Classification Societies, 2015a). A Canadian official stressed the importance of unified standards to me using the following example:

When a ship comes to Canada and says, "I'm a Polar 5 ship," we know exactly what that is. Because right now when a vessel comes into Canada and says, "I'm an Arctic Class 2 Lloyds" or "I am a DNV Polar 17 1/2"—as I heard quoted, they were going to build a Polar 17 1/2, and I said "What the hell is that?" [Laughs] And you know what, they do not know what a Polar 17 1/2 is, but that is what they were advertising. Having harmonized standards that are understood and transparent [makes sense]; the classification societies should compete on service, not on safety. (Transport Canada official, 2012c)

The unified standards address one of the IACS's key aims: to "establish, review, promote and develop minimum technical requirements in relation to design, construction and survey of ships and other marine units" (International Association of Classification Societies, 2015b). The IACS makes these standards publicly available to non-member societies. The minimum standards are just that: a minimum standard that societies can surpass in their own rules.

How this process of uniform regulation came about is another matter. The working group was a particularly novel approach to the subject of creating regulations. The working group consisted of

master mariners, naval architects, academics, experts in ice and ice operations, and government people like me with some knowledge of regulations. We developed all of that over a very intense period of about 6 years, but [it] really took 10 years. (Transport Canada official, 2012c)

While the occasional diplomat or legal expert participated in the meetings and conversations, the vast majority of these participants were “experienced maritime professionals” from specialized agencies¹⁰ (Kikkert, 2012b). This focused working group operated outside of the IMO for a very specific reason:

The so-called “Polar Code” was always intended to be a parent document: a framework at the IMO and with a reference to the polar rules with the classification societies. That was deliberately done, because the expertise for construction is with the classification societies. That is the proper way, because the IMO should be looking at policies, not at the sizes of brackets for ships. Because the people that mostly go to the IMO know about brackets, they talk about the sizes of brackets instead of talking about policies. We developed it outside [the IMO] because their process was very difficult. We said, “We will keep you informed of the progress.” (Transport Canada official, 2012c)

The working group demonstrated the importance of both expertise and the relational focus of governance. How state power operated was to approach the interested parties under the auspices of the IMO to develop the standardized rules for the polar regions. The document’s format reflects the importance of these relations—of the process. The official used an astute metaphor to frame the work:

¹⁰ See Kikkert (2012b) for a full list.

It is like an iceberg. What is at the IMO is 10% of the Polar Code. The 90% is the work and the real engineering and the effort was spent at developing the polar rules, which are with IACS. However, that 10%, the part that is on top, is very important, because that is what you see, the IMO stuff. (Transport Canada official, 2012c)

The members of the working group recognized that classification societies, and particularly IACS members, play an important role in supporting shipping and possess vital knowledge and expertise on ship construction. While the IMO might attract officials with its particular expertise, it does not have the same expertise as the societies.

Implementing the polar rules was not a smooth process. The IMO made the following conclusions:

Ships should have suitable ice strengthening for their intended voyage and ice strengthening construction standards should be unified for Polar Ships. Oil should not be carried against the outer shell. All crew members should be properly trained. Appropriate navigation equipment shall be carried. Suitable survival equipment shall be carried for each person. Consideration of vessel installed power and endurance must also be made. (In American Bureau of Shipping, 2016)

However, the idea of a mandatory code for all ships would have to wait. As the official recalled, I had a very interesting meeting in Washington with the State Department. [The polar shipping guidelines] was not a big enough issue, but because Canada had a leading role, they felt that there was something wrong. Therefore, the US did not support [the work]. They were leading [efforts] to make the Polar Code

guidelines, which is what happened. [Just] because it has always been done does not mean it is necessarily right. [Because the State Department] did not have, or did not want to put, the resources to look at it, they decided the least amount of harm was to make it a set of guidelines, which is what happened. (Transport Canada official, 2012c)

This was the result despite the fact members of the U.S. Coast Guard were active participants in forming both the parent document and the technical standards. Furthermore, the initial document that the IMO passed was geographically limited:

[The United States] manoeuvred to take out the application [of the Polar Code] to the Antarctic waters. In 2002 when the guidelines were put in place, it was *Guidelines to Ships Operating in the Arctic Ice-Covered Waters*. The United States had a lot to do with that. The important part was that the technical principles had to remain. We [Canada] had to fight for that, because unfortunately when you get lawyers attending technical meetings, they were proposing things that did not make any sense whatsoever. Canada's bottom line was that we preserve the technical, operational, crew, equipment requirements. As somebody from Foreign Affairs put it, "What is our interest if it doesn't apply to the Antarctic?" (Transport Canada official, 2012c)

The official's statement identifies an interesting geographic focus of the work. The frustration with the United States' Antarctic exclusion is evident, because the official's greatest concern was for the safety of vessels operating in all polar waters. It took an official from Foreign Affairs to refocus the work to what Canada's delegation at the IMO wanted: international regulations that addressed the Arctic, *its* maritime space. This demonstrates the relational aspect of the work

done in agencies like Transport Canada. Because their focus is a ship's operations, not the territorial state, these diplomatic and legal moves did not make sense. However, the territorial focus of an agency such as Foreign Affairs recognized that Canada's focus was really the Arctic. The sinking of the MV *Explorer* in 2007 off the coast of Antarctica had, according to the official, a butterfly effect, spurring action from the Antarctic treaty members and reintroducing the region to the updated guidelines in 2009.

The international regulations are important to Canada. These efforts at the IMO emphasize how a regulatory agency like Transport Canada operates within the wider framework. As one official told me when I asked about government funding for projects,

Particularly with policy development, it takes some money but not tons of money. Regulatory development can be expensive if you are hiring a lot of technical expertise to support it, but there are slower, less expensive ways to get to the same end. The one that comes to mind is the choice we have of updating our made-in-Canada ASPPR, which we implemented in 1970, and we have to heavily update those, but we have not put a lot of money into them since the mid-1990s. They are out of date now. We have our eggs in the IMO Polar Code. There are strategic reasons for that. If the world is willing to adopt mandatory Arctic shipping rules, perhaps we can use that as the base for Canadian Arctic shipping rules. And if all ships are adhering to that high level—if we get a high-level, robust code—then some of the tension that exists now, about Canada imposing its own requirements for ships going through the Arctic, will disappear. The Polar Code could solve two or three problems very efficiently, so how much money does it take us to participate in the discussions in London at the IMO? Can we

contribute to the thinking and understanding of the safety requirements? And we are one of 160¹¹ countries there, so how do we punch above our weight in order to get the code that we think is appropriate? That is what we are trying to do now for international Arctic shipping rules. (Transport Canada official, 2012a)

The process described above is an interesting one. Rather than spending the money to hire technical experts to develop their own code, the official suggests that other agencies such as the classification societies and the IMO can do the technical work. This work then becomes the basis for Canada's unique regulations. Rather than being at the forefront of regulations—like with the AWPAA, which lead to Article 234 in UNCLOS, the ASPPR laying the groundwork for the IMO Guidelines, and the AIRSS paving the way for the IMO's new *Polar Operational Limit Assessment and Risk Indexing System*—Transport Canada can supplement the international regulations.

One of the key issues the official identified is mobilizing influence at the IMO. The above strategy only works if Canada has an influential position in the discussions and the debates, and as discussed above, Canada is simply one of 171 countries at the IMO. This, then, entails a different process than that adopted by the outside working group in 1993. The IMO effectively dilutes expertise from key states and IACS members. One official suggested that the issues plaguing work at the IMO stem from the current process:

There have been problems in the discussions of the pollution prevention aspects because [the] process is in separate committees [at the IMO]. The mandatory aspect has not been dealt with, to me, in the proper way. A document is produced for the whole of the Polar Code which is then sent to the other committees and

¹¹ The current IMO Membership is 171 countries

subcommittees for their expertise. What has happened is that [the Polar Code authors] are sending requests to the subcommittees and to the pollution prevention committee: “You have the experts. You tell us what you want.” They do not have the experts. You have to put the experts together [to] develop something. You have to give [the committees] something that they can then comment on. This is what we did in the original, and it worked. They have chosen to do a different process and it is a disaster right now. (Transport Canada official, 2012c)

This statement highlights the policy-making process at the IMO. Whereas the work begun in 1993 (to develop the 2002 guidelines) happened in an outside working group, the work on the mandatory code remained inside the IMO, within the particular committees. Moreover, discussions on the mandatory code ignored the important role classification societies played in creating the guidelines. The official went on to add that the division of work in the committees endangers the holistic focus of Arctic shipping, which has been a cornerstone of Canadian regulations. As one colleague stated,

We have concerns that the work done at the IMO is not good enough to say, “Yeah, that is fine. We are going to adopt it whole-heartedly.” We already have what is, quite likely, going to be the best regime for operating in Arctic waters in the world, because there are not that many. (Transport Canada official, 2012b)

There are very few countries with regulatory knowledge and expertise of polar shipping, and in particular Arctic shipping. Furthermore, the Canadian regulations focus on shipping as a holistic activity, which emphasizes the relational aspect of governance.

The international regulations these officials hope for might solve a very significant debate in academic, policy, and public circles. The basis of the ASPPR is the safety of navigation in

Arctic waters. It is a document of technical standards. Unlike the AWPPA, nothing of those regulations has to do with the sovereign state's territorial claims:

If we have a substantive Polar Code [with] harmonized requirements in place, it puts aside all this business about sovereignty. If we all agree that this particular vessel has to comply with these rules, what does it matter what border, imaginary or otherwise, 200 miles or not 200 miles? [What does it matter] if the requirements are the same, and we all agree that this is a substantive requirement and everybody enforces it, and we all adopt that? That has always been the intention of Transport Canada. When we adopt those, then, well, if it's 200 miles, 201 miles, or 199 miles off shore, it makes no difference whatsoever, because we have agreed that that vessel is complying with the right international standard. That is the great importance. I have tried to make this point to the Foreign Affairs people. It is a technical [issue]. It is entirely [about] safety, pollution prevention, and crew qualifications. This is why I talk about the holistic nature of the Polar Code, which is how it was conceived, and how it was delivered in 1998 when the original was delivered [to the IMO]. (Transport Canada official, 2012c)

These unified standards question the territorial state's form. The substantive point behind the movement to standardize regulations in the Polar Code was to create a single international standard. The AWPPA was a territorial document that delimited a space of environmental protection while also defining an "inside" and an "outside" to Canadian space. However, as I have argued above, the ASPPR creates effective state presence through the regulations that apply to individual ships. The Canadian regulations answer the question of how to govern shipping.

The only way to take advantage of this is through the process of governance in the Arctic and the relations between Canada, other states, and classification societies.

The Polar Code extended the scale of the process begun in the ASPPR. If the mandatory international regulations are substantial enough to meet the standards of Canada's regulatory agency, having distinct national regulations does not make sense. The maritime boundary question at the heart of the regulation of shipping in the Canadian Arctic would no longer apply. The question of sovereignty and legal definition of the Northwest Passage route is less relevant from a regulatory framework perspective.

The language and conception of the territorial sovereign state in the Arctic focused greater attention on the AWPPA. A Polar Code that reproduces the holistic foundations of the ASPPR and Canada's distinct regulations washes the AWPPA's foundation away. Governance directs our attention to the state's particular relations with other actors and frameworks, rather than its own territory. The state's territorial boundaries no longer matter to vessels in the region. The Polar Code exercises the state's power through the mechanisms of construction, design, outfitting, equipment, training vessels, and crew. These are fundamental standards applied to each vessel as it moves into and out of the IMO's defined Arctic and Antarctic regions.

4.4 Conclusion

The two primary acts governing shipping in the Canadian Arctic represent two different state approaches and mentalities. The Arctic Waters Pollution Prevention Act is sovereignty promotion under the guise of environmental protection. The Act established strict boundaries in response to a critical moment when the *Manhattan* encroached on the state's perceived territorial extent. But the question of how to enforce the regulations and govern shipping remained. The Arctic Shipping Pollution Prevention Regulations, developed in concert with outside groups such as classification societies, emphasized a holistic approach to shipping. Classification societies

issue compliance certificates, applying regulations on the state's behalf but without state interference. The regulations emphasize a flexible territorial approach, with state power acting over the vessels not as they cross a boundary, but through their construction and inspection.

Canadian and recent international regulations demonstrate the importance of governance as a framing concept for shipping. The relational approach found in the ASPPR demonstrates how state power operates through shipping as a distinct activity. The regulations not only identify shipping's particular framework, but also operate within this framework to allow state power to operate. The work of Canadian officials on the IMO's guidelines and Polar Code show this process in action. Working with the experts at the IACS and other regulatory bodies for the ASPPR demonstrates how these regulations are developed in the international forum. With the mandatory aspect of the Polar Code still under development, the question remains if it will be sufficient to supersede national regulations in Canada.

I turn to the issue of the future in the following two chapters. I address the way that government policies anticipate particular futures discursively. I focus on the idealistic economic futures of Nunavut suggested in 2009's *Northern Strategy*, in which resource extraction activities and tourism are marked out as the largest future growth areas of shipping in the region. Moreover, I address the issue of trans-Arctic shipping, and the Northwest Passage in particular, within the wider framework of shipping's economic reality. All of the futures hold particular discursive promises, shaping how government anticipates future activities in the present.

Chapter 5: Idealistic futures of shipping and economic development

How does the perception of the future influence actions taken in the present? More importantly, how does a specific vision of the future become prominent—to the detriment of other futures? An understanding of anticipatory action addresses these questions by making clear the relationship between the future and the present. As I discussed in Chapter 1, anticipatory geographies constantly remake the future through styles, practices, and logics. This process dictates how futures are made known, are related to, and are made actionable in the present. I focus in this chapter on styles: the way, according to B. Anderson (2010a), that specific futures are discursively formed from many different sources.

This chapter examines how government policies and commentators present mining as a future economic benefits to Nunavut, and how news media and academics frame the trans-Arctic routes as potential shortcuts for international shipping. I argue these perceptions of the future marginalize alternatives. I focus on documents from the Nunavut government, in addition to the discursive construction of the North's future in the 2009 report, *Canada's Northern Strategy*. These sources emphasize that economic growth in the territory can only come through mining and tourism. Mining and resource extraction provide significant opportunities for economic growth. Tourism can be both an economic growth activity and an activity that helps protect the fragile environment according to these sources. These activities connect the Arctic to wider global flows of capital and people (see Dodds & Nuttall, 2015; Heininen & Southcott, 2010). Trans-Arctic shipping links global flows of goods and people across space to future perceptions of the open, accessible, and traversable Arctic. Commentators argue that the Northwest Passage and the Northern Sea Route offer significant savings in distance and time compared to traditional routes (see Liu & Kronbak, 2010; Martínez-Zarzoso, 2013; Somanathan, Flynn, & Szymanski,

2009; The Economist, 2012b, 2013a). These perceptions do not, however, take into account the specifics of the shipping industry. In other words, the future of the Arctic as a shipping superhighway does not fit the present calculations and actions of shipping companies.

I argue that these specific perceptions of the future are political. These futures depoliticize and delegitimize opposing visions of the future that contradict the importance of mining and trans-Arctic shipping. As I will emphasize below, to be against mining is to be against economic development for Inuit communities and to be against alarmist warnings of the Northwest Passage's viability as a shipping route is to ignore the apparent lack of state presence. As I demonstrate, these perceptions of the Arctic's future often close off specific alternatives. Further, the significance of these limited perceptions of the future sets the course for future discussions and debates. Anticipatory practices emerge as the idealized future of substantial mining and tourism provide the economic engine, closing the substantial gap between Nunavut and the rest of Canada. The future made present directs activity supporting focused investment in these sectors. Community concerns and benefits are secondary to the overall good these idealized futures bring. In the same way, trans-Arctic shipping through the Northwest Passage is an idealized future. The route may exist, but this activity draws focus from more prominent maritime activity. Further, the idealized discussion of the Northwest Passage as a viable route neglects to fully account for the machinations of the shipping industry itself. I emphasize the empirical cases to challenge the prominent narrative around the future of these activities.

This chapter begins with an overview on the political economy of shipping, touching on the specifics of bulk shipping, container shipping, and the development of logistics. I turn next to focus on Nunavut's economic future. I use 2009's *Canada's Northern Strategy* as a framing document for the future economic prospects of Canada's North. Mining and extractive industries

are crucial to the economic growth and self-sufficiency of the territory, according to the strategy document. Nunavut's government strategy document emphasizes the importance of these industries as well. I then turn to the perception, among both scholars and the media, that the Northwest Passage will be a key shortcut for global shipping in the future. Developments in the shipping industry, however, such as slow steaming and hub-and-spoke networks, work against this presumed future of Arctic shortcuts. The shipping industry uses an already-existing networked world system, limiting the immediate use of trans-Arctic routes.

5.1 Political economy of shipping

Maritime shipping is a fundamental part of the globalized economy today. Ships move 90% of global trade (UNESCO, 2010), resulting in specific geographies of shipping and transportation. These geographies extend to the infrastructure on land and water that supports vessel operations, for example ports, navigation buoys, and nautical charts. Shipping is ubiquitous around the world and humans have a long history of relations with the sea (see Mack, 2013). It should be no surprise, then, that there is a similar history of shipping and vessel transportation in the Arctic regions (Arctic Council, 2009; see also Bennett & Rowley, 2004; Inuit Circumpolar Council Canada, 2007). In the case of Nunavut, the lack of other viable transportation methods means that shipping is essential to communities and economic development activities (Arctic Council, 2009; Government of Nunavut, 2010).

I begin this section by examining the two primary modes of shipping, bulk and container, which make up the majority of the global fleet. I then examine the development of logistics as a key organizing principle of shipping today. I turn my attention to the Arctic routes after this, addressing their potential within shipping's network of routes today before examining their impact on local communities. I identify where my work, which focuses on policy makers and anticipatory futures, can fill the gap between a community and industry-focused work. The role

of policy makers in anticipatory futures of shipping can highlight particularly fruitful intervention points within the international shipping regime.

Bulk shipping is foremost about carriage of uniform goods (Hilling & Browne, 1998; Stopford, 2009). The goods must be able to fill a ship on their own and make economic sense to be shipped in large quantities, based on the economies of scale of moving the goods from place to place (Stopford, 2009). Additionally, these goods usually have low inventory and storage costs, meaning they can be stored and shipped later when market prices rise (Stopford, 2009). At the same time, bulk shipping is most beneficial to the normalized transportation of goods, because the capital investment in infrastructure that handles bulk goods can be mitigated across regular shipping schedules (Stopford, 2009). On the other hand, container shipping is based around the shipping container itself as a means to handle cargo more efficiently across multiple modes of transportation (see Stopford, 2009, p. 508). Additionally, the container allows different volumes of goods. The container is “the single major development that has deeply revolutionized freight transportation” along the east-west trade routes between North America, Europe, and Asia (Valentine, Benamara, & Hoffmann, 2013, p. 232). The role of the container has had a significant influence on the development of the just-in-time economic processes that occur today.

These distinctions between shipping methods and the types of goods they handle extend to the ports that receive and process the goods on the ships. While warehousing and storage remain important to the bulk shipping industry, it is unnecessary to the container shipping industry. Many of the bulk shipping operations in port have been automated to increase the speed of loading and unloading vessels, in large part due to the speed and amount of materials transported (Stopford, 2009). As the goods on the ship are the same, speed of loading and

unloading is of the utmost importance. On the other hand, containerization has changed port layout and infrastructure to facilitate ease of movement between the ship and the next method of transportation, whether road, rail, or another boat. The processing of containers also has speed as its central concern, but in a different way. The container is offloaded and then moved to the next mode of transportation to continue its journey. There is no desire to warehouse the goods in between the two transportation methods (Stopford, 2009, p. 510). Additionally, the size of the container ports has grown to keep up with the growing scale of container ships as well as the terminals and equipment to service these ships (Valentine et al., 2013).

More broadly, container ships influence the economic system based around logistics and just-in-time economics. Logistics as a subject is defined as “a science of the efficient organization of movement within spatial systems that entails the design and management of supply chains” that aim to “‘add value’ to space and action between production and consumption, annihilating minutes or even seconds from the transactions along supply chains” (Cowen, 2010, pp. 601-602). As McCalla, Slack, and Comtois (2004) highlight, there is a focus now around global supply chain logistics; major shipping companies are no longer just moving goods across water, but are now involved in the door-to-door logistics of delivering goods and information about the process (see also Panayides & Song, 2013; Stopford, 2009, p. 511). Cowen (2010) argues that logistics are a means of further time-space compression under capitalist production and distribution. Lasserre argues that this move towards logistics means that shipping companies are selling “a schedule and a delivery date,” something that many commentators forget when talking about the Arctic routes (2011, p. 805). Overlooking the development of logistics is a significant problem when approaching the future of shipping in the Arctic. Focusing on the Arctic as a transitory space not only ignores the development of

logistics, but also further obscures the wider presence of shipping in the region. Further developments within the industry and infrastructure will have more beneficial effects on international shipping than the opening of transitory polar routes.

Logistics creates a specific geography around the production and distribution of goods (Hesse & Rodrigue, 2004). This geography differs between regions, as Rodrigue and Notteboom (2010) highlight in their comparative study of logistics in Europe and North America. One way that logistics influence shipping is through the development of liner services that shipping companies provide. These operations are based around a regular service route of vessels that move goods from point to point, since operators only get compensated by the voyages, not the time spent in port (Slack, 1998). Fremont (2007) details the development of the hub and spoke model of the Maersk shipping line and the advantages of its network structure along this pattern. This model of shipping is a more efficient way to transport goods: larger ships with more containers make the longer voyages between the hub ports, while smaller ships operate on the individual spoke lines out from the central hub. The result is that there is near complete coverage along the transportation system, and the company can take advantage of the economies of scale in using larger ships and ports to serve the hubs and smaller ships to service the routes and ports along the spoke routes. The system operates around the fastest possible method of unloading ships and moving goods onto the next mode before loading the ship for its next journey. The underlying logistical problem is getting containers onto the ship in the correct order so they can be offloaded at the right port and sent where they are needed, on time.

The main draw of polar routes to shipping companies is that they reduce the overall distance travelled by ships. Lasserre (2011) argues that distance is the key factor in a consideration of the viability of these routes (e.g. Martínez-Zarzoso, 2013). The Northwest

Passage would save 1,650 nautical miles from New York to Yokohama compared to the Panama Canal (Somanathan et al., 2009), while the Northern Sea Route would save over 2,000 miles between Rotterdam and Yokohama (Liu & Kronbak, 2010). Shorter distance means less time spent travelling and potentially making more trips. External costs would temper the benefits of saving fuel and making more voyages. In a simulation of shipping costs in the Northwest Passage, Somanathan et al. (2009) found that increased maintenance, the specialized nature of ships that operate in ice-covered water, higher insurance, and potentially increased fuel use to handle ice encounters cost more than the savings the Northwest Passage route provided. Liu and Kronbak (2010) found costs for labour increased by 10% across the Northern Sea Route, and maintenance and repairs rose by up to 100%. They also noted the cost of icebreaking escorts, required by the Russian government for commercial ships. These external costs must be weighed against the potential profits that the shorter route might generate. I discuss the calculations of route viability in Chapter 5.

The case of the *Nordic Orion* in the introduction highlights one example of the effect of external costs on the economic viability of these routes. The voyage through the Northwest Passage in September 2013 saved approximately \$80,000 in fuel alone, and with the increased load of coal, the entire voyage saved \$200,000 (Stueck, 2013a; Weber, 2014). The profitability of the voyage was dependent on a number of factors, from the ship's construction and operational capabilities to the weather and ice conditions that the ship encountered (Stueck, 2013a). Additionally, the *CCGS Louis St. Laurent* icebreaker was on hand to escort the *Nordic Orion* in the event the ship were stuck in ice or needed assistance. The Canadian Government covered the cost of icebreaker escort—approximately \$50,000 per day for operations north of 60

(McGarrity & Gloystein, 2013). One invoice from the Canadian Coast Guard for four days of escort service makes the profit margin disappear.

5.1 Nunavut and Canada economic futures

Canada's Northern Strategy communicates the government's perspective on the region's future in detail. The four pillars of this perspective, discussed in Chapter 1, are exercising sovereignty, promoting social and economic development, protecting environmental heritage, and improving and devolving northern governance. Through these four pillars, "the Government recognizes what must be done to secure the future of Canada's North, for the benefit of all Canadians, and is taking concrete action to turn this vision for the North into reality" (Government of Canada, 2009). In direct relation to my work on shipping, the policy dismisses the immediate viability of the Northwest Passage route for shipping in favour of increasing tourist and resource exploitation voyages. Therefore, this chapter's focus fits the framework of future shipping activities identified in the strategy document, which positions mining and extractive activities as

the cornerstones of sustained economic activity in the North and the key to building prosperous Aboriginal and Northern communities... Large-scale projects already underway barely scratch the surface of the North's immense store of mineral, petroleum, hydro and ocean resources. However the full extent of the natural resources [*sic*] potential in the Arctic is still unknown." (Government of Canada, 2009)

The government admits to having "learned from its past mistakes" from mines in the region and ensures that remediation activities are happening (Government of Canada, 2009). Mining and extractive activities are *the* way forward for the region in the policy document. Furthermore, future projects promise to be more valuable and beneficial because their full extent has not yet

been exploited. This unlocks resources for use in international commodity markets. The government's admission that it has learned from its mistakes is supposed to remedy concerns about negative impacts on the environment and suggest the government's knowledge of the ongoing negative effects of mining and extractive industries; nonetheless, the policy does not specifically address remediation actions. The policy only suggests that remediation activities are a part of the individual project's development plan, suggesting these economic activities are too important to the future of the region to stop because of negative after-effects. The policy also frames environmental protection as a way to secure the unique environment for "visitors from every corner of the globe" (Government of Canada, 2009). Tourism is the motivating factor behind future environmental protection: the government must protect the distinct flora and fauna of the Arctic for visitors, but notably *not* for those living in the region. In this strategy, tourism supports wider market activities, whereas the hunting and fishing of local people does not.

I turn now to the specifics of mining in Nunavut. Government policies at both the territorial and national level suggest that this is the potential future economic engine of the territory. I address mining and resource development through the policies and interviews of officials in the territorial government. I present a brief case study of the Mary River project as an example of the promise and the challenges of relying on resource development as a major economic engine. This case highlights the need to critically investigate how prospective futures are established and mobilized for particular outcomes, like economic development.

5.1.1 Mining in Nunavut

The Government of Nunavut sees mining "providing the opportunities for high levels of employment and economic activity that will lead to substantial social and economic benefits in every Nunavut community" (Government of Nunavut, 2007, p. 8). The aim of the territorial government regarding mining is to "create the conditions for a strong and sustainable minerals

industry that contributes to high and sustainable quality of life for all Nunavummiut” (Government of Nunavut, 2007, p. 2). This is similar to the perspective of the federal government’s policy detailed above. Both policies highlight the economic potential of mining for the territory and emphasize that the natural resource sector is key to social and economic development.

The boom and bust cycle of mining and extractive activities, however, threatens to leave the territory without its significant economic engine. The boom and bust cycle is not ideal for long-term economic planning on a territorial scale, but with an emphasis on exploration activities, the policy suggests that cycle might be avoided:

A strong and sustainable mining industry will have operating mines throughout the territory providing employment and business opportunities. This will require a high level of exploration activity resulting in new mineral discoveries and development with new mines coming in to production as older mines are closed (Government of Nunavut, 2007, p. 9).

Because of the focus on constant exploration and active mines, remediation remains out of the picture. The very nature of the mining and extractive industry is unsustainable. The future relies on the constant exploration and discovery of new sites to mine, as others become unproductive. There is no real focus or attention in the territorial policy document on these mines as a part of wider international commodity markets. But, as I demonstrate below with the issues at the Mary River site, these international markets greatly influence activities in the territories.

The Nunavut Land Claims Agreement (NLCA) settled legal title between the Inuit and Canadian Government in the territory. In the negotiations and final agreement, the federal government valued the mineral rights more highly than the surface rights. The NLCA gave

356,000 square kilometres of land to the Inuit where they have surface rights—17% of the total area of Nunavut—and only 38,000 square kilometres of subsurface rights. Slightly less than 10% of Inuit-owned lands include mineral rights. As one member of the Economic Development and Transportation Department told me when asked about the difference that the NLCA makes, “There are no unsettled claims. What you see is what you get here” (2012b). This point was again made in the 2011 Government of Nunavut’s *Overview of the Mining Activities*: “Significantly, the NLCA is a final settlement whereby all land claims in Nunavut have been settled with the Inuit of Nunavut, thus providing an unmatched level of land tenure certainty” (Costello, Senkow, Bigio, Budkewitsch, & Ham, 2011, p. 2). Mining activities thus can occur without potential interference or counter claims.

The remote nature of the territory creates a number of economic challenges. The territorial government’s policy identified a number of issues that challenged development:

Nunavut is a high-cost area for mineral exploration and development. The lack of knowledge about the geology of the territory, the lack of a road network, and the challenging climate combine to increase project costs and planning timelines.

(Government of Nunavut, 2007, p. 23)

An official at the Department of Economic Development and Transportation emphasized the costs related to the mineral deposits using the terminology of *stranded* resources. These resources are stranded economically and physically. Commodity markets need to make the mines economically profitable for the companies:

The majority [of sites] since the 1970s have never been economically viable because of their stranded nature. Some are more stranded than others are: Mary River is fairly stranded; something like Meliadine and Meadowbank, they are not

so bad. Others are significantly inland. The quality and the richness of the deposits have to compensate for that. Shipping is the only way to make that work. The basic equation is the closer you are to tidewater, the more viable it is going to be: simple as that. (Economic Development and Transportation official, 2012b)

The “not so bad” overland route to the Meliadine gold mine is 25 km north from Rankin Inlet, NU (Agnico-Eagle, 2016b), and Meadowbank gold mine is 110 km north from Baker Lake, NU (Agnico-Eagle, 2016a). As I explore below, Mary River’s projected overland rail route highlights the stranded nature of the site.

Aside from the physical location of a mining site, the economics of a project need to be viable. All mine operations in Nunavut rely on the summer sealift for materials, but can fly the people and their food to the site:

There is a recognition you are going to have to put in your own infrastructure. Then it comes down to a per-commodity basis. If you are doing gold or something, you need access to get all the modular and prefabricated goods in. Every year... roughly one third of your annual operating cost is fuel. You need to bring all that in. Most of the other stuff is minor: moving the food, moving people around, that is, by air. (Economic Development and Transportation official, 2012b)

Under these conditions, deposits have to be three to four times richer than elsewhere (Economic Development and Transportation official, 2012b) in order for them to be economically viable. An estimated 33–45% of the total operating costs for the Mary River project will come from importing the diesel fuel needed to generate electricity for the machinery (Economic

Development and Transportation official, 2012b). Further complicating the work is the process of getting the materials to market. As one official from the Department of Economic Development and Transportation told me,

If you are producing diamonds, they can go out in a satchel; gold, it can go out in a steamer trunk; silver is a few steamer trunks. But if you are producing copper, zinc, or nickel, you are probably shipping 1 million tons of concentrate every year. That will equate to probably 6 or 8 shiploads going out. Polaris will ship out [sic – the mine ceased operations in 2002], in their 6- to 8-week window according to the Fednav guys, something like 6 loads. The coal and iron ore...there is not much viable coal here because it is too far inland. You can only make money with a bulk commodity if you can deal in high tonnage. (2012b)

The economics of getting materials to the site and mineral resources to market complicates the development of mines in the region. Coal and iron ore represent low-value, high-bulk goods. Companies need to mine and ship out significant quantities to make the operations viable. The main mines operating in the North are diamond and gold mines, save for the Mary River site.

Because of the large geographic expanse of Nunavut, there are few direct links between communities and mining projects. The mines are seen to bring “stable and long-term developments for which permanent infrastructure must be built” (Government of Nunavut, 2007, p. 24). The presence of a mine will potentially create spin-off opportunities to other sectors of the economy, including perhaps the construction of a more modern infrastructure with the prospect of long-term investment in the community to make it viable. The territorial government’s policy suggests that communities could benefit by providing infrastructure, including hotel facilities, fuel storage, and charter aircraft to fly the workers in and out. The

policy also suggests that the government should “encourage the development of economically viable, value-added industries that may flow from mining operations” (2007, p. 15). These statements demonstrate how a particular future vision of mining activity as a key economic growth engine shapes the conversation of wider economic investments and benefits. Investment must happen to support mining, but the benefits are all conditional. Permanent infrastructure must be built for the “stable and long-term developments” that mining supposedly offers, rather than focusing on the needs of the communities. At no point is the spatial relation between communities and mine sites addressed, nor the global markets these raw resources flow into. In addition, there is no consideration for the aftereffects of these extractive activities (for more on this issue, see Keeling & Sandlos). Only a few mines offer communities the chance to partner with projects, for example the Bathurst Inlet Port and Road (BIPAR) project:

I think if you look at the BIPAR project, it is difficult to say what the status of that project is, but I think there was some hope that if it happened, the port facilities could be used as a staging facility for the adjacent Kitikmeot communities. I guess the other two projects where this kind of, or similar but more localized potential might exist is the Meliadine project near Rankin Inlet, and the Peregrine project, [where] Iqaluit is the closest community. There is the potential to have some kind of marine infrastructure that would both serve the local community’s needs and the mining company’s needs, but in both cases, it is just a potential rather than [a reality]. There are no [concrete development] plans. (Economic Development and Transportation official, 2012a)

There are relatively few opportunities for these partnerships to happen, but they remain conditional and potential, rather than an actuality or eventuality like the policy documents describe.

5.1.2 Mary River Mine project

The most significant development in mining in the region has been the development of the Mary River project. The mine site is located 160 km south of Pond Inlet on northern Baffin Island. There are five deposits of high-grade iron ore, and a further four prospective sites nearby. The main deposit has proven reserves of 160 million tons at 64.4% iron ore content and probable reserves of 205 million tons at 64.9%. Deposits two and three have proven reserves of 0.4 million tons at 65.4% concentration, an identified 52 million tons at 64.6%, and an inferred 448 million tons at 65.5% (Costello et al., 2011). The ore is of such high quality that there is no need for further processing. The mine will be supported by two ports, one located at Milne Inlet on the northern part of the island and the other located at Steensby Inlet on the southern side of the island. The construction of the port at Steensby Inlet will take four years, and the Milne Inlet site will be used for bringing materials, supplies, fuel, and equipment to the mining site (Nunavut Impact Review Board, 2012). The port at Steensby Inlet will handle year-round operations by ice-strengthened ore carriers. The Steensby Inlet site will connect to the mining site by a 150-km rail line that will be built before extraction can start. Once the railway is completed, Steensby Port will be the main receiving site for materials.

One official at Environment Canada described the Mary River project as a “game changer” due to the size and value of the deposits (Environment Canada official, 2012b). The executive summary of the Nunavut Impact Review Board’s report captures this thought process:

During the Board’s review of the Project, a central theme emerged: This Project represents an unprecedented development for Nunavut and for Canada in many

respects—the development of a Railway [*sic*] in Arctic conditions, conducting year round shipping with purpose-built ice-breaking ore carriers that are considerably larger than any other ships that have travelled in Nunavut waters, a projected mine life greater than 20 years and the potential for billions of dollars in benefits and revenues to be shared by the federal and territorial governments and the land and mineral owners, the Qikiqtani Inuit Association and Nunavut Tunngavik Inc. (2012)

The project represents a significant investment of money and resources in the region. It is a game changer because of the length of time it will operate and the prospective value to the territory. The scale and ambition of the project set Mary River apart from any active or closed mines. The project's scale is similar to other iron ore mines, according to one official from the Department of Economic Development and Transportation:

Mary River is huge for the territory, but it is not [huge compared to other sites]. Iron ore mines are the same scale everywhere. They are much larger in Brazil; they are much, much larger in Australia. What they are proposing here is the same as [what is] being done two to three times over in Québec and Labrador. (2012b)

The perception of this mine from officials in Ottawa and Iqaluit emphasizes the economic potential of this development. At the same time, global commodity market fluctuations challenge the perceived benefits.

The initial investment was projected to be close to \$5 billion (Economic Development and Transportation official, 2012b). This does not include the projected cost to build and operate the 10 to 12 ice-strengthened ore carriers needed to transport the raw materials (Transport

Canada official, 2012c). As a part of the recent fluctuations of the commodity market in 2012, the project has been scaled down from its initial \$5 billion investment to \$750 million for a revenue-generating period. The Baffinland Corporation sent a notice to the Nunavut Impact Review Board in early January 2013 highlighting the changes, cutting the tonnage of ore shipped out from 18 million to 3.5 million. This revenue-generating period necessitates using the Milne Inlet port and overland shipping during the ice-free months. The companies need to pay down their debt and generate revenue to build the more ambitious parts of the project: the railway and deepwater port at Steensby Inlet (Nunatsiaq News, 2013). The London Mining Company, a partner in the project, filed for bankruptcy protection after closing its mine in Sierra Leone in 2014 due to falling ore prices and the Ebola crisis in the country (Nunatsiaq News, 2014b). Further setbacks have hit the project as the price for iron ore fell from \$130 to \$77 per metric ton in 2014 (Nunatsiaq News, 2014b). Baffinland asked for more shipping days out of the Milne Inlet site, and asked to use self-discharging ore carriers to bring material to a Capesize¹² ore carrier moored offshore (Nunatsiaq News, 2014b). However, the Nunavut Planning Commission rejected this plan because it contravened existing land use plans by requiring almost year-round icebreaking near the Milne Inlet site (Gregoire, 2015). In February 2016, Baffinland proposed constructing a railway line to replace the road between the mining site and the Milne Inlet port as part of its revised submission to the NIRB with expanded shipping from Milne Inlet (Skura, 2016). Global forces thus greatly influence the development of mines, despite the best efforts of the territorial and federal governments.

Before this market-induced setback, the topic of Mary River was one that came up in many of the interviews with policy makers and advocates, both in Ottawa and in Iqaluit. One

¹² Capesize carriers are ships over approximately 150,000 deadweight tons. These ships are too large to transit the Suez or Panama Canals; their name comes from the need to pass around the Cape of Good Hope or Cape Horn.

reason that the Mary River project is of particular interest is its sheer size and value. Officials at the Conference Board of Canada highlighted the potential of resource extraction and mining industry as a key opportunity for the region (2012). Another official from Transport Canada advised me to “follow the cash” to trace present and future opportunities in the North (2012c). The number and size of ships contracted to service the mine site emphasize the value of the project, according to the same official. These ships, as I describe below, would be significantly larger than any previous ships operating in the Arctic.

Yet the officials I interviewed also voiced concerns about the project. A Department of Economic Development and Transportation official raised a concern that the increased number of vessels operating throughout the year meant that there would be increased traffic in the region: “I know that...if Mary River gets up and running, there’ll be more shipping to ship the product overseas. Even there now, there are local folks asking questions how the shipping is going to affect whales and seals and marine life in general” (2012b). This same official indicated that these concerns were already present for sealift operations, but on a smaller scale. The increased shipping also created a fear of the unknown for residents that the officials relayed to me: “In Cape Dorset, for instance, [the residents] are fearful that the big ships will keep the whales from coming into the harbour; they’ll scare them off. They hunt the beluga whales for food all the time, year round” (Economic Development and Transportation official, 2012b). Cape Dorset is located on Hudson Strait, right along the projected route the ships would take. The Department of Fisheries and Oceans pointed out in the Nunavut Impact Review Board report that there have not yet been any year-round tests of the routes (Nunavut Impact Review Board, 2012, p. 137). Another concern raised in the report came from the Qikiqtani Inuit Association, which emphasized that the magnitude of shipping and icebreaking activities for the project is

unprecedented in Canadian Arctic waters. The potential impact of shipping and icebreaking is a substantial concern among Inuit members (Nunavut Impact Review Board, 2012, p. 132). The concern is that the icebreaking will disrupt travel routes over the ice, making it more dangerous for locals to fish and hunt (see Bennett & Rowley, 2004; Inuit Circumpolar Council Canada, 2007, 2014).

The vessels' size is also significant. The largest vessels currently operating in the Canadian North are the *Arctic* and the *Umiak*, run by the Fednav group. These vessels serve the Raglan nickel mine in Deception Bay, QC, and the nickel mine in Voisey's Bay, QC, respectively. The *Arctic* is capable of moving over 150,000 tons of material a year, while the *Umiak* moves over 360,000 tons. The Baffinland Mining Company contracted Fednav to build and operate the 10 to 12 Polar Class 4 vessels that can operate in the Hudson Strait and Foxe Basin region year round. The total cost of the ships alone is around \$2 billion. The proposed ships will be 330 m long, 52 m wide, with a draft of 20 m and powered by a 90,000-shaft horsepower engine, allowing for a deadweight tonnage of 185,000 (Baffinland Iron Mines Corporation, 2012).

The ships proposed for the Mary River project are critical to its success. They are far larger than any other ice-capable bulk cargo ships currently operating in the world. These ships have three times more capacity than the *Umiak*. Transporting the proposed 18 million tons of material per year when the project is operating at its fullest capacity is a realistic expectation. Baffinland has estimated that the ships will make over 102 round trip voyages each year, which means that a ship will be passing through the area once every 1.8 days (Baffinland Iron Mines Corporation, 2012). This is a key aspect of the bulk shipping economic reality: moving a massive amount of low-value material to make up for the investment and costs involved in the

project. The frequency of these voyages is one of the worries of Cape Dorset residents I mentioned above.

The ships' size creates a distinct challenge for government agencies. The Department of Fisheries and Oceans's concern in the Nunavut Impact Review Board's report was about the untested routes that the ships would be taking during their year-round voyages. Because the ships are larger than any other vessel operating in the North, there are no charts or navigational information suitable for these vessels. This is one example of the changing demands on navigation support infrastructure that the government must address in the region.

The role of ships in the success of mining activity is twofold. First, these ships are the only way to move materials to the mine. Second, the ships are essential to carry the necessary volume of low-value, high-bulk material to the marketplace. The mining operations at Mary River require the larger ore carriers to operate year round to make the project economically feasible, but the Mary River ships are of a scale not seen in the region. Therefore, their impact to the region is beyond the impact that other vessels might have.

Mary River is a potential game-changer and economic engine in the territory. However, the policy documents that frame this and other mining activities as economic engines do not account for international commodity market conditions. The challenges to setting up and developing the mine come from outside the territory. These international connections should temper the overarching importance placed upon mining operations in the territory.

Canada's Northern Strategy singles out mining as a key area of future growth in the Canadian North. As I have detailed above, vessel activities relate to specific economic activities. While the government positions these activities as potential economic windfalls for Nunavut, there are significant hurdles associated with mining. Mining is a place-situated activity

dependant on international commodity markets to make its resources economically viable. When markets change, the shockwaves affect operations in the territory. The case of Mary River highlights both the territorial and federal governments' ambition to position future mining projects as an economic growth engine, and the effects of resource development on the territory. With mining a primary concern of the territory's economic future, any opposition is dismissed as being against progress, despite mounting evidence of its inefficient returns to the local communities and its wider environmental impact.

5.2 Postmodern ocean space: crossing the blank ocean space

The previous section detailed the role shipping plays in the idealistic economic futures of Nunavut. I turn now to the perception of Arctic maritime routes as a future shortcut for shipping activities. The perception of the Northwest Passage and the Northern Sea Route as shortcuts is a key framing discourse for present and future shipping. There is a belief that the melting sea ice is leaving the Canadian Arctic open to trans-Arctic shipping by commercial companies, and that there are significant dangers attached to that. This follows from the belief that without sea ice in the region, transportation will be easier and therefore traffic will increase. A BBC report on August 25, 2011, stated that "shipping companies are already eyeing the benefits [the Northwest Passage and Northern Sea Route] may bring if they remain open regularly" (Black, 2011). The Reuters news agency quoted the director of a Danish shipping firm who said that "the biggest obstacle in sailing the remote icy waters [of the Northern Sea Route] is not ice, but Russian bureaucracy" (Vesterager, 2011). The CBC reported on the findings of Dr. David Barber, which showed that the Arctic Ocean was becoming more like the other oceans; Barber reasoned that the information would "sound like welcome news for intercontinental commerce" (Paris, 2012). These articles highlight the narrative that the shrinking sea ice is bringing benefits, lessening obstacles, and welcoming international shipping to the Arctic.

One significant conceptualization of wider ocean space is that of a surface to be crossed: the idealized space of capitalism's compression of space by time. Steinberg (2001, p. 165) argues that within postmodern capitalism's "triumphant Fordism, hypercommodification, and global homogenization," the ocean holds a distinct form as a "seemingly friction-free surface across which capital can move without hindrance" (p. 159). The ocean is the space where visions of time-space compression (see Harvey, 1990) are most easily imagined, which makes it a flat space *par excellence* in postmodern capitalism (Deleuze & Guattari, 1987). Ships laden with goods cross over this flat space, linking distant lands together (see Hasty & Peters, 2012; Lambert, Martins, & Ogborn, 2006; Mack, 2013; Steinberg, 2001). The development of logistics in the shipping industry highlights its relation with the ocean space. As I detail in Chapter 1, logistics is at the heart of the postmodern capitalist production of space-time compression (Cohen, 2014; see also Harvey, 1990). Shipping companies no longer operate simply port to port; they have shifted their focus to the door-to-door management of goods (McCalla et al., 2004; Panayides & Song, 2013; Stopford, 2009). Panayides and Song (2013) emphasize the change in the shipping industry as companies use logistics to expand their operations to match the physical integration that the container gives to different transportation modes (Martin, 2013, 2014). Lasserre (2011) argues that companies no longer sell only the speed of a voyage but also the delivery date and schedule. Arctic shipping routes are opening into this system of commercial shipping. As I will highlight below, the utopian future of the Northwest Passage as a shortcut relies more heavily on an outdated conception of commercial shipping than it does on the present reality of intermodal transportation operations.

Trans-Arctic routes are now conceived of as blank spaces to be crossed and rendered blue on images and maps of the region (Aporta, 2011; Dodds & Nuttall, 2015; Steinberg, 2001).

However, as I have detailed in the previous chapters, shipping already exists and happens in the Canadian Arctic. While the work of Vannini, Baldacchino, Guay, Royle, and Steinberg (2009) emphasizes how Canada's Arctic is increasingly perceived as a peninsular and archipelagic region, government officials already hold this view. As a Department of Fisheries and Oceans official told me,

The Arctic is as prominent as any other ocean, essentially. There is no difference between the Arctic, the Atlantic, or the Pacific oceans: they are bodies of water that are being used by mariners. The only difference in terms of prominence is that [the Arctic] was not used as extensively in the past, and it is increasingly being used. The impact is that some of the services that have been provided have been provided there for decades with a very stable number of vessels navigating and vessels that understand how to navigate these waters and they have very experienced personnel onboard. What's happening now is that you've got a different mix of users going there, newcomers who are first being drawn in there by increased business, more fuel deliveries, more cargo deliveries. All of that brings larger ships, more ships that bring new personnel who are not used to navigating there. It also attracts tourists and recreational boaters as well who think the Arctic is essentially ice free, and they go there and they say, "Oooh, what a wonderful place to navigate." The changes in the Arctic make it different, but the Arctic in itself is no different. It is a body of water that is open part of the year. (2012)

As a body of water, the Arctic has and will continue to have vessel activity, even if the transitory routes are not used. The shipping there is different from the rest of the world. As I detailed in

previous chapters, the majority of voyages in the Canadian Arctic are destination, with a particular mix of vessels. These vessels are not a part of the wider perception of transnational shipping, where the Northwest Passage figures a shortcut between the major economic centres of North America, Asia, and Europe.

There are a number of challenges to a view of the Northwest Passage route as a part of these wider international shipping networks. A Transport Canada official (2012d) cited four main concerns in relation to the Northwest Passage as a part of this conceptualization of maritime shipping. First is the development of the Asian Gateway transportation network with its port at Prince Rupert, which is on the great circle route between Asia and North America. The Asian Gateway may lessen costs using the economic benefits of rail travel to move containers across North America. Second is the Panama Canal Expansion project that will widen the locks to allow larger ships to pass through. As I detail below in Table 2, the “New Panamax” ships can carry more than double the volume of “Panamax” container vessels.

| | Length (metres) | Width (metres) | Draft ¹³ (metres) | Capacity ¹⁴ (TEUs) |
|-------------|-----------------|----------------|------------------------------|-------------------------------|
| Panamax | 289.56 | 32.31 | 12.04 | 5,000 |
| New Panamax | 366 | 49 | 15.2 | 12,500 (estimate) |

Table 3. Vessel Size Limits for Panama Canal Expansion (from Benítez, 2009)

The canal’s new locks opened for operations on June 26, 2016. The third concern is that the wider network of ports in southern waters offers alternative ports for the vessel to dock at should the market change for certain commodities; no such alternatives exist on the Northwest Passage route. The fourth concern is the movement of the shipping industry to the practice of

¹³ The vertical distance between a ship’s waterline and the bottom of a vessel’s hull.

¹⁴ Twenty-foot Equivalent Units. This is a generalized measurement of a cargo vessel’s capacity to carry containers based on the 20 x 8 foot intermodal container.

slow steaming to save fuel and reduce emissions. None of these developments relies on the melting of sea ice in the Arctic. They are all developments within the industry or infrastructure.

I turn my attention to the wider network of shipping companies, and in particular Maersk, to highlight the port and transportation network alternatives that exist in southern waters. As the largest shipping company in the world, both in terms of fleet size and the amount of cargo moved, Maersk operates a hub-and-spoke model (Fremont, 2007). Key ports in certain regions operate as hubs on main shipping routes, and spokes extend to regional hubs that organize local shipping. Operating this network allows Maersk to take advantage of the economies of scale by operating different-sized ships on these routes as well as utilizing specific transshipment hubs like the one at Algeciras, Spain. Fremont suggests that, with the success that Maersk has had, other shipping companies will try to implement a similar system (2007, p. 442). Maersk's hub-and-spoke network highlights the structure of international shipping networks. These routes have been in place for many years, and companies organize their operations around them.

The Arctic routes are not always compatible with the hub-and-spoke networks that major companies operate. The Arctic routes have not been incorporated in the planning and construction of the shore-based infrastructure that supports these international networks. Second, the Arctic routes offer a single pathway. Once a ship enters them, there are no reasonable alternative transportation methods to move the goods to a market. A container whose market changes in the current maritime network can be diverted at one of the many transshipment hubs to another vessel or to another destination entirely. Arctic routes do not have the infrastructure to allow this option to even exist.

I turn now to the development of slow steaming. Slow steaming is the process of deliberately sailing a vessel at a significantly slower speed than its maximum speed in order to

save fuel. Maersk developed this tactic in response to high oil prices (Jorgenson). Traditionally, the maximum speed of a container vessel is approximately 28 knots; slow steaming ranges from 21 knots to as slow as 15 knots. The single biggest cost of merchant shipping is fuel oil (Notteboom & Vernimmen, 2009; Wiesmann, 2010). Yin, Fan, Yang, and Li (2014) highlight three forces that encourage slow steaming: an oversupply of ships, a significant increase in bunker fuel prices, and an increase in environmental pressure. Past operations in shipping were dependent on the speed of a vessel. Standard shipping contracts use the language of “utmost dispatch” to emphasize the speed of getting cargo from A to B (Alvarez, Longva, & Engebretsen, 2010). The industry’s focus on speed was evident in surveys conducted by Brooks (1990) that emphasized speed as the most important consideration. Saldanha, Tyworth, Swan, and Russell (2009) argue that speed was a factor often overlooked when companies chose a shipping agent, despite their recognition that delays in non-ocean segments of the transportation network offset the speed of a journey. Furthermore, they identified a potential choke point with the “pipeline stock at either end of the slow steaming voyage where cargo would congest at the dispatching port.”

However, the growing emphasis on logistics has shifted the focus of the industry to the schedule and delivery of the goods, as I discussed above. Maloni, Paul, and Gligor (2013) argue that extra slow steaming is more profitable because of the associated fuel savings. Despite the longer trip times, the fuel savings offset the potential costs of stocking and pipeline concerns that Saldanha et al. (2009) mentioned above. Furthermore, despite the increased number of days and the increased number of ships on routes to make up for slower travel times, there has been a decrease in carbon dioxide emissions and environmental impact (Cariou, 2011; Yin et al., 2014).

How, then, does slow steaming work, and how does it better serve logistics? All ships must cope with hydrodynamic forces that work against moving forward. While vessel speed grows arithmetically, fuel consumption and engine load grow exponentially. This is not due to a lack of innovation or propulsion, but is rather a product of the hydrodynamic resistance from water to the ship itself. Slow steaming can offset this hydrodynamic resistance. Merchant fleet vessels use propellers that are directly connected to the engines, so the only way to reduce fuel consumption is to reduce the engine’s speed. Slow steaming thus reduces the engine’s power output in order to reduce fuel consumption. Table 3 highlights the difference that a reduction in speed can have on a ship’s fuel use. Reducing the speed causes a significant reduction of fuel use per voyage.

| Vessel Speed (knots) | % Reduction in speed relative to 27 knots | % Reduction in fuel use relative to 27 knots |
|----------------------|---|--|
| 22 | 19 | 58 |
| 18 | 33 | 75 |

Table 4. Reduction in fuel use by vessel speed. Compiled from Wiesmann (2010).

This strategy is not without its problems. The majority of the engines in the merchant fleet were designed and engineered to run at or near full steam. Any change to this standard use might cause problems for the operator. I turn again to the example of Maersk. The main engine providers to the Maersk Shipping fleet and its associated ships, MAN Diesel and Wärtsilä, both issued “Letters of No Objection” to reduced engine loads, despite their concerns (Jorgenson, 2011, p. 4). Wärtsilä’s technical briefing suggested that its two-stroke diesel engine was designed to operate at 75–80% of maximum load. The engine’s “operational parameters, the specification of the turbochargers, coolers, auxiliary systems, exhaust gas boilers, and so on, are chosen and optimized for that normal load range”; operating below 60% load for an extended

period of time would mean that the system is not optimized (Wiesmann, 2010, p. 52). Both companies have issued upgrade kits for the engines, with modifications that include changing the slide fuel valves, a turbocharger cut-out, lubrication and oil system upgrades, derating the engine (lowering the mean pressure within a cylinder and adjusting the timing of the engine), and upgrading the propeller (MAN PrimeServ, 2012, p. 11; Wiesmann, 2010, pp. 54-55). These changes allow operators to take advantage of the benefits of slow steaming by modifying the propulsion system to enhance the direct-drive nature of the engines.

In 2007, the Maersk Line conducted internal studies of how to lower fuel costs and cut carbon dioxide emissions. The solution was to steam the ships at 10% of the engine load, which cut the sailing speed from 24 knots to 12 knots (44.4 to 22.2 km/h). This strategy lowered bunker fuel use by 3.8 million tons between 2007 and 2010, and by 2 million tons of carbon dioxide emissions in 2010. Maersk has further invested in new engines and hull designs that create more storage capacity below deck. A voyage from China to Rotterdam by the Suez Canal that used to take 21 days under ideal conditions now takes 23 days, but it is more reliable. Reliability has become more important than speed as transportation logistics emphasize delivery at the right time. As Jorgenson states, “Maersk has invested billions of dollars into slowing down” (2011, p. 7). When a ship steams at or near its operational limits, any delay due to weather or route choke points puts a ship behind schedule (see Lasserre, 2011 for a similar argument). With slow steaming, there is a buffer created by the reduced speed. The ship can sail faster to make up time, because the arrival date accounts for a slower planned vessel speed.

The act of slow steaming recognizes the physical and natural limitations of ocean travel in the era of postmodern capitalism while at the same time creating new ways of working within it. The recognition, by the industry’s largest company, that slowing down saves money runs

counter-intuitive to prevailing assumptions about a sped-up global economy (see also Rosenthal, 2010). The world today is about getting things *right away*; manufacturing supports a just-in-time system of transportation to reduce warehouse costs; and with the Internet, the globe is literally a fingertip away. Yet here is a major player in the shipping industry actively slowing down its fleet of ships—and not only saving money, but also reducing its impact on the environment through fewer emissions.

Slow steaming has two impacts on the Arctic. First, as more and more companies adopt this operational tactic, slow steaming's influence on the transportation system will change. The importance of the polar routes is widely perceived in terms of shaving distance and time off the shipping journey. But in fact, the immediacy of the intermodal transportation system relies more on logistical accuracy than on speed. Without a guarantee that vessels will arrive on time, the polar routes will remain unmanageable for container cargo. The present transportation system can accommodate more ships along the route to make up for the increased duration of sailing journeys.

Second, slow steaming's reduction in speed also reduces the emissions of the ships. This reduction may not be great—Cariou (2011) calculated an 11% reduction in carbon dioxide emissions due to slow steaming between 2008 and 2010—but the industry's focus on saving money comes with the added bonus of being able to claim the environmental benefits of slow steaming (MAN PrimeServ, 2012). This double benefit should encourage more operators to look into the strategy as a way to reduce costs and meet new environmental regulations that ports and states are putting in place.

Slow steaming offers a further advantage to companies. As Harvey (2010) writes, “the circulation and accumulation of capital cannot abide limits. When it encounters limits it works

assiduously to convert them into barriers that can be transcended or by-passed.” In the case of slow steaming, hydrodynamics placed physical limits on the movement of ships across the ocean’s surface. Slow steaming is just one of a number of potential fixes to these limits of hydrodynamics, including the bulbous bow and adjustable propeller. The latter two address the resistance and efficiency of the ship, but do not address the limits of the fluid the vessel moves through. Slow steaming bypasses these natural limits with a more holistic approach, adjusting the space-time compression of the capitalist transportation system (see Harvey, 1990). By slowing vessels down, capital turns the limits of hydrodynamics into a barrier and offers a new solution to address it. Just-in-time economies run more efficiently without potential delays from ships. Shipping companies can take advantage of economies of scale to move more goods on larger vessels because the vessel uses less fuel at slower speeds. The engine and propulsion companies offer upgrade services, capitalizing on an existing fleet that needs to upgrade its engines and propellers. Slowing down offers a number of key incentives for objects that cannot go faster: cost savings through reduced fuel use, more scheduled departures and arrivals, and environmental plaudits for shipping companies.

The workings of the shipping industry above demonstrate how the Arctic routes are often misunderstood by the wider public. As I set out at the beginning of this section, a simplified equation of melting ice and increased shipping traffic is often found in the popular press. This influences the public’s understanding, as well as the focus of academics on questions like sovereignty over these vessels –discussed in Chapter 4–that will eventually travel along these routes. The historical appeal of the Arctic routes was that they offered a key shortcut between Western Europe and Asia. However, applying this rationale today ignores developments in the shipping industry. The development of logistics has encouraged management at all points along

a transportation network. The goal now is the accurate delivery of cargo, not the fastest delivery. The idealized future of the Arctic as a shortcut for shipping operations is incompatible with the shipping industry's current and near-future trends.

5.3 Conclusion

In this chapter, I have examined three overarching ideas about the future. The first two relate directly to Nunavut's economic development. The perception that the future of the territory lies with mining and tourism dominates narratives that direct action and attention towards these specific economic activities. These activities are tied to international industries and global processes of capitalism. Mining and resource extraction activities, however, are situated economic developments that do not offer significant spin-off benefits to communities in the North. These operations hinge on international commodity markets that drive investment and activity, and many of the sites in the territory were not viable until recently. Companies took action towards more mining exploration and operations, but fluctuations in the markets have detracted from their success, as the case of Mary River shows.

The other overarching future vision of the region positions it as a shortcut to international shipping. This perception is central to the wider public's understanding of shipping in the North. As I discuss in previous chapters, there is significant vessel activity, unrelated to transitory shipping, happening in the region already. Expected increases in shipping relate to this already existing shipping. The prospective future of trans-Arctic shipping does not address shipping activities happening throughout the world today. Shipping companies develop and implement networks that best serve their current hubs and routes. Trans-Arctic routes may not fit neatly into these networks or have the available ports to unload vessels if market conditions change. Moreover, the rationale behind the trans-Arctic routes is less applicable to the development of slow steaming. The development of logistics has shifted importance from the speed of a journey

to the schedule and delivery of the goods. Slow steaming creates better conditions for operators to meet their scheduled deliveries, it is a more economical method of shipping, and it garners greater environmental praise with its lower emissions. The prospective future of the shipping industry is not solely focused on the shortened travel time that these Arctic routes offer.

Chapter 6: Anticipating future Arctic shipping

How does the future become the cause and justification of action in the present? This is a key question that anticipatory action attempts to answer. Rather than assuming that the future is a culmination of progress or an empty space, anticipatory action identifies how specific futures are constructed and made known, related to and actualized, and made actionable in the present. These distinct futures are political productions, specifying not only action but also acceptable responses.

Anticipatory action focuses on these different styles, practices, and logics. I examined the styles, or the way that certain futures are made known in Chapter 5. The promise of economic development in mining directs action towards this activity in the present. However, the industry is part of wider global flows of capital and resources that ultimately challenge its growth. At the same time, one significant future of the Canadian Arctic is the potential of the Northwest Passage. Focusing on the perceived benefits of the Northwest Passage as a shortcut overlooks wider trends and developments in global shipping activities. Thus, it is important remember the existing framework these particular futures have overlooked in their promotion of particular activities. I argue that through anticipatory action, the practices and logics that make particular futures present and actionable become clear, ensuring the ongoing importance of the experts that create these particular futures. I further argue that the logic of prevention imbues the regulatory framework of shipping that emerges from anticipated futures.

I begin with a review of anticipatory actions as an alternative to future studies and suggest that anticipatory action opens a critical and distinct approach to the future, particularly with regard to the Arctic and shipping. I then focus on the different practices that render specific futures present, examining the calculation and imagination of particular futures and paying

particular attention to the imagined future of Arctic shipping recounted in the Arctic Council's *AMSA 2009 Report*. Two particular documents that feed into the larger report also demand greater attention: the Global Business Network's¹⁵ *The Future of Arctic Marine Navigation in Mid-Century*, and the University of New Hampshire Coastal Response Research Centre's *Opening the Arctic Seas: Envisioning Disasters and Framing Solutions*. These documents emphasize the role of expertise in scenario planning exercises. The futures these experts help make present are made actionable through an emphasis on the logic of prevention. I end this chapter with a discussion of how Canadian officials employ these preventative logics.

6.1 Anticipatory action and future studies

There is a key distinction between anticipatory action and future studies. Anticipatory action focuses on the *process* of making particular futures actionable in the present. Future studies attempts to discern trends from a wide range of projections about the future of a particular region or phenomenon. Key futures that mobilize policy decisions in the present are too easily lost or overlooked in the work on future studies. Furthermore, anticipatory action's framework of styles, practices, and logics addresses how specific futures are developed and given significance over other futures, and ultimately how they influence action in the present.

I turn to a review of future studies in the Arctic mentioned in Chapter 1. Arbo et al. (2012) specifically address the wide scholarship produced around the future of the Arctic. Over fifty studies met the criteria of the authors. They identify four subjects that preoccupy Arctic scholars: climate change and its social impact; natural resources; politics, governance, and security; and holistic studies. For the most part these studies situate the Arctic as either a space

¹⁵ The Global Business Network is a group that specialized in scenario planning exercises for businesses and agencies. It was brought in to the AMSA Report project to conduct, lead, and present the scenario narratives workshops.

for investment or a space to be preserved and use participatory methods such as scenario planning and statistical calculation in their attempts to derive the future.

The sheer number of studies that are produced highlights a key framework of future studies. Arbo et al. (2012) suggest that future studies conceptualize the future in one of two ways. First, future studies contribute to “preparedness and wiser long-term decision making” (Arbo et al., p. 165) rather than to endorse any predictive outcomes. Policy makers can develop and consider different scenarios by accounting for how actions and events may influence each other. Second, as Arbo et al. (2012, pp. 175-176) claim,

In future studies, uncertainties abound. There is no crystal ball into which the future can be gazed. When reliable predictions and forecasts are in short supply, thinking in terms of alternative futures might be the only option for robust policy-making and strategy development.

Thus, future studies attempts to systematically deduce trends and commonalties between the multitudes of scenarios produced to present a picture of what might be done in the future (B. Anderson & Adey, 2012).

Anticipatory action takes a fundamentally different approach to studying the future. Anticipation “implies a heightened attentiveness” to what might come, while denying the “otherness, mystery or unknowability of things to come” and actively “striving to control the future” (B. Anderson, 2010b). The focus of anticipatory action is “how geographies are made and remade as futures are brought into the present and take on some form of presence” (B. Anderson & Adey, 2012). Specific futures are made known, related to, and acted upon in the present.

The key difference between future studies (and to a lesser extent planning) and anticipatory actions is scope and focus. Planning addresses one or two factors that change while keeping everything else constant. Future studies focuses on wider trends and commonalities to discern the scope of the future. These trends and commonalities do not focus on the way certain futures seem to take on more importance than others in the decision-making process.

Anticipatory action identifies a process around key “call-to-action” moments that renders specific futures in response to these moments actionable in the present. Rather than offering robust overviews or limited projections, anticipatory action focuses on the process of key decision makers in the construction of specific futures that they can then act upon.

B. Anderson (2010a) provides the framework for this anticipatory approach. The future is composed of styles, practices, and logics. *Styles* make specific futures known. *Practices* give content to these futures in the present. *Logics* direct action in the present that seeks to safeguard life against the future. Chapter 5 explored particular styles of Arctic futures. Below, I address the way practices make Arctic futures present. I pay particular attention to the role of scenario planning and imagined futures. These scenarios emphasize a preventative logic.

6.2 Anticipatory futures of the AMSA 2009 Report

The *AMSA 2009 Report's* scenarios were constructed with assistance from the Global Business Network, an agency that specialized in scenario planning. Two workshops held in 2007 brought together experts from academia, circumpolar governments, the shipping industry, naval construction firms, classification societies, and environmental groups. The leaders of the AMSA Report commissioned this exercise to explore the different scenarios of maritime access in the region. The report cited two primary drivers and key uncertainties of future marine use in the Arctic: governance, and resources and trade. Governance is defined as “the degree of relative stability of rules for marine use both within the Arctic and internationally,” while

resources and trade are understood as “the level of demand for Arctic natural resources and trade” (Arctic Council, 2009, p. 94). These were chosen as the most important from around “120 factors and forces that could shape the future of Arctic marine activity by 2050,” 20 of which are included in the report (Arctic Council, 2009, p. 91). The sheer number of different factors influencing shipping regulation highlights the complexity of creating and understanding the future, as well as the difficulties of trying to focus attention around the most important issues. The participants in the workshops behind the development of the report reduced the number of factors to 20, and then down to pairs of two to make “candidate frameworks.” These included Indigenous welfare and resource exploitation; new resource development and maritime disasters; climate change and levels of trade; Indigenous people and the rise of Asia; legal regime and the value of natural resources; and new resource development and legal regime (Arctic Council, 2009, p. 92). Thus, in attempting to produce a region-wide future scenario, the report minimizes complexity in the Arctic region in favour of broad statements.

The *AMSA 2009 Report* limits potential intervention and establishes the very path that discussions can take. In particular, by highlighting the variables of governance and resources and trade—the participants’ particular areas of expertise—it ensures the continued importance of this expertise and those who possess it. The difficulty in relying on imagined futures as an anticipatory practice is that the evidence comes from the tacit and codified knowledge of the participants (B. Anderson, 2010a, p. 788). Working groups held at different times and places in the lead-up to the report assembled the different factors mentioned above, but the constant presence in these meetings was the main representatives of the national governments. The production of the final document relied heavily on the expertise of the authors, all of whom have their own background and perceptions. B. Anderson (2010a) writes, “Statements about the

future condition and limit how ‘the future’ can be intervened on” and “function through a circularity, in that statements disclose a set of relations between past, present and future *and* self-authenticate those relations” (pp. 778-779, emphasis in original). The *AMSA 2009 Report* reduces discussions of shipping’s future in the North to that of a question of economic development and trade and governance of ships. While other concerns, such as the perspectives of Indigenous peoples or the environment, are considered, the two preferred main axes of forecasting mediate and restrict their applicability. Any concern that falls outside of these two axes is tangential to the imagined future of Arctic shipping by the Arctic Council.

The *AMSA 2009 Report* includes four scenarios in a two-by-two grid highlighting the key roles governance and the demand for resources and trade would have on the future of Arctic shipping. Different combinations produced different possible futures: an “Arctic Race” when high demand for resources exist without a governance regime; a “Polar Low” when low demand for resources combines with low governance intervention; a “Polar Preserve” with strict governance and low demand for resources; and an “Arctic Saga” that results from high demand for resources and strong governance over activities. When I asked about their ideal future for the region, an official from Environment Canada referenced the four potential futures from the Arctic Council’s *2009 Arctic Marine Shipping Assessment*:

It is funny I have this thing up; the four scenarios from the AMAP exercise—the Arctic Marine Shipping Assessment: the Arctic Race, Polar Lows, Polar Preserve, and Arctic Saga. I think all four of them are going to come true, to be quite honest, depending on where in the Arctic we are talking about. (2012b)

These four imagined futures emerged solely from the “two primary drivers and key uncertainties” (Arctic Council, 2009, p. 94) in the Arctic as defined by the Arctic Council.

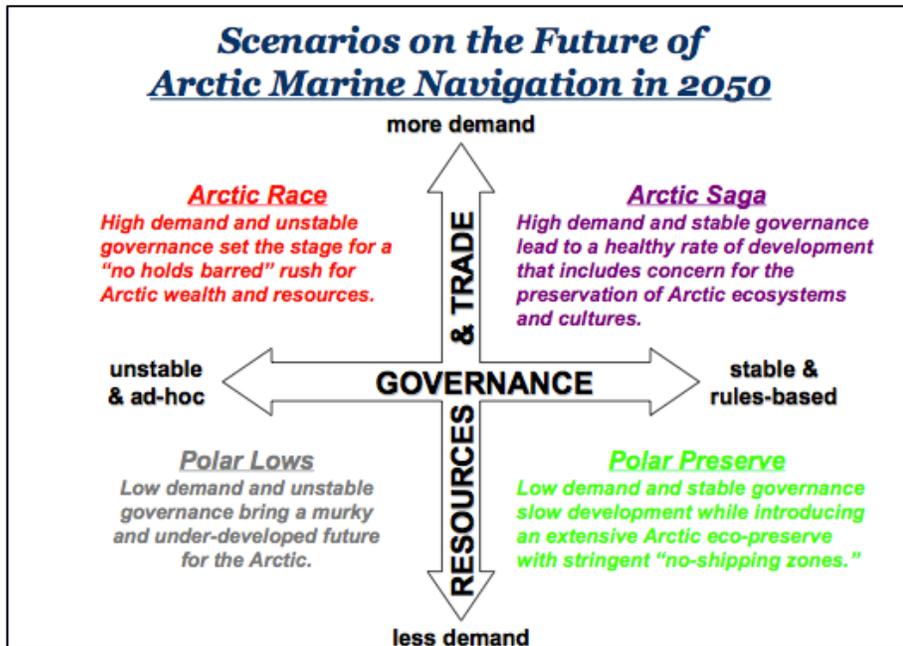


Figure 6. Two-by-two grid of the primary drivers of future shipping in 2050 (Arctic Council, 2009; Global Business Network, 2008).

The participants in the workshops leading up to the *AMSA 2009 Report*'s publication were asked to envision futures of what Arctic shipping would look like under the different scenarios (Arctic Council, 2009, p. 95). I have grouped these visions together below to offer a fuller perspective of the different opportunities and challenges facing the future of Arctic shipping. The matrix produces imagined futures around the framing concept of the two key forces: a high-concept narrative of the framing action, the primary drivers of change, and finally implications for Arctic marine navigation. The scenarios direct the reader to make comparisons across each future.

Key frameworks emerge from each of these four futures. A report from the Global Business Network summarizes the working groups' ideas and lays out potential future narratives that each of these four scenarios might produce. These enabled the participants to incorporate "many of the other uncertainties explored at the workshop, while still creating four different scenarios that are plausible and relevant to the full range of Arctic shareholders" (Global

Business Network, 2008). They presented these narratives in three periods: short, (2009–2020), middle (2020–2035) and long (2035–2050) terms. I argue that participants constructed specific future scenarios that ensure their continued relevance in these activities. I demonstrate the value of employing anticipatory actions to examine these scenarios. Since the lack of control over resources and trade are evident in the scenarios, the most influence the participants can have is in the category of governance. Anticipatory action thus allows me to show how the particular futures, in this case the Arctic Saga scenario, that emerge as the most desirable are also the ones where participants maintain the greatest influence and continued relevance. I turn to these scenarios now to draw attention to the way they frame specific futures and concerns.

6.2.1 Arctic Race

The Arctic Race’s future is described as “a world in which many international players anxiously move to outwit competitors and secure tomorrow’s resources today” with an “intense interest in Arctic natural resources” (Arctic Council, 2009). The working group’s short-term narrative identifies significant political and economic tensions: the continuation of territorial claims, new trade blocs formed outside of the World Trade Organization, and singular national maritime frameworks created “outside of the IMO process”(Global Business Network, p. 7). The narrative on the middle term emphasizes a greater role played by military and force projection—even “country companies” have been forged between national militaries and private companies. In this narrative, military-backed infrastructure is unplanned and unsustainable, and the five littoral states have formed an alliance to control the resources of the regions. In the long term, this scenario is characterized by political tensions and occasional flashpoints between states, as well as significant, ongoing environmental damage caused by low-level spills and military dumping in the region, which triggers large protests from Indigenous groups. The scenario ends in 2050 with a warning:

Military and intelligence experts generally agreed that a Great Arctic War has narrowly been avoided several times in recent years—and that if there were going to be a real world war in the 21st Century, it would most likely be sparked in the open summer waters of the Arctic Ocean. (Global Business Network, 2008, p. 9)

The lack of governance and the high demand for resources and trade, in other words, would drive heightened state power and military conflict.

This scenario reflects some of the participants' common fears regarding the Arctic's future, since a lack of maritime governance and high demand for resources are current features of the Arctic. The terminology is stark. To “anxiously move to outwit competitors” emphasizes a cutthroat environment where companies and countries take great risks for potentially great benefits. To “secure tomorrow's resources today” evokes a scramble that is often associated with the polar regions (see discussion in Dodds & Nuttall, 2015). Furthermore, because maritime rules and infrastructure development are piecemeal, international shipping and cooperation suffer. This future downplays the significance of the expertise of participants in the workshop, none of whom were from the state departments or military agencies. The participants' seat at the table is not guaranteed, as their knowledge is unimportant in this militarized future. The narrative highlights the importance of ensuring that significant international cooperation is present and that these participants remain relevant.

6.2.2 Polar Low

The Polar Low's narrative scenario highlights a future in which “global financial tensions are prevalent,” “domestic disturbances divert attention from global issues, and simmering frictions cause prolonged divisiveness” (Arctic Council, 2009). The short-term narrative emphasizes a significant global economic recession through protectionist policies and international disease outbreak along global trade lines. Furthermore, this economic downturn

lessens overall emissions and slows the melting ice in the region. The middle years see independent growth in emerging markets and a push for energy-efficient infrastructure in Europe and the United States as energy prices soar. Regional development standards hinder development, and the presence of ice causes exploration companies to lose millions of dollars in potential Arctic ventures. In the long term, regionalism reduces demand for resources as resource cartels develop in regions to secure energy rights. Single-ship companies take “rust buckets” through the Arctic Ocean without any attention to the region’s maritime routes. Arctic maritime routes become a “missed opportunity” as land routes out of the region become more popular. The final assessment is that

By 2050, many historians and commentators felt that the world had changed little in the past century. The world remained divided and tense, with no foreseeable hope for broader cooperation and alignment. Region after region was mired in a cycle of posturing for territory, dominance, and control. The Arctic’s 15 minutes of fame had peaked back in 2010. (Global Business Network, 2008, p. 12)

Thus, the Arctic remains an ignored region through a lack of governance and a lack of resource demand and global trade.

Workshop participants presented this scenario as an undesirable future. In it, global trade is curtailed significantly in favour of regional trade. Furthermore, the Arctic remains tangential to global economic processes. Most interesting is the lack of maritime development in the region. The continued presence of sea ice means that navigation and extraction activities are difficult. There is an assumption that a transition to energy-efficient infrastructure lessens the melting of sea ice, making the Arctic less open to economic investment. Moreover, the development of overland transportation routes is significant; it emphasizes a future where

maritime traffic is limited, thus reducing the future influence of the participants. Their expertise and opinions have less impact, because maritime transportation in the Arctic is restricted. Thus, a future where Arctic sea ice remains present or even grows does not secure the participants' ongoing position as influential experts. Just as in the Arctic Race scenario, other forms of expertise become more important, as the Arctic remains largely peripheral to global trade and resource development.

6.2.3 Polar Preserve

The Polar Preserve is “a world where concern about the environment, coupled with geopolitical and economic interests elsewhere, drives a movement toward a systematic preservation of the Arctic Ocean” (Arctic Council, 2009). The short-term narrative emphasizes a lack of proven reserves, which slows down speculation, and two significant international disasters, which create public demand for intervention on behalf of the Arctic environment. The IMO forms a committee that suggests strict control of navigation in the Arctic. Indigenous groups are key players in creating an international environmental agreement. In the middle term, countries “double down” on alternative energies, and Coca-Cola and Disney open up an ecological theme park. An international Arctic Preservation Treaty is passed in 2030 with a strict enforcement arm, and companies leverage “Arctic Friendly” as a new marketing tool. The long-term narrative emphasizes sustainability as a built-in feature of the economy. However, the development of environmentally friendly ships and technologies, coupled with the depletion of resources elsewhere, means that the Arctic preserve comes under renewed attention. Arctic sea ice still melts, creating situations where there are open maritime routes in the region. “Competitive forces” return to the economy after the downturn and focus elsewhere. By 2050, the narrative emphasizes

the twentieth anniversary of the Arctic Preservation Treaty. This time around, Shell outfitted the iconoclastic polar bear image with snowshoes that left the imprint, “Helping you tread more carefully in the Arctic.” This would be the phrase used to lobby for temporary rollback of parts of the Arctic Preservation Treaty. It would be expensive with all the new regulations, but still worth it. Now that global economic attention had returned to the Arctic, observers noted that public opinion about activities in the Arctic had seemingly come full circle back to 2010—but this time, development activities were to be done with greater foresight, restraint, and responsibility. (Global Business Network, 2008, p. 15)

The Arctic remains an attractive site for development, even if low demand for resources and trade in the region and an increased focus on international governance create an environmental consciousness.

This particular future highlights the regime of environmental protection that potentially comes with strong governance. The high number of accidents in the short term drives public opinion towards environmental protection. Furthermore, Indigenous groups become key actors in the development of regional cooperation towards this environmental future. Despite the existence of environmental protection and an international treaty with an enforcement arm, there is still underlying pressure for economic resources. The Arctic’s resources remain intact as resources elsewhere become used up. Companies capitalize on “Arctic friendly” products and areas as examples of Corporate Social Responsibility. The push towards alternative energy and “green” products lessens potential critiques of economic development in the long-term narrative. Maritime transportation routes are still opening, despite the work to strictly control navigation.

This is an undesirable future, because the economic imperative challenges the underlying environmental ethos of prohibiting development. Thus, while noteworthy accidents dampen economic activities in the short term, economic forces embrace environmentally friendly alternatives that reignite today's debates about developing the North. It is a more desirable future because of regulation. But the Arctic remains as a peripheral region for much of the future.

6.2.4 Arctic Saga

The Arctic Saga narrative frames “a world largely driven by business pragmatism that balances global collaboration and compromise with successful development of the resources of the Arctic” (Arctic Council, 2009). In the short term, the scenario narrative emphasizes the expansion of territorial control and resource exploration. The United States ratifies the UN Convention on the Law of the Sea in 2009 to participate in the scramble. The Panama Canal expansion opens to ships, but these ships wait for days to be able to cross the canal. Boom towns develop in small Arctic outposts that develop significant port infrastructure. Shipyards produce icebreakers and ice-capable tankers to support extraction activities. Technological breakthroughs create better designs and improved training methods for ice operations, though pirates and solo entrepreneurs put old vessels to use in the region.

The Arctic Saga's middle term sees a significant accident along the coast of Norway and Russia. An unregistered icebreaker and an aging cruise liner without any Arctic training collide in the summer of 2028, killing 347 people in frigid waters. The accident, a result of an unbridled push towards development and a lack of regulation, emphasizes the need for regulation in the region. This lesson is publicized when a movie is made about one of the icebreaker's crew who fled climate change in Bangladesh on a raft, was rescued by a slave trading ship off Dubai, and was forced into service on the icebreaker. Thus, four supranational agencies emerge from a

decade of negotiations: the Arctic Commerce Commission, the Arctic Development and Protection Commission, the Arctic Marine Safety Commission, and the Arctic Transportation Management Commission. Expanded resource development activities significantly affect Indigenous groups in the Arctic. However, these groups work with the supranational agencies and UNESCO to preserve the cultures and “sanctity of Indigenous Arctic societies” (Global Business Network, 2008, p. 17).

The long-term narrative emphasizes the creation of “Petrol Ice”: nomenclature developed “to grand effect” as a marketing ploy to “decouple the dominance of regional oil cartels and resource nationalism” (Global Business Network, 2008, p. 17). A stock market based in Helsinki is created to trade specifically Arctic resources, with the sheer volume of resources stabilizing the boom and bust cycles. Businesses in the region consolidate around regional conglomerates within the regulated framework developed in the medium term. By 2050, the Arctic is the new hub of activity:

Although the pressures on the local environment and population were not small, the international community created—through a transparent process of trial and error—a structure for development, safety, and oversight that promoted the prudent management of growth in the region. The overall result was one with significantly more ships in the ice than many would have guessed, all coordinated through more cooperative governance, policy, and regulations than any would have imagined at the outset of the century. (Global Business Network, 2008, p. 18)

Thus, the future Arctic is a well-managed and productive space with increased governance and demand for resources.

According to the workshop participants, this is the most desirable future of all scenarios. Even its name emphasizes a heroic tale of achievement. The scenario frames business activity as pragmatic and emphasizes global cooperation and compromise. Markets are awash with Arctic resources. Achieving the short-term goal of American ratification of UNCLOS removes a significant hurdle to international cooperation. The Panama Canal's underwhelming enlargement project shifts maritime traffic attention to the trans-Arctic routes. Technological development in ship design and training creates a new collection of ice-capable vessels and captains. However, the leftover vessels and inexperienced crews create a significant turning point in the medium term. The accident, loss of life, and subsequent film prompt regulatory development and international cooperation to ensure safe shipping in the region. This ensures both economic growth and cultural preservation for Arctic Indigenous groups.

Shipping is the foundation of this future narrative. Cooperation and development overcome today's problems. Thus, the participants in the workshop are secure in their roles as experts guiding the process forward. Changes in the global market and transportation routes necessitate an ongoing demand for Arctic resources and the trans-Arctic routes. Furthermore, the accident creates a particular response that their skills and knowledge can address. The accident also addresses the necessity of transparency, which is a part of the scenario's working definition of governance. Thus, the participants ensure the future of the Arctic as a regulated but active maritime space supporting significant resource development, community growth, and preservation.

The practice of imagining futures through scenario planning and storytelling emphasizes particular knowledge and expertise in the region. This practice orients a particular view of the future while also making it known and actionable in the present. The participants favour futures

that feature significant improvements in the governance of maritime shipping. The lack of governance is viewed as a significant driver of negative futures, for both the region and the participants. This is a framework that they have some degree of control and influence over. Resource development and trade, on the other hand, is a more global activity that fluctuates according to international markets and prices. Too much regulation and governance over maritime activity hinders growth, but too little regulation means that little changes from today's Arctic. Thus, the only actionable route, according to the conceptual system devised by the Arctic Council, is to increase cooperation and governance to allow economic development to happen within a well-managed framework—with shipping at the heart of this growth.

6.2.5 Future “Areas and issues for research”

The narratives of the four different scenarios interpret particular futures that emphasize specific outcomes, but they do not mention the ways that actions can be taken in the present. This presents a challenge for future studies. Arbo et al. (2012) conclude that it is “hard to say to what extent the studies reviewed have become self-fulfilling or self-defeating prophecies” (Arbo et al., 2012, p. 179). In the example of the four scenarios above, the focus of future studies on the overarching trends does not create an analytical tool to examine the way certain futures influence the present. This is an inherent challenge of future studies. Arbo et al. (2012) overlook key moments in the process of scenario planning and participant reflection where future action is prioritized, as their major concern is with the wider trends of the literature (B. Anderson & Adey, 2012). Anticipatory action attempts to address this shortcoming. Its styles, practices, and logics attempt to account for these moments where the future becomes both “cause and justification for action in the present” (B. Anderson, 2010a).

Tucked at the end of the scenario narratives, but before the list of participants, is a particularly long list under the heading “Areas and Issues for Research” that “represent[s] an

initial set of ideas for further consideration, debate, investigation, and—*ideally*—prioritization and action” (Global Business Network, 2008, p. 20, emphasis mine). Not only does this list lay out the process of developing the scenarios, but it also emphasizes how these narratives direct particular action in the present. Whereas future studies from Arbo et al. (2012) focuses on the scenarios and the two-by-two grid, anticipatory action draws attention to areas for research in the present. These areas of research are drawn from the scenarios and show how these narratives and imagined futures influence actions and decisions in the present.

The key areas highlighted in the report align with a number of issues identified in the scenario. Better cooperation and communication, both regionally and internationally, is at the very top of the list, followed by “collation and understanding of pan-Arctic maritime legislation, regulation and policies” (Global Business Network, 2008). Third on the list is a “mandatory regime of International Arctic Shipping Standards”—in other words, the Polar Code. Farther down the list is the creation of a regional incident command system that includes everything from “emergency preparedness to search-and-rescue needs in cold conditions (especially for cruise ships), oil spill response and clean up, etc.” (Global Business Network, 2008). Following that is an Arctic-wide vessel traffic system. Operations in cold temperatures and ice is another major issue for research. Infrastructure in general and specific to future Arctic economic development is mentioned. The last two sections of the list relate to environmental and socio-economic issues from the economic development. These areas are important, but their implementation requires expertise beyond the participants in the scenario workshops.

Significant changes have happened since these workshops were held. Officials have taken action to address many issues that emerged from the scenario planning workshops. This demonstrates the importance of anticipatory action for guiding activities in the present. The

IMO began the process to introduce a mandatory Polar Code in 2009, after the Arctic Council published the *AMSA 2009 Report*. This addressed a number of key areas identified in the report. In particular, the Polar Code established mandatory standards for construction, manning/crew, operations, and pollution, while ensuring that innocent passage rights remain (International Maritime Organization, 2016). The Polar Code is framed by the International Convention for the Safety of Life at Sea (1974) and the International Convention for the Prevention of Pollution from Ships (1973; amended in 1978 and 1997) (American Bureau of Shipping, 2016; International Maritime Organization, 2016). These two IMO conventions provide guidelines for the two parts of the Polar Code. Part 1 covers safety measures, from the construction and design of vessels to navigation, communication, and training requirements. Any issue that could threaten lives at sea is included in this section. Part 2 addresses pollution from ships, including oil, sewage, and waste, and discusses potential environmental issues that could come from ships. When taken together, the code presents a holistic understanding of shipping.

In particular, the Polar Code specifies the inclusion of a Polar Waters Operation Manual (PWOM). This regulation aims to provide “sufficient information regarding the ship's operational capabilities and limitations in order to support their decision-making process” (International Maritime Organization, 2016). The PWOM is specific to each ship, based on the operational assessment of a ship’s capabilities vis-à-vis low temperatures, ice, high latitudes, potential abandonment, and potential to encounter polar-specific hazards. This regulation requires vessel-specific knowledge and experience (see American Bureau of Shipping, 2016). The PWOM for each ship should include instructions for normal operations, incident response, operations in changing conditions that exceed the vessel’s capabilities, and operations with icebreaker assistance (International Maritime Organization, 2016, p. 13). Each of these

operational conditions requires risk-based response procedures. The PWOM emphasizes the expertise and experiential knowledge of those who are familiar with Arctic shipping to help craft these procedures for each vessel that might be in the region (American Bureau of Shipping, 2016). Furthermore, the PWOM emphasizes the preventative logic of Arctic shipping, a point I will return to below.

The “Areas and Issues for Research” emphasize anticipatory processes that deem certain futures actionable in the present. Many of the issues identified in the report fall easily within the mandates of those participants working in government agencies or the shipping industry. Further, it is through scenario planning that these issues emerge. The four narratives allow the future of Arctic shipping to be made present in a way that stresses focused attention to issues for research. Policy makers and government officials prioritize these areas in the present, directing action towards the specific future that they envision as the best or most beneficial.

I turn now towards a Canadian example of this process. The Northern Marine Transportation Corridor Initiative began in 2012 as a way to address systematic infrastructure in Canada’s northern waters. Corridors are a usual feature in shipping. When asked about future opportunities, a Transport Canada official responded that one such plan for the agency was to construct maritime corridors along the main North-South Arctic routes (2012d). The practice of defining routes for ships to travel along is a long-standing maritime tradition dating back to the end of the 19th century. The IMO’s governance of such routes was codified in 1964, when governments established routing schemes to ensure safe navigation, the safety of those on board, and the protection of the marine environment. These corridors can include features such as traffic lanes or separation schemes, recommended routes with a centreline of buoys, precautionary areas, and areas to be avoided. The Department of Fisheries and Oceans has

established a number of these routing schemes, either compulsory or recommended, and areas to be avoided along the Pacific and Atlantic coasts (see Canadian Coast Guard, 2014). The IMO routinely publishes the locations of these traffic schemes and restricted areas (see International Maritime Organization, 2010).

The use of traffic corridors in the Arctic, however, is less about the overall traffic scheme. Rather it is a way to devote certain spaces to higher traffic to receive better infrastructure in a calculation of financing and demands. The official from Transport Canada saw these corridors as a means to prioritize activities such as charting, navigation aids, oil and fluid spill response, search and rescue operations, and icebreaker support to areas that would see the most traffic (2012d). As the official relayed to me, they saw four different factors that went into making up each corridor: transportation routes, fishing and the environment, services, and technology and research and development. These corridors would allow the government to prioritize the most used spaces in order to provide the fastest and most efficient support for mariners (Transport Canada official, 2012d). The government began progress on the Northern Marine Transportation Corridor Initiative (NMTCI) in 2012, moving towards an improvement of infrastructure requirements.

Yet, this imagined future of Arctic traffic leaves out many other activities that do not occur along these routes. While destination shipping activities may use these pre-determined routes, fishing fleets in the area do not—they follow the fish. Additionally, these corridors would not support the majority of cruise or pleasure crafts, which are in the area to experience the so-called pristine wilderness that often lies away from the main routes and communities as noted in Chapter 5. The corridors also lack the support for Indigenous activities, in large part because of their absence from commercial destination shipping activities.

In particular, Inuit concerns have not been accounted for to a significant degree. Oceans North Canada produced a 2016 report that “strengthens the NMTCI and balances calls for northern development with the strongest possible environmental protections and guarantees of rights for the region’s people” (Oceans North Canada, 2016, p. 3). The goals of the report are to integrate Inuit knowledge and environmental protection in the corridors of the NMTCI. The guiding principles of this report are to address standards in the region, environmental protection, and Inuit rights. The resulting new corridors will minimize vessel traffic to spaces of significant environmental or cultural importance by scaling routes based on risk to the environment, with areas such as the Hudson Strait and Lancaster Sound needing more regulation and infrastructure to protect the environment.

The Oceans North Canada report identifies two significant issues that emerge within an anticipatory framework. First, it identifies whose visions of the future are considered more viable and probable. As I have argued above, not all visions of the future are incorporated or made actionable. In particular, the report focuses heavily on the relationship between the Inuit and their surrounding environment, through which the NMTCI directs ships (for background on Inuit and their territory, see Inuit Circumpolar Council, 2013; Inuit Circumpolar Council Canada, 2007, 2014). The focus of the NMTCI has been on spaces used by shipping companies in the region, in particular those destination voyages that make up the majority of traffic, discussed in Chapter 2. Inuit concerns are notably absent from these futures of Arctic shipping.

Second, the Oceans North Canada report significantly overlooks a process that already exists at the IMO to create traffic schemes and environmentally sensitive zones. Applying these schemes and their associated zones, such as the areas to be avoided, would translate the language of environmental risk into the language of international shipping. This would synchronize the

different anticipatory practices of the groups, encouraging a specific plan of action going forwards. Rather than pushing for an environmental focus, working within the framework and language of international shipping emphasizes the processes used around the world to ensure safe navigation and environmental protection.

6.3 Preventative logics and shipping regulations

Logics are the legitimization of action taken in the present that aim to “prevent, mitigate, adapt to, prepare for, and preempt specific forms” of the future (B. Anderson, 2010a, p. 779), as discussed in detail in Chapter 1. The future is not only the cause, but also the justification for action in the present. Specific conceptions of the future direct action in specific ways. I argue that a preventative logic imbues shipping’s regulations and policies through this anticipatory policy framework. This section presents an overview of the logic of prevention, before discussing specific cases in the Arctic and Canadian waters specifically.

The logic of prevention has a few key features. First, prevention works to stop the “occurrence of an undesirable future” (Dodds, 2013) from happening when an “identified threat reaches a point of irreversibility” (B. Anderson, 2010a; Massumi, 2007). This logic presupposes that a preventative action can be taken that is outside and separate from the processes that it acts upon (B. Anderson, 2010a). Massumi (2007) further argues that preventative action must work on that process or object’s terrain, rather than establishing its own field of operation.

Ontologically, he argues that prevention “assumes that what it must deal with has an objectively given existence prior to its own intervention” (2007). For example, shipping’s existence is a combination of vessels, captains, crew, owners, operators, inspectors, classification societies, and regulators. These precede any attempt to widely regulate Arctic shipping. Introducing regulatory measures that aim to prevent negative outcomes focus on one or more areas which are presently operating. These measures do not create or invent new methods of water transportation

or training for the crews. Rather, preventative measures act on already existing operations, modifying their operation in order to counteract potential negative outcomes. The preventative logic for Arctic shipping therefore must operate within this process and use the already existing networks and connections.

A logic of prevention fits extremely well with shipping. Ships are a part of many undesirable futures in the Arctic. Whether it is from oil spills (see Inuit Circumpolar Council Canada, 2014), animal harvesting and transportation routes (see Aporta et al., 2011; Inuit Circumpolar Council Canada, 2007), or even questions of Canadian sovereignty (see Coates et al., 2008; Grant, 2010; Lackenbauer & Kikkert, 2010; Lajeunesse, 2016), ships are significant actors in these future visions. These perceptions of the future see shipping as a growing concern (see statement by Duane Smith in Inuit Circumpolar Council Canada, 2014) with wide social, ecological, and political impacts. Shipping is an activity that carries significant risk.

The preventative logic of regulations and government action takes a more measured approach to the future of shipping and focuses on the ship as the source of these undesirable futures. The Polar Code recognizes that “any safety measure taken to reduce the probability of an accident, will largely benefit the environment” (International Maritime Organization, 2016). The Polar Code and Canada’s Arctic Shipping Pollution Prevention Regulations account for the different and exceptional requirements the polar regions impose on ships compared to operations in warmer waters. Action must be taken over the vessel itself to prevent negative or undesirable futures from happening. Because shipping is a tool for global commerce (see Arctic Council, 2009), this regulatory action allows shipping to continue to function. Thus, negative potential futures are an inherent part of the good futures that shipping produces, requiring governance and action (see B. Anderson, 2010a). Furthermore, the role of classification societies as independent

inspection agencies directs specific regulatory actions into the already existing shipping operations and networks. The polar certificates from Transport Canada, discussed in Chapter 4, and the IMO's Polar Ship Certificate, are means of ensuring that the vessel is capable of safe operations in polar waters.

Environmental concerns emphasize the bad within the good outcomes of shipping in the North. The year-round shipping proposed for Mary River was a major source of negative feeling in the communities:

If Mary River gets up and running there will be more shipping to ship the product overseas. Even there now, there are local folks asking questions: how the shipping is going to affect whales, seals, and marine life in general.... I can see where probably there's going to have to be policies surrounding the treatment of sea mammals.... In Cape Dorset, for instance, they are fearful that the big ships will keep the whales from coming into the harbour; they will scare them off.

They hunt the beluga whales for food all the time, year round. There are fears like that. (Economic Development and Transportation official, 2012b)

Marine mammal harvesting was a significant topic of the Nunavut Impact Review Board hearings on the mine's proposed activities (see Nunavut Impact Review Board, 2012). Thus, the negative impacts of shipping associated with the project were a concern, even with the significant promises of this project, as discussed in Chapter 5.

The perception of the bad within the good, which B. Anderson (2010a) cites as a fundamental feature of this preventative logic, changes based on the type and purpose of shipping. I asked another official in the Department of Economic Development and Transportation their thoughts on the role of shipping in the North, and they responded,

You are probably aware of the Baffinland [Mary River] project. There is no small amount of concern about year-round shipping, and I suppose the fact that it is year round does add a new dimension to it. But I think some of the concerns are about the traffic, the increased traffic, and the possibility of fuel spills or sewage discharge or what have you. But of course occasional instances of that are unavoidable with the annual resupply that happens in every community.

My follow-up question was,

Do you think that having shipping going from a seasonal activity with the resupply to the-year round shipping, is that what is causing one of the major questions of activity in the North, or is it that it is connected to an economic project and not necessarily the well-being of the communities?

The official's response:

Well, I think, ultimately, I have confidence that it will be connected to the well-being [of the communities], although that is not its initial purpose. I will not use the word *trickle down*, but let's use *spin-off effects*. Certainly, the controversy would be mitigated if it were expressly for resupplying community. (Economic Development and Transportation official, 2012a)

It is an interesting framing of the issue. First, the official recognizes that occasional and unintentional spills happen with the annual sealift operations. More of these cargo ships will be present as communities grow and resource exploration activities increase in the North. However, the positive impact on the communities serviced by the sealift's vessels points towards a different conception of negative impacts of shipping. The impact of shipping is seasonally present, but the impact on wildlife is somewhat overlooked because of the benefits brought by

the ships stopping in communities. This highlights the importance of an anticipatory policy framework: good and bad are both brought together. Therefore, policies should anticipate mitigating potential negative aspects.

The 2008 *Opening Arctic Seas: Envisioning Disasters and Framing Solutions* workshop was another important contribution to the *AMSA 2009 Report* emphasizing the logic of prevention. This workshop focused on responding to five disaster scenarios, developed to emphasize specific response activities: “spill response, search and rescue, fire fighting and salvage, communications, and governance and legal issues” (Coastal Response Research Center, 2009, p. 5).¹⁶ Each scenario was assigned a working group that responded to four questions: how would we respond at the time, how would we prefer to respond, what gaps exist today between actual and ideal response, and what do we need to do to address these gaps (Coastal Response Research Center, 2009). Two key themes emerged from this workshop. One was the necessity of better international cooperation among Arctic states. The second theme was the importance of prevention and preparedness:

Such measures range from conducting extensive risk assessments for the Arctic seas, shipping routes, and ports to increasing stockpiles of emergency response equipment and supplies throughout the Arctic. By properly managing risk using appropriate policies and strategies supported by sound scientific research, opportunities for development and tourism in the Arctic can continue with

¹⁶ The disasters were (1) a cruise ship runs aground off Greenland’s western coast and 1400 people need to abandon ship; (2) a bulk carrier is trapped in the ice attempting a late-season crossing of the trans-polar route; (3) a fire on an ice-support ship next to an exploratory drilling operation on the disputed US–Canada border collides with the drill ship, spilling fuel and ballast water; (4) an oil tanker collides with a fishing vessel in ice and zero-visibility conditions in the Barents Sea, disputed territory between Russia and Norway; and (5) a tug loses power and runs aground on St. Lawrence Island, becoming separated from its barge with mining explosives and containers for nearby communities (see Arctic Council, 2009; Coastal Response Research Center, 2009).

reduced risk for environmental damage and loss of life. (Coastal Response Research Center, 2009)

The emphasis on managing risks and the logic of prevention is significant here. The scenarios create situations that encourage both realistic responses as well as ideal responses. The gap between the ideal and expected responses addresses areas to improve.

The Arctic does not easily suit preparedness as an anticipatory logic. In talking about the issue of security, a Transport Canada official gave the agency's perspective through one of his colleague's presentations about pollution prevention:

He was talking about the North Slope [in Alaska] and the Beaufort area and what the impact of a Polar Code might be in terms of preventing pollution. His take was prevention is much more important than response in the Arctic because if you have to do a response exercise, similar to the Gulf of Mexico, there were 7500 people working at the height of the Macondo incident, 140 ships, aircraft. If you were to go up along either side of the Alaska or the Yukon border here in the Beaufort, there is an Alaskan town of 200 [Kaktovik] and there is Tuktoyaktuk, which is not much bigger. Where are you going to put 7500 people? How are you going to feed them? Just bringing in the porta potties is going to be a challenge! Our strongly held view is that prevention is key in helping provide a sustainable development scenario for the Arctic. (2012b)

Although there was a mix-up between ship-based and oil extraction scenarios, the important point is the official's focus on prevention rather than response. The fundamental infrastructure to support significant disaster response does not exist in the North. As Dodds (2013) writes about preparedness in the Arctic, "The dependence on infrastructures (often modest and

dispersed) and interconnections between human and non-human communities and processes (for example the role of sea ice and permafrost in shaping animal distribution) needs thus to be recognized explicitly.” Thus, the infrastructure that enables a response to specific disasters in southern waters does not exist in the Arctic. Expecting these to be available if a tanker ship goes down, an oil-drilling rig explodes, or a cruise ship sinks would lead to significant disasters. Therefore, rather than preparing for a scenario that calls upon this modest and sparse infrastructure, prevention is the most important logic in anticipating future Arctic shipping activities.

When officials consider passenger ships, the need for preventative regulations becomes even starker. As one Transport Canada official said,

I am fond of saying the requirements for a ship in the middle of the Atlantic or the Pacific at the equator [are] exactly the same requirements now [2012] for the middle of the Arctic or around the Antarctic continent. You can wear the same lousy life-saving equipment, the same lousy emergency suits that may be summer emergency suits. There is absolutely no difference. As long as you are complying with the international rules you can go anywhere, you can go to the middle of the Arctic in the wintertime with your summer thongs, which is the crew arriving in Churchill, Manitoba, through the ice wearing thongs on their feet.
(Transport Canada official, 2012c)

The Polar Code addresses a number of these issues, including life-saving equipment, cold weather survival gear, and enclosed lifeboats. Furthermore, the provision for specific Polar Water Operations Manuals (PWOM) for each vessel operating in the region attempts to lessen risks to the vessel and account for conditions that the vessel may operate in. The PWOM focuses

entirely on risk-based decision making to ensure safe operations in the region. This includes voyage planning to avoid ice and temperature conditions more severe than the vessel can handle—a method of receiving information, addressing existing gaps in infrastructure, and implementing special measures to ensure the functionality of equipment on board (International Maritime Organization, 2016). Thus, the Polar Code attempts a preventative logic to lessen the occurrence and impact of hazardous situations.

Cruise ships are especially significant examples in this context because of the potential loss of life. As discussed in Chapter 4, it took the sinking of the *Explorer* to finally apply the IMO's guidelines to the Antarctic. Along with the grounding of the *Clipper Adventurer* in the Canadian Arctic in 2010 (see George, 2010a; George, 2010b, 2012; Transportation Safety Board of Canada, 2012), and the *Academik Shokalskiy* beset in Antarctic ice in 2013 (see Luck-Baker, 2014a; Luck-Baker, 2014b), the *Explorer* sinking demonstrates the attention that issues with passenger vessels in polar conditions can attract. When asked about the changes to shipping in the North that he envisioned, a Canadian Ice Service official responded with a number of scenarios, including the following about cruise ships:

I do think you are going to see the Arctic as a destination for tourism. That is going to grow immensely from what we have now in the Canadian Arctic, being the adventure passenger ships. And what I mean by adventure is ships with a compliment of passengers of, say, at the most 400, to what you're getting in Alaska and Greenland now where you're looking at three to four thousand passengers, and mostly elderly. There is a difference between the adventure passenger crew who are relatively fit. They know what they are going to encounter: they like hiking, they like boating, they like doing this and that and the

other thing, and it doesn't matter how old they are because they are in very good shape. Whereas you get the three to four thousand passengers, those are the true cruise lines where you have many elderly people who rely on their medications. You get a shipwreck and you have four thousand people all of a sudden in a remote area where you cannot get to it. We are going to see those [ships] in the Canadian Arctic. (Canadian Ice Service official, 2012)

The “true cruise lines” of thousands of passengers was an example in the disaster scenario workshop. The first of 17 recommendations was to “develop preventative legislation for safe operations in the Arctic” (Coastal Response Research Center, 2009, p. 10). The gaps between an ideal response and the realistic response were stark:

Cruise ships have a minimal capacity for self-rescue, and due to their lack of propulsion, current life rafts could not reasonably transit the 50 miles from the incident location to Ilulissat. The passengers are also likely to be ill-prepared for the weather, which decreases their likelihood of survival, if they are not rescued quickly. Vessels may elect to follow International Maritime Organization guidelines on a voluntary basis. Therefore, capability for self-rescue will vary with the degree of adherence. (Coastal Response Research Center, 2009, p. 9)

Taken with the comments from the Transport Canada official above regarding regulations in 2012, this assessment represents a significant anticipatory focus on prevention. It argues that regulations and legislations need to be in place to head off a potential disaster and crisis scenario if a major cruise liner disaster happens in the Arctic. The mandatory Polar Code addresses many of these problems, including specific regulations for passenger ships, cold-weather survival gear,

and enclosed lifeboats. Thus, the preventative logic is present to secure the lives of passengers before a negative future occurs.

The need for preventative logics in regulations comes from the environmental challenges of the Arctic, which exceed existing regulations and policies at the IMO. However, the environmental and human risks in the Arctic and Antarctic require specific regulations. These regulations operate under the logic of prevention because they aim to prevent negative futures from happening. They are external to the object of regulation, while happening on the object's terms and processes. The Polar Code makes significant use of classification societies to issue Polar Operation Certificates, similar to those under Canada's ASPPR. The most successful way to protect against negative scenarios is thus to enact, as much as possible, the mandatory regulations that attempt to prevent scenarios from happening.

6.4 Conclusion

Anticipatory action addresses how specific futures are made present and therefore actionable. It opens more spaces for investigation than the literature on future studies. By focusing on the specific futures of policy makers and experts, the distillation of particular futures becomes less important. Furthermore, anticipatory action directs attention to the processes experts use to create futures that address what is important and what is not, and how experts construct these to ensure their continued relevance and importance within future activities. Scenario planning becomes political: a matter of who is included or not, and whose specific future is made actionable through specific scenarios. These scenarios encourage consideration of specific conclusions that then direct action in the present.

The *AMSA 2009 Report's* significant consideration of future scenarios demonstrates the significant power that scenarios and their conclusions can deliver. While the main report posits two key drivers of maritime activity, the meetings that produced these key drivers emphasized a

particular vision of the future. This vision emphasized that officials could control the level and degree of governance over shipping in the region. The amount of resources and trade was beyond their control. Thus, the most important action in the present became increasing governance over shipping to ensure safe and profitable operations in the region.

By paying attention to the practice of imagined futures, the logic behind actions in the present also becomes clear. Shipping in the Arctic operates according to an inherently preventative logic. The specific conditions of the Arctic necessitate prevention in the absence of other reasonable anticipatory logics. Prevention operates in a particular framework to avert negative futures from happening. In addition, this preventative logic assumes that shipping has already existing operations that it must work with, rather than reinventing these operations. The focus on construction standards, equipment, and training emphasize how preventative logics work within these already existing operations. Classification societies are ideally placed in shipping's regular activities to address these regulations. Thus, rather than creating new inspection sites, the Polar Code works within this inspection system to ensure safe shipping in the Arctic. Thus, the logic of prevention ensures environmental and human security through the regulation of the holistic nature of shipping—before the vessel encounters conditions that can negatively affect its operations and safety.

Chapter 7: Conclusion

7.1 Epilogue

On September 19, 2014, the MV *Nunavik* set sail from Deception Bay, QC, with 23,000 tons of nickel concentrate valued at \$100 million, destined for a processor in Bayuquan, China (Fednav, 2014c). A year after the *Nordic Orion* sailed through the Northwest Passage, the *Nunavik* was transiting the passage in the opposite direction. The route through the Northwest Passage is 40% shorter than traditional sea routes at about 9,400 km (CBC News, 2014a; Nunatsiaq News, 2014a; Oskin, 2014). In open waters, the loaded ship sailed at 12 knots, using only 26% of the engine's actual power, demonstrating slow steaming principles in action (Fednav, 2014c). This saved both fuel costs and emissions from the vessel.

The *Nunavik*'s voyage was not a harbinger of unregulated ships racing through the passage each summer, because it is not an ordinary bulk cargo ship. It was delivered to Fednav from the Japan Marine United shipbuilders in 2014.¹⁷ The ship is classified as a Polar Class 4 under the IACS unified standards, meaning it can safely operate in thick first-year ice up to 1.5 m thick with old ice incursions (Fednav, 2014c; Nunatsiaq News, 2014a). The ship has a ballast water treatment system, the first on a Canadian-owned ship, addressing the concerns of many that ballast waters would be a vector for invasive species (water pumped into the ship for stability and safe operations is treated to kill off invasive species caught in the water) (Gelling, 2014; Nunatsiaq News, 2014a). Furthermore, the ship had a captain with 25 years of experience in the Arctic, along with an experienced ice navigator. Fednav worked with government officials at Transport Canada, Environment Canada, the Canadian Ice Service, Fisheries and Oceans Canada, and the World Wildlife Fund to ensure the voyage would be a success.

¹⁷ The *Nunavik* is 188.8 m long, 26.6 m across, and has a draft of 10.9 m. It is classified specifically as a Det Norske Veritas ICE-15 ship (see Det Norske Veritas, 2013; Fednav, 2014b).

This voyage was a realized anticipated future of Arctic shipping. The value of the resources the ship would carry was a key factor in choosing the route and constructing the ship. The *Nunavik* was constructed specifically to operate at the Deception Bay nickel mine (CBC News, 2014b; Watson, 2015). It met all Canadian and international regulations for the voyage. The work with government officials and the World Wildlife Fund emphasized a responsible approach to shipping from a knowledgeable company with more than 25 years' experience in Arctic maritime operations (see Fednav, 2014a).

As the *Nunavik* turned south into the Prince of Wales Strait, it encountered thick first-year ice covering 5/10 of the 6/10 of ice cover. The vessel's construction indicated that it could still operate in these ice conditions. As reported in the logbook:

Both Captains Rose and Grandy said on different occasions that "boring is good" when it comes to navigating in the Arctic... Here, boring refers to not having to spend hours or days beating through difficult ice. The easy life, relatively speaking... Captain Rose is delighted with the conditions—made to order, really. The winds today pinched the 5/10th concentration to the south side of the strait. The ship is slipping through barely impeded, but for one small section. That small section however is a reminder of the unpredictability of shipping in the Arctic. One patch, even a small one strategically placed, would make the route impassable by the vast majority of ships. (Fednav, 2014c)

Boring is good for the regulators as well. Boring means no search and rescue for passengers. Boring means no spill response or clean-up. Boring means that the regulations and support infrastructure from the government worked. The future of Arctic shipping is thus a reasonably managed one that allows vessels to sail as long as they meet the standards.

7.2 Conclusion

Arctic waters present significant challenges that do not exist in other regions in the world. From the presence of sea ice to extended darkness or daylight, and from cold temperatures to incomplete maritime infrastructure, Arctic shipping requires more government attention to ensure safe operations. I identified many of these key infrastructure gaps, as well as the foundation of Canadian and international regulations, in Chapter 2. These regulations are important, as shipping is a particularly international activity. It is a tool for globalization and the global movement of goods. Many actors participate in shipping, from designers and builders to those who operate and regulate vessels and crew. The owner and operator of the vessel, the cargo, the flag state, and the classification society demonstrate the wide network of actors present in shipping.

I have argued that anticipation is a key framework through which to understand the actions and policies of key government agencies. Specific futures view well-regulated shipping as a support for economic growth in the Arctic that benefits those living there. The anticipation of an increase of shipping, therefore, is an important framing discourse. It illustrates how conversations about the future legitimate certain activities while leaving out others. These futures are anticipated by the officials I interviewed, and in policy documents such as *Canada's Northern Strategy* and the Arctic Council's *AMSA 2009 Report*. The long list of 120 different factors the *AMSA 2009 Report* authors considered before settling on "governance" and "resources and trade" demonstrates how anticipatory action operates as a process. In order to simplify the scenario process, certain decisions must be made. However, these alternatives are either delegitimized or positioned as secondary concerns throughout the process of anticipation.

Anticipatory action offers a blueprint of styles, practices, and logics to better understand how potential "call-to-action" events are used to mobilize responses in the present. Styles are

the ways that specific futures are discursively created. I examined the role of discursive futures in detail in Chapter 5, emphasizing the role of policy documents and public perception in framing particular futures as inevitable or in need of the most attention. *Canada's Northern Strategy* identified mining as a key economic opportunity for the North's future. News reports and interviews with officials supported the policy document's discursive future. But this perception of the future does not account for the wider economic market. The future of mining and extraction depends on global commodity prices. The public focus of Arctic shipping in Canada is undeniably the Northwest Passage. However, the framework of international shipping activity means this route does not fit neatly into changing commercial networks and technologies. The new locks in the Panama Canal and the process of slow steaming discussed in Chapter 5 challenge the viability of the Northwest Passage as a shipping route.

Practices address how we relate to particular futures in the present. I examined this process in detail in Chapter 6. Anticipatory actions make clear the way specific futures are made present. Imagined futures of Arctic shipping, create a relatable future in the present through scenario planning and narratives. These imagined futures rely on the expertise of participants to make prospective futures present. The importance of the scenarios in the *AMSA 2009 Report* emphasizes how these imagined futures both rely on and reinforce the ongoing expertise of participants. A key narrative, the Arctic Saga, emphasized the triumphant future of a well-regulated and active maritime space in the Arctic. This future scenario builds upon the regulation and government support of shipping as the only controllable variable going forward. Global market forces around resources and trade are not controllable. Participants portrayed scenarios in which governance was lacking as comparatively negative futures, thus arguing for action in the present to strengthen the governance of shipping activities.

Logics justify actions taken in the present. I argue throughout this thesis that the logic of prevention imbues global shipping. Prevention heads off the occurrence of negative futures by intervening from outside of the object's normal activities and operating on the object's terrain. Shipping is a prime medium of this preventative logic, especially in the Arctic. Ice, weather, and patchwork infrastructure present conditions that are more challenging than at lower latitudes. However, shipping is important to communities and economic activities in the North. Ships are also the primary source of environmental threats in the region, thus bringing together the good (economic benefit) and the bad (environmental damage) in a single object.

Regulations in the Canadian Arctic focus on the ships rather than particular threats to the people or the environment. Classification societies apply these regulations to ensure that ships are capable of operating on specific voyages. And they apply regulations at every stage of a vessel's operational life cycle, from design and construction to operation and crew. The Polar Waters Operations Manual (from the IMO's mandatory Polar Code) also enacts this preventative logic. Each vessel's manual is different, because each vessel is constructed differently and operates in different regions. These preventative regulations work within the framework of shipping activities by using existing classification societies and their inspection procedures. The anticipation of the future of Arctic shipping keenly demonstrates the logic of prevention in action.

My second argument states that governance and effective sovereignty offer a conceptual synergy to understand the actions of the Canadian state in the Arctic. Shipping is truly transnational and crosses the watery boundaries of state territory. The number of actors involved in shipping demonstrates the government's need to interact with, and consider, more than just its own legal state power. Additionally, as I have shown throughout this thesis, specific agencies,

such as the departments of Foreign Affairs and National Defence, are vested with the power to speak on the nation's behalf. Very few of these agencies, and none in Canada, deal with shipping on a day-to-day basis. The agencies I discussed above are not concerned with sovereignty, and the officials were quick to suggest that sovereignty was under the mandate of Foreign Affairs. Chapter 4's discussion of the *Healy's* ice trials and the negotiations between Canada and the US below the diplomatic level emphasizes this point. Furthermore, this synergy offers a flexible understanding of the state's territorial formation and operations, and focuses instead on how the government operates and demonstrates effective presence. The mandala system of effective control, as understood by Scott (2009), is an applicable model in the Canadian Arctic. The variability of state power in remote areas with challenging environmental conditions promotes a different conception of the state's territorial form. Rather than seeing ships that breach the state's territorial extent as a challenge to sovereignty, regulations and support from specific agencies demonstrate the flexibility of both the state's territorial form and its exercise of power.

A key future of all five littoral states' federal policies is the need for more governance, support, and infrastructure (from Brosnan et al., 2013). I employed this as framing device to understand what infrastructure currently exists in the Canadian Arctic. Chapter 3 focused on the role of the Department of Fisheries and Oceans, Environment Canada, and the Canadian Ice Service in providing key areas of support and infrastructure to shipping. The officials I interviewed emphasized the need to frame infrastructure with a consideration of the mix of vessels and captains using the waters. This mix is projected to change in the future, thus changing the demands on infrastructure. In particular, aids to navigation from the Coast Guard represent a physical infrastructure needed by vessels for safe operations. The Canadian system is

part of a wider international framework that standardizes navigation information for this very reason. However, the environmental conditions and mix of vessels in the Arctic means that the full suite of navigation aids available in Canada's southern waters is not present. The aids to navigation currently in the Arctic represent the needs and requirements of past users. As the vessels and the captains change, the gaps become more evident. Further, the aids are set out and removed seasonally by the Coast Guard. The state's presence and effective control through the minister's mandate to provide for aids to navigation are limited seasonally and territorially to the active use of the waters. Providing, and more importantly maintaining, year-round navigation aids in a region that sees significantly less traffic than southern waters does not make economic sense for the Coast Guard. This is not to say that the waters are closed when the navigation aids are pulled up, but rather that the agency's presence is limited until the aids are replaced the following summer.

The role of Environment Canada and in particular the Canadian Ice Service further demonstrates government support of shipping. Sea ice and icebergs are incredibly hazardous to shipping. Knowledge of the different conditions around the vessel and its intended path is important for safe operations. The changing mix of vessels and users shapes the operations of the Canadian Ice Service. The Ice Service's ice and weather information demonstrates the state's effective presence in the region. The use of its services in the region denotes a flexible territorial form of the state, operating beyond sovereign territorial waters. The MET/NAV areas for which Canada is in charge of coordinating information most clearly demonstrate this role. Environment Canada works with counterparts from the United States and Denmark to ensure that accurate weather information is available to vessels in those areas. The Canadian Ice Service is a leading agency in the world on ice knowledge and products. Its work to produce charts for

Danish territorial waters and the American National Ice Centre demonstrates the agency's preeminence. Furthermore, the Ice Service operates outside of the Coast Guard's presence in the Arctic during the fall and spring seasons. Thus, government agencies support shipping even when the environment reduces or diminishes the physical presence of the state. The state maintains effective control as operators rely on the Ice Service for important weather and ice information that ensures safe operations.

The role of regulations in the Arctic is the second area identified by Brosnan et al. (2013) as a key focus of future activity in littoral states' policies. I focused on regulation in detail in Chapter 4. In Canada, the two main regulations are the Arctic Waters Pollution Prevention Act and the Arctic Shipping Pollution Prevention Regulations. The AWPPA focused on the protection of the environment in Canada's North in the wake of the *Manhattan's* voyage in 1969. The AWPPA followed specific sovereign-state legal frameworks, establishing Canada's Arctic sovereign maritime territorial extent and promoting Canadian sovereign claims over the waters of its archipelago. A lone state established a law to create a form of territorial control and denote a specific "inside" and "outside" of Canadian territory. Other states, such as the United States, challenged the legality of the AWPPA. Academic and legal scholars have debated the merits of using environmental protection to justify the legislation of shipping. This principle, that ice-covered waters need special regulation, was enshrined in international law with the ratification of the UN Convention on the Law of the Sea in 1984. However, this law did not direct how to implement pollution prevention guidelines. It is thus limited in its application to shipping, despite its significant connection to Canada's Arctic sovereignty.

The ASPPR, passed in 1977, established a template for future regulations of Arctic shipping. Transport Canada took the lead in developing and promoting these regulations. It

viewed shipping as a holistic activity: the vessel's construction, equipment, operation, and crew's training all mattered to ensure safe operations in the remote Arctic. The regulations are dry and technical, but they demonstrate the key role shipping classification societies play as independent surveyors of vessels. A Canadian official does not need to inspect and certify every ship that enters its Arctic waters. Rather, surveyors from classification societies issue the certificate of compliance for Canadian regulations. A state agency need not apply these regulations, since doing so is simply a technical calculation.

The ASPPR shift the discussion towards governance and effective sovereignty in two key ways. First, the regulations work within an international framework of actors in shipping. Classification societies have no connection to state agencies, and yet they play a significant role in assessing a vessel's seaworthiness. In the Arctic, this means that the hull is suitable for the potential ice conditions and the equipment and machinery are also operational and designed for the conditions. These societies work with officials at Transport Canada to maintain and enforce the state's regulations. Second, the ASPPR emphasize a significantly different territorial form of state power than that found in the AWPPA's definition of internal waters. While there is a territorial aspect to the regulations, the target of regulations moves beyond the state's legal territorial claims. The regulations, as technical standards, are always with a ship, even if it is outside of Canadian waters. Thus, the state's effective control extends to wherever the vessel operates. This change in the understanding of state power encourages a different focus than sovereignty's rigid territorial form. Thus, the state works through other actors to ensure that operators follow its regulations, and its effective control expands beyond the boundaries of the territorial conception that has underpinned work on sovereignty.

Globally, the International Maritime Organization has not made any specific regulations for ships operating in Arctic waters, and Canada's unique regulations have filled this regulatory space. Canada led the push for international regulations, collaborating with many key experts in polar shipping from industry and regulatory bodies. This ad hoc committee formed the IMO's 2002 guidelines outside of the regular processes of the international organization. The process ensured that the knowledge and expertise of the participants were central to the document. In particular, the guidelines' establishment of unified classification standards through the International Association of Classification Societies solved a key challenge of polar shipping: the large number of classification societies, each with different notations. Creating a unified standard among the major societies (that covered over 90% of total ships) meant that these regulations were a step in the right direction to ensuring safe operations. With these unified standards, there are fewer questions about the suitability of a ship to operate in polar waters.

Recently, attention has turned to the IMO's mandatory Polar Code. This takes the guidelines one step further. For Transport Canada, the mandatory code was both an opportunity and a challenge. Canada's regulations are outdated—something that officials I interviewed readily admitted. The last substantial update happened in 1995. The officials' work since then has been based on these international regulations. This is risky, because while the cost to create the standards might be less than the testing and investigation of unique domestic regulations would require, there is a chance that IMO standards will not be suitable for Canada's waters.

The challenges of the mandatory Polar Code's negotiations are found in the institutionalized setting of the IMO's work. The previous *Guidelines* emphasized the benefits of the process of forming an ad hoc committee of experts that was a part of the initial guidelines in 2002. The 2002 ad hoc committee ensured that Canada had a seat at the table and could bring its

own knowledge and experience as a leader in Arctic and polar shipping to the work. At the IMO, however, where the mandatory code was developed, Canada is one of 171 members, all of whom have a voice in the organization's work. Thus, Canada's voice and ideas may not remain central to the process. The example presented in Chapter 4, about the removal of Antarctic waters from the 2002 guidelines, demonstrates this difference. Key states negotiated the Antarctic's removal, which frustrated and bewildered a Transport Canada official, because it was a question of technical standards for vessels. A Foreign Affairs official had to remind him that Canada's main concern was the Arctic. Not five years later, the sinking of the *Explorer* off the Antarctic coast demonstrated the necessity of including this space in the guidelines. Thus, the work to make the mandatory code shifted from the field of technical standards to that of diplomacy, beyond the expertise of officials who knew the specific technical need for regulations.

The mandatory Polar Code could potentially see the elimination of Canada's unique regulations and the connection between the AWPPA and sovereignty. The need for Canada's domestic regulations stems from a lack of international regulations (beyond what is currently at the IMO) to ensure safe vessel operations. Protecting the environment means ensuring that a vessel is less likely to spill oil or other fluids. If the mandatory Polar Code is substantial enough for Canada's regulators, the entire basis of distinct national regulations disappears. The AWPPA, as an act of sovereignty, would be moot; even the particulars of the ASPPR's technical standards and application would become redundant, as all vessels would have to meet the same, stringent standards whether in Canadian, American, or Danish waters. The substantial and universal regulations would diminish the need for territorial division between states.

Lastly, this thesis's focus on regulations demonstrates the significant degree to which states regulate shipping. Scholarly work engaging with ships and shipping relies significantly on the idea of freedom of navigation. This is an argument invoked to suggest that shipping is a global activity that exists completely outside of state regulation (see Mack, 2013; Steinberg, 2001; Votolato, 2011), and any potential regulation a state might impose limits this freedom of navigation. Thus, there is a tension between the sovereign state that restricts movement across its borders and the freedom of navigation vessels enjoy while out at sea.

However, using the conceptual synergy of governance and effective sovereignty that I have employed here demonstrates the significant state presence that supports and regulates shipping. The state is present in providing infrastructure to ships. The state is present in defining how ships are regulated to ensure the protection of life and the environment. The state is present in providing ice and weather information. These mechanisms emphasize the effective presence of the state in its many forms. Focusing solely on legal sovereignty restricts the territorial imagination and ignores the network of agencies and both intergovernmental and non-state actors that are present shipping.

It should be clear that these regulations and support infrastructure do not stop shipping from happening—stopping all vessel activity would limit the potential future employment of the officials. These regulations aim to encourage more shipping conducted in a responsible way and according to specific rules to ensure safe operations and environmental protection. By working within existing international frameworks for standardizing navigation and weather information, and working with many actors in shipping operations, officials encourage shipping's future. Less regulation does not lead to more shipping. Rather, a greater state presence secures the

ongoing *mundaneness* of shipping. If all voyages in the Canadian Arctic were like the *Nunavik's* 2014 voyage, then these officials would likely be content with their role.

Producer and media critic Douglas Rushkoff's recent book *Present Shock: When Everything Happens Now* is an exploration of apocalyptic future scenarios:

The future does seem to be upon us. It feels as if we can see the writing on the wall as it rapidly approaches from the distance. What is too easy to forget is that we are the ones simultaneously scrawling that very writing (Rushkoff, 2013, p. 259).

The future's "call-to-action" moments are an integral part of the present, influencing decisions that act with a specific vision of the future in mind. As I have shown here, there is great value in understanding the way officials see specific futures, as well as the role this vision plays in decision and policy-making processes. These policy makers always anticipate a specific future, though the process behind the justification often ignores or marginalizes other important voices. Decisions made in the present thus relate to specific futures.

While the future of the Canadian Arctic remains unformed and out of our grasp, its looming apparition has a significant influence on the present. Anything that happens in the region will surely involve shipping in some form or another. The regulations over these ships that once seemed appropriate are changing along with technical knowledge, the number of ships, and the changing environment that ships encounter. Anticipating an active and well-regulated maritime space is critical to policy makers in Ottawa and Iqaluit. As Rushkoff said, we are the ones holding the pens.

Bibliography

- Adey, P., & Anderson, B. (2011). Anticipation, Materiality, Event: the Icelandic Ash Cloud Disruption and the Security of Mobility. *Mobilities*, 6(1), 11-20.
doi:10.1080/17450101.2011.532919
- Agnew, J. (2005). Sovereignty Regimes: Territoriality and State Authority in Contemporary World Politics. *Annals of the Association of American Geographers*, 95(2), 437-461.
doi:10.1111/j.1467-8306.2005.00468.x
- Agnico-Eagle. (2016a, 31 December 2015). Meadowbank. Retrieved from <http://www.agnicoeagle.com/en/operations/northern-operations/meadowbank/pages/default.aspx> (Last accessed 30 May 2016)
- Agnico-Eagle. (2016b, 31 December 2015). Meliadine. Retrieved from <http://www.agnicoeagle.com/en/Exploration/Advanced-Projects/Meliadine/Pages/default.aspx> (Last accessed 30 May 2016)
- Alvarez, F. J., Longva, T., & Engebretsen, S. E. (2010). A methodology to assess vessel berthing and speed optimization policies. *Maritime Economics & Logistics*, 12(4), 327-346. doi:10.1057/mel.2010.11
- American Bureau of Shipping. (2016). *IMO Polar Code Advisory*. Houston: American Bureau of Shipping.
- Anderson, B. (2010a). Preemption, precaution, preparedness: Anticipatory action and Future geographies. *Progress in Human Geography*, 34(6), 777-798.
doi:10.1177/0309132510362600
- Anderson, B. (2010b). Security and the future: Anticipating the event of terror. *Geoforum*, 41(2), 227-235. doi:<http://dx.doi.org/10.1016/j.geoforum.2009.11.002>
- Anderson, B., & Adey, P. (2012). Guest Editorial. *Environment and Planning A*, 44(7), 1529-1535. doi:10.1068/a45316
- Anderson, J., & Peters, K. (Eds.). (2014). *Water Worlds: Human Geographies of the Ocean*. London: Routledge.
- Aporta, C. (2011). Shifting perspectives on shifting ice: documenting and representing Inuit use of the sea ice. *Canadian Geographer / Le Géographe canadien*, 55(1), 6-19.
doi:10.1111/j.1541-0064.2010.00340.x
- Aporta, C., Taylor, D. R. F., & Laidler, G. J. (2011). Geographies of Inuit sea ice use: introduction. *Canadian Geographer / Le Géographe canadien*, 55(1), 1-5.
doi:10.1111/j.1541-0064.2010.00339.x

- Arbo, P., Iversen, A., Knol, M., Ringholm, T., & Sander, G. (2012). Arctic futures: conceptualizations and images of a changing Arctic. *Polar Geography*, 36(3), 163-182. doi:10.1080/1088937X.2012.724462
- Arctic Council. (2004). *Impacts of a Warming Arctic: Arctic Climate Impact Assessment*. New York: Cambridge University Press.
- Arctic Council. (2009). *Arctic Marine Shipping Assessment*. Tromsø, Norway: Arctic Council.
- Arctic Council. (2011a). *Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic*. Tromsø, Norway: Arctic Council Secretariat.
- Arctic Council. (2011b). *Status on Implementation of the AMSA 2009 Report Recommendations*. Tromsø, Norway: Arctic Council.
- Arctic Council. (2013). *Status on Implementation of the AMSA 2009 Report Recommendations*. Tromsø, Norway: Arctic Council.
- Arctic Council. (2015). *Status on Implementation of the AMSA 2009 Report Recommendations*. Tromsø, Norway: Arctic Council.
- Aslaksen, I., Glomsrød, S., & Myhr, A. I. (2012). 'Late lessons from early warnings' – uncertainty and precaution in policy approaches to Arctic climate change impacts. *Polar Geography*, 35(2), 135-153. doi:10.1080/1088937X.2011.654357
- Baffinland Iron Mines Corporation. (2012). Shipping and the Marine Environment. *Nunavut Impact Review Board Presentation* [Powerpoint presentation].
- Balmasov, S. (2013). Final Statistics Figures for transit navigation on the NSR in 2013. Retrieved from <http://www.arctic-lio.com/node/209> (Last accessed 29 October 2014)
- Beck, U. (1992). *Risk Society: Towards a New Modernity*. London: Sage.
- Benítez, M. E. (2009). OP's Advisory to Shipping [Press release]. Retrieved from <http://www.pancanal.com/common/maritime/advisories/2009/a-02-2009.pdf>
- Bennett, J., & Rowley, S. D. M. (Eds.). (2004). *Uqalurait: an oral history of Nunavut*. Montreal, QC: McGill-Queens University Press.
- Biersteker, T. J., & Weber, C. (1996). Social Construction of State Sovereignty. In T. J. Biersteker & C. Weber (Eds.), *State sovereignty as social construct* (pp. 1-21). New York: Cambridge University Press.
- Black, R. (2011, 25 August 2011). Arctic sea routes open as ice melts. Retrieved from <http://www.bbc.co.uk/news/science-environment-14670433> (Last accessed 13 November 2016)
- Borgerson, S. G. (2013). The Coming Arctic Boom. *Foreign Affairs*(July/August 2013).

- Braudel, F., Ayala, R. d., Braudel, P., & Guilaine, J. (2001). *The Mediterranean in the ancient world*. London ; New York: Allen Lane.
- Brekke, H. (2014). Defining and recognizing the outer limits of the continental shelf in the polar regions. In R. C. Powell & K. Dodds (Eds.), *Polar Geopolitics? Knowledges, Resources, and Legal Regimes* (pp. 38-54). Cheltenham: Edward Elgar.
- Brewster, M. (2013, June 18). 'Critical equipment shortfalls' plague Canadian Forces in Arctic *Globe and Mail*. Retrieved from (Accessed
- Brooks, M. R. (1990). Ocean Carrier Selection Criteria in a New Environment. *Logistics and Transportation Review*, 26(4), 339.
- Brosnan, I., Leschine, T., & Miles, E. (2013). Cooperation or Conflict in a Changing Arctic? Opportunities for Maritime Cooperation in Arctic National Strategies. In B. S. Zellen (Ed.), *The fast-changing Arctic: Rethinking Arctic security for a warmer world* (pp. 83-103). Calgary, AB: University of Calgary Press.
- Budd, L., & Adey, P. (2009). The Software-Simulated Airworld: Anticipatory Code and Affective Aeromobilities. *Environment and Planning A*, 41(6), 1366-1385. doi:10.1068/a41249
- Byers, M. (2009). *Who owns the Arctic?: understanding sovereignty disputes in the north* (1st U.S. ed ed.). Vancouver, BC Douglas & McIntyre ; Distributed in the U.S. by Publishers Group West.
- Byers, M. (2013, September 20). Canada's Arctic Nightmare just came true: The Northwest Passage is Commercial, Editorial. *Globe and Mail*. Retrieved from <http://www.theglobeandmail.com/globe-debate/canadas-arctic-nightmare-just-came-true-the-northwest-passage-is-commercial/article14432440/> (Accessed 2 November 2013)
- Byers, M. (2014). *International Law and the Arctic*. Cambridge: Cambridge University Press.
- Cameron, E. (2015). *Far Off Metal River: Inuit Lands, Settler Stories, and the Making of the Contemporary Arctic* Vancouver: University of British Columbia Press.
- Cameron, E., Mearns, R., & McGrath, J. T. (2015). Translating Climate Change: Adaptation, Resilience, and Climate Politics in Nunavut, Canada. *Annals of the Association of American Geographers*, 105(2), 274-283. doi:10.1080/00045608.2014.973006
- Campbell, D. (1992). *Writing Security*. Minneapolis, MN: University of Minnesota Press.
- Canadian Coast Guard. (1999). *Ice Navigation in Canadian Waters*. Ottawa, Ontario: Fisheries and Oceans Canada.
- Canadian Coast Guard. (2012). *The Canadian Aids to Navigation System 2011*. Ottawa ON: Fisheries and Oceans Canada.

- Canadian Coast Guard. (2013). *Integrated Business and Human Resources Plan 2013-2016*. Ottawa, ON: Fisheries and Oceans Canada.
- Canadian Coast Guard. (2014). *Notices to Mariners 1 to 46*. Ottawa, ON: Canadian Coast Guard.
- Canadian Coast Guard. (2016). *Notice to Mariners 1 to 46*. Ottawa, ON: Canadian Coast Guard.
- Canadian Ice Service official. (2012, 28 June) *Personal Interview, 28 June/Interviewer: A. Grove*.
- Cariou, P. (2011). Is slow steaming a sustainable means of reducing CO2 emissions from container shipping? *Transportation Research Part D: Transport and Environment*, 16(3), 260-264. doi:<http://dx.doi.org/10.1016/j.trd.2010.12.005>
- CBC News. (2014a, 3 October). MV Nunavik makes it through Northwest Passage on way to Asia. *CBC News*. Retrieved from <http://www.cbc.ca/news/canada/north/mv-nunavik-makes-it-through-northwest-passage-on-way-to-asia-1.2787120> (Last accessed 6 November 2014)
- CBC News. (2014b, 24 March). MV *Nunavik* the newest icebreaker to hit Arctic waters. *CBC News*. Retrieved from <http://www.cbc.ca/news/canada/north/mv-nunavik-the-newest-icebreaker-to-hit-arctic-waters-1.2583861> (Last accessed 6 November 2014)
- Centre for Marine Simulation. (2003). *Review of Ice Navigation Simulator*. Retrieved from St. John's, NL:
- Centre for Marine Simulation. (2010). Fundamentals of Ice Navigation (Meeting the guidelines of IMO's MSC/Circ. 1056 and MEPC/Circ. 399. Chapter 14). St. John's, NL: Marine Institute, Memorial University.
- Centre for the North. (2011). About The Centre the North. *Centre for the North*. Retrieved from <http://www.centreforthenorth.ca/about> (Last accessed 12 October 2012)
- Centre for the North official. (2012, 15 June) *Personal Interview, 15 June/Interviewer: A. Grove*.
- Christie, G. (2011). Indigeneity and Sovereignty in Canada's Far North: The Arctic and Inuit Sovereignty. *South Atlantic Quarterly*, 110(2), 329-346. doi:10.1215/00382876-1162480
- Coastal Response Research Center. (2009). *Opening the Arctic Seas: Envisioning Disasters and Framing Solutions*. Durham, NH: University of New Hampshire.
- Coates, K., Lackenbauer, P. W., Morrison, W. R., & Poelzer, G. (2008). *Arctic front: defending Canada in the far north*. Toronto: Thomas Allen Publishers.
- Cohen, A. (2014, September 2). A Nordic identity for Canada. *Ottawa Citizen*. Retrieved from <http://ottawacitizen.com/news/politics/cohen-a-nordic-identity-for-canada> (Accessed 7 September 2014)

- Costello, K., Senkow, M., Bigio, A., Budkewitsch, P., & Ham, L. (2011). *Mineral Exploration, Mining and Geoscience overview 2011*. Ottawa, ON: Aboriginal Affairs and Northern Development Canada.
- Cowen, D. (2010). A Geography of Logistics: Market Authority and the Security of Supply Chains. *Annals of the Association of American Geographers*, 100(3), 600-620. doi:10.1080/00045601003794908
- Dalby, S. (1990). *Creating the second cold war: the discourse of politics*. London : New York: Pinter Publishers ; Guilford Press.
- Dalby, S. (2013). Climate Change. *The RUSI Journal*, 158(3), 34-43. doi:10.1080/03071847.2013.807583
- de Goede, M., & Randalls, S. (2009). Precaution, Preemption: Arts and Technologies of the Actionable Future. *Environment and Planning D: Society and Space*, 27(5), 859-878. doi:10.1068/d2608
- Dean, M. (2007). *Governing Societies*. London: Sage.
- Dean, M. (2010). *Governmentality: Power and Rule in Modern Society*. Thousand Oaks, CA: SAGE Publishing.
- Deleuze, G., & Guattari, F. (1987). *A thousand plateaus: Capitalism and Schizophrenia* (B. Massumi, Trans.). Minneapolis, MN: University of Minnesota Press.
- Der Derian, J. (2001). *Virtuous War*. Boulder, Co: Westview Press.
- Det Norske Veritas. (2010). *Shipping across the Arctic Ocean: A feasible option in 2030-2050 as a result of global warming?* (Position paper 04-2010). Retrieved from
- Det Norske Veritas. (2013). Nunavik - DNL GL Vessel Registry. Retrieved from <http://vesselregister.dnvgl.com/VesselRegister/vesseldetails.html?vesselid=32867> (Last accessed 23 June 2016)
- Dittmer, J., Moisiso, S., Ingram, A., & Dodds, K. (2011). Have you heard the one about the disappearing ice? Recasting Arctic geopolitics. *Political Geography*, 30(4), 202-214. doi:10.1016/j.polgeo.2011.04.002
- Dodds, K. J. (2010). Flag planting and finger pointing: The Law of the Sea, the Arctic and the political geographies of the outer continental shelf. *Political Geography*, 29(2), 63-73. doi:10.1016/j.polgeo.2010.02.004
- Dodds, K. J. (2013). Anticipating the Arctic and the Arctic Council: pre-emption, precaution and preparedness. *Polar Record*, 49(02), 193-203. doi:10.1017/S0032247412000198
- Dodds, K. J., & Nuttall, M. (2015). *The Scramble for the Poles: The Geopolitics of the Arctic and Antarctic*. Cambridge: Polity.

- Douglas, J. D. (1985). *Creative Interviewing*. Beverly Hills: Sage.
- Dunn, K. (2005). Interviewing. In I. Hay (Ed.), *Qualitative Research Methods in Human Geography* (pp. 79-105). Oxford: Oxford University Press.
- Eber, D. (2008). *Encounters on the passage: Inuit meet the explorers*. Toronto: University of Toronto Press.
- Economic Development and Transportation official. (2012a, 10 Aug) *Personal Interview, 10 Aug (AM)/Interviewer: A. Grove*.
- Economic Development and Transportation official. (2012b, 10 Aug 2012) *Personal interview, 10 Aug (PM)/Interviewer: A. Grove*.
- Emmerson, C. (2010). *The future history of the Arctic* (1st ed ed.). New York: PublicAffairs.
- Emmerson, C., & Lahn, G. (2012). *Arctic Opening: Opportunity and Risk in the High North* (Lloyd's Ed.). London: Chatham House.
- English, J. (2013). *Ice and Water: Politics, Peoples and the Arctic Council*. Toronto: Allen Lane.
- Environment Canada. (2011). Weather and Marine Services in the Arctic [Press release]. Retrieved from <http://www.ec.gc.ca/default.asp?lang=En&n=714D9AAE-1&news=3FCC5F0F-01C6-4EC6-99A6-20E2D1973F08>
- Environment Canada. (2015, 31 July 2015). Ice Bulletins (and Warnings) and Iceberg Bulletins. Retrieved from <http://www.ec.gc.ca/glaces-ice/default.asp?lang=En&n=E568E9D7-1> (Last accessed 20 May 2016)
- Environment Canada official. (2012a, 12 June) *Personal Interview, 12 June/Interviewer: A. Grove*.
- Environment Canada official. (2012b, 19 July) *Personal Interview, 19 July/Interviewer: A. Grove*.
- Ewald, F. (2002). "The Return of Descartes" malicious demon: an outline of the philosophy of precaution. In T. Baker & J. Simon (Eds.), *Embracing Risk: The Changing Culture of Insurance and Responsibility* (pp. 273-302). Chicago: University of Chicago Press.
- Fairhall, D. (2010). *Cold front: conflict ahead in Arctic waters*. London: I. B. Tauris.
- Farish, M. (2006). Frontier engineering: from the globe to the body in the Cold War Arctic. *Canadian Geographer / Le Géographe canadien*, 50(2), 177-196. doi:10.1111/j.0008-3658.2006.00134.x
- Fednav. (2014a). Arctic Shipping | Fednav. Retrieved from <http://www.fednav.com/en/services/arctic-shipping> (Last accessed 7 November 2014)

- Fednav. (2014b). Nunavik | Fednav Fleet. Retrieved from <http://www.fednav.com/en/fleet/nunavik> (Last accessed 6 November 2014)
- Fednav. (2014c). Nunavik's Log Book. Retrieved from <http://www.fednav.com/en/voyage-nunavik> (Last accessed 6 November 2014)
- Fisheries and Oceans Canada. (2013a, 2013/06/24/). Icebreaking Fleet. *CCG - Icebreaking*. Retrieved from http://www.ccg-gcc.gc.ca/eng/CCG/Ice_Fleet (Last accessed 6 November 2014)
- Fisheries and Oceans Canada. (2013b, 26 August). Polar Icebreaker Project Timeline. *Vessel Procurement*. Retrieved from <https://web.archive.org/web/20131002024644/http://www.ccg-gcc.gc.ca/vessel-procurement/polar-icebreaker/timeline> (Archived, link no longer active) (Last accessed 11 November 2013)
- Fisheries and Oceans Canada official. (2012, 6 June) *Personal Interview, 6 June/Interviewer: A. Grove*.
- Ford, J. D., Pearce, T., Duerden, F., Furgal, C., & Smit, B. (2010). Climate change policy responses for Canada's Inuit population: The importance of and opportunities for adaptation. *Global Environmental Change*, 20(1), 177-191. doi:<http://dx.doi.org/10.1016/j.gloenvcha.2009.10.008>
- Foucault, M. (1991). Governmentality. In G. Burchell, C. Gordon, & P. Miller (Eds.), *The Foucault effect: studies in governmentality* (pp. 87-104). Chicago: University of Chicago Press.
- Foucault, M. (2008). *The birth of biopolitics. Lectures at the Collège de France, 1978-1979*. London: Palgrave.
- Fournier, S. (2012). *Getting it Right: Assessing and Building Resilience in Canada's North* (C. f. t. North, Trans.). Ottawa, ON: Conference Board of Canada.
- Fournier, S., & Caron-Vuotari, M. (2013). *Changing Tides: Economic Development in Canada's Northern Marine Waters* (C. f. t. North, Trans.). Ottawa: Conference Board of Canada.
- Fremont, A. (2007). Global maritime networks: The case of Maersk. *Journal of Transport Geography*, 15(6), 431-442. doi:10.1016/j.jtrangeo.2007.01.005
- Furgal, C., & Prowse, T. D. (2008). Northern Canada. In D. S. Lemmen, F. J. Warren, J. Lacroix, & E. Bush (Eds.), *From Impacts to Adaption: Canada in a Changing Climate 2007* (pp. 57-118). Ottawa, ON: Government of Canada.
- Gelling, N. (2014, 29 May). Arctic Shipping: Good For Invasive Species, Bad For the Rest of Nature. *Smithsonian*.
- George, J. (2010a, 4 September). Expert: Clipper Adventurer ran into a known hazard. *Nunatsiaq News*. Retrieved from

- http://www.nunatsiaqonline.ca/stories/article/0409102_clipper_adventurer_ran_into_a_charted_hazard_expert_says (Accessed 2 November 2011)
- George, J. (2010b, 30 August). Stranded passengers find warmth in Kugluktuk. *Nunatsiaq News*. Retrieved from http://www.nunatsiaqonline.ca/stories/article/3008109_Stranded-passengers_crew_find_warm_welcome_in_Kugluktuk (Accessed 2 November 2011)
- George, J. (2011, 21 August). Armed forces suspends mock disaster response after crash in Resolute Bay. *Nunatsiaq News*. Retrieved from http://www.nunatsiaqonline.ca/stories/article/65674military_was_ready_to_respond_to_aug_20_crash_in_resolute/ (Accessed 2 November 2011)
- George, J. (2012, 27 April). TSB report on Clipper Adventurer grounding reveals broken equipment, questionable decisions. *Nunatsiaq News*. Retrieved from http://www.nunatsiaqonline.ca/stories/article/65674tsb_report_on_the_clipper_adventures_grounding_reveals_broken_equipme/ (Accessed 30 April 2012)
- Gerhardt, H., Steinberg, P. E., Tasch, J., Fabiano, S. J., & Shields, R. (2010). Contested Sovereignty in a Changing Arctic. *Annals of the Association of American Geographers*, 100(4), 992-1002. doi:10.1080/00045608.2010.500560
- Global Business Network. (2008). *The Future of Arctic Marine Navigation in Mid-Century: Scenario Narratives Prepared for the Arctic Marine Shipping Assessment*. San Francisco: Global Business Network.
- Government of Canada. (1985). *Arctic Waters Pollution Prevention Act (1970)*. Canada.
- Government of Canada. (2000). *The Northern Dimension of Canada's Foreign Policy*. Ottawa, ON: Department of Foreign Affairs and International Trade.
- Government of Canada. (2009). *Canada's Northern Strategy: Our North, Our Heritage, Our Future*. Minister of Indian Affairs and Northern Development and Federal Interlocutor for Métis and Non-Status Indians.
- Government of Canada. (2010). *Shipping Safety Control Zones Order*. Canada: Minister of Justice Retrieved from http://laws-lois.justice.gc.ca/eng/regulations/C.R.C.,_c._356/FullText.html.
- Government of Canada. (2012). *Arctic Shipping Pollution Prevention Regulations (1978)*. Retrieved from http://laws-lois.justice.gc.ca/eng/regulations/C.R.C.,_c._353/FullText.html.
- Government of Canada. (2015, 28 August 2015). Operation Nanook. Retrieved from <http://www.forces.gc.ca/en/operations-canada-north-america-recurring/op-nanook.page> (Last accessed 27 April 2016)

- Government of Nunavut. (2007). *Parnautit: A foundation for the future. Nunavut Mineral Exploration and Mining strategy*. Iqaluit, NU: Nunavut Department of Economic Development and Transportation.
- Government of Nunavut. (2010). *Ingirrasiliqta (Let's Get Moving): Nunavut Transportation Strategy*. Iqaluit, NU: Nunavut Department of Economic Development and Transportation.
- Government of the United States of America. (2009). *Arctic Region Policy*. Washington, DC: Government of the United States of America.
- Grant, S. D. (2010). *Polar imperative: a history of Arctic sovereignty in North America*. Vancouver: Douglas & McIntyre.
- Gregoire, L. (2015, 9 April). Nunavut regulatory org says no to Baffinland. *Nunatsiaq News*. Retrieved from (Accessed
- Griffiths, F. (2003). The Shipping News: Canada's Arctic Sovereignty Not on Thinning Ice. *International Journal*, 58(2), 257-282. doi:10.2307/40203841
- Griffiths, F. (2004). Pathetic Fallacy: That Canada's Arctic Sovereignty is on thinning ice. *Canadian Foreign Policy*, 11(3), 1-16.
- Grove, K. J. (2013). From emergency management to managing emergence: a genealogy of disaster management in Jamaica. *Annals of the Association of American Geographers*, 103(3), 570-588.
- Grove, K. J. (2014). Adaptation machines and the parasitic politics of life in Jamaican disaster resilience. *Antipode*, 46(3), 611-628.
- Harvey, D. (1990). *The Condition of Postmodernity: An Examination of the Origins of Cultural Change*. Malden, MA: Blackwell Publishers.
- Harvey, D. (2010). *The Enigma of Capital and the Crisis This Time*. Paper presented at the American Sociological Association Meeting, Atlanta, GA.
<http://mrzine.monthlyreview.org/2010/harvey270910p.html>
- Hasty, W., & Peters, K. (2012). The Ship in Geography and the Geographies of Ships. *Geography Compass*, 6(11), 660-676. doi:10.1111/gec3.12005
- Heininen, L. (2014). Northern geopolitics: actors, interests, and processes in the circumpolar Arctic. In K. Dodds & R. C. Powell (Eds.), *Polar Geopolitics? Knowledges, Resources, and Legal Regimes* (pp. 241-259). Cheltenham, UK: Edward Elgar.
- Heininen, L., & Nicol, H. N. (2007). The Importance of Northern Dimension Foreign Policies in the Geopolitics of the Circumpolar North. *Geopolitics*, 12(1), 133-165. doi:10.1080/14650040601031206

- Heininen, L., & Southcott, C. (2010). *Globalization and the circumpolar North*: University of Alaska Press.
- Hesse, M., & Rodrigue, J.-P. (2004). The transport geography of logistics and freight distribution. *Journal of Transport Geography*, 12(3), 171-184.
doi:10.1016/j.jtrangeo.2003.12.004
- Hilling, D., & Browne, M. (1998). Ships, ports and bulk freight transport. In B. S. Hoyle & R. D. Knowles (Eds.), *Modern Transport Geography* (pp. 241-261). New York: Wiley.
- House, D. (2007). *Ship Handling*. Oxford: Routledge.
- Huebert, R. (2002). Climate change and Canadian Sovereignty in the Northwest Passage. *Isuma*, 2(4), 93.
- Huebert, R. (2003). The Shipping News Part II: How Canada's Arctic Sovereignty is on Thinning Ice. *International Journal*, 58(3), 295-308.
- Huebert, R. (2005). The return of the 'Vikings': The Canadian-Danish dispute over Hans Island - new challenges for the control of the Canadian North. In F. Berkes, R. Huebert, H. Fast, M. Manseau, & A. Diduck (Eds.), *Breaking Ice: Renewable Resource and Ocean Management in the Canadian North* (pp. 319-336). Calgary, Alberta: University of Calgary Press.
- IALA. (2014). About IALA. Retrieved from www.iala-aism.org/about (Last accessed 13 November 2014)
- International Association of Classification Societies. (2015a). *Classification Societies - What, Why and How?* London: IACS Permanent Secretariat.
- International Association of Classification Societies. (2015b). *IACS Objectives, Strategy and Action Plan 2015-2016*. London: International Association of Classification Societies.
- International Association of Marine Aids to Navigation and Lighthouse Authorities. (2010). *Maritime Buoyage System and Other Aids to Navigation*. Saint Germain en Laye, France IALA.
- International Association of Marine Aids to Navigation and Lighthouse Authorities. (2013). *Guideline 1108 - The Challenges of Providing AtoN Services in Polar Regions*. Retrieved from Saint Germain en Laye, France:
- International Maritime Organization. (2010). *Guidelines for Ships Operating in Polar Waters*.
- International Maritime Organization. (2016). *International Code for Ships Operating in Polar Waters (Polar Code)*. London: International Maritime Organization.
- Inuit Circumpolar Council. (2009). *A Circumpolar Inuit Declaration on Sovereignty in the Arctic*. Ottawa, ON: Inuit Circumpolar Council.

- Inuit Circumpolar Council. (2011). *A Circumpolar Inuit Declaration on Resource Development Principles in Inuit Nunaat*. Ottawa, ON: Inuit Circumpolar Council.
- Inuit Circumpolar Council. (2013). *Circumpolar Inuit Response to Arctic Shipping Workshop Proceedings*. Paper presented at the Circumpolar Inuit Response to Arctic Shipping Ottawa ON.
- Inuit Circumpolar Council Canada. (2007). *The Sea Ice is Our Highway: an Inuit Perspective on Transportation in the Arctic*. Ottawa, ON: Inuit Circumpolar Council.
- Inuit Circumpolar Council Canada. (2014). *The Sea Ice Never Stops: Circumpolar Inuit Reflections on Sea Ice Use and Shipping in Inuit Nunaat*. Ottawa, ON: Inuit Circumpolar Council.
- IPCC. (2007). *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Geneva, Switzerland: Intergovernmental Panel on Climate Change.
- IPCC. (2013). *Climate Change 2013: The Physical Science Basis Summary for Policymakers*. Geneva, Switzerland: Intergovernmental Panel on Climate Change.
- Jeffrey, A. (2015). The State *The Wiley Blackwell Companion to Political Geography* (pp. 61-72): John Wiley & Sons, Ltd.
- Jessop, B. (2007). From micro-powers to governmentality: Foucault's work on statehood, state formation, statecraft and state power. *Political Geography*, 26, 34-40.
- Jessop, B., Benner, N., Jones, M., & MacLeod, G. (2003). State space in question. In B. Jessop, N. Benner, M. Jones, & G. MacLeod (Eds.), *State/space: a reader*. Oxford: Blackwell.
- Jones, M., Jones, R., & Woods, M. (2004). *An Introduction to Political Geography*. London: Routledge.
- Jorgenson, R. (2011). Slow steaming - the full story. In A. P. M.-M. Group (Ed.): A.P. Moller - Maersk Group.
- Keeling, A., & Sandlos, J. (Eds.). (2015). *Mining and Communities in Northern Canada: History, Politics, and Memory*. Calgary, AB: University of Calgary Press.
- Kikkert, P. (2012a). The Disappointing Arctic: Will More Shipping Dreams be Shattered on the Ice? *Journal of Maritime Law & Commerce*, 43(4), 539-552.
- Kikkert, P. (2012b). Promoting National Interests and Fostering Cooperation: Canada and the Development of a Polar Code *Journal of Maritime Law & Commerce*, 43(3), 319-334.
- Kingdom of Denmark. (2008). *Arctic in a Time of Change. Proposed Strategies for Activities in the Arctic Area*. Copenhagen: Kingdom of Denmark.

- Kingdom of Denmark. (2011). *Strategy for the Arctic 2011-2020*. Copenhagen: Kingdom of Denmark.
- Koivurova, T. (2010). Limits and possibilities of the Arctic Council in a rapidly changing scene of Arctic governance. *Polar Record*, 46(237), 146-156.
- Koselleck, R. (2004). *Futures Past: On the Semantics of Historical Time*. New York: Columbia University Press.
- Kuus, M. (2013). Foreign Policy and Ethnography: A Sceptical Intervention. *Geopolitics*, 18(1), 115-131. doi:10.1080/14650045.2012.706759
- Kuus, M., & Agnew, J. (2007). Sovereignty, Subjectivity, Territoriality State and Society. In K. Cox, M. Low, & J. Robinson (Eds.), *The SAGE Handbook of Political Geography* (pp. 95-106). Thousand Oaks, CA: Sage Publications.
- Lackenbauer, P. W., & Farish, M. (2007). The Cold War on Canadian Soil: Militarizing a Northern Environment. *Environmental History*, 12(4), 920-950. doi:10.1093/envhis/12.4.920
- Lackenbauer, P. W., & Kikkert, P. (2010). *The Canadian Forces and Arctic sovereignty: debating roles, interests, and requirements, 1968-1974*. Waterloo, Ont: Laurier Centre for Military Strategic and Disarmament Studies.
- Lagoni, N. (2007). *The Liability of Classification Societies*. Berlin: Springer.
- Lajeunesse, A. (2012). A New Mediterranean? Arctic Shipping Prospects for the 21st Century. *Journal of Maritime Law & Commerce*, 43(4), 521-537.
- Lajeunesse, A. (2016). *Lock Stock and Icebergs: A History of Canada's Arctic Maritime Sovereignty*. Vancouver: UBC Press.
- Lambert, D., Martins, L., & Ogborn, M. (2006). Currents, visions and voyages: historical geographies of the sea. *Journal of Historical Geography*, 32(3), 479-493. doi:<http://dx.doi.org/10.1016/j.jhg.2005.10.004>
- Lasserre, F. (2011). Arctic Shipping Routes: From the Panama Myth to Reality. *International Journal: Canada's Journal of Global Policy Analysis*, 66(4), 793-808. doi:10.1177/002070201106600409
- Lasserre, F., & Pelletier, S. (2011). Polar super seaways? Maritime transport in the Arctic: an analysis of shipowners' intentions. *Journal of Transport Geography*, 19(6), 1465-1473. doi:<http://dx.doi.org/10.1016/j.jtrangeo.2011.08.006>
- Liu, M., & Kronbak, J. (2010). The potential economic viability of using the Northern Sea Route (NSR) as an alternative route between Asia and Europe. *Journal of Transport Geography*, 18(3), 434-444. doi:10.1016/j.jtrangeo.2009.08.004

- Luck-Baker, A. (2014a, 15 January). Ice rescue ship leaves for Australia. *BBC*. Retrieved from <http://www.bbc.com/news/science-environment-25745163> (Last accessed 7 June 2016)
- Luck-Baker, A. (2014b, 21 January). Why did Antarctic expedition ship get stranded in ice? *BBC*. Retrieved from <http://www.bbc.com/news/science-environment-25833307> (Last accessed 7 June 2016)
- M'Gonigle, R. M. (1976). Unilateralism and International Law: The Arctic Waters Pollution Prevention Act. *University of Toronto Faculty of Law Review*, 34(2), 180-198.
- Mack, J. (2013). *The Sea: A Cultural History*. London: Reaktion Books.
- Maloni, M., Paul, A. J., & Gligor, M. D. (2013). Slow steaming impacts on ocean carriers and shippers. *Maritime Economics & Logistics*, 15(2), 151-171. doi:10.1057/mel.2013.2
- MAN PrimeServ. (2012). *Slow Steaming Practices in the Global Shipping Industry: Results of a survey conducted by MAN PrimeServ in late 2011 among representatives of the global container, bulk and tanker shipping industry*. Copenhagen, Denmark: MAN Diesel & Turbo.
- Mann, M. (1984). The autonomous power of the state: its origins, mechanisms and results. *European Journal of Sociology*, 25, 185-213.
- Martin, C. (2013). Shipping Container Mobilities, Seamless Compatibility, and the Global Surface of Logistical Integration. *Environment and Planning A*, 45(5), 1021-1036. doi:10.1068/a45171
- Martin, C. (2014). The Packaging of Efficiency in the Development of the Intermodal Shipping Container. *Mobilities*, 9(3), 432-451.
- Martínez-Zarzoso, I. (2013). Alternative Sea Routes: What Effects on Maritime Trade? *SAIS Review of International Affairs*, 33(2), 61-74. doi:10.1353/sais.2013.0020
- Masco, J. (2006). *The Nuclear Borderlands*. Princeton, NJ: Princeton University Press.
- Massey, D. (1995). Places and their past. *History Workshop Journal*, 39, 182-192.
- Massumi, B. (2005). Fear (the spectrum said). *Positions*, 13(1), 31-48.
- Massumi, B. (2007). Potential Politics and the Primacy of Preemption. *Theory & Event*, 10(2). doi:10.1353/tae.2007.0066
- McCalla, R. J., Slack, B., & Comtois, C. (2004). Dealing with globalization at the regional and local level: the case of contemporary containerization. *The Canadian Geographer*, 48(4), 473-487.
- McCannon, J. (2012). *A History of the Arctic: Nature, Exploration, and Exploitation*. London: Reaktion Books.

- McDorman, T. (2009). *Salt Water Neighbours: International Ocean Law and Relations Between the United States and Canada*. Oxford: Oxford University Press.
- McGarrity, J., & Gloystein, H. (2013, 27 September). Northwest Passage crossed by first cargo ship, the Nordic Orion, heralding new era of Arctic commercial activity. *National Post*. Retrieved from <http://news.nationalpost.com/2013/09/27/northwest-passage-crossed-by-first-cargo-ship-the-nordic-orion-heralding-new-era-of-arctic-commercial-activity/> (Accessed
- McNiven, C., & Puderer, H. (2000). *Delineation of Canada's North: An Examination of the North-South Relationship in Canada* (92F0138MIE, no. 2000-3). Retrieved from Ottawa, Ontario:
- Meren, D., & Plumptre, B. (2013). Rights of Passage: The Intersecting of Environmentalism, Arctic Sovereignty, and the Law of the Sea, 1968-82. *Journal of Canadian Studies*, 47(1), 167-196,256-257.
- Murphy, A. (1996). The sovereign state system as political-territorial ideal: historical and contemporary considerations. In T. J. Biersteker & C. Weber (Eds.), *State sovereignty as social construct* (pp. 81-120). Cambridge: Cambridge University Press.
- National Transportation Safety Board. (2004). *Marine Accident Brief* (NTSB/MAB-06/01). Retrieved from Washington, DC:
- Nicol, H. N. (2005). Policy Gaps in the Northern Dimension: Raising Questions and Awareness in the Context of Globalization. *Polar Geography*, 29(2), 79-90. doi:10.1080/789610126
- Norshipping. (2007). *Arctic shipping 2030: from Russia with oil, stormy passage, or Arctic great game?* (ECON-Report no. 2007-070, Project no. 50450). Oslo: ECON.
- Norwegian Ministry of Foreign Affairs. (2006). *The Norwegian Government's High North Strategy*. Oslo: Government of Norway.
- Notteboom, T. E., & Vernimmen, B. (2009). The effect of high fuel costs on liner service configuration in container shipping. *Journal of Transport Geography*, 17(5), 325-337. doi:10.1016/j.jtrangeo.2008.05.003
- Novak, P. (2011). The Flexible Territoriality of Borders. *Geopolitics*, 16(4), 741-767. doi:10.1080/14650045.2010.494190
- Numminen, L. (2010). Breaking the ice: Can environmental and scientific cooperation be the way forward in the Arctic? *Political Geography*, 29(2), 85-87. doi:10.1016/j.polgeo.2010.02.002
- Nunatsiaq News. (2011, 22 August). 12 killed in Boeing 737 crash near Resolute Bay. *Nunatsiaq News*. Retrieved from http://www.nunatsiaqonline.ca/stories/article/65674deaths_reported_in_resolute_bay_plane_crash/ (Accessed 2 November 2013)

- Nunatsiaq News. (2013, 10 January). Baffinland slashes scope of Nunavut's Mary River project. *Nunatsiaq News*. Retrieved from http://www.nunatsiaqonline.ca/stories/article/65674baffinland_slashes_scope_of_nunavut_s_mary_river_project/ (Accessed 2 November 2013)
- Nunatsiaq News. (2014a, 22 September). MV Nunavik: from Quebec to China via the Northwest Passage. *Nunatsiaq News*. Retrieved from http://www.nunatsiaqonline.ca/stories/article/65674mv_nunavik_from_northern_quebec_to_china_via_the_northwest_passage/ (Accessed 23 September 2014)
- Nunatsiaq News. (2014b, 5 November). Nunavut iron producer proposes big changes for Mary River. *Nunatsiaq News*. Retrieved from http://www.nunatsiaqonline.ca/stories/article/65674nunavut_iron_producer_proposes_big_changes_for_mary_river/ (Accessed 7 November 2014)
- Nunavut Impact Review Board. (2012). *Final Hearing Report: Mary River Project Baffinland Iron Mines Corporation*. (NIRB File No. 08MN053). Cambridge Bay, Nunavut: Nunavut Impact Review Board.
- Nuttall, M. (2008). Anticipation, climate change, and movement in Greenland. *Etudes/Inuit Studies*, 34, 21-37.
- Ó Tuathail, G. (1996). *Critical geopolitics: the politics of writing global space*. Minneapolis: University of Minnesota Press.
- Oceans North Canada. (2016). *The Integrate Arctic Corridors Framework: Planning for responsible shipping in Canada's Arctic Waters*. Retrieved from Philadelphia, PA:
- Oskin, B. (2014, 2 October). Cargo Ship Is First to Solo the Northwest Passage. *LiveScience*. Retrieved from <http://www.livescience.com/48105-cargo-ship-solos-northwest-passage.html> (Last accessed 6 November 2014)
- Paasi, A. (2008). Territory. In J. Agnew, K. Mitchell, & G. Toal (Eds.), *A Companion to Political Geography* (pp. 109-122). Malden, MA: Blackwell.
- Painter, J. (2015). Power *The Wiley Blackwell Companion to Political Geography* (pp. 141-151): John Wiley & Sons, Ltd.
- Panayides, P. M., & Song, D.-W. (2013). Maritime logistics as an emerging discipline. *Maritime Policy & Management*, 40(3), 295-308. doi:10.1080/03088839.2013.782942
- Paris, M. (2012, 23 April). Arctic Ocean may open to regular shipping by 2017. *CBC News*. Retrieved from <http://www.cbc.ca/news/technology/arctic-ocean-may-open-to-regular-shipping-by-2017-1.1178628/> (Last accessed 2 November 2013)
- Pehora, B. (2016a, 28 January). Coast Guard: new \$1.3 billion Arctic icebreaker to be ready by 2022. *Nunatsiaq News*. Retrieved from

- http://www.nunatsiaqonline.ca/stories/article/65674coast_guard_new_1.3_billion_arctic_icebreaker_to_be_ready_by_2022/ (Accessed 21 July 2016)
- Pehora, B. (2016b, 24 February). One new Arctic icebreaker, few places to dock it. *Northern Public Affairs*. Retrieved from <http://www.northernpublicaffairs.ca/index/one-new-arctic-icebreaker-few-places-to-dock-it/> (Accessed 16 July 2016)
- Peters, G. P., Nilssen, T. B., Lindholt, L., Eide, M. S., Glomsrød, S., Eide, L. I., & Fuglestedt, J. S. (2011). Future emissions from shipping and petroleum activities in the Arctic. *Atmos. Chem. Phys.*, *11*(11), 5305-5320. doi:10.5194/acp-11-5305-2011
- Peters, K. (2012). Manipulating material hydro-worlds: rethinking human and more-than-human relationality through offshore radio piracy. *Environment and Planning A*, *44*(5), 1241-1254.
- Pharand, D. (2007). The Arctic Waters and the Northwest Passage: A Final Revisit. *Ocean Development & International Law*, *38*(1-2), 3-69. doi:10.1080/00908320601071314
- Phillips, L., & Jørgensen, M. W. (2002). *Discourse Analysis as Theory and Method*. London: Sage Publications.
- Pizzolato, L., Howell, S. E. L., Derksen, C., Dawson, J., & Copland, L. (2014). Changing sea ice conditions and marine transportation activity in Canadian Arctic waters between 1990 and 2012. *Climatic Change*, *123*(2), 161-173. doi:10.1007/s10584-013-1038-3
- Powell, R. C. (2010). Lines of possession? The anxious constitution of a polar geopolitics. *Political Geography*, *29*(2), 74-77. doi:10.1016/j.polgeo.2010.02.001
- Powell, R. C., & Dodds, K. (2014). Polar geopolitics. In R. C. Powell & K. Dodds (Eds.), *Polar Geopolitics? Knowledges, Resources, and Legal Regimes* (pp. 3-19). Cheltenham, UK: Edward Elgar.
- Ridanpää, J. (2010). A masculinist northern wilderness and the emancipatory potential of literary irony. *Gender, Place & Culture*, *17*(3), 319-335. doi:10.1080/09663691003737595
- Rodrigue, J.-P., & Notteboom, T. (2010). Comparative North American and European gateway logistics: the regionalism of freight distribution. *Journal of Transport Geography*, *18*(4), 497-507. doi:10.1016/j.jtrangeo.2010.03.006
- Rose, N., & Miller, P. (1992). Political Power beyond the state: problematics of government. *British Journal of Sociology*, *43*(2), 173-202.
- Rosenthal, E. (2010, 17 February). Slow Trip Across Sea Aids Profit and Environment. *The New York Times*. Retrieved from (Accessed
- Rothwell, D. R. (2014). The polar regions and the law of the sea. In R. C. Powell & K. Dodds (Eds.), *Polar Geopolitics? Knowledges, Resources, and Legal Regimes* (pp. 19-37). Cheltenham, UK: Edward Elgar.

- Rushkoff, D. (2013). *Present Shock: When Everything Happens Now*. New York: Penguin.
- Russian Federation. (2008). *The Fundamentals of State Policy of the Russian Federation in the Arctic in the Period up to 2020 and Beyond*. Moscow: Government of the Russian Federation.
- Saldanha, J. P., Tyworth, J. E., Swan, P. F., & Russell, D. M. (2009). CUTTING LOGISTICS COSTS WITH OCEAN CARRIER SELECTION. *Journal of Business Logistics*, 30(2), 175-195. doi:10.1002/j.2158-1592.2009.tb00118.x
- Santos-Pedro, V. M., & Timco, G. (2001). *Canadian R&D Participation in the ESCGC Healy Ice Trials (2000)*. (HYD-TR-068). Ottawa, Ontario: Canadian Hydraulics Centre.
- Scott, J. C. (2009). *The Art of Not Being Governed: An Anarchist History of Upland Southeast Asia*. New Haven, CT.: Yale University Press.
- Shore, C., & Wright, S. (1997). Policy: A new field of anthropology. In C. Shore & S. Wright (Eds.), *Anthropology of policy: critical perspectives on governance and power* (pp. 3-42). London ; New York: Routledge.
- Skura, E. (2016, 18 Feb 2016). Baffinland proposes changing Mary River project's shipping road to a railway. *CBC News*. Retrieved from (Accessed
- Slack, B. (1998). International Transportation. In B. S. Hoyle & R. D. Knowles (Eds.), *Modern Transport Geography* (pp. 263-289). London: Wiley.
- Slotkin, R. (1992). *Gunfighter Nation: The myth of the frontier in twentieth century America*. Norman, OK: University of Oklahoma Press.
- Smith, L. C. (2011). *The New North: The World in 2050*. London: Profile Books.
- Somanathan, S., Flynn, P., & Szymanski, J. (2009). The Northwest Passage: A simulation. *Transportation Research Part A: Policy and Practice*, 43(2), 127-135. doi:10.1016/j.tra.2008.08.001
- Steinberg, P. E. (2001). *The social construction of the ocean*. Cambridge ; New York: Cambridge University Press.
- Steinberg, P. E. (2010). You are (not) here: On the ambiguity of flag planting and finger pointing in the Arctic. *Political Geography*, 29(2), 81-84. doi:10.1016/j.polgeo.2010.02.003
- Steinberg, P. E. (2014). Mediterranean metaphors: travel, translation, and oceanic imaginaries in the 'new Mediterraneans' of the Arctic Ocean, the Gulf of Mexico and the Caribbean. In J. Anderson & K. Peters (Eds.), *Water Worlds: Human Geographies of the Ocean* (pp. 23-38). London: Routledge.
- Stephenson, S. R., Smith, L. C., & Agnew, J. A. (2011). Divergent long-term trajectories of human access to the Arctic. *Nature Clim. Change*, 1(3), 156-160.

doi:<http://www.nature.com/nclimate/journal/v1/n3/abs/nclimate1120.html#supplementary-information>

- Stopford, M. (2009). *Maritime economics* (3rd ed ed.). London ; New York: Routledge.
- Stueck, W. (2013a, 2 October). Groundbreaking Northwest Passage voyage almost foundered over insurance. *The Globe and Mail*. Retrieved from (Accessed
- Stueck, W. (2013b, 25 September). Ship crosses Northwest Passage, sails into history. *The Globe and Mail*. Retrieved from (Accessed
- Swyngedouw, E. (2007). Impossible 'sustainability' and the post-political condition. In R. Krueger & D. Gibbs (Eds.), *The Sustainable Development Paradox* (pp. 13-40). New York: Guilford Press.
- The Economist. (2009a, 29 August 2009). The Americas; Harper of the melting north; Canada's Arctic Policy. *The Economist*.
- The Economist. (2009b, 10 October 2009). International; Mirror mirror on the wall; the Arctic. *The Economist*.
- The Economist. (2012a, 24 March 2012). Cosy amid the thaw. *The Economist*.
- The Economist. (2012b, 16 June 2012). The melting north. *The Economist*.
- The Economist. (2012c, 16 June 2012). Short and Sharp; shipping. *The Economist*.
- The Economist. (2013a, 2 February 2013). The roar of ice cracking; outsiders in the arctic. *The Economist*.
- The Economist. (2013b, 18 May 2013). A warmer welcome; Arctic diplomacy. *The Economist*.
- The Economist. (2014, 6 September 2014). Snow Dragons; Banyan. *The Economist*.
- The Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology. (2016). JCOMM Home. Retrieved from <http://www.jcomm.info/> (Last accessed 4 May 2016)
- Timco, G., & Johnston, M. (2001). *Arctic Ice Regime Shipping System: Pictorial guide*. Ottawa, Ontario: Transport Canada.
- Transport Canada. (2012, 24 February). Zone/Date System Map and Dates of Entry Table. Retrieved from <http://www.tc.gc.ca/eng/marinesafety/debs-arctic-acts-regulations-zds-chart-2014.htm> (Last accessed 2 November 2013)
- Transport Canada official. (2012a, 12 May) *Personal Interview, 12 May/Interviewer: A. Grove*.
- Transport Canada official. (2012b, 17 May) *Personal Interview, 17 May/Interviewer: A. Grove*.

- Transport Canada official. (2012c, 18 June) *Personal Interview, 18 June/Interviewer: A. Grove.*
- Transport Canada official. (2012d, 29 June) *Personal Interview, 29 June/Interviewer: A. Grove.*
- Transportation Safety Board of Canada. (2012). *Marine Investigation Report: Grounding Passenger Vessel Clipper Adventurer.* Retrieved from Ottawa, ON:
- U. S. Naval Institute. (2013). U.S. Coast Guard's 2013 Review of Major Icebreakers of the World. *USNI News.*
- UNESCO. (2010). *Why monitor the Arctic Ocean? Services to society from a sustained ocean observing system.* Retrieved from Paris, France:
- United Nations. (1982). United Nations Convention on the Law of the Sea: United Nations Division for Ocean Affairs and the Law of the Sea.
- Valentine, V. F., Benamara, H., & Hoffmann, J. (2013). Maritime transport and international seaborne trade. *Maritime Policy & Management, 40*(3), 226-242.
doi:10.1080/03088839.2013.782964
- Vannini, P., Baldacchino, G., Guay, L., Royle, S., & Steinberg, P. E. (2009). Recontinentalizing Canada: Arctic Ice's Liquid Modernity and the Imagining of a Canadian Archipelago. *Island Studies Journal, 4*(2), 121-138.
- Vesterager, J. (2011, 29 September). Shipper touts Arctic route to China as cost saver. *Reuters News Service.* Retrieved from <http://www.reuters.com/article/2011/09/28/shipping-arctic-idUSL5E7KS55F20110928> (Accessed 2 November 2013)
- Votolato, G. (2011). *Ship.* London: Reaktion Books.
- Waitt, G. (2005). Doing Discourse Analysis. In I. Hay (Ed.), *Qualitative Research Methods in Human Geography* (pp. 163-192). Oxford: Oxford University Press.
- Walker, R. B. J. (1993). *Inside/outside: international relations as political theory.* Cambridge [England] ; New York: Cambridge University Press.
- Watson, P. (2015, 31 January). A drone boost for a Canadian Arctic icebreaker and cargo ship. *The Star.* Retrieved from <https://www.thestar.com/news/insight/2015/01/31/a-drone-boost-for-a-canadian-arctic-icebreaker-and-cargo-ship.html> (Accessed 31 January 2015)
- Watt-Cloutier, S. (2006, 4 March 2006). *The Arctic and Climate Change: Inuit Defend Our Right to be Cold.* Paper presented at the Global Climate Change: The Arctic to the Rocky Mountain West, Salt Lake City, Utah.
- Watt-Cloutier, S. (2015). *The Right to be Cold: One Woman's Story of Protecting Her Culture, the Arctic and the Whole Planet.* Toronto: Allen Lane.

- Weber, B. (2014, 3 January). More Northwest Passage travel planned by Danish shipper. *The Canada Press*. Retrieved from (Accessed
- Wheatley, P. (1975). Satyanrta in Suvarnadvipa: From Reciprocity to Redistribution in Ancient Southeast Asia. In J. A. Sabloff, C. C. Lamberg-Karlovsky, & School of American Research (Santa Fe N.M.) (Eds.), *Ancient civilization and trade*. Albuquerque: University of New Mexico Press.
- Wiesmann, A. (2010). Slow Steaming - a viable long-term option? *Wärtsilä Technical Journal*, 2, 49-55.
- World Meteorological Organization. (2016a). GMDSS Metarea IV. Retrieved from http://www.wmo.int/pages/prog/www/ois/Operational_Information/VolumeD/GMDSS/Metarea4/Metarea4.html (Last accessed May 20 2016)
- World Meteorological Organization. (2016b). GMDSS Metarea XVII. Retrieved from http://www.wmo.int/pages/prog/www/ois/Operational_Information/VolumeD/GMDSS/Metarea17/Metarea17.html (Last accessed 20 May 2016)
- World Meteorological Organization. (2016c). GMDSS Metarea XVIII. Retrieved from http://www.wmo.int/pages/prog/www/ois/Operational_Information/VolumeD/GMDSS/Metarea18/Metarea18.html (Last accessed May 20 2016)
- World Wildlife Fund official. (2012, 25 May) *Personal Interview, 25 May/Interviewer: A. Grove*.
- Wright, S. (2011). Introduction. In C. Shore, S. Wright, & D. Perô (Eds.), *Policy worlds: anthropology and the analysis of contemporary power*. New York: Berghan Books.
- Wright, S. (2014). *Our Ice is Vanishing = Sikuvut nunguliquq: A history of Inuit, newcomers, and climate change*. Montreal: McGill-Queen's University Press.
- Yin, J., Fan, L., Yang, Z., & Li, K. X. (2014). Slow steaming of liner trade: its economic and environmental impacts. *Maritime Policy & Management*, 41(2), 149-158. doi:10.1080/03088839.2013.821210
- Young, O. R. (2011). If an Arctic Ocean treaty is not the solution, what is the alternative? *Polar Record*, 47(04), 327-334. doi:doi:10.1017/S0032247410000677
- Young, O. R. (2012). Arctic Tipping Points: Governance in Turbulent Times. *Ambio*, 41(1), 75-84. doi:10.1007/s13280-011-0227-4
- Zinn, J. O. (2008). Introduction: The contribution of sociology to the discourse on risk and uncertainty. In J. O. Zinn (Ed.), *Social Theories of Risk and Uncertainty. An Introduction*. Malden, MA: Blackwell.