

UNDERSTANDING THE FUTURE ARCTIC SECURITY ENVIRONMENT

Applying NATO Strategic
Foresight Analysis to
Canadian Arctic
Defence and
Security
2020

NAADSN

North American and Arctic Defence
and Security Network



FOREWORD

This report by the North American and Arctic Defence and Security Group (NAADSN) applies NATO's Strategic Foresight Analysis (SFA) 2017 Report, created to support NATO leadership's visualization of the future security environment, to Canada's Arctic security environment in its international, regional, and domestic contexts. Highlighting the rapid rate of change, complexity, uncertainty, and interconnectivity, it reinforces the need for creative and systematic thinking so that the Canadian Armed Forces (CAF) can anticipate potential threats to Canada and Canadian interests, act proactively to emerging challenges, and adapt with decisive military capability across the spectrum of operations to defend Canada, protect Canadian interests and values, and contribute to global stability.

The Arctic, integral to Canada and an avenue of approach to North America, necessitates defence across all domains enabled by partnerships. The CAF must be prepared to counter hostile foreign state and non-state actors, or respond anywhere in our vast area of responsibility (AOR) if help is requested, whether intervention for disaster relief, support in critical incidents or for search and rescue in the region.

As the area's strategic importance grows, the Government of Canada continues to increase its Arctic and northern footprint in support of defence safety and security. This effort is anchored in Canada's defence

policy, *Strong, Secure, Engaged*. This policy recognizes the need to enhance the CAF's presence in the region over the long term by setting out the capability investments that will give our armed forces the mobility, reach, and footprint required to project force across the region in ways that further our national interests. To be strong at home, we seek to defend the North and work with our Arctic partners to plan and coordinate operations to enable defence, safety and security in this austere environment.

This report, like the 2017 NATO SFA Report that inspires it, is not intended to predict the future but to suggest potential trajectories for several trends and highlight their implications for the Canadian Defence Team, its partners, and its allies. Not everyone will agree with all of the observations, suggestions, and potentialities suggested in this document, but offering them in a transparent format is useful to invite deeper reflection, discussion, and debate. By providing a foundation upon which to contemplate potential futures, this report seeks to propel future deliberations beyond general descriptions of well-documented trends and instead to encourage more coordinated strategies to anticipate and respond to potential risks, seize opportunities, and develop an appropriate mix of capabilities to respond to rapidly changing global and Arctic environments.

Contents

FOREWORD	I
EXECUTIVE SUMMARY	V
INTRODUCTION	IX
0.1 AIM	IX
0.2 CONCEPT	IX
0.3 OBJECTIVES	XI
0.4 METHODOLOGY	XI
0.5 BACKGROUND AND CONTEXT	XII
0.6 TERMINOLOGY	XVIII
0.7 STRUCTURE	XVIII
CHARACTERISTICS OF THE FUTURE	1
1.1 GLOBAL CONTEXT: STRONG, SECURE, ENGAGED	2
1.2 THE CANADIAN ARCTIC: TOWARDS A WHOLE-OF-SOCIETY APPROACH	5
1.3 COMPLEXITY AND UNCERTAINTY	8
1.4 CONFLUENCE AND INTERCONNECTEDNESS	11
POLITICAL	15
2.1 SHIFTS IN GEOSTRATEGIC POWER	17
2.2 USE OF POWER POLITICS	19
2.3 DEVOLUTION OF GOVERNANCE AND RECONCILIATION WITH INDIGENOUS PEOPLES	23
2.4 NON-ARCTIC STATE AND NON-STATE ACTOR INFLUENCE IN DOMESTIC AND INTERNATIONAL AFFAIRS	26
2.5 REGIONAL GOVERNANCE AND THE INTERNATIONAL LEGAL REGIME	31
2.6 PUBLIC DISCONTENT/DISAFFECTION AND POLARIZATION	34
ENVIRONMENT	39
3.1 ENVIRONMENT	41
3.2 NATURAL DISASTERS	47
3.3 HUMAN-MADE DISASTERS	50
ECONOMICS AND RESOURCES	53

4.1 ARCTIC SHIPPING	54
4.2 RESOURCE DEVELOPMENT	56
4.5 FISHERIES	62
HUMAN	65
5.1 DEMOGRAPHIC CHANGE	67
5.2 SETTLEMENT PATTERNS AND URBANIZATION	69
5.3 INFRASTRUCTURE GAPS	71
5.4 SOCIAL AND HEALTH INEQUALITIES	73
5.5 HUMAN NETWORKS AND INCREASING FRACTURED OR POLARIZED SOCIETY	76
TECHNOLOGY	81
6.1 RATE OF MILITARY TECHNOLOGY ADVANCEMENT	81
6.2 UNMANNED AUTONOMOUS SYSTEMS (UAS)	84
6.3 THE DEPENDENCY ON INDUSTRY TO PROVIDE TECHNOLOGICAL SOLUTIONS TO THE ARCTIC	85
6.4 TECHNOLOGY AND THE ENVIRONMENT	86
6.5 TECHNOLOGY AND SOCIETY	88
6.6 OVER-RELIANCE ON TECHNOLOGY SOLUTIONS	89
CONCLUSIONS	93
ENDNOTES	95
APPENDIX A: ARCTIC THEMES, TRENDS, AND IMPLICATIONS	97
SELECTED BIBLIOGRAPHY	104
ACKNOWLEDGMENTS	114
IMAGE CREDITS	114



EXECUTIVE SUMMARY

1. This NAADSN activity adopts the [NATO Strategic Foresight Analysis \(SFA\) 2017](#) model to help frame a conceptual model that anticipates and conveys an understanding of the future Canadian Arctic security environment, and to assess the applicability of its findings to Canadian Arctic defence and security policy. Our goal is to assist the Defence Team, the Government of Canada more generally, and academic stakeholders in testing assumptions, focusing future lines of research effort, and developing coordinated strategies to anticipate and respond to potential risks, as well as taking advantage of opportunities that arise from a complex security environment out to 2035.

2. This project succeeded in achieving the main objectives of NAADSN's *Understanding the Future Arctic Security Environment* assessment project, leveraging the expertise of the network team (members, postdoctoral and graduate fellows, and student associates) in the drafting and review phases. A draft version was circulated to academic and government experts for feedback during the Advancing Collaboration in Canada-U.S. Arctic Regional Security (ACCUSARS) workshop, co-hosted with the Arctic Domain Awareness Center (ADAC) in September 2020, and at a series of small NAADSN virtual events

in October 2020. Although COVID-19 constraints forced changes to planned engagement activities and delayed the release of the report, the process demonstrated the response capabilities of NAADSN to anticipate and identify emerging risks and threats to Canada and analyze these risks.

3. Canada's defence policy, [Strong, Secure, Engaged](#), highlights three key security trends that will continue to shape events: the evolving balance of power, the changing nature of conflict, and the rapid evolution of technology. These trends have a direct bearing when contemplating future Arctic security environments, vulnerabilities, and requirements. Like the 2017 NATO SFA, this report visualizes a future Arctic security environment characterized by a rapid rate of change, complexity, uncertainty and interconnectedness. Most of the drivers and implications identified in this report highlight "soft" security and safety challenges in the Arctic rather than "hard" military kinetic threats to the Arctic, thus confirming the line of reasoning that has become well entrenched in Canadian defence planning over the last decade.

4. This report retains the structure of the NATO SFA by organizing ideas around main political, social, technological, economic, and environmental

trends. While this proved relevant to assessing Arctic defence and security futures, participants in the project (both authors and reviewers of drafts) noted the limitations of a siloed approach that can conceal the cross-cutting nature of drivers and themes. Future work will further articulate the interaction of trends, identify instability situations, and clarify implications for defence and security practitioners.

5. Political. The resurgence of great power competition, and particularly dynamics related to Chinese and Russian interests and activities, poses new or renewed risks related to strategic delivery systems passing through or over the Arctic to reach targets outside of the region. It may also bring new threats to or in the region, although these are likely to take non-kinetic forms. In a complex security environment characterized by trans-regional, multi-domain, and multi-functional threats, Canada will continue to work with its allies to understand the broader effects of the return of major power competition to the international system and to regions like the Arctic, and what this means for Canadian defence relationships and partnerships. Canada's full contribution to continental defence efforts to detect, deter, and defend against threats in all domains to be determined, but its Arctic will inevitably factor heavily. Furthermore, Canada's cooperation with other Arctic states and partners is likely to reflect more direct involvement of Northern territorial and Indigenous governments and organizations.

6. A growing interest in Arctic affairs by non-Arctic state and non-state actors has significant implications for the evolving Arctic security environment. Regional governance systems will face pressures from heightened international interest and strategic competition, and the international legal regime will play a pivotal role in guiding state-to-state relations. Adversarial actors may also foment or amplify political polarization through social media and the spreading of disinformation or "fake news," which can undermine political and social cohesion.

7. Environment. Environmental and ecological changes in the Canadian Arctic are being driven predominantly by climate change, which exacerbates emerging regional challenges. The likelihood and prevalence of natural disasters is expected to increase, straining the capacities of all levels of government. Furthermore, the Canadian Arctic is at significant risk of human-made disasters that pose serious prospective challenges for Northerners and federal and territorial governments.

8. Economics and Resources. Shipping activity in and through the Canadian Arctic is increasing in volume, and there are signs of future interest by foreign. If shipping in the region becomes more economical, resources will represent a more attractive development opportunity. Canada will require foreign partners and significant private sector investment to address its Arctic infrastructure deficit, which raises concerns about foreign actors' influence. Before COVID-19, tourism was on the rise throughout the circumpolar world, ranging from large-scale cruise ships, to sport fishing and hunting, to adventure and eco expeditions, to cultural tourism. This is likely to resume after a vaccine is widely available, and an expanding tourism industry increases the risk of human-made disasters and amplifies search and rescue and emergency response requirements. Canada's *Arctic and Northern Policy Framework* also highlights the idea of a conservation economy, which the federal government is slowly growing in the Canadian Arctic in collaboration with Northern Indigenous stakeholders. It is uncertain how climate change will impact the Arctic's fisheries over the next two decades, but this has implications for food security, the enforcement of regulations, and political and jurisdictional challenges.

9. Human. There is uneven population growth across Canada's North, and this is expected to continue over the next fifteen years. Differences in population distributions are likely to continue to strain resources, and youth disenfranchisement could worsen

health indicators, increase political instability, and lead to out-migration. The populations of many smaller settlements are expected to decline over the next two decades, while urban centres are expected to grow. Deficits in critical infrastructure keep communities isolated, inhibit the delivery of health and social services, and limit economic opportunities. Northern and Indigenous communities are particularly susceptible and vulnerable to emerging health threats, and limitations or interruptions to an already strained food supply chain pose acute risks for Northern communities. Furthermore, climate change poses a growing threat to the health of Northern populations. The amplification of socio-economic, cultural, and political divisions may become an unstable fault line as human networks in the Canadian Arctic continue to evolve. Fractures in Northern Canadian societies and between the North and South may undermine existing governance systems, and while polarization between Canadians is likely to erode social cohesion it is unlikely to produce major societal disruption.

10. Technology. Technology is expected to be a force multiplier and the single best predictor of deterrence in the future. Communication challenges, gaps in situational awareness, and cyber threats will need to be addressed.

Choke points for improvements in the Arctic from a technological perspective are almost wholly dependent on industry to see the cost-benefit of hours of research and production. Technological development will have positive and negative implications for the Arctic environment and must be considered in partnership with Northern stakeholders and rightsholders. Advancements in technology can also help to address Northern social and economic challenges and reduce regional disparities. Conversely, an increasing dependency on technology to conduct certain operations has led to an assumption that technology can solve most problems, which could lead to inadequate government responses to social problems or create new vulnerabilities.

11. In most analyses of the region, climate change and technological advancements point to an increasingly accessible Arctic. While sections of this report highlight how limited infrastructure and geophysical conditions continue to constrain certain activities during certain times of the year (and will do so into the future), the global demand for resources, desire for efficient shipping routes, tourism, and geostrategic position of the Circumpolar North portend enhanced interest in the region. Accordingly, strategic forecasters must situate the Canadian Arctic in global, regional, and domestic contexts to anticipate new challenges, promote effective adaptations to changing circumstances, and identify how the CAF should be trained and equipped to act decisively with effective military capability in concert with its allies. This includes not just kinetic operations, but also being prepared to respond effectively to safety and security challenges such as search and rescue and natural or human-created disasters. As this report demonstrates, anticipating and addressing twenty-first century challenges requires a whole-of-society approach: coordinated action that leverages the broad and deep expertise and capacity of both the modern state and civil society.

12. By encouraging experts to contemplate a long-term perspective of the future Canadian Arctic security environment, we hope that the information consolidated in this report - and the future discussions stimulated by it - contribute to the development of coordinated strategies that mitigate potential risks and seize opportunities arising in a dynamic, complex region. Furthermore, by complementing a forthcoming NATO Regional Perspective Report on the Arctic and High North which identifies trends across the Circumpolar North as a whole, this Canadian-centred report can serve as a foundation for comparison to discern common challenges and opportunities facing Canada and its allies.



INTRODUCTION

P. WHITNEY LACKENBAUER

The Arctic region represents an important international crossroads where issues of climate change, international trade, and global security meet.... Arctic states have long cooperated on economic, environmental, and safety issues, particularly through the Arctic Council, the premier body for cooperation in the region. All Arctic states have an enduring interest in continuing this productive collaboration.... This rise in [commercial, research, and tourism] activity will also bring increased safety and security demands related to search and rescue and natural or [humanitarian] disasters to which Canada must be ready to respond.

[*Strong, Secure, Engaged*](#) (2017)

0.1 AIM

The purpose of this NAADSN activity is to analyse and apply the [*NATO Strategic Foresight Analysis \(SFA\) 2017*](#) findings to determine their applicability to Canadian Arctic defence and security policy and to help frame a conceptual model that anticipates and conveys an understanding of the future Arctic security environment. This will assist NAADSN and the Defence Team in creating indicators of changing

risk or threat levels. It is also designed to test the capabilities of NAADSN as a research network that can effectively and efficiently parcel out discrete work packages to small teams, consolidate findings, and produce timely, relevant results to Defence Team stakeholders.

0.2 CONCEPT

The [*MINDS Policy Challenges for 2020-21*](#) highlight how Canada's defence policy "values the ability to anticipate new challenges in order to better prepare for, and respond to, threats to Canadian defence and security." By anticipating emerging threats and challenges, and better understanding the defence and security environment, the Defence Team can provide timely and relevant information to decision-makers, thus "allowing the Government to identify and understand emerging issues, events and crises in the global security environment, and to respond appropriately and effectively."

[*Strong, Secure, Engaged*](#) (SSE), Canada's 2017 defence policy, emphasizes how trends in global economic development are shifting the relative power of states from the West to the East and

The aim of the Strategic Foresight Analysis (SFA) 2017 Report is to identify trends that will shape the future strategic context and derive implications for the Alliance out to 2035 and beyond. The SFA does not attempt to predict the future, for the future is neither predictable nor predetermined. It provides an iterative assessment of trends and their implications to understand and visualize the nature of the dynamic and complex security environment.

NATO SFA 2017
Report, 11

“Together the territories represent a vast geographic area encompassing 3.9 million square kilometers. This accounts for nearly 40% of Canada’s landmass and comprises a large part of the longest coastline in the world, with tremendous untapped economic opportunities including unparalleled natural resource development potential. The territories’ geographic expanse also represent centuries of Indigenous history, Canada’s northern identity and actual sovereignty in the Arctic, both at home and on the international stage.”

- Pan-Territorial Vision and Principles for Sustainable Development (2017)

how major power competition has returned to the international system. “The Arctic is also becoming more relevant to the international community,” the white paper observes. With climate change “opening new access” to the region, “Arctic and non-Arctic states alike are looking to benefit from the potential economic opportunities associated with new resource development and transportation routes.” Rather than promoting a narrative of inherent competition or impending conflict, however, the narrative points out that “Arctic states have long cooperated on economic, environmental, and safety issues, particularly through the Arctic Council, the premier body for cooperation in the region. All Arctic states have an enduring interest in continuing this productive collaboration.” This last sentence suggests that Russia (described elsewhere in the policy document as a state “willing to test the international security environment” that had reintroduced “a degree of major power competition”) does not inherently threaten Arctic stability given its vested interests in the region. Accordingly, the drivers of Arctic change cited in *SSE* emphasize the rise of security and safety challenges *in* the Arctic rather than conventional defence threats *to* the Arctic, thus confirming the line of reasoning that has become well entrenched in defence planning over the last decade. Furthermore, it also highlights how international threats may pass *through* the Arctic to reach targets outside of the region.

Are these assumptions correct? What do we anticipate being the emerging defence and security risks or threats in, to, and through the Canadian Arctic in the short-, medium- and long-term? We use NATO’s *Strategic Foresight Analysis 2017 Report* as a baseline to address these general questions. This NATO report visualizes a future security environment characterized by a rapid rate of change, complexity, uncertainty and interconnectedness, offering military advice and informing alliance and national defence planning processes that are based on assessments of the long-term future. The report highlights that:

- polarization within and between states, power politics, and competition between major powers have increased the potential for instability
- state and non-state actors using hybrid and cyber tools to impact the security environment in the grey zone under the threshold of conflict
- other transnational challenges such as organized crime, climate change, and economic instability might further deepen the uncertainty, disorder and complexity that is now called the “new normal”

Rather than conducting a full strategic foresight exercise from the proverbial ground up, I proposed that NAADSN members test the applicability of the SFA to the Canadian Arctic. Building upon a presentation that I gave to the Arctic Security Working Group (ASWG) in Yellowknife, Northwest Territories, in November 2019, teams were asked to specifically analyze themes and trends across various **levels of analysis**:

- Grand strategic threats to the international system with an Arctic nexus (thus best considered by starting with general strategic analysis and then discerning if Arctic-specific responses are required outside of broader defence and security postures)
- Circumpolar threats applying to the entire Arctic region (NATO)
- Continental Arctic threats (eg. North American Arctic / NORAD; European Arctic / NATO; Eurasian Arctic / Russia)
- Domestic Arctic threats (Canada)

Although there is overlap between these levels, we hoped that an attentiveness to the various scales may help to reduce analytical imprecision and conceptual sloppiness in this exercise.

Teams were asked to produce a short narrative (akin to, and in some cases based upon, the NATO SFA theme chapters) describing relationships between NATO

SFA trends and Arctic defence and security implications across the various scales (global, regional, national). Contributors were asked to identify key indicators that might suggest changing risk or threat levels in the defence and security domains. Where possible, the teams were also asked to indicate potential time horizons.

0.3 OBJECTIVES

The objectives of NAADSN's *Understanding the Future Arctic Security Environment* assessment project were to:

- Plan and execute a collective research project by leveraging the expertise of the network team (members, postdoctoral and graduate fellows, and student associates).
- Test the response capabilities of NAADSN to anticipate and identify emerging risks and threats to Canada, provide robust analysis of these risks, and disseminate findings in a timely, concise, and conceptually coherent way to the Defence Team.
- Produce a report on the applicability of NATO SFA trends to Arctic defence and security futures, with a goal of helping to develop coordinated strategies to anticipate and respond to potential risks, as well as taking advantage of opportunities that arise from a rapidly changing, complex security environment.

0.4 METHODOLOGY

Small teams analyzed one theme described in the 2017 NATO SFA (political, human, technology, economics/resources, and environment) in detail. They then assessed the Arctic defence and security implications of their theme. Some teams chose to meet in person, while others convened by teleconference or videoconference. Each team or a designated author then submitted a series of narrative paragraphs, akin to the chapters in the SFA Report, describing

the relationships between the trends and defence and security implications. Each of these draft documents was circulated to elicit input, suggest other considerations or implications, and offer critiques. This final report offers a consolidation of the various recommendations.

Like the NATO SFA, this effort is “designed to be a regularly updated, collaborative and transparent effort, which encourages meaningful discourse and an open exchange of ideas” that seeks to identify “a range of defence and security implications based upon current recognized trends likely to shape events in the foreseeable future out to 2035 and beyond.” It is not intended to be predictive, but to identify particular trends that might influence future events and have implications for Canada. As the NATO report explained:

The SFA does not imply a particular or specified future. This report provides a balanced view of the future, describing challenges, but also identifying potential opportunities. It is based on analysis of the past to help the Alliance understand today as well as visualize the future, establishing a bridge between the two, thereby enabling NATO to adapt, ensuring it remains fit for purpose. The trends and implications identified in this report are not simply important short-term events and issues of today; they are projected to have relevance for the next two decades, describing the future security environment. They are pertinent worldwide, to developed and developing regions and nations. The implications are derived from trend analysis using professional military

judgement, academic expertise and outcomes of workshops, and are not intended to be prescriptive or necessarily linked to any specific capability.

0.5 BACKGROUND AND CONTEXT

As an Arctic State with forty percent of its landmass north of 60° latitude and 162,000 km of Arctic coastline, Canada’s interest in the region is obvious. Its emphasis on the human dimensions of the Arctic, and particularly those related to the northern Indigenous peoples, also reflect national realities. Canada’s three northern territories are home to over 126,000 people, more than half of whom are Aboriginal (Inuit, First Nations, or Métis). Social indicators in Canada’s Indigenous North are abysmal, reflecting the challenges of providing social services and infrastructure to small, isolated settlements spread out over a vast area. Northern Indigenous peoples face many challenges associated with rapid changes to their homelands, including threats to language and culture, erosion of traditional support networks, poorer health than the rest of Canadians, and changes to traditional diet and communal food practices. These challenges represent Canada’s most acute Arctic imperative.

Canadian governments have recognized and grappled with the challenge of balancing the needs of Northern Canadians with economic development and environmental protection for fifty years. Under Conservative Prime Minister Stephen Harper (2006-15), the balance seemed to tip in favour of resource development and hard-line messaging about defending sovereignty. A more careful reading reveals that the federal government’s sovereignty-security rhetoric became more nuanced

over time, reflecting an attempt to balance messaging that promised to “defend” Canada’s Arctic sovereignty (intended primarily for domestic audiences)

The Defence Team uses the following planning horizons:

Horizon 1 – short term (1-5 years) – 2020-25

Horizon 2 – medium term (6-15 Years) – 2026-35

Horizon 3 – long term (16-30 years) – 2036-50

ANTICIPATING emerging threats and challenges is fundamental to Canada's security. The Defence team will improve its ability to provide timely information to decision-makers, allowing the Government to identify and understand emerging events and crises, respond appropriately, and minimize the destructive effects of prolonged conflict. – DND, *Strong, Secure, Engaged* (2017)



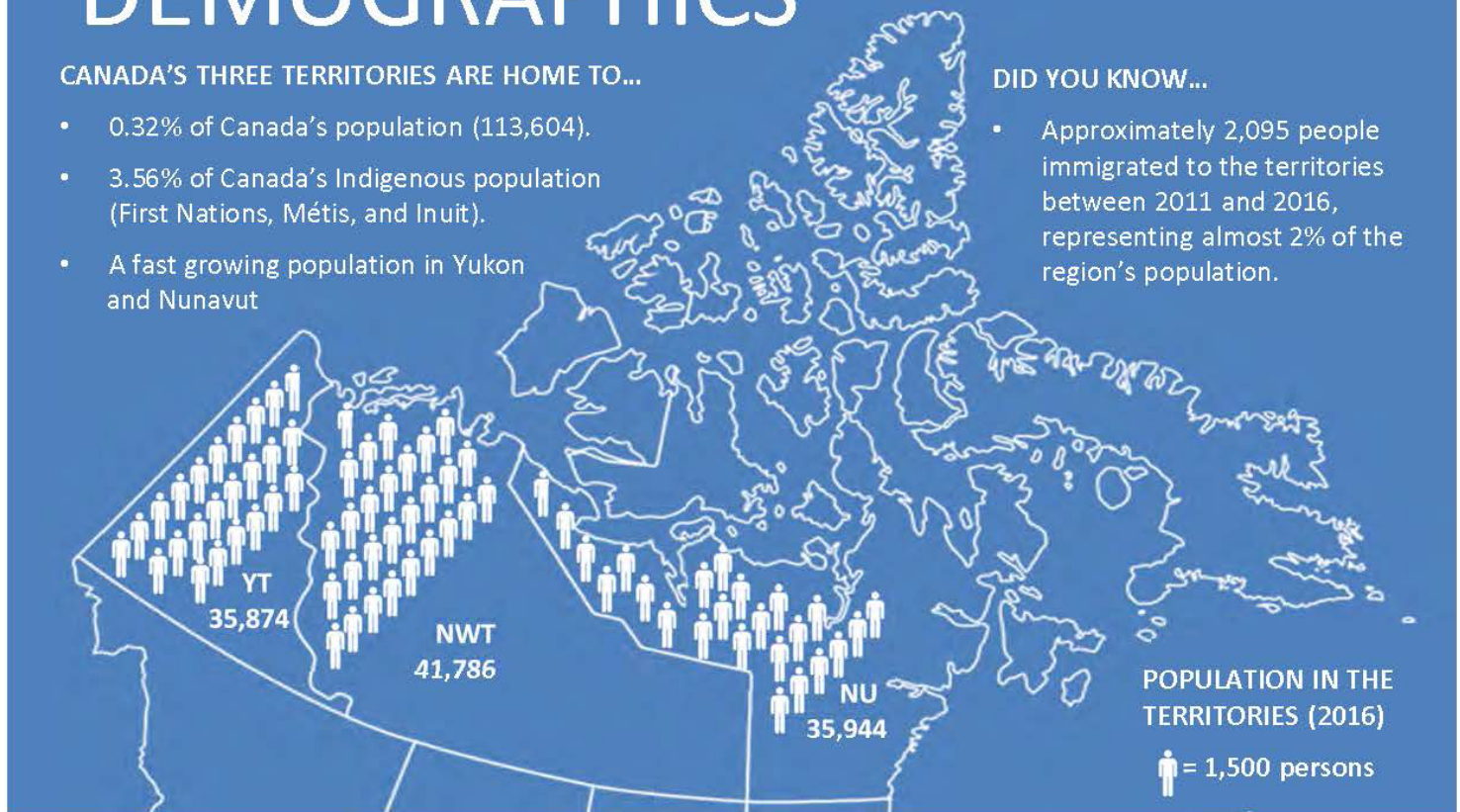
DEMOGRAPHICS

CANADA'S THREE TERRITORIES ARE HOME TO...

- 0.32% of Canada's population (113,604).
- 3.56% of Canada's Indigenous population (First Nations, Métis, and Inuit).
- A fast growing population in Yukon and Nunavut

DID YOU KNOW...

- Approximately 2,095 people immigrated to the territories between 2011 and 2016, representing almost 2% of the region's population.



COMMUNITY GROWTH RATES (2011-2016)

- Whitehorse, YT – 7.8%
- Fort Smith, NWT – 25.3%
- Hay River, NWT – -2.6%
- Inuvik, NWT – -6.5%
- Yellowknife, NWT – 1.1%
- Arviat, NU – 38.9%
- Baker Lake, NU – 10.0%
- Cambridge Bay, NU – 11.5%
- Gjoa Haven, NU – -1.4%
- Iqaluit, NU – 10.3%
- Kugluktuk, NU – 1.0%
- Rankin Inlet, NU – 28.1%

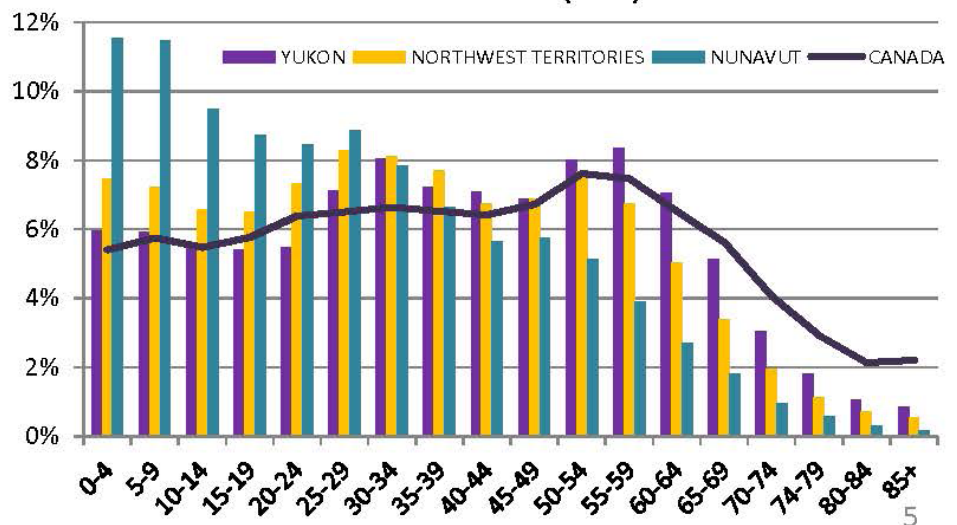
WANT TO KNOW MORE?

- [Statistics Canada: Canada at a Glance 2018](#)

CHALLENGES AND OPPORTUNITIES

- All territories have a younger population than Canada as a whole; over 60% of the population is under the age of 40.
- The average age of the Indigenous population ranges between 2 and 5 years younger than for the non-Indigenous population.
- The territorial population is spread across more than 3.4 million square kilometers, which includes many remote communities.

PERCENTAGE OF THE POPULATION BY AGE (2016)



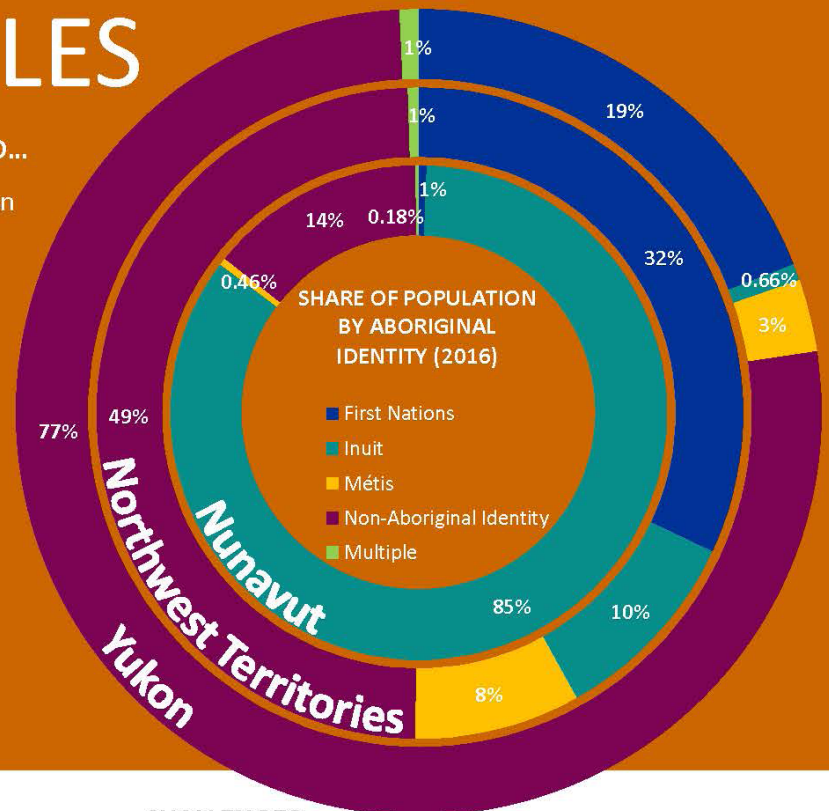
INUIT, FIRST NATIONS, AND MÉTIS PEOPLES

CANADA'S THREE TERRITORIES ARE HOME TO...

- More than half of Canada's Inuit population (53%).
- A high proportion of Indigenous peoples, 53.3% of the population in the territories identified as Indigenous in 2016, versus 4.9% in Canada at large.

DID YOU KNOW...

- The 2011 National Household Survey identified that 2% of the Indigenous population aged 15 and over in the territories were self-employed.



LANDSCAPE

- The Nunavut population is comprised of 86% Indigenous persons, compared to 51% in Northwest Territories and 23% in Yukon.
- The territorial Indigenous population includes more than 20,000 First Nation, 4,500 Métis, and 34,400 Inuit.
- 88% of the Inuit population in Canada's territories is located in Nunavut.

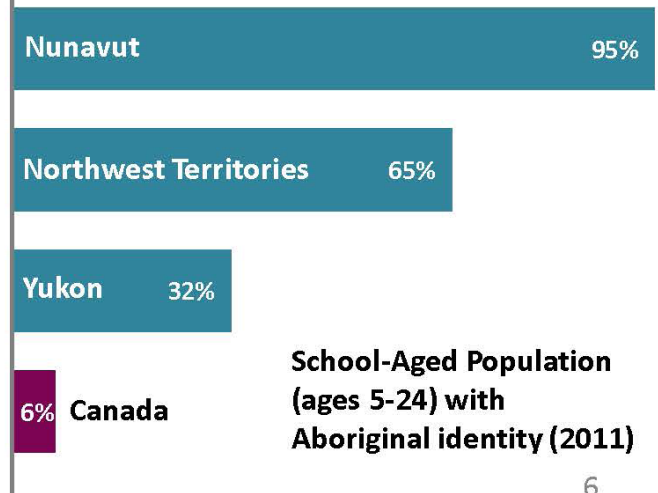
WANT TO KNOW MORE?

- [National Aboriginal Economic Development Board: Reconciliation: Growing Canada's Economy by \\$27.7 Billion](#)
- [National Aboriginal Economic Development Board: Investing in Canada's Future Prosperity: An Economic Opportunity for Canadian Industries](#)
- [TD Economics: The Long and Winding Road Towards Aboriginal Economic Prosperity](#)
- [Canadian Council for Aboriginal Business: Promise and Prosperity: the 2016 Aboriginal Business Survey](#)

CHALLENGES

AND OPPORTUNITIES

- The territories have some of the highest unemployment rates for Indigenous persons in Canada.
- The traditional knowledge and practices of Indigenous Peoples are globally recognized as vital to sustainable development and climate change adaptation in the North.



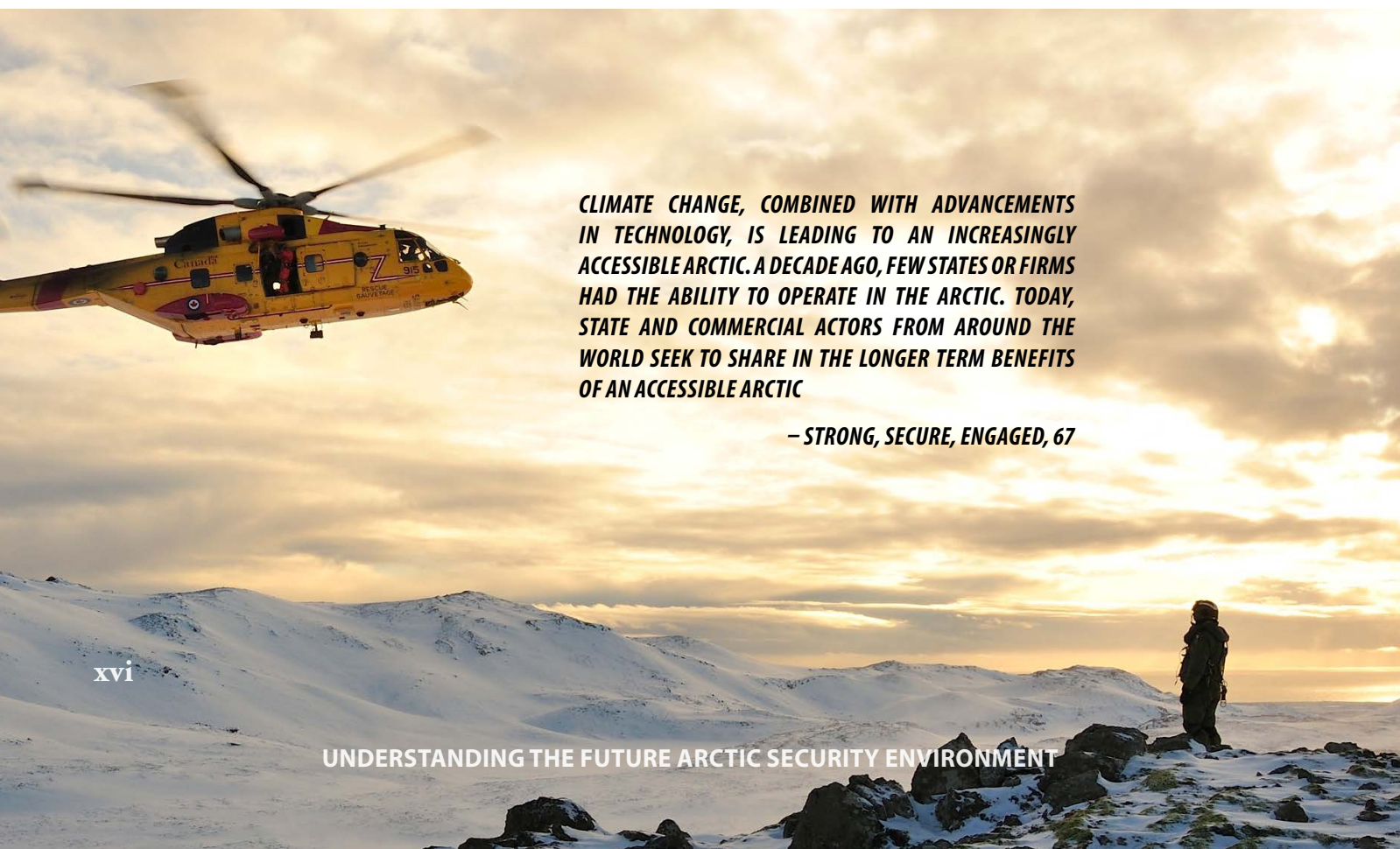
Sources: Statistics Canada; Canadian Council for Aboriginal Businesses

with a growing awareness that the most likely challenges were “soft” security- and safety- related issues that required “whole of government” responses.¹

Although the election of Justin Trudeau’s Liberal party in October 2015 represented a significant *political* departure from the previous government’s approach, the main substantive elements of Canada’s Arctic policy (which have remained remarkably consistent since the 1970s) have not fundamentally changed. A domestic focus on Indigenous rights, conservation, and the health and resiliency of Northern communities has been complemented by a renewed commitment to global climate change mitigation and the benefits of co-developing policy with Northern stakeholders and rightsholders. Through bilateral statements with President Barack Obama in 2016, Prime Minister Trudeau offered a model for Arctic leadership that placed a clear priority on Indigenous and “soft security” issues and abandoned the classic sovereignty-focused messaging of his predecessor. Similarly, the federal

government’s [*Arctic and Northern Policy Framework*](#) (ANPF), released in September 2019, indicates a concerted emphasis on environmental conservation and improving the socio-cultural health of Northern Indigenous peoples. The decision to link the domestic and international dimensions of Canada’s Arctic and Northern strategy in a single policy framework reaffirms the inter-connectivity between national, regional, and global dynamics.

SSE confirms that the Arctic remains an area of particular interest and focus for Canada’s Defence Team. The policy highlights the region’s cultural and economic importance to Canada as well as its state of rapid environmental, economic, and social change. While this change presents opportunities, it has also spawned new defence, safety, and security, challenges. To meet those challenges and “succeed in an unpredictable and complex security environment,” SSE committed the country to an ambitious program of naval construction, capacity enhancements, and technological upgrades to improve situational



CLIMATE CHANGE, COMBINED WITH ADVANCEMENTS IN TECHNOLOGY, IS LEADING TO AN INCREASINGLY ACCESSIBLE ARCTIC. A DECADE AGO, FEW STATES OR FIRMS HAD THE ABILITY TO OPERATE IN THE ARCTIC. TODAY, STATE AND COMMERCIAL ACTORS FROM AROUND THE WORLD SEEK TO SHARE IN THE LONGER TERM BENEFITS OF AN ACCESSIBLE ARCTIC

– STRONG, SECURE, ENGAGED, 67

awareness, communications, and the ability of the Canadian Armed Forces (CAF) to operate across the Arctic. How can and should the CAF work with partners to address long-term challenges in the Canadian Arctic, including those posed by rapid climate and environmental change? How should Canada prepare to meet shifting power dynamics associated with increased “militarization,” Chinese interest and activity, and Russian actions in the region? Should the Arctic be a region where Canada engages with ‘partners’ considered adversaries in other venues? Should Canada focus on threats in, to, or through the Arctic? How much attention and resources should NORAD and NATO dedicate to the region, and what role should they play to best serve the interests of Canada and its allies? Beyond the military domain, what emerging defence and security threats might Canada face in and to its Arctic over the next two decades?

The [safety, security, and defence chapter of the 2019 Arctic and Northern Policy Framework \(ANPF\)](#) lays out the Government of Canada’s objectives to ensure a safe, secure, and well-defended Arctic and North through to 2030. “While Canada sees no immediate threat in the Arctic and the North, as the region’s physical environment changes, the circumpolar North is becoming an area of strategic international importance, with both Arctic and non-Arctic states expressing a variety of economic and military interests in the region,” the policy framework emphasizes. “As the Arctic becomes more accessible, these states are poised to conduct research, transit through, and engage in more trade in the region. Given the growing international interest and competition in the Arctic, continued security and defence of Canada’s Arctic requires effective safety and security frameworks, national defence, and deterrence.”

Given the evolving balance of power, changing nature of conflict, and rapid

evolution of technology globally over the last decade, National Defence recognizes the need for new approaches to anticipate and confront threats and challenges in the years ahead. To remain effective in a highly dynamic, complex global and regional environment, policymakers and planners must develop mechanisms to continuously test their assessments, ideas, and assumptions to ensure that they do not become limiting or outdated. This logic underpins *Strong, Secure, Engaged*, which commits the CAF to:

ANTICIPATE and better understand potential threats to Canada and Canadian interests so as to enhance our ability to identify, prevent or prepare for, and respond to a wide range of contingencies;

ADAPT proactively to emerging challenges by harnessing new technologies, fostering a resilient workforce, and leveraging innovation, knowledge, and new ways of doing business

ACT with decisive military capability across the spectrum of operations to defend Canada, protect Canadian interests and values, and contribute to global stability.

Major power competition, challenges to an increasingly fragile international order, and global shock wrought by the COVID-19 pandemic invite reflections on what assumptions in SSE should be revisited to ensure that the CAF is prepared and capable of meeting Canada’s defence needs now and into the future. As recent events in Ukraine, Syria, and Libya have revealed, state adversaries are taking actions “below the threshold” of conventional kinetic warfare that could escalate into conventional, high-intensity war unless Canada and its allies discern proportionate ways to defend against and deter such practices. The post-Cold War liberal international system appears increasingly

vulnerable to stresses emanating from both within increasingly polarized liberal democratic states and from autocratic regimes issuing explicit critiques of U.S. hegemony and Western worldviews. The NATO SFA 2017 report observes that:

The world is transforming in multiple, yet connected, areas at an exponential rate. Driven mostly by rapid changes in technology, the world is becoming more interconnected. As people communicate within and across national boundaries more than ever before, the events and decisions in one region influence the lives of others across the rest of world. Ageing populations, with their attendant health and pension costs, are gradually straining social welfare systems that are already stressed with mounting public debt in both developed and developing economies. The global power shift continues toward multi-polarity. While an information society is evolving globally and economic globalization is intensifying, nationalist reactions and anti-globalization sentiments are also growing. Additionally, the effects of climate change are more evident and pervasive than ever before. While these developments increase uncertainty and complexity, they present challenges to the capacity of individual states to manage a mounting set of interconnected problems.

Accordingly, contemplating strategic futures in Canada's Arctic requires attentiveness to global, circumpolar regional, continental, and domestic drivers - across multiple themes and domains - that could affect the CAF's mission to make Canada strong at home, secure in North America, and engaged in the world to promote peace and stability.

0.6 TERMINOLOGY

As per the NATO SFA 2017 report, we adopt the following definitions:

THEME. A collection of similar or related trends.

TREND. A discernible pattern or a specified direction of change.

IMPLICATION. A significant effect on the defence and security of one or more NATO Nations that results from one or more particular trends.

0.7 STRUCTURE

We have deliberately mirrored the structure of the NATO SFA 2017 report. The first chapter filters the general characteristics of the future suggested in that earlier report through a Canadian lens, providing an overview of what recent Canadian policy documents highlight as some core assumptions and drivers. The subsequent chapters apply the principal themes framed in the SFA Report, seek to discern main trends of Arctic change, and derive potential defence and security implications for Canada. We have re-ordered the chapters, which appear as follows:

- a. **Political:** Includes the re-distribution of geostrategic power, challenges to governance, non-state actor influence in domestic and international affairs, power politics, public discontent and disaffection, interconnectedness, and polycentrism.
- b. **Environment:** Includes climate change, climate adaptation and mitigation measures, water and food stresses, and natural and human-made disasters.

c. Economics/Resources:

Includes globalization of financial resources, geopolitical dimension of resources (rare earth elements, water, food, and energy), asymmetric change in defence expenditures, and increased global inequality.

d. Human: Includes asymmetric demographic change, increasing urbanization, fractured and/or polarized societies, gender norms and relations, and increasingly connected human networks.

e. Technology: Includes rate of technology advancement, access to technology, global network development, dominance of the commercial sector in technological development, and dependence on certain technologies.



EXECUTIVE SUMMARY OF THE NATO 2017 SFA REPORT (EXCERPTS)

1. The Strategic Foresight Analysis (SFA) 2017 Report ... provides a wide-ranging shared understanding of the future security environment. The SFA describes the future NATO expects to unfold to 2035 and beyond, depicted as political, social, technological, economic, and environmental trends. Where trends may move in diverging directions, an alternative view is provided to maintain utmost objectivity.

2. The SFA is the initial phase of the ongoing Long-Term Military Transformation (LTMT) efforts at Allied Command Transformation (ACT) and sets the intellectual foundation for a follow-on report, the Framework for Future Alliance Operations (FFAO). The FFAO looks into the interaction of trends, identifies instability situations then develops military implications. Together, the SFA and FFAO are designed to improve the Alliance's long-term perspective of the future security environment to support and inform the NATO Defence Planning Process (NDPP), as well as other NATO and national processes that require an assessment of the long-term future.



3. The confluence of several political, social, technological, economic, and environmental trends is redefining the global security context. Some trends driven by technological innovation may offer opportunities to address global problems. But the confluence of trends has also created complexity, disorder and uncertainty that are now called the new normal. Western countries and institutions, such as NATO and the EU, can benefit from the information provided in the document to develop coordinated strategies in order to respond to potential risks, and take advantage of opportunities that arise from this new normal.

4. **Political.** Fundamental changes in the international security environment, driven by power transitions among states from West to East and power diffusions from governments to non-state actors worldwide, have created strategic shocks resulting in increasing instability within the post-Cold War world order. These shocks have contributed to greater

public discontent and increasing challenges to governance.

- a. The redistribution of economic and military power, most notably towards Asia, continues to contribute to the relative decline of the West. The predominance of NATO and the West is likely to be increasingly challenged by emerging and resurgent powers.
- b. Non-state actors, benign and malign alike, are expected to exert greater influence over national governments and international institutions.
- c. Power politics and competition between major powers may intensify, increasing the likelihood of confrontation and conflict in the future, thus highlighting the importance of commitment to collective defence.
- d. Alternative global governance institutions, championed by emerging and resurgent powers, are likely to challenge the existing international organization as they seek a voice in decision-making structures.
- e. Public discontent has led to increasing polarization between political and social groups, further eroding trust in governments and traditional institutions.

5. **Human.** Social trends that will most profoundly shape the future are asymmetric demographic change, rapid urbanization and increasingly polarized societies.

- a. In societies with an ageing population, the demand on resources for medical and social welfare will grow, nations' ability to allocate necessary funds for defence and security will be increasingly strained and changes in demography may limit recruitment for security forces.
- b. In developing countries, high fertility rates lead to youth bulges resulting in unemployment and insufficient education opportunities for the young that will foster perceived disenfranchisement and may lead to social unrest.
- c. Rapid urbanization might lead to resource scarcity and challenge the distribution of available resources.
- d. Fractured and polarized societies and growing interconnected human networks are likely to present unprecedented opportunities and challenges in the next two decades.

6. **Technology.** Technology will continue to shape the social, cultural, and economic fabrics of our societies at all levels. New and emerging technologies offer enormous opportunities, but also present new vulnerabilities and challenges as the world pivots towards digitalization.

- a. The increasing rate of technology advancement will challenge acquisition management processes and the interoperability between nations and institutions. New technologies, such as offensive cyber, artificial intelligence, autonomous systems and human enhancement, are not yet widely accepted and will

expose divergent ethical and legal interpretations.

- b. Individuals, state actors and non-state actors have greater opportunity to exploit readily available technologies in an innovative and potentially disruptive manner.
- c. The scale and speed of global networks allow individuals and groups immediate access to information and knowledge but may also enable the dissemination of false or misleading information. Additionally, data will increasingly become a strategic resource.
- d. Commercial innovation has outpaced traditional defence Research and Development (R&D). Reductions in defence budgets have led to over-reliance on commercially available solutions, the loss of defence-focused R&D skills and may increase security risks.
- e. Operational effectiveness has become overly dependent on advanced technology and civilian infrastructure without redundant systems. Technological advancements will continue to open new domains of warfighting such as cyber and space.

7. **Economics/Resources.** Globalization has opened markets and intensified economic integration, while increasing the influence of developing countries and straining natural resources. The advent of emerging markets has also shifted jobs to countries and regions with cheap labour and eroded the economic base for the working middle class in Western countries, fuelling social inequality.

- a. An increasingly interconnected global financial system is more vulnerable to attacks by both state and non-state

actors. Through the exploitation of decentralized networks, financial origins and transactions supporting terrorism and organized crime will become less visible and traceable.

- b. The demand for resources will increase with population and economic growth particularly in developing countries.
- c. Access to and control over natural resources will play an increasing role in power politics.
- d. Increased inequality is a catalyst for migration and can have second-order effects such as fractured and conflictual societies, violent extremism, nationalism, isolationism, and protectionism.
- e. The existing burden on national economies will grow due to the rise in competing demands for limited resources.

8. **Environment.** Environmental issues are dominated by climate change and its far-reaching and cross-cutting impacts. Climate change may also lead to increasing incidences of natural disasters. The demand for natural resources is increasing. Water and food security are growing concerns along with losses to biodiversity. These stresses on eco-system services may reduce resilience

- a. Changes to the climate will impose stresses on current ways of life, on individuals' ability to subsist and on governments' abilities to keep pace and provide for the needs of their populations.
- b. Natural disasters will have an increasing impact, particularly in those areas unaccustomed to such events.
- c. Governments and international institutions will be expected to



provide humanitarian assistance and relief with increasing frequency.

9. The SFA is a collaborative effort drawing on expertise and resources from NATO and partner nations, international organizations, think tanks, industry and academia to identify trends and implications that are likely to shape the future security environment. The SFA is built upon analysis of commonalities and differences in trends while focusing on the future challenges, opportunities and other relevant implications facing the Alliance. (See Appendix B of this NAADSN report for the list of trends and implications produced in the SFA.)

10. NATO will remain the key security alliance for the Euro-Atlantic region for the foreseeable future. Accordingly, it behoves NATO to further explore and prepare for these possibilities, to best posture for a dynamic future and to effectively meet its core tasks.



CHARACTERISTICS OF THE FUTURE

P. WHITNEY LACKENBAUER

The NATO SFA observes that, “for the past two decades, the world has been experiencing a period of significant changes in political, social, economic and environmental areas substantially influenced by exponential developments in technology.” This produces a different global security context marked by complexity, disorder and uncertainty. Readers are encouraged to [look to that document](#) for general discussions of the current period of transition marked by the rising influence of developing countries and alternative international organization led by rising powers; an exponential rate of change in an increasingly complex international system; growing polarization, regionalization, and fragmentation, as well as globalization and interconnectedness; and the proliferation of disruptive technologies and the potential for strategic shocks.

Although the Arctic is a region in which academics and politicians have often heralded as an “exceptional” space of international cooperation since the end of the Cold War, it is increasingly acknowledged as an area of competition as well. As I summarized in 2014:

Climate change. Newly accessible resources. New maritime routes.

Unresolved boundary disputes. New investments in military capabilities to “defend” sovereignty. Arctic defence and security have emerged as a core topic in international and domestic circles over the past decade, spawning persistent debates about the whether the region’s future is likely to continue along cooperative lines or transform into unbridled competition and conflict.... These frameworks are very significant in shaping expectations for the Government of Canada and for the Canadian Armed Forces more specifically.¹

In most analyses on the region, climate change and technological advancements point to an increasingly *accessible* Arctic. While geophysical conditions continue to constrain certain activities during certain times of the year (and will so into the future), the global demand for resources, desire for efficient shipping routes, and geostrategic position of the circumpolar north portend enhanced interest in the region. In imagining the future for Canada, the Arctic and Northern Policy Framework (ANPF) suggests that “climate change and technology are making the Arctic more accessible,” with diminishing sea ice “open[ing] shipping routes ... [and] putting the rich

wealth of northern natural resources within reach. Increased commercial and tourism interests also bring increased safety and security challenges that include search and rescue and human-created disasters.” This echoes assumption articulated in Canada’s 2017 defence policy, which emphasizes that “new actors are pursuing economic and military activities, some of which may pose a threat to Canadian security and sovereignty.” To address risk and meet emerging threats, *Strong, Secure, Engaged* recognizes that working cooperatively with allies and partners will be essential in a complex security environment.

Drawing excerpts from broader Canadian and Allied policy statements, this chapter frames some general characteristics of the future related to defence and security issues and threats facing DND/CAF from a forecasting perspective. Individual chapters provide more robust context and elaboration of implications on specific themes and issues introduced in this general overview.

1.1 GLOBAL CONTEXT: STRONG, SECURE, ENGAGED

Canada has a long-standing, honourable tradition of robust engagement in support of global stability, peace and prosperity. We are uniquely positioned now to further this role. Arguably, our engagement has never been more necessary, or valued by our international allies and partners.

Canada’s defence policy notes that economic inequality is on the rise globally, with an attendant rise in instability and violent extremism. Mass migration, radicalization and hateful ideologies, weak or undemocratic governance, and political polarization stress individual countries, regions, alliances, and the international system as a whole. *Strong, Secure, Engaged* emphasizes that “Canada is not immune

from these concerns, and we must be part of the solution – a force for security, stability, prosperity and social justice in the world.” Furthermore, “climate change threatens to disrupt the lives and livelihoods of millions around the world. It also presents us with an urgent call to innovate, to foster collective action, to work hand-in-hand with like-minded partners around the world to meet this threat and defeat it, rather than stand passively by.”

Within this broader context, SSE highlights three key security trends that will continue to shape events: the evolving balance of power, the changing nature of conflict, and the rapid evolution of technology. All of these trends have direct and indirect application when contemplating and imagining future Arctic security environments, vulnerabilities, and requirements. The ANPF emphasizes that:

The international order is not static; it evolves over time to address new opportunities and challenges. The Arctic and the North is in a period of rapid change that is the product of both climate change and changing geopolitical trends. As such, international rules and institutions will need to evolve to address the new challenges and opportunities facing the region. As it has done in the past, Canada will bolster its international leadership at this critical time, in partnership with Northerners and Indigenous peoples, to ensure that the evolving international order is shaped in a manner that protects and promotes Canadian interests and values.

For nearly a century, Canada has invested in building and sustaining an international system that reflects its values and interests, carving out a functional role as a “middle power” to promote peace and prosperity around the world. The balance of power is shifting, however, the re-emergence of

major power competition threatens to undermine or strain the established international order and rules-based system. China's rise as an economic superpower and its aspirations to have a global role proportionate to its economic weight, population, and self-perception as the Middle Kingdom. Russian President Vladimir Putin's recent declaration that [liberalism is "obsolete"](#) affirms that the former superpower has deviated from its early post-Cold War path and its revisionist behaviour in Georgia, Ukraine, and Syria are examples of its willingness to test the international security environment. Consequently, Canada's role is less obvious in the emerging multipolar world, which challenges the Western-designed security system, than it was in the bipolar Cold War order or the unipolar moment that followed it. This creates more space for emerging state and non-state actors to exercise influence, including in the Arctic.

The growing realization of the disproportionate impact of climate change on the circumpolar region, and concomitant social, economic and environmental consequences for the rest of the world, also command global attention. Canada's ANPF notes that "the Canadian North is warming at about 3 times the global average rate, which is affecting the land, biodiversity, cultures and traditions." This rapid change is "having far-reaching effects on the lives and well-being of northerners, threatening food security and the transportation of essential goods and endangering the stability and functioning of delicate ecosystems and critical infrastructure." There is extensive Canadian interest in how these changes affect Northern peoples and the environment that sustains them at local and domestic scales, as well as the implications of rising international interest in the region. Although non-Arctic observers have traditionally confined their polar interest to scientific research and environmental issues, over the past decade significant international interest and attention

has turned to oil, gas and minerals, fisheries, shipping and Arctic governance. In turn, this has generated debates amongst Arctic states about non-Arctic states' intentions and their receptiveness to welcoming Asian countries in particular "into the Arctic cold."²

In a complex security environment characterized by trans-regional, multi-domain, and multi-functional threats, Canada will continue to work with its allies to understand the broader effects of the return of major power competition to the international system and to regions like the Arctic, and what this means for Canadian defence relationships and partnerships. Emerging threats to North America, across all domains, must be situated in the context of continental defence and the longstanding Canada-US defence partnership exemplified by the North American Aerospace Defence Command (NORAD). This binational command has proven effective in deterring, detecting, and defending North America's approaches since the 1950s, and it remains ["the cornerstone of Canada's defence relationship with the US"](#), and provides both countries with greater continental security than could be achieved individually." NORAD commander [General Terrence O'Shaughnessy told the Senate Strategic Forces Subcommittee in April 2019](#) that "the six decades of NORAD's unmatched experience and shared history are proving more vital than ever as we face the most complex security environment in generations," and that "this unique and longstanding command serves as both a formidable deterrent to our adversaries and a clear symbol of the unbreakable bond between the United States and Canada." Resurgent major power competition and advances in weapons technology pose new threats to continental security, however, which require NORAD to modernize and evolve to meet current and future threats. Both SSE and the ANPF underscore the importance of NORAD modernization efforts, the integration of layered

IMPLICATIONS FOR CANADA OF A CHANGING SECURITY ENVIRONMENT

- The global security environment transcends national borders, requiring Canada to help promote peace and stability abroad in order to maintain security at home.
- In a global security environment defined by complexity and unpredictability, Canada requires an agile, well-educated, flexible, diverse, and combat-ready military capable of conducting a wide range of operations at home and internationally.
- The interrelated nature of global security challenges puts a premium on deep knowledge and understanding. Using a range of analytical tools, Canada must develop sophisticated awareness of the information and operating environment and the human dimension of conflict to better predict and respond to crises.
- To keep pace, Canada must develop advanced space and cyber capabilities, and expand cutting-edge research and development.
- Canada must continue to be a responsible partner that adds value to traditional alliances, including NORAD, NATO, and the Five-Eyes community.
- Canada must balance these fundamental relationships with the need to engage with emerging powers, particularly in the Asia-Pacific region.
- Canada must address the threat stemming from terrorism and the actions of violent extremist organizations, including in ungoverned spaces.
- Recognizing the devastating effects of climate change, Canada must bolster its ability to respond to severe weather events and other natural disasters, both at home and abroad.
- Acknowledging rising international interest in the Arctic, Canada must enhance its ability to operate in the North and work closely with allies and partners.
- Canada and the United States must work closely together on NORAD Modernization in order to defend North America.



sensor and defeat systems, and improving the CAF's reach and mobility in the Arctic within this alliance construct.

Strategic forecasters must situate the Canadian Arctic in global, regional, and domestic contexts to anticipate new challenges, promote effective adaptations to changing circumstances, and identify how the CAF should be trained and equipped to act decisively with effective military capability in concert with its allies. Canada's [Defence Investment Plan 2018](#) notes that "Canada has an agile, multi-purpose, combat-ready military that is operated by highly-trained, well-equipped, and professional personnel." It also emphasizes how, "given the uncertainty and complexity of the global security environment, now and into the future," it must continue to build and refine "a flexible and versatile Force that can take informed, decisive action to accomplish the Government's objectives is essential to the military's operational effectiveness and long-term success."

1.2 THE CANADIAN ARCTIC: TOWARDS A WHOLE-OF-SOCIETY APPROACH

'Nothing about us, without us' is the essential principle that weaves federal, territorial, provincial and Indigenous institutions and interests together for mutual success.

Canada's Arctic and Northern Policy Framework (2019)

Anticipating and addressing twenty-first century challenges requires coordinated action rather than siloed thinking in order to leverage the broad and deep expertise of the modern state and civil society. In the defence and security realm, SSE emphasizes that meeting "enormous collective challenges requires coordinated action across the whole-of-government – military capabilities working hand in hand with diplomacy and development." Taken together, the opportunities, challenges, increased competition, and risks

associated with a more accessible Arctic require a greater presence of security organizations, strengthened emergency management, effective military capability, and improved situational awareness. Meeting these demands necessitates a collaborative approach among all levels of government, as well as with Northerners, including Indigenous peoples, and in cooperation with the private sector where relevant to ensure that the region can prosper and that it continues to be a zone of peace and cooperation.

Canada's defence and security policies and practices must also fit within its broader national strategy for the Canadian Arctic and the Circumpolar North. The ANPF promotes "a shared vision of the future where northern and Arctic people are thriving, strong and safe." Priorities include actions to:

- nurture healthy families and communities
- invest in the energy, transportation and communications infrastructure that northern and Arctic governments, economies and communities need
- create jobs, foster innovation and grow Arctic and northern economies
- support science, knowledge and research that is meaningful for communities and for decision-making
- face the effects of climate change and support healthy ecosystems in the Arctic and North
- ensure that Canada and our northern and Arctic residents are safe, secure and well-defended
- restore Canada's place as an international Arctic leader
- advance reconciliation and improve relationships between Indigenous and non-Indigenous peoples

Consistent with a whole-of-society approach, SSE emphasizes the importance of "exploiting defence innovation by ensuring that the Defence Team can tap into

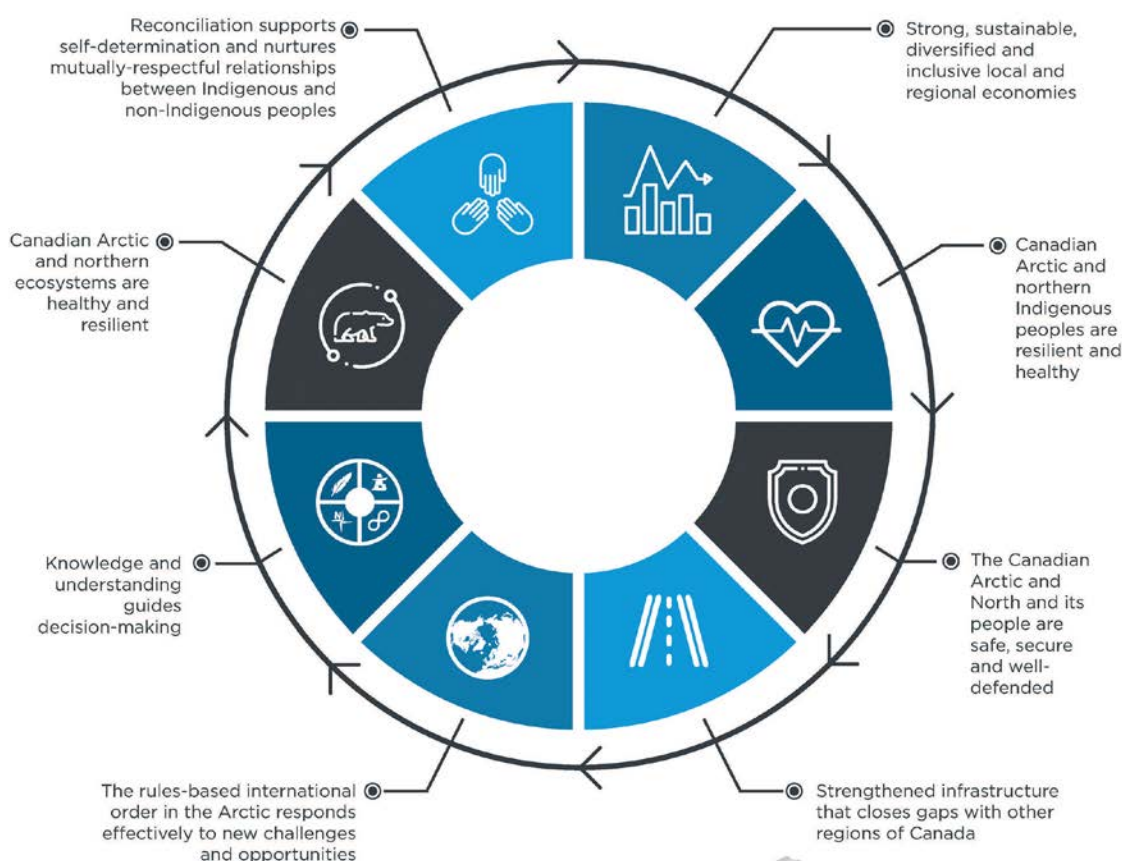
creativity and expertise available outside of government” and leverage the research, development, and “ground-breaking concepts generated by academics, universities, and the private sector.” These efforts can help to identify and meet the challenges associated with emerging domains, conceptualize multi- and all-domain threats across the spectrum of operations, and the need to analyze and fuse intelligence and other data at “speed of relevance.” The [Defence Investment Plan 2018](#) also highlights the importance of modernizing and “streamlining the procurement process, adopting innovative ways of delivering

critical infrastructure services, and working as efficiently and effectively as possible to deliver results. It also means being a responsible steward of the environment by reducing the environmental footprint of National Defence, minimizing the impact of its activities on the natural environment, and managing resources responsibly.”

In a Canadian Arctic context, a key challenge will involve co-developing practical implementation plans that meet the needs of DND/CAF, our allies, and of Northern Canadians, in light of accelerating rates of change “in many aspects of human society

Arctic and Northern Policy Framework vision: “Strong, self-reliant people and communities working together for a vibrant, prosperous and sustainable Arctic and northern region at home and abroad, while expressing Canada’s enduring Arctic sovereignty.”

» The **framework** builds on 8 overarching and interconnected goals:



[that are] expected to continue increasing complexity and uncertainty while creating concurrent opportunities and risks.” As the NATO SFA notes, disruptive technologies, Artificial Intelligence (AI) and machine learning, biotechnology, and autonomous systems “could be considered as game changers that might help humanity solve problems at a global level,” but they also create disruption and introduce new challenges at all levels. Furthermore, new technologies and their application in layered offensive and defensive systems also give rise to moral, ethical, and legal issues that are likely to play out in debates about Arctic defence and security as well as more generalized ones. [General O’Shaughnessy told the U.S. Senate Armed Services Committee in February 2020](#) that “geographic barriers that kept our homeland beyond the reach of most conventional threats” no longer offer protection and “the Arctic is no longer a fortress wall ... [but an avenue] of approach for advanced conventional weapons and the platforms that carry them.” What does this mean for Northern policies predicated on the idea of the Arctic as a “distinct” homeland that is inherently conceived of as a material *place* rather than a threat vector? How do measures to address strategic threats to North America passing *through* the Canadian Arctic relate to threats *to* the region or *in* the region?

Northern Canadian economic futures are also tied to global drivers in terms of supply and demand for non-renewable resources, maritime (in)accessibility, and climate change. The intrinsic dilemma or contradiction between Arctic state support for the exploitation of Arctic hydrocarbon resources (given the direct economic benefits of doing so) and the desire to mitigate global climate change (with its clear effects on the Arctic) is likely to persist. The implications of heightened regional activity on core socio-economic areas such as population demographics, gross domestic product, urbanization, energy options, transportation, and communications remain sources of both optimism in some circles and concern in others. The Inuit Circumpolar Council’s [A Circumpolar Inuit Declaration on Sovereignty in the Arctic](#) (2015) notes that “as states increasingly focus on the Arctic and its resources, and as climate change continues to create easier access to the Arctic, Inuit inclusion as active partners is central to all national and international deliberations on Arctic sovereignty and related questions,

ANPF Goal 7: The Canadian Arctic and North and its people are safe, secure and well-defended. Objectives:

1. Strengthen Canada’s cooperation and collaboration with domestic and international partners on safety, security and defence issues
2. Enhance Canada’s military presence as well as prevent and respond to safety and security incidents in the Arctic and the North
3. Strengthen Canada’s domain awareness, surveillance and control capabilities in the Arctic and the North
4. Enforce Canada’s legislative and regulatory frameworks that govern transportation, border integrity and environmental protection in the Arctic and the North
5. Increase the whole-of-society emergency management capabilities in Arctic and northern communities
6. Support community safety through effective and culturally-appropriate crime prevention initiatives and policing services

such as who owns the Arctic, who has the right to traverse the Arctic, who has the right to develop the Arctic, and who will be responsible for the social and environmental impacts increasingly facing the Arctic.” It also insists that states must ensure sustainable economic development that increases standards of living for Inuit, and that they “deflect sudden and far-reaching demographic shifts that would overwhelm and marginalize indigenous peoples where we are rooted and have endured.”

1.3 COMPLEXITY AND UNCERTAINTY

While the Canadian Arctic has historically been — and continues to be — a region of stability and peace, growing competition and increased access brings safety and security challenges to which Canada must be ready to respond.

— ANPF (2019)

The NATO SFA notes that “the growing number of stakeholders combined with the interconnected nature of the international system, the exponential rate of change and the confluence of trends has continued to increase the potential for disorder and uncertainty in every aspect of world affairs.” The Arctic is far from immune to these changes. In an increasingly complex (rather than complicated) environment, “there are too many interactions to comprehend all the possible outcomes, increasing the risk of surprise or even failure.” Accordingly, Canadians must look to more comprehensive approaches that accept and incorporate complexity and uncertainty in world affairs as a pervasive reality. Doing so will require projections that anticipate future trends which are not simple extensions of previous curves but reflect several “trajectories of potential outcomes, which in turn will require leadership to utilize a more comprehensive, flexible and adaptive decision-making system.” The NATO document also suggests that “complexity is likely to

increase the divergence of national interests and fuel greater differences in the perception of risks and threats.”

Complexity and uncertainty are also defining features of Canada’s Arctic, reflecting unique political, socio-economic, demographic, geographic, and physiographic considerations. The ANPF notes that “the qualities that make the Canadian Arctic and North such a special place, its size, climate, and small but vibrant and resilient populations, also pose unique security challenges, making it difficult to maintain situational awareness and respond to emergencies or military threats when and where they occur.” Climate change compounds these challenges, reshaping the regional environment and, in some contexts and seasons, facilitating greater access to an increasingly “broad range of actors and interests” (both Canadian and international). Accordingly,

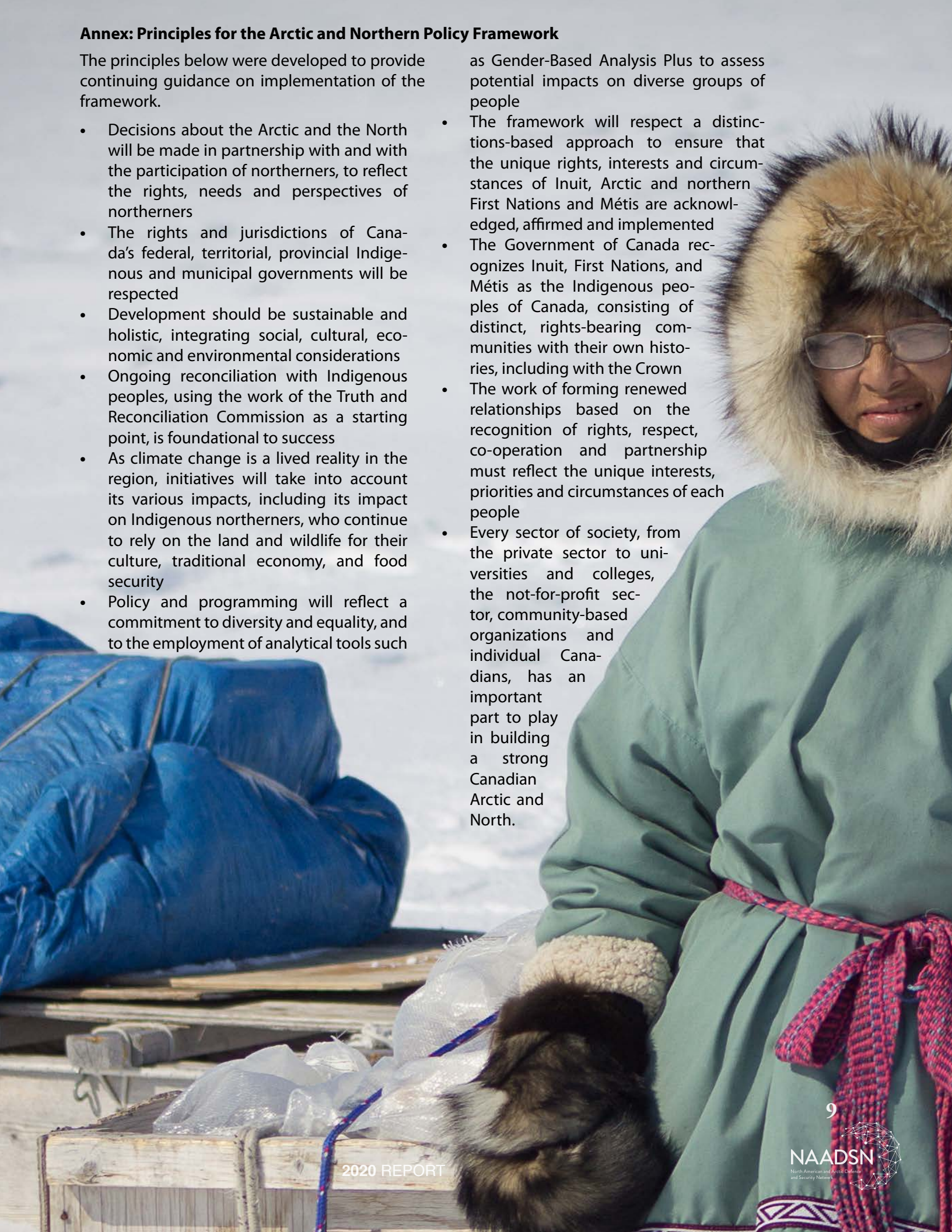
To protect the safety and security of people in the region and safeguard the ability to defend the Canadian Arctic and North, and North America now and into the future, a multi-faceted and holistic approach is required. The complexity of the regional security environment places a premium on collaboration amongst all levels of government, Indigenous peoples and local communities, as well as with trusted international partners....

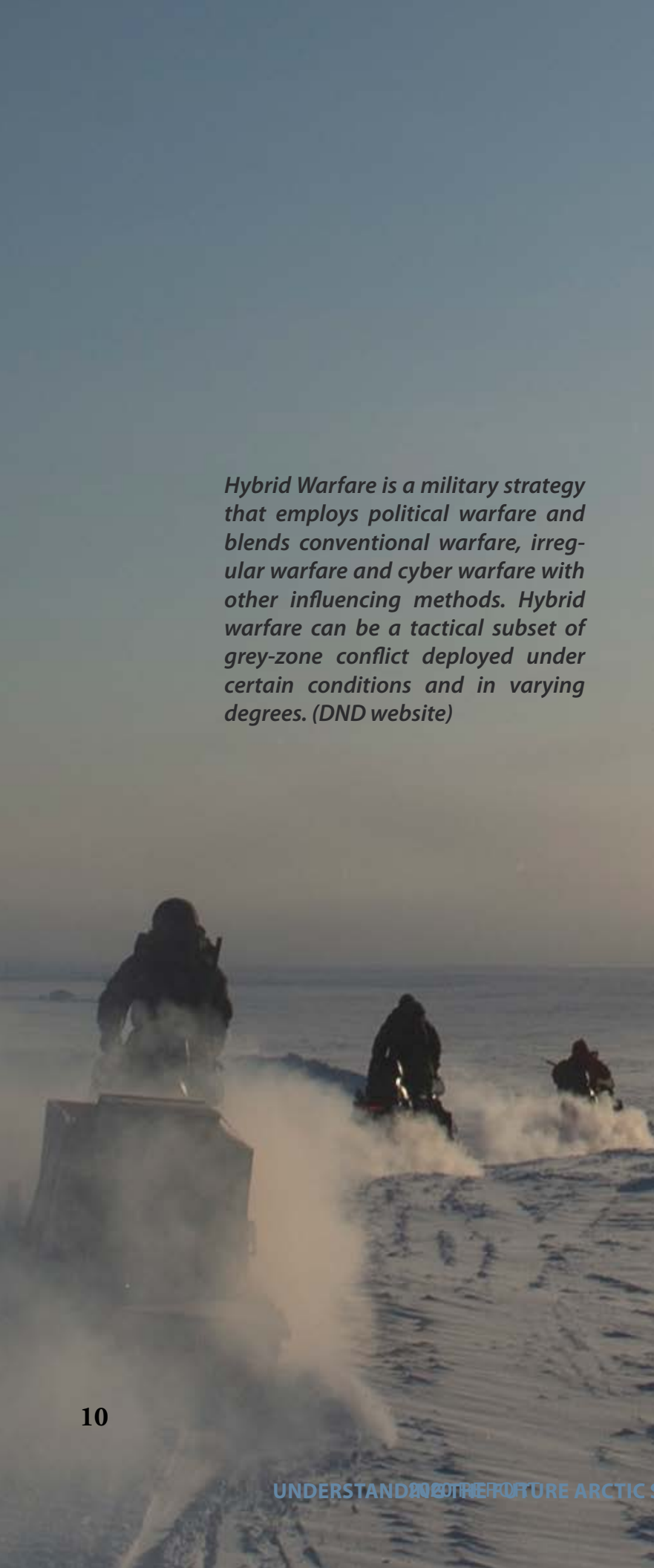
Given the high proportion of Indigenous people (Inuit, First Nations and Métis) in Canada’s Arctic population, as well as Ottawa’s acute political focus on improving Indigenous-Crown relations and promoting reconciliation, the region enjoys a much higher political profile than simple population statistics and parliamentary representation numbers might suggest. As the Arctic Human Development Report (2015) notes, Indigenous peoples’ “efforts to secure self-determination and

Annex: Principles for the Arctic and Northern Policy Framework

The principles below were developed to provide continuing guidance on implementation of the framework.

- Decisions about the Arctic and the North will be made in partnership with and with the participation of northerners, to reflect the rights, needs and perspectives of northerners
- The rights and jurisdictions of Canada's federal, territorial, provincial Indigenous and municipal governments will be respected
- Development should be sustainable and holistic, integrating social, cultural, economic and environmental considerations
- Ongoing reconciliation with Indigenous peoples, using the work of the Truth and Reconciliation Commission as a starting point, is foundational to success
- As climate change is a lived reality in the region, initiatives will take into account its various impacts, including its impact on Indigenous northerners, who continue to rely on the land and wildlife for their culture, traditional economy, and food security
- Policy and programming will reflect a commitment to diversity and equality, and to the employment of analytical tools such as Gender-Based Analysis Plus to assess potential impacts on diverse groups of people
- The framework will respect a distinctions-based approach to ensure that the unique rights, interests and circumstances of Inuit, Arctic and northern First Nations and Métis are acknowledged, affirmed and implemented
- The Government of Canada recognizes Inuit, First Nations, and Métis as the Indigenous peoples of Canada, consisting of distinct, rights-bearing communities with their own histories, including with the Crown
- The work of forming renewed relationships based on the recognition of rights, respect, co-operation and partnership must reflect the unique interests, priorities and circumstances of each people
- Every sector of society, from the private sector to universities and colleges, the not-for-profit sector, community-based organizations and individual Canadians, has an important part to play in building a strong Canadian Arctic and North.





Hybrid Warfare is a military strategy that employs political warfare and blends conventional warfare, irregular warfare and cyber warfare with other influencing methods. Hybrid warfare can be a tactical subset of grey-zone conflict deployed under certain conditions and in varying degrees. (DND website)

self-government are influencing Arctic governance in ways that will have a profound impact on the region and its inhabitants in the years to come.” Countless reports highlight longstanding inequalities in transportation, energy, communications, employment, community infrastructure, health, and education that continue to disadvantage Northerners compared to other Canadians. Furthermore, poor socio-economic and health indicators also point to significant gaps between Northern Canadian jurisdictions and their southern counterparts. Population density, poor economies of scale, high costs, and myriad other factors often limit the applicability or utility of conventional economic models to Arctic contexts.

Exogenous variables also complicate the Canadian Arctic security landscape. As non-state actors and non-Arctic state actors seek greater influence on Arctic affairs, the Government of Canada may face direct and indirect challenges to its legitimacy and credibility. The Government of Canada may also be presented with opportunities for constructive engagement and co-operation that could strengthen its Arctic position. Furthermore, increasing polarization, regionalization, and fragmentation within North American society could deepen distrust in conventional politics and politicians, exposing vulnerabilities that are susceptible to outside influence and can be exploited to disrupt the social fabric and sow seeds of disunity. A declining sense of fate control, lingering anxieties about sovereignty, and concerns about an increasingly complex future could also prove sources of greater uncertainty and social and political division.

In an increasingly globalized information and social media environment, adversaries are likely to use disinformation and misinformation strategies to influence Canadian opinion, undermine sources of strength, and complicate decision making. The NATO SFA also notes that “although socio-economic, political and environmental changes will continue to create uncertainty at individual, organizational,

local, regional and global levels, new methods and tools, in particular big data, technological literacy and AI, have the potential to provide new ways of managing uncertainty and complexity. This will require a shift from an organizational culture that takes an incremental approach, has stove-piped working practices and waits for greater clarity, to one that has a more collaborative approach that supports bold and innovative decisions.” Current discussions about the future of North American defence and security architecture, included new “ecosystem” approaches to integrating layered defences, anticipate a future where NORAD might achieve all domain awareness from the seabed to outer space and have the ability to fuse the data from these sensors into a common operating picture that decision-makers can use to defend against adversarial actions.³

1.4 CONFLUENCE AND INTERCONNECTEDNESS

In a globalized world, many of the issues facing Canada, including in the Arctic and the North, cannot be addressed effectively through domestic action alone. A whole-of-government effort that leverages both domestic and international policy levers is therefore required. For example, economic growth in Canada’s Arctic and North can be facilitated through infrastructure investments that increase access to world markets, along with trade commissioner services to help businesses based in the region access international markets and attract and retain foreign direct investment that benefits Northerners and respects Canada’s national interest.

– ANPF (2019)

The Arctic is inextricably tied to the rest of Canada, to North America, and to the international system as a whole. This interconnectedness brings opportunities for communities, governance, and economic


Close Engagement: Land Power in an Age of Uncertainty (2019) summarizes that conflict over the next 10 to 15 years will take place in the context of the following trends:

- increasingly rapid technological change;
- an increase in the number of actors willing and able to use organized force to achieve their objectives;
- an ever more pervasive globalized information and social media environment;
- increasing resource shortages and population movements driven by climate change;
- rising economic inequality;
- weapons systems with radically increased lethality;
- greater power and reach of transnational organized crime;
- democratization of advanced weaponry;
- greater proliferation of evolved hybrid threats;
- increased likelihood of great power / regional power conflict, whether directly or by proxy, including an increased risk of nuclear conflict; and
- more rapid emergence and escalation of conflicts.

development, and also poses complex, multifaceted challenges. The Canadian Army's capstone future land operating concept, [Close Engagement: Land Power in an Age of Uncertainty](#) (2019), highlights how "globalization, social connectivity, climate change, and empowered non-state actors are working to blur the distinction between homeland and overseas threats." The complex, dynamic, volatile, and uncertain future operating environment, where the risk of miscalculation and escalation is acute, requires comprehensive approaches that can draw upon all of the levers of national power, including military power. Accordingly, it emphasizes that the Canadian Army needs to foster a culture and tools to interoperate with joint, interagency, and multinational partners; embrace adaptability and agility; and establish robust networks while retaining the ability to operate effectively in a

degraded or austere environment.

The NATO SFA notes that "confluence refers to the interactions and intersection of different trends causing a multiplication of the effects, the outcomes of which may be very challenging to predict but should be considered nonetheless." Technological advances that bring together people can also have sweeping (and sometimes highly disruptive) political, socio-economic, cultural, and environmental implications. New connections between people within and across national boundaries can produce greater empathy and cohesion, but they also provide pathways for groups harbouring grievances and radical ideas to recruit and mobilize members and can threaten traditional forms of cultural expression, social organization, and political control. Furthermore, technology is an enabler for innovation, education, improved health



ANTICIPATING emerging threats and challenges is fundamental to Canada's security. The Defence team will improve its ability to provide timely information to decision-makers, allowing the Government to identify and understand emerging events and crises, respond appropriately, and minimize the destructive effects of prolonged conflict. – SSE 2017

outcomes, and positive social change, but can also exacerbate gaps between people with access to advanced technology and training and people without such access.

These confluence of these factors, and many others, changes the nature of conflict. The SSE highlights the increasing prevalence of “coordinated hostile activities across all spheres of state power (i.e., diplomatic, economic, information, military) that are deliberately crafted to fall below the traditional threshold of armed conflict.” This “grey zone” encompasses a broader and opaquer spectrum of threats than established policy and legal frameworks were designed to address, and are difficult to identify, attribute, categorize, and counter. “The linkages between disparate spheres of activity are also difficult to understand and can mask broader strategic objectives,” the defence policy notes. “Below threshold tactics and hybrid warfare also introduce questions regarding the appropriate distribution of responsibilities to respond across government, including DND/CAF’s role when defence equities are threatened through non-military spheres.”

Adversaries are discerning new opportunities to attack Canada’s vulnerabilities and contest our narratives at all levels, “weaponizing” information operations to sow confusion and discord, creating ambiguity about intent, and preserving deniability. These activities are difficult to deter, detect, and attribute, and calibrated responses must be appropriate and proportionate, balancing the risk of escalation and the failure to deter future malicious activity.

The NATO SFA also anticipates that “the confluence of trends, compounded with uncertainty, is more likely to create strategic shocks and problems of great magnitude.” These strategic shocks (sometimes referred to as “black swan” events) can emanate from “a rapid, unanticipated, less predictable event, such as the 9/11 attacks,”

or can be a scenario that strategists have contemplated but transpires much earlier than expected. In an Arctic context, examples could be the complete collapse of the Greenland ice sheet, a nuclear disaster, a terrorist attack on critical infrastructure, or the immediate closure of other strategic straits around the world that force risky transits of Northern sea routes on a massive scale.

Other problems have long-term consequences but the temporal or geographical horizon over which they unfold make it difficult to secure support for specific initiatives to counter them or resources to address them, given competing priorities. Climate change is the most obvious – and, arguably, the most existential – example facing humanity as a whole. While the overwhelming preponderance of evidence proves that climate change will have devastating, long-term effects on the planet, it is difficult to discern specific “tipping points” that will cause a major disruption in non-linear, complex systems. Similarly, disruptive technologies, the growing role of non-state actors and super-empowered individuals in domestic and international affairs, and violent extremism simmering in unexpected sectors of society all require careful monitoring to ensure that responses do not undermine innovation or the democratic values that animate Canadian society. Continuous horizon-scanning and ongoing (re)assessment of political, environmental, economic, societal, and technological trends are important to provide credible, advance warning of disruptive changes in a complex, uncertain, and potentially volatile future security environment.



POLITICAL

LEAD AUTHOR: P. WHITNEY LACKENBAUER; WITH CONTRIBUTIONS BY JUSTIN BARNES, ALDO CHIRCOP, RYAN DEAN, SUZANNE LALONDE, AND ANDREAS ØSTHAGEN

Broadening international awareness and acceptance of the heightened impacts of global climate change in the Arctic, most poignantly depicted in the accelerated melting of the polar ice cap, have generated sweeping debates about present and future security and safety challenges and threats in the region. Visions of increasingly accessible natural resources and navigable polar passages connecting Asian, European, and North American markets have resurrected age-old ideas about the region as a resource and maritime frontier—as well as concomitant insecurities about the geopolitical and geostrategic impacts of growing global attentiveness to the region’s possibilities. Accordingly, debates about whether the region’s future is likely to follow a cooperative trend or spiral into military competition and even conflict rage on.

Scholars have well established how a robust array of rules, norms and institutions guide international interactions in the circumpolar north. This rules-based order not only advances Canada’s national interests but its global ones as well, offering opportunities to shape international agendas on climate change, contaminants, and other environmental threats with a global scope that have a disproportionate impact on the Arctic. Furthermore, it is well documented

how Canada continues to leverage existing multilateral organizations – such as the Arctic Council, Arctic Economic Council, United Nations Commission on the Limits of the Continental Shelf, International Maritime Organization (IMO), the North Atlantic Treaty Organization (NATO), Arctic Coast Guard Forum, and the Arctic “5+5” dialogue on Central Arctic Ocean fisheries – to promote its interests in the circumpolar world. These multilateral tools have proven resilient even with the downturn in relations between the West and Russia since 2014, with complex interdependence sustaining regional cooperation on search and rescue, transboundary fisheries, extended continental shelves, navigation, a mandatory polar code, and science.

Defence cooperation, however, has felt the direct effects of resurgent major power competition internationally – perhaps inevitably, given that five of the Arctic Council’s eight members are NATO members. The alliance’s role in “Arctic” defence and security has been contested over last decade, with Canada typically opposing appeals by countries like Norway to have NATO assume a more explicit Arctic role because this would unnecessarily antagonize Russia (or at least play into Putin’s hands by appearing to validate his suggestion of Western aggressive intentions against

Russia's Arctic), draw non-Arctic European states more directly into Arctic affairs writ large, and/or amplifying the misconception that Arctic regional dynamics are likely to precipitate conflict between Arctic states. Others have pushed for stronger NATO involvement to meet a heightened Russian military threat, stand up to Russian intimidation, and show strong deterrent. Since the Ukrainian crisis of 2014, Western concerns about Russian intentions and behaviour on the international stage have reinforced a popular image of that country as the wild card in the Arctic strategic equation and reignited questions about regional security.

The Canadian debate on Arctic security reveals various schools of thought and divergent threat assessments. Proponents of the "sovereignty on thinning ice" school suggest that Arctic sovereignty, maritime disputes, and/or questions of resource ownership will serve as catalysts for regional conflict. They associate the need for military activities demonstrating effective control over Canadian territory and internal waters with the preservation or enhancement of the international legal basis for Canada's Arctic sovereignty. This thinking underpinned the "use it or lose it" messaging that dominated during Prime Minister Stephen Harper's first years in office in the mid-2000s. Although this idea no longer dominates academic

discussions, it still lingers in news media and public perceptions, and "purveyors of polar peril" continue to point to the Arctic interests of Russia, a rising China, and the United States, as cause for Canadian alarm.

Other commentators argue that there is no military threat to the Arctic and that defence resources should instead be directed to dealing with human and environmental security issues associated with climate change and the region as an Indigenous peoples' homeland.

A third school of thought argues that, while strategic deterrence continues to have an Arctic dimension (and that this is best conceptualized at an international rather than a regional level of analysis), Canada is not likely to face conventional military threats in or to its Arctic region in the next decade. Instead, members of this school suggest that Canada should focus on building Arctic military capabilities within an integrated, "whole of government" framework, largely directed towards supporting domestic safety and "soft" security missions that represent the most likely incidents to occur in the Canadian Arctic. It should also invest in sensors and capabilities in the Arctic that can contribute to broader defence of North America missions, but these should not be misconstrued as capabilities needed because the Canadian Arctic itself is specifically threatened by foreign adversaries and vulnerable to attack.



2.1 SHIFTS IN GEOSTRATEGIC POWER

Canada's defence policy acknowledges that "a degree of major power competition has returned to the international system." The United States remains the world's only "superpower," but China has emerged as a "rising economic power with an increasing ability to project influence globally" and "Russia has proven its willingness to test the international security environment." More broadly, *Strong, Secure, Engaged* observes how "trends in global economic development are shifting the relative power of states..., creating a more diffuse environment in which an increasing number of state and non-state actors exercise influence." While this shift brings benefits (such as the alleviation of poverty, democratization, and empowerment), it "has also been accompanied by weak governance and increasing uncertainty." As an extension of these broader shifts and heightened global competition, the actions of a resurgent power (Russia) and the increasing presence of extra-regional powers (including China) are likely to influence perceptions of the strategic balance in the Arctic. We contend that changing power dynamics in the Arctic are unlikely to derive from disputes over regional disputes over boundary disputes, resources, or regional governance in the next fifteen years, and instead will be a reflection of broader international forces and dynamics. Although the evolving balance of power may undermine global peace and security, we also highlight that this is not necessarily a zero-sum game in terms of Arctic regional stability.

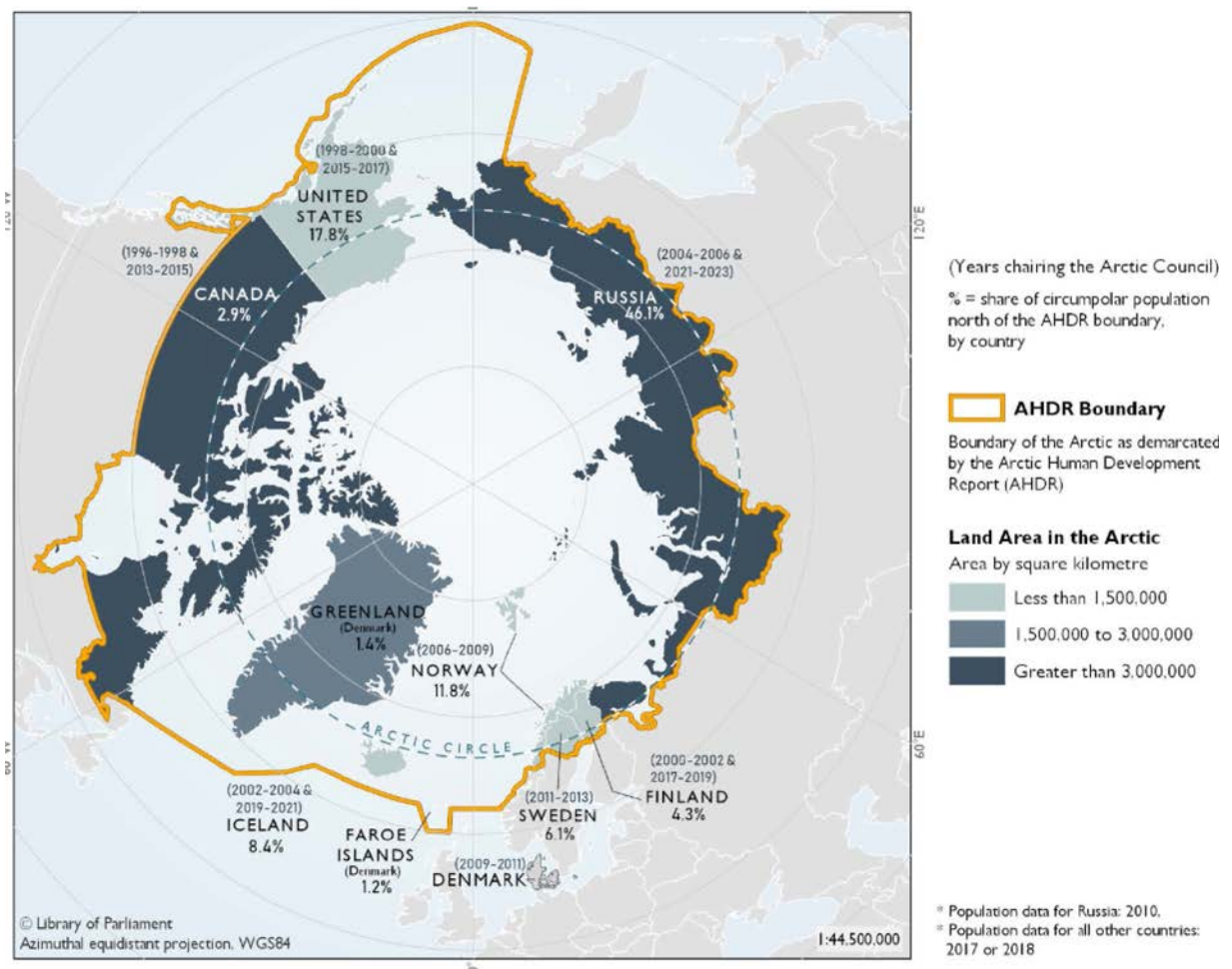
While careful to acknowledge Russia's rights and interests as an Arctic state, Canada's defence policy notes that country's role in the resurgence of major power competition globally and concomitant implications for peace and security. Russian aggression in annexing Crimea and fomenting the war in Eastern Ukraine, as well as its military intervention in the Syrian civil war, has sparked international

debate about Russia's apparent "revisionist position" towards what it views as a Western-dominated international system – and the implications for the Arctic. Some commentators cast this as a new "cold war" between Russia and the West, a "resumption of great-power rivalry," and a "return of geopolitics," while others decry these frames as outmoded or alarmist. Accordingly, debates persist about the pace and form of Russia's military and security posture in the region, with some experts seeing it as a dramatic build-up portending Russian aggression, and others suggesting that its military modernization program represents reasonable defensive measures aimed at protecting Russia's economic and sovereign interests in its Arctic and at addressing security and safety threats (such as search and rescue, safe navigation, and responding to natural and humanitarian emergencies).

The NATO SFA Report highlights that "the redistribution of economic and military power, most notably towards Asia, continues to contribute to the relative decline of the West." General Western concerns about the rise of Asia, and particularly China's use of hard and soft power to reshape the geostrategic power balance globally, has extended to the Arctic. China's desire to access strategic resources located in the Arctic, the pivotal importance of maritime commerce to Asia-Pacific economies, and China's peculiar interpretations of international laws and treaties all make the growing polar interests of this self-proclaimed "near-Arctic state" both significant and, in some circles, disconcerting.

IMPLICATIONS

- a. **Challenges to the rule-based order in the Arctic.** Canada is a responsible international player committed to upholding universal liberal values, contributing to peace building, and working with allies and partners to address security challenges and build resiliency.



Some other countries, however, are testing the international security environment and challenging the rules-based order. Canada cannot assume that the Arctic is inherently immune to such challenges, most likely in an indirect way.

- b. Increased requirement for cooperation with other actors.** *Strong, Secure, Engaged* affirms the compatibility between Canada exercising sovereignty and collaborating with international partners. "Canada remains committed to exercising the full extent of its sovereignty in Canada's North, and will continue to carefully monitor military activities in the region and conduct defence operations and exercises as required," the policy explains. Concurrently, "Canada's renewed focus on the surveillance

and control of the Canadian Arctic will be complemented by close collaboration with select Arctic partners, including the United States, Norway and Denmark, to increase surveillance and monitoring of the broader Arctic region."

- c. Challenges to NORAD:** The United States is pressuring Canada and its other allies to assume a greater share of the overall defense burden. SSE commitments to renew the North Warning System (NWS) and modernize elements of NORAD flow from Canada's longstanding bilateral defence arrangements with the US to jointly monitor and control the air and maritime approaches to the continent. New commitments, however, will require creative thinking and new approaches about infrastructure,

surveillance and detection, interception capabilities, and command and control relationships. Furthermore, despite sharing common security interests and concerns in the North, Canadian and American academic and “think tank” experts tend to operate in distinct spheres, often limiting the exchange of knowledge and the sharing of best practices and new ideas.

- d. **Challenges to NATO:** Canada is working with its NATO allies to re-examine conventional deterrence. The statement in SSE that “NATO has also increased its attention to Russia’s ability to project force from its Arctic territory into the North Atlantic, and its potential to challenge NATO’s collective defence posture” marks a measured shift in Canada’s official position. Despite Canada’s reticence to have NATO adopt an explicit Arctic role over the past decade, the inclusion of this reference – as well as the commitment to “support the strengthening of situational awareness and information sharing in the Arctic, including with NATO” – indicates a newfound openness to multilateral engagement on “hard security” in the Arctic with our European allies. NATO is the cornerstone of both Danish and Norwegian defence and security policy, which also opens opportunities for enhanced bilateral relationships. How this newfound interest in NATO’s Arctic posture interacts with Canada’s longstanding preference to partner bilaterally with the US on North American continental defence remains to be clarified in the next decade.

2.2 USE OF POWER POLITICS

Canadian political scientist [Rob Huebert recently argued](#) that “a New Arctic Strategic Triangle Environment (or NASTE) is forming, in which the core strategic interests of Russia, China and United States are now converging at the top of the world.” He suggests that this new “great game” is not about conflict *over* the Arctic but rather occurring *through* the Arctic. “This does not make the threat any less dangerous,” he suggests, “but it does make it more complicated.” With tensions growing between Russia and the West, and China’s relationships evolving with both the West and Russia, Huebert asserts that “the primary security requirements of the three most powerful states are now overlapping in the Arctic region, producing new challenges and threats.”

Huebert finds support in US Northern Command/NORAD Commander [General Terrence O’Shaughnessy’s statement to the Senate Armed Services subcommittee on readiness in March 2020](#), which insists that “the threats facing the United States and Canada are real and significant,” and that “the Arctic is no longer a fortress wall, and our oceans are no longer protective moats; they are now avenues of approach for advanced conventional weapons and the platforms that carry them.” Instead, O’Shaughnessy describes the Arctic as “the new frontline of our homeland defense as it provides our adversaries with a direct avenue of approach to the homeland and is representative of the changing strategic environment in our area of responsibility.” Blending images of “more consistently navigable waters, mounting demand for natural resources, and Russia’s military buildup in the region” with Russia’s ability to field “advanced, long-range cruise missiles - to include land attack missiles capable of striking the United States and Canada from Russian territory,” O’Shaughnessy concludes that “Russia has left us with no choice but to improve our homeland defense

capability and capacity. In the meantime, China has taken a number of incremental steps toward expanding its own Arctic presence.” As a solution, he emphasizes the importance of advanced sensors that can “detect, track, and discriminate advanced cruise missiles, ballistic missiles, hypersonics, and small unmanned aerial systems at the full ranges from which they are employed,” as well as “detect and track the platforms - aircraft, ships, and submarines - that carry those weapons.” Evoking the phrase that “the Homeland is not a sanctuary,” he emphasizes the need for “new defeat mechanisms for advance threat systems - to include the advanced cruise missiles capable of striking the homeland from launch boxes in the Arctic.”

Talk of the need to “[harden the shield](#)” to project a credible deterrent against conventional and below-the-threshold attacks on North America anticipates new approaches that will incorporate Arctic sensors and systems in a layered “ecosystem” of sensors, fusion functions, and defeat mechanisms. *Strong, Secure, Engaged* explains that “the re-emergence of major power competition has reminded Canada and its allies of the importance of deterrence.” At its core, deterrence is about discouraging a potential adversary from doing something harmful before they do it. Accordingly, a credible military deterrent serves as a diplomatic tool which, in concert with dialogue, can help to prevent conflict. While deterrence theory has traditionally focused on conventional and nuclear capabilities, the concept is also relevant in the space, cyber, information, and cognitive domains – although the means to achieve it remain less clear in these domains.

NORAD plays a central role in the protection of North American security and has always been closely associated with Arctic defences. As political scientist [Andrea Charron observes](#), “its crest includes a broad sword facing due north, suggesting that the avenue of potential attack against

North America is through the Arctic.” In light of advanced technologies and capabilities that adversaries can use to strike from multiple directions, the binational command has turned its focus to “all-domain” awareness, improved command and control, and enhancing targeting capabilities that can allow decision-makers to respond “at the speed of relevance.” Canada has committed to modernize the North Warning System (NWS) and to include the air and maritime approaches to North America in any effort to modernize the overall system, and is developing new space-based systems to track threats, improve situational awareness, and improve communications globally – and with specific application throughout the Arctic region. The full extent of its contribution to continental defence effort to detect, deter, and defend against or defeat threats from all domains remain to be determined, but its Arctic will inevitably factor heavily given that the polar region remains the [fastest avenue of approach to North America](#) for various delivery systems emanating from major power competitors.

In the “state competition” section that immediately precedes the discussion about “a changing Arctic,” SSE observes that “NATO Allies and other like-minded states have been re-examining how to deter a wide spectrum of challenges to the international order by maintaining advanced conventional military capabilities that could be used in the event of a conflict with a ‘near-peer.’” Accordingly, debates about NATO’s role in the Arctic are inextricably linked to broader discussions about the alliance.

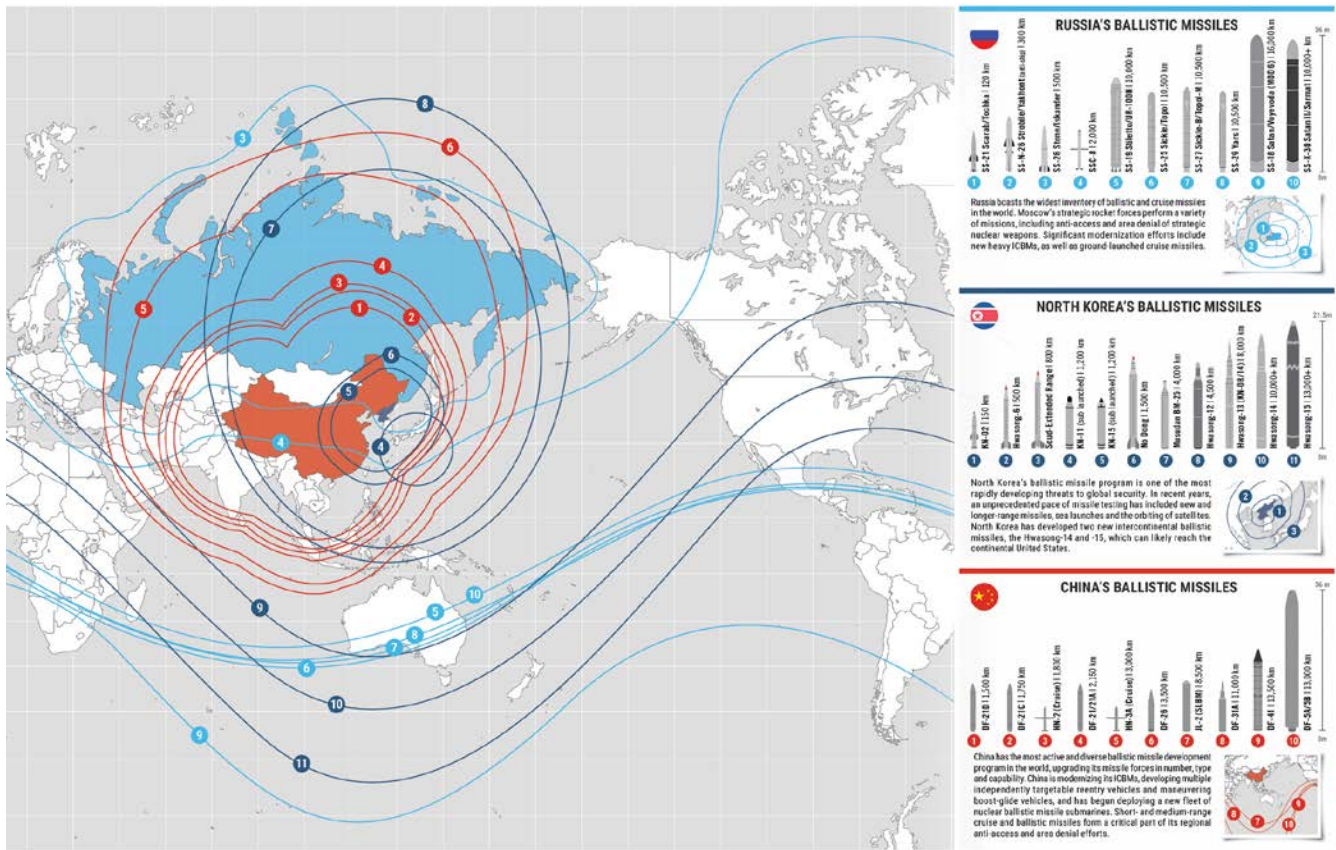
Implications:

- a. **Increased potential of “spillover” from confrontation and competition elsewhere.** Although recent scholarship seeks to explain the lack of direct spillover from the war in Ukraine in 2014 and from ensuing Western sanctions into general

Arctic relations (although it has affected some specific ones), legitimate concerns linger that Russia's "increasingly confrontational, rule breaking and assertive" behaviour will eventually manifest in the Arctic. As the prospect of Western economic cooperation fades and companies cut ties with Russian partners, the motivations to retain the rules-based approach to the circumpolar region may fray. In this scenario, Canada could be faced with an increasingly aggressive Russia, willing to use its growing Arctic military might to challenge the rules secure its objectives in the circumpolar world. Furthermore, aggressive Chinese activities in the South China Sea might undermine the ability of states to peacefully manage and resolve disputes in accordance with international

law, leading to coercion and other actions that could spillover into the Arctic or see China use the circum-polar region as a [theatre for diversionary activities](#).

b. Growing requirement for new forms of robust and credible deterrence. Recent events in Ukraine, Syria, and other parts of the world reinforce the ongoing importance of territory and the traditional roles of deterrence and defence, with a particular focus on collective defence. Future conflicts, however, could range from hybrid wars, to selective military operations by major powers, to precise long-range strikes using conventional weapons, to the use of small mobile units in special operations to disrupt communications. Canada and its allies will have to determine how best they can deter



enemy attacks with specific, limited objectives that adversaries seek to achieve using select elements of power across all domains. The Arctic cannot be excluded from these deliberations.

- c. **Deterrence by punishment still has its place.** Changes in nuclear strategy and the modernization of nuclear and conventional forces by major and regional powers, have significant implications for strategic stability. NORAD officials' recent emphasis on the need to *defeat* any delivery systems or threats traveling through the Arctic (deterrence by denial), in all domains, could destabilize the deterrence-by-punishment regime that has safeguarded North America against a nuclear or conventional military attack since the early Cold War. It could also divert unnecessary resources from domains where defeating threats may be essential (e.g. cyber) and to deter below-threshold tactics and hybrid warfare in the "grey zone." Messaging associated with NORAD modernization over the next decade should be carefully situated in deterrence logic and clearly communicated to not unintentionally escalate tensions with adversaries or invite strategic miscalculations.
- d. **Nationalism and divergent risk and threat perception.** Resurgent nationalism worldwide, expressed in forms like the "America First" and BREXIT movements, changes national risk and threat assessments. This, in turn, may drive some of Canada's key allies to look inwards. On the other hand, divergent perceptions of Arctic risks and threats could cause Canada's NATO Allies to shuffle their defence priorities, either pivoting away from the Arctic or adopting

more strident measures that upset established relationships and challenge alliance cohesion. Accordingly, Canada will need to strike a balance between national and collective efforts to strengthen Arctic defence and security. Furthermore, it will have to assure that over-inflated or misplaced fears about military threats to and in the Arctic do not become strategic distractions that divert Canada's attention and defence resources from elsewhere, thus opening other windows of opportunity for adversaries.

- e. **Discerning Russia's Arctic thinking.** North American analysts must deliberately consider Russia's *Arctic* interests, motivations, and fears through more systematic and culturally-attuned lenses, avoiding the temptation to simply import assumptions about that country's revisionist designs elsewhere into their assessments of the international Arctic. They must also balance Russian claims that dual-use Arctic infrastructure is inherently defensive with potential offensive uses and implications for broader deterrence. Furthermore, Russia is likely to become increasingly dependent economically upon Arctic resources and politically reliant on its imagined 'besiegement' by the West over the next decade. Managing polar relationships requires multilateral and bilateral engagement that reflects nuanced understandings of defence and foreign policies, as well as the history, economic drivers, and national cultures which contribute (sometimes imperceptibly) to policy.
- f. **Discerning China's Arctic thinking.** Chinese declarations that it is a "near Arctic state" and that it aspires to become a "great polar power" indicate that the country

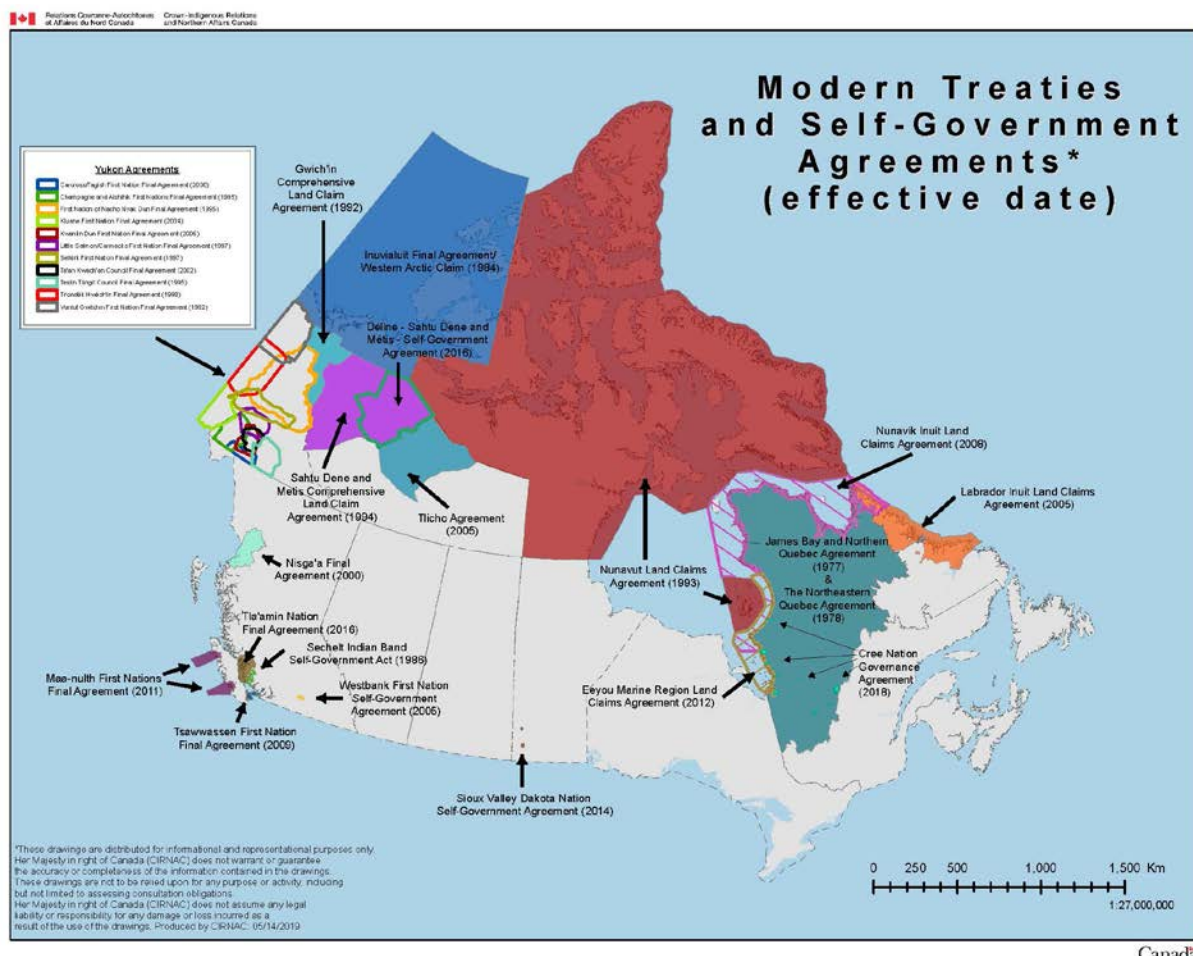
has strategic interests in the Arctic – but it does not inherently mean that it will seek to achieve them through revisionist behaviour or military force, or that the region really represents a core “strategic direction” for China. Instead, its aspirations and possible behaviours must be considered as part of a larger global game in which the Arctic represents a minor – but potentially important - piece.

2.3 DEVOLUTION OF GOVERNANCE AND RECONCILIATION WITH INDIGENOUS PEOPLES

Reconciliation in the North is also linked with political evolution, including the devolution of governance and self-determination. The negotiation and full implementation of land claims and

self-government agreements, which are modern forms of treaty-making, are considered key components of this process. Over the past half century, the settlement of land claims and the devolution of governance has also seen the federal government transfer much responsibility for land and renewable resource management in the Canadian Arctic to territorial and Indigenous governments and organizations. The process remains incomplete, however, and Indigenous leaders frequently highlight uneven implementation of land claim commitments and other government promises. Furthermore, Northern leaders express concern about a lack of capacity to manage myriad issues (both existing and anticipated) associated with rapid regional change, much of it driven or compounded by climate change.

The northern devolution process has been underway since the early 1970s,



highlighted by the creation of Nunavut in 1999 and agreements on land and resource management with the government of Yukon and the Northwest Territories. “When combined with the signing of modern treaties across much of the North and the expansion of Aboriginal self-government, devolution is an integral part of an extensive process of regional empowerment and local control,” scholars [Ken Coates and Greg Poelzer explain](#). “The process has been surprisingly smooth and without controversy, despite the complex financial, human resource, and other issues that have to be addressed when transferring authority to another jurisdiction. Problems remain, however, particularly in terms of capacity of northern governments to absorb the rapid transitions, disagreements about the appropriate levels of funding for devolved responsibilities, and the complex challenges of delivering government services in the Far North.”

Over the last three decades, co-management structures that share jurisdiction over lands and resources, harvesting rights, environmental management, parks and conservation areas, social and cultural

enhancements, and infrastructure have brought decision-making over land and territories closer to Northern communities. Indigenous leadership and participation within co-management structures have created regulatory regimes that consider Indigenous knowledge and scientific evidence to make decisions on wildlife management, land use, and environmental protection. These collaborative arrangements will continue to evolve through to 2035, deepening linkages between rightsholders.

Respect for and reconciliation with Indigenous peoples lies at the heart of the federal government’s agenda, and reconciliation is likely to be long-term process given the deep history and ongoing legacies of colonialism in the region. “It is time for a renewed, nation-to-nation relationship with Indigenous Peoples, based on recognition of rights, respect, co-operation, and partnership,” [Prime Minister Justin Trudeau instructed to each of his Cabinet ministers](#) after taking office in 2015. Accordingly, Canada places the highest priority on ensuring that its domestic and international activities in the Arctic acknowledge,

“Canada’s Arctic and Northern governments and communities are at the heart of security in the region. Partnership, cooperation and shared leadership are essential to promoting security in this diverse, complex and expansive area. Working in partnership with trusted international allies and all levels of government, including Indigenous communities, organizations and governments, Canada will continue to protect the safety and security of the people in the Arctic and the North, now and into the future.” - [ANPF Safety, Security, and Defence chapter](#) (2019)



protect, and promote Indigenous peoples' rights—and Canada insists that other Arctic stakeholders do the same.

In May 2016, Canada officially lifted the qualifications to its endorsement of the [United Nations Declaration on the Rights of Indigenous Peoples \(UNDRIP\)](#), affirming its strong commitment to welcome “Indigenous peoples into the co-production of policy and joint priority-setting.” The ANPF commits Canada to “honour, uphold, and implement the rights of Arctic and northern Indigenous peoples, including those outlined in historic and modern treaties and in the United Nations Declaration on the Rights of Indigenous Peoples.” Obligations of UNDRIP include the need for free, prior, and informed consent (FPIC) by Indigenous peoples before projects can take place on lands which they inhabit or have a claim. UNDRIP offers guidance on cooperative relationships with Indigenous peoples to states, the United Nations, and other international organizations based on the principles of equality, partnership, good faith, and mutual respect. Canada's implementation of UNDRIP remains a work in progress, and bringing all of its domestic and international practices into workable alignment with the declaration (some provisions of which are subject to radically [different interpretations, such as FPIC](#)) is likely to remain so over the fifteen years.

The Government of Canada's dedicated efforts to engage Northerners (particularly Indigenous peoples) as co-creators of an Arctic and Northern policy vision that seeks to reflect their lived realities and desires has confirmed a people-centric strategy that places human and environmental security at the forefront.¹ The clear focus on Indigenous consultation and leadership in policy-making also resulted in a protracted policy-development process that cannot serve as a workable model to discern more immediate policy needs. Nevertheless, adopting the ANPF idea of “Nothing about us [Northerners], without us” as an “essential principle that weaves

federal, territorial, provincial and Indigenous institutions and interests together for mutual success” offers important guidance for what Arctic and northern people, and their institutions, municipalities, organizations and governments will expect in the coming decades. It also resonates in an era of reconciliation with Indigenous peoples.

Implementing reconciliation is a complex process which includes recognition of Canada's colonial legacy for Indigenous peoples and the intergenerational impacts of attempts at assimilation and other destructive practices; the acknowledgement of and respect for Indigenous rights and self-determination; and supporting Indigenous peoples' efforts to reclaim their identity, language, culture, and nationhood. In 2015, Prime Minister Trudeau accepted the Truth and Reconciliation Commission's final report and its [“94 Calls to Action”](#) on behalf of Canada and committed his government to implement the recommendations.

In the future, Canada's cooperation with other Arctic states and partners is likely to reflect more direct involvement of Northern territorial and Indigenous governments and organizations. For example, pursuant to its efforts to promote sustainable marine spatial management of shared ocean areas, [Canada has committed](#) to play an “active role in supporting the development of a pan-Arctic network of marine protected areas at the Arctic Council and to partner with Indigenous peoples to recognize and manage culturally and environmentally significant areas and pursue additional conservation measures, including those led through Indigenous management authorities.” Establishing transboundary marine protected areas, such as the one covering North Water Polynya in northern Baffin Bay between Nunavut and Greenland that the [Pikialasorsuaq Commission](#) recommended in 2017, will entail partnerships with Inuit communities and organizations, territorial and foreign governments, and the Inuit Circumpolar Council.

Implications:

- a. **The roles and influence of Indigenous peoples in the development of domestic and international policy are likely to expand over the next fifteen years.** Accordingly, Canada's declared intent to play a leadership role in circumpolar affairs is likely to become even further invested in advancing domestic priorities related to social and economic development, environmental protection, scientific and traditional Indigenous knowledge, and diversity. The extent to which this involvement carries into the defence and national security realm remains to be determined.
- b. **Indigenous and territorial governments will expect to play key roles in the co-management of all Arctic activities and decisions.** For example, Inuit leaders consider Inuit Nunangat - the Arctic waters, ice, and land above the treeline – to be their homeland, and assert their Indigenous rights to be involved in every decision relating to it. Presumably this includes foreign and defence affairs.
- c. **Reconciliation is a process in which all Canadian institutions are expected to engage.** Growing awareness and concern about the impacts of colonial legacies in the Arctic will colour expectations about future relationships between Northern peoples and governments, including the military. During the consultations leading to the ANPF, Northern participants highlighted the Canadian Rangers as an important and culturally-appropriate form of community-based military presence in the North, and also "expressed appreciation for the way in which the Canadian Armed Forces consult local communities and Indigenous

groups." Continuing and enhancing these forms of collaboration are likely to yield important dividends.

- d. **An increasing focus on Indigenous distinctiveness** will continue to promote Indigenous rights and self-determination and produce new Crown-Indigenous relationships through collaborative processes (such as negotiation, facilitation, and mediation) as well as [litigation](#). Heightened frustrations with governments' inability to address core human needs in a timely manner are also likely to erode political cohesion, with the potential to inhibit progress towards achieving improved socio-economic outcomes. Persistent "we/they" messaging may also increasingly divide Canadians and lead to political friction or alienation over the next fifteen years.

2.4 NON-ARCTIC STATE AND NON-STATE ACTOR INFLUENCE IN DOMESTIC AND INTERNATIONAL AFFAIRS

The [safety, security, and defence chapter of the ANPF](#) notes that a growing interest in Arctic affairs by non-Arctic state and non-state actors has significant implications for the evolving Arctic security environment. "Easier access to the Arctic may contribute to greater foreign presence in Canadian Arctic waterways," requiring that Canadian remain vigilant in enforcing its sovereignty over its waters and ensuring that activities in the region do not pose security or safety risks to Canada and to Canadians. The policy framework also emphasizes that:

Canada's Arctic and natural resources are attracting interest from foreign states and enterprises. Foreign investment, research, and science have the potential to improve the lives of Northerners. However, some

of these investments and related economic activities could seek to advance interests that may be in opposition to those of Canada. Recognizing that economic growth and investment in the Arctic supports good jobs, healthy people and strong communities, there are also security risks associated with these investments that could impact the well-being of Northerners. Canada will continue to balance needed economic development while ensuring that security in the Arctic and the North is maintained.

Discerning ways to proactively engage non-Arctic states and non-state actors that

are expressing commercial, scientific, and military interest in the region – and balancing new economic opportunities with impacts that activities have on Northerners, Arctic ecosystems, and defence and security – remain central international considerations to any Arctic policy.

Narratives of China's rising interests as a "near-Arctic state" and its future designs for the region are regular features in the burgeoning literature on Arctic security and governance over the last decade. Many of these Arctic narratives cast suspicion at China, based on concern that the Asian power will seek to undermine the sovereignty of Arctic states and co-opt regional governance mechanisms to facilitate access to resources and new sea routes to

The Canadian Rangers, a sub-component of the CAF Reserves in isolated northern and coastal communities, are widely celebrated as a military organization that has balanced both the needs of local communities and the federal government, and has contributed to the revitalization of cultural and traditional practices in Northern communities. The Rangers provide an important outlet for Northern Indigenous peoples who wish to serve in the defence of their country without having to leave their communities. Ranger activities allow members of Indigenous communities to practice and share traditional skills, such as living off the land, not only with people from outside their cultures but also inter-generationally within them. By celebrating traditional knowledge and skills, as well as encouraging and enabling community members to go out on the land and share their knowledge and expertise, the Rangers can play an important role in supporting the retention or expansion of core cultural competencies. In turn, the Ranger concept is inherently rooted in the idea that the unique knowledge of Northern Indigenous peoples can make an important contribution to effective military operations. It is this partnership, rooted in mutual learning and sharing, that has made the Rangers a long-term success on the local and national scale.



fuel and connect its growing global empire. [Other scholars](#) have laid out the conditions under which China might play a constructive role in circumpolar affairs and Canadian Arctic development. Positive relations are inherently predicated on China respecting Canadian sovereignty as an Arctic state and, in terms of the maritime domain, as an Arctic coastal state with extensive historic internal waters as well as sovereign rights to an exclusive economic zone (EEZ) and extended continental shelf. This is consistent with international law, which China promises to respect in its [2018 Arctic policy](#). China's growing interest in polar scientific research can contribute to enhanced international understanding of Arctic dynamics, particularly in the natural sciences. Heightened but appropriate Chinese involvement in Arctic governance, with due respect for Arctic states, can also bolster regional stability. Foreign investments from non-Arctic

sources, including Asian investors, holds the potential to increase the relative prosperity of Arctic regions within Arctic states like Canada. As a source of investment capital to advance resource development projects, China would have to respect the rule of law, Canadian regulations, and the rights of Northern Canadians (particularly Indigenous peoples).

Non-state actors include benign and non-benign entities from Non-Governmental Organizations (NGOs), Multinational Corporations (MNCs), advocacy networks, transnational activists, super-empowered or rogue individuals, and terrorist and criminal organizations. As the NATO SFA notes, these actors exercise significant economic, political, or social power and influence at national and at international levels. In the future, non-state actors "are expected to exert greater influence over national governments and international institutions and their role is likely to expand," heightening the "complexity of addressing issues such as corruption, social and economic inequality and effectiveness of state institutions." Although Canada's Northern economy remains disproportionately reliant on the public sector, the private sector is an essential driver of economic growth and prosperity, and business interests and priorities must be considered in contemplating Arctic futures. Furthermore, NGOs will continue to exert pressure and wield influence on local and regional issues, demanding government and corporate transparency, promoting environmental and social justice and human rights, and seeking to sway public opinion through direct and indirect action, including social media.

The ANPF explains that Canada



will “consider establishing Arctic dialogues with key non-Arctic states and actors, where practical, to discuss issues of mutual interest, ... prioritize[ing] cooperation with non-Arctic states and actors whose values and scientific, environmental and/or economic interests align with the priorities of Canada’s Arctic and Northern peoples as well as Canada’s national security interests.” It also emphasizes cooperation with “non-Arctic states who uphold Arctic and Northern values and interests, such as sustainable harvesting of Arctic wildlife and the Indigenous right to self-determination.” What mechanisms government decision-makers will use to make these assessments, and how they will respond to state and non-state actors that do not conform to Canadian expectations or are deemed security risks, remains to be seen.

IMPLICATIONS

a. **Growing complexity due to non-Arctic state and non-state actors articulating and asserting interests in the Canadian Arctic and circumpolar regions.**

The huge diversity of actors that fall within this category creates a complex environment where it is difficult to comprehend each player’s role in domestic and international affairs, whether their underlying motivations are sincere and resonate with Canadian values, and their interactions with other actors. Furthermore, the line between state and non-state actors is unclear or blurred in some cases. Canada and its allies will need to carefully discern what non-Arctic state behaviours are supportive or benign, and which signal revisionist or disruptive intent or possible outcomes, and potential risks or threats they pose to Canadian and alliance interests.

b. **Analytical frameworks designed to anticipate non-Arctic state**

actors’ roles in possible Arctic futures should not just fixate on material gains in the region

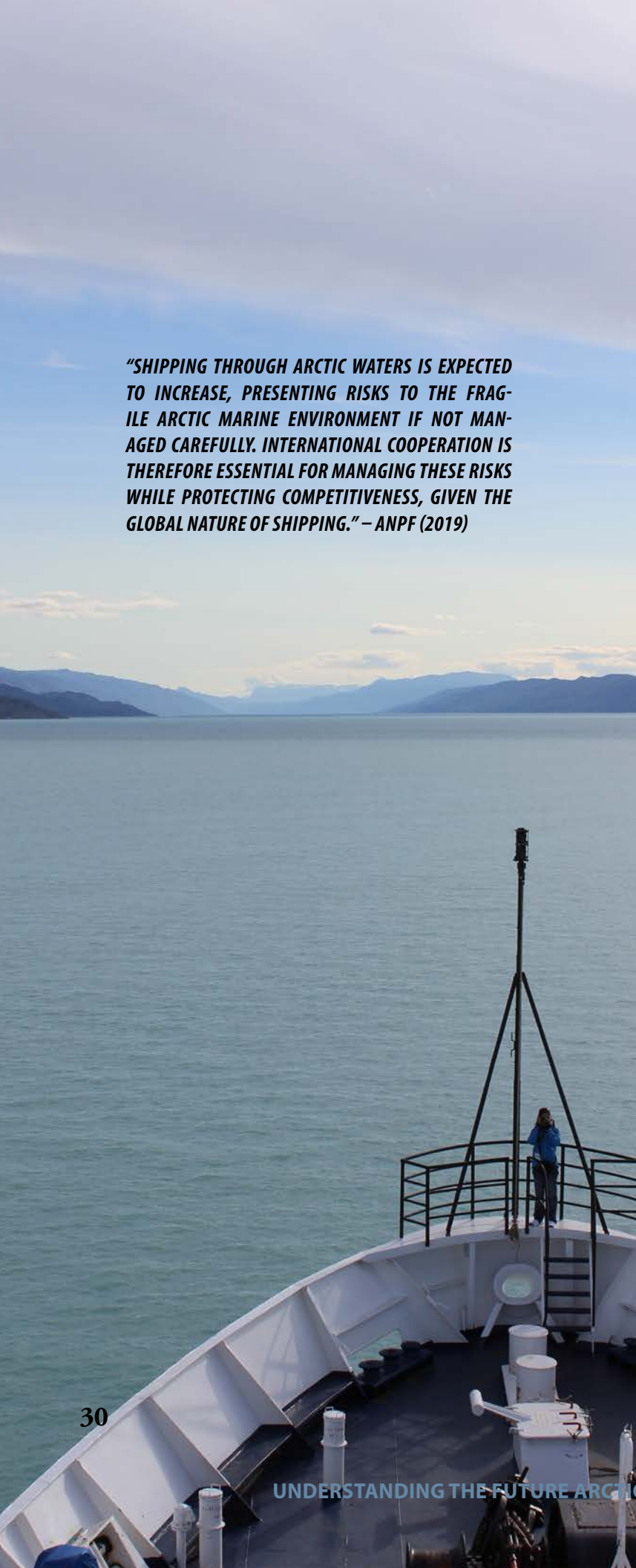
but also considerations related to broader international reputation and possible moves to distract Arctic states such as Canada. “Playing by the rules” and exemplifying “Arctic civility” can build political capital to invest in other regions of the globe that are of greater strategic importance. Furthermore, foreign behaviour should be analyzed for the diversionary value that it may hold in a global context, rather than as tools for power projection designed to secure narrow, regional gains in the Arctic itself.

c. **Opportunities for closer cooperation with non-Arctic state actors.**

This includes non-Arctic state allies and partners in multilateral contexts such as NATO and regional fora such as the Arctic Council, as well as bilateral cooperation to advance shared scientific, environmental, and/or economic interests. These collaborative efforts are likely to generate new legal instruments to support sustainable development, heighten awareness of Indigenous peoples’ rights and interests, and [draw non-Arctic states into Arctic “ways of thinking.”](#) On the other hand, science and resource development projects can serve as vectors for non-Arctic state influence activities that are not aligned with Canadian interests or can serve to “normalize” a presence that may have unanticipated, long-term repercussions.

d. **Growing worries about the presence and influence of non-Arctic State-Owned or State-Controlled Enterprises in the region.**

Largely state-owned or -controlled corporations such as Russia’s Gazprom or China’s National Petroleum



“SHIPPING THROUGH ARCTIC WATERS IS EXPECTED TO INCREASE, PRESENTING RISKS TO THE FRAGILE ARCTIC MARINE ENVIRONMENT IF NOT MANAGED CAREFULLY. INTERNATIONAL COOPERATION IS THEREFORE ESSENTIAL FOR MANAGING THESE RISKS WHILE PROTECTING COMPETITIVENESS, GIVEN THE GLOBAL NATURE OF SHIPPING.” – ANPF (2019)

Corporation may not share the same incentives and goals as their private counterparts, and they may act as proxies extending the political objectives of their countries.

[Roger Robinson Jr.’s “Long Con” narrative](#) posits that China’s Arctic strategy is “based on a term of art used in the confidence racket – the “long con” – wherein it is making a sizeable investment of capital, time, and energy over an extended period to build a false sense of trust and achieve a more valuable “score” at the end of the scheme.” When China sees that it has an advantage, it will turn “the dial to its hard strategy.” Robinson argues that China’s “true intention is to position itself to influence heavily, if not outright control,” Arctic energy and fishing, as well as to shape “the rules and political arrangements governing the use of strategic waterways now gradually opening due to melting ice” for its benefit. For example, investing in a mining site could secure a footprint at a strategic location adjacent a shipping route or allow for the construction of infrastructure to gather intelligence.

- e. **Opportunities for closer cooperation with non-state actors in the Arctic.** A “whole-of-society” approach to comprehensive Arctic security, as espoused in the ANPF, reflects the value of engaging constructively with benign non-state actors. Better leveraging the capacities and expertise of NGOs and the private sector, for example, can enhance the effectiveness and efficiency of emergency responses. On the other hand, the actions of malign non-state actors (such as terrorist organizations, criminal organizations, and traffickers) have to potential to disrupt domestic

and international affairs and undermine Arctic security.

2.5 REGIONAL GOVERNANCE AND THE INTERNATIONAL LEGAL REGIME

Since 1996, Canada has consistently referred to the Arctic Council as the leading body for regional cooperation in the region. Preserving this role is a Canadian priority. While there is no need or appetite for wholesale “reform” of the Arctic Council, Canada should continue to support general efforts to enhance its work, particularly through its working groups and task forces, as well as resources to enhance the capacity of Permanent Participants (PPs). Ongoing Arctic Council research on climate change, sustainable resource and ecosystem management, biodiversity, education, and connectivity also factor heavily into Canada’s international and domestic priorities.

As climate change heightens international commercial interest and activity in the Arctic, Canadians have raised important questions about maritime environmental protection and response, safe regional transportation, and search and rescue. Canada spearheaded efforts to create a mandatory Polar Code through the IMO (which entered into force on 1 January 2017) that covers the full range of design, construction, equipment, operational, training, search and rescue, and environmental protection matters relevant to ships operating in polar waters. Over the next fifteen years, Canada may play a leading role in addressing some of the contentious issues deliberately left out of the current polar code, such as the use of heavy fuel oil and its impact on short lived climate forcers like black carbon, mandatory invasive species protections, greywater restrictions, and

underwater noise abatement requirements. Furthermore, it could work to ensure that subsequent negotiations correct the almost complete lack of consultation with indigenous and coastal communities that marked the previous IMO process. Other international bodies, like the Arctic Coast Guard Forum launched in 2015, offer important venues for Arctic states to advance practical maritime cooperation at the operational level, exemplifying how differences in other parts of the world do not preclude collaboration on essential missions.

Despite the prevalence of misconceptions about the northern polar region as a “last frontier” without any governing rules, the Arctic Ocean is subject to a clear and widely-accepted international legal regime. With 168 state parties, the United Nations Convention on the Law of the Sea, 1982 (UNCLOS) is regarded by the international community as the constitution for the world’s oceans. Of the Arctic 5 states (Canada, Denmark, Norway, Russian Federation, United States), only the United States is not party, but it considers much of the convention to be customary international law binding on all states. When senior ministers of the [Arctic 5 states met in 2008 in Ilulissat, Greenland](#) (Kalaallit Nunaat), they committed to the law of the sea framework to ensure “the orderly settlement of any possible overlapping claims” and to dismiss ideas that the Arctic needed new comprehensive international legal regime. UNCLOS does not remove all conceivable stressors, however, and competing claims and counterclaims to the legal status of straits, overlapping continental shelf claims and unsettled maritime boundaries, and regulation of polar shipping are likely to continue to raise concern.

“With Russia’s growing drive toward increasing its domination in the Arctic and with Moscow seeing Canada as one of its chief adversaries in this pursuit, Ottawa should be ready for a new surge of active measures levelled against Canada in the near future.” – Sergey Sukhankin, [The Western Alliance in the Face of the Russian \(Dis\)Information Machine: Where Does Canada Stand?](#) (2019)

Canada maintains its position on the legal status of the archipelagic waters enclosed by straight baselines (which includes much of the Northwest Passage) as internal waters and subject to a historic title and falling within its sovereignty. The United States counterclaims that the passage is subject to the right of international navigation, including the regime of transit passage through straits used for international navigation and has protested mandatory reporting. In 1988, [Canada and the United States entered into an agreement on Arctic cooperation](#) in which the United States pledged that “all navigation by U.S. icebreakers within waters claimed by Canada to be internal will be undertaken with

the consent of the Government of Canada,” but added the caveat that nothing in the agreement affected either state’s position on the law of the sea in this area. This “agree to disagree” arrangement remains intact, although some commentators worry whether this bilateral approach will be sustainable as international interest grows in Arctic shipping routes.

The adoption of the [International Code for Ships Operating in Polar Waters \(Polar Code\)](#) by the International Maritime Organization (IMO) in 2014/15 provides an international standard for maritime safety and pollution prevention for ships navigating Arctic waters. The Polar Code has been domesti-

cated or referentially incorporated by all Arctic 5 states, and Canada and the Russian Federation have retained some prior unilateral rules and procedures to protect domestic interests. Furthermore, [article 234 of UNCLOS](#) provides coastal states bordering ice-covered areas with a unique legislative and enforcement jurisdiction for pollution prevention within the EEZ not enjoyed by any other marine region. States using this power may raise environmental standards for ships without prior resort to the IMO, but must do so in a non-discriminatory manner and on the best available scientific evidence.

UNCLOS provides rules and procedures for continental shelf claims through the [Commission on the Limits of the Continental Shelf \(CLCS\)](#), a scientific and technical review body for extended continental shelf submissions (i.e., extending beyond the 200-nautical mile limit) that provides recommendations on the outer



limits proposed by submitting states. To date all Arctic 5 states have conducted scientific research to support claims and, with the exception of the United States, have made [partial submissions to the CLCS](#). Following a submission for the Northwest Atlantic continental shelf in 2013, Canada made a submission with respect to the Arctic in 2019. The extended continental shelf claim process has been largely cooperative to date. This is particularly interesting given the substantial overlaps among the Arctic states' submissions made to the CLCS and the expectation of several future maritime boundaries (including between states located at the opposite ends of the Arctic), but reflects cooperative marine scientific research and data exchange, consultations among the affected states prior to submission, expressions of non-objection to submissions being entertained by the CLCS, common understanding that the CLCS recommendations to a state were without prejudice to other states, and the CLCS recommendations would be without prejudice to the future delimitation of continental shelf boundaries.

Although Arctic sovereignty disputes attracted significant political and media attention a decade ago, there is now general consensus that they are well-managed and unlikely to generate conflict in the next fifteen years. The low-level dispute over the sovereignty of Hans Island remains unresolved – largely because the practical stakes in doing so are very low. A more substantial and longstanding dispute concerns the maritime boundary between Canada and the United States in the Beaufort Sea, but neither country seems in a hurry to resolve it given the lengthy process of defining the outer limits of the extended continental shelves in the region.

IMPLICATIONS

a. Challenges to existing regional governance structures. As non-Arctic states, sub-national Arctic governments, and non-state

actors seek a greater role in circumpolar decision-making systems, they may seek to create alternative structures to increase their leverage and/or ensure that their concerns and/or agendas are addressed. The creation of the Arctic Circle assembly as an alternative platform for Iceland, China, Alaska, and other actors who perceived their voices to be marginalized in Arctic Council and “Arctic-Five” coastal state meetings is a case in point. While new governance bodies or mechanisms can supplement and complement existing channels, they can also compete for legitimacy and seek to usurp existing structures currently dominated by the Arctic states.

- b. Increased requirement for partnership and inclusive governance.** Although Canada and the other Arctic states might prefer to manage northern circumpolar affairs as a closed club, international cooperation is increasingly necessary at various levels to address Arctic issues such as climate change, fisheries beyond national jurisdictions, organized crime, safe shipping in international waters, space and cyberspace, and biodiversity.
- c. Projecting stability beyond the Arctic region.** While commentators frequently refer to the danger of heightened strategic competition or conflict “spilling over” into the Arctic, stable circumpolar governance and security could have a positive “spill over” effect on other international relationships. This was part of the original intent of creating the Arctic Council to “socialize” post-Soviet Russia into Western liberal internationalist norms.
- d. Upholding the Law of the Sea.** At this time there appears to be little to no danger that the Arctic 5

states will lose faith in the conventional and customary Law of the Sea, because they are all net beneficiaries. Other major maritime powers, such as China, benefit from international navigation rights in Arctic waters. The adoption of the Polar Code has promoted a substantial degree of harmonization of the national regimes for navigation, although departures are also visible and ostensibly justifiable in part under Article 234 of UNCLOS. More of a concern for Canada and the Russian Federation is the possibility that the United States might extend its Freedom of Navigation (FONOP) Program into Arctic waters. While the intention of the United States would be to affirm its view on international navigation rights in the Northwest Passage and Northeast Passage, it could serve to harden the disputes over the legal status of the waters concerned. Given past Canadian nationalistic reactions to the *Manhattan* (1969/70) and *Polar Sea* (1985) voyages, a FONOP would likely have a negative impact on bilateral Canada-US relations which could disrupt progress on core initiatives such as North American defence modernization.

- e. **Safe Shipping and Search and Rescue (SAR).** Despite their unilateral requirements for mandatory reporting and some deviations from IMO safety and pollution prevention standards, both Canada and the Russian Federation are investing in infrastructure to promote safe and environmentally-responsible shipping. This is one area where Canada is likely to restart a bilateral dialogue with Russia, given what the ANPF describes as “common interests, priorities and challenges faced by Canada,

Russia and our respective Arctic and Northern communities as they struggle to adapt to and thrive in rapidly changing conditions.” Domestically, Canada is likely to introduce low-impact corridors to concentrate infrastructure and services in Canadian Arctic waters.

- f. **Resolving Maritime Boundaries.** None of the Arctic 5 states appears in a rush to resolve outstanding maritime boundaries in the Central Arctic Ocean. CLCS consideration of extended continental shelf submissions is a lengthy process. There does not appear to be any tension with respect to continental shelf submissions owing to good levels of communication, cooperation, and common understanding on the rules and procedures. Following completion of the CLCS procedures, the process of negotiating extended continental shelf boundaries where they overlap is expected to occur. This process could lead to friction but, more likely, may produce outcomes that affirm a message of mutual respect, stability, and rule of law in the Circumpolar Arctic. If friction were to occur, it is likely that the source would be the lengthy time period and significant resources required to resolve overlaps, rather than the overlaps themselves.

2.6 PUBLIC DISCONTENT/DISAFFECTION AND POLARIZATION

[NATO's 2017 SFA](#) posits that political discontent arises when citizens perceive that government mandates fail to address political impasses. Such impasses range from chronic economic crisis to persistent unemployment to inefficient social and welfare systems. Governments that are seen to successfully mitigate these impasses earn or retain credibility, while those that



are perceived as failing to address them lose credibility. This is tied to an increasingly polarized news media that amplifies societal divisions. [The Canadian Security Intelligence Service \(CSIS\) observes](#) how politically disaffected Canadians are increasingly turning to social media as alternative news sources, believing governments and traditional media sources as untrustworthy. Accordingly, “independent actors use social media and specialised web sites to strategically reinforce and spread messages compatible with their own.” These messages tend to be “anti-globalist, with a nationalist and anti-immigration rhetoric that attracts elements of both the left and right.”

When citizens perceive that their governments are failing to overcome political impasses, this can erode the credibility or legitimacy of the institutions upon which the established political system is founded. [SSE](#) notes that this can drive Canadians to view alternative organizations – empowered by social media – “as more legitimate than the state.”

The NATO SFA notes international actors can harness and amplify political polarization through social media and the spreading of disinformation or ‘fake news.’ This can undermine political and social cohesion. Canada’s [ANPE](#) notes that as economic development prospects and perceptions of regional “accessibility” draw more attention to the region, foreign actors have more incentive to engage in subversive behaviour. CSIS notes that both Russia and China have “developed sophisticated information doctrines as part of their strategy to... advance foreign-policy objectives.” Their goals range from short-term economic advantage to undermining the political legitimacy of Canadian institutions over the long-term.

IMPLICATIONS

- a. **Widening North/South political fault lines.** Increasing polarization and political disaffection could renew perennial strains between the territories and the federal government. Issues include territorial control over public lands and

resource revenues, resentment about high [federal transfer payments to the territories, and allegations of governments shirking](#) their responsibilities to each other and to Canadian citizens.

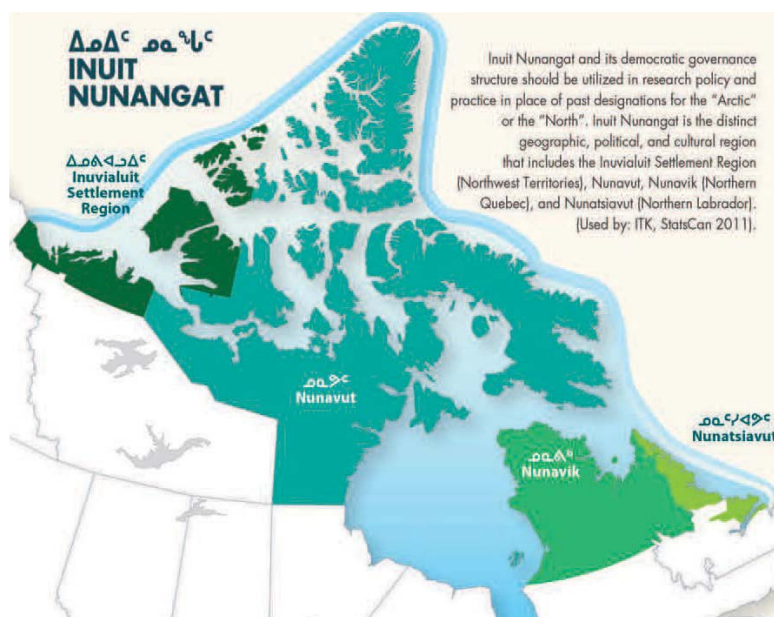
b. Frustrations about the Non-Renewable Resource Economy.

Although non-renewable resource development is a key tenet of the [Pan-Territorial Vision For Sustainable Development](#), the political prioritization of the [economy over the environment](#) could lead to heightened political tension and confrontation. Similarly, greater friction between [economic regulations and co-management boards](#) could bring increasing polarization.

c. Competing Visions of Nunavut and Inuit Nunangat. Increasing [frustration amongst some Inuit leaders with the territorial public government](#) in Iqaluit has prompted some calls for the entrenchment of Inuit Nunangat as a distinct political jurisdiction delivering services within Canada. The perceived failure of Nunavut could undermine the credibility of the federal state rooted in public

governments that serves a diverse population. Furthermore, the independence movement in Greenland could influence Inuit political discourse in the Eastern Canadian Arctic. While the emergence of a similar independence movement in Inuit Nunangat is unlikely in the next fifteen years, voices calling for greater autonomy (and potentially supported by foreign interests) could undermine political cohesion in the Canadian North.

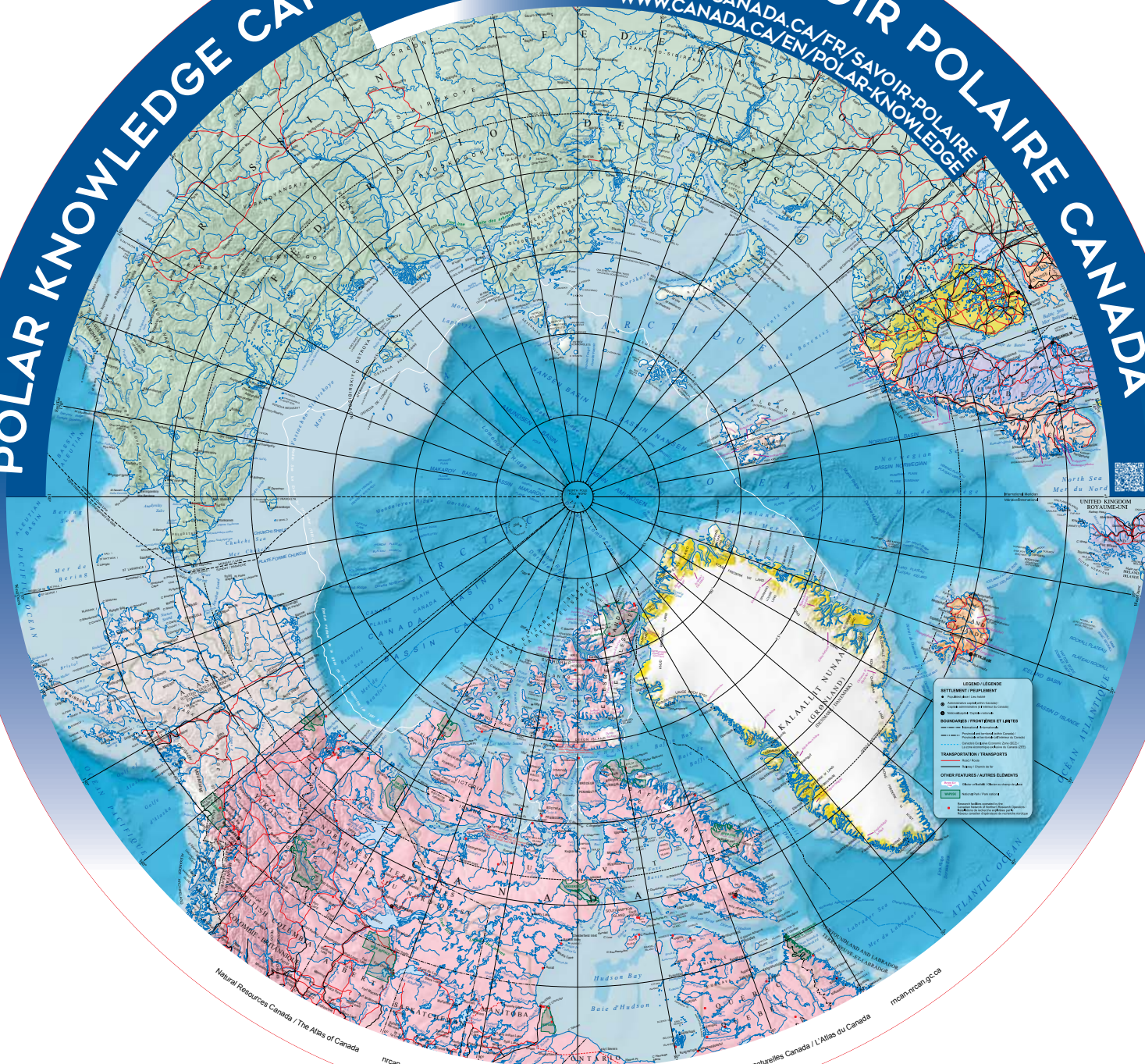
d. Russia as the disaffected Arctic State. Russia is the non-liberal democratic nation amongst the Arctic states. [Growing NATO attention to the Arctic and North Atlantic](#) in response to Russia's revisionist actions elsewhere in the world has led Moscow to express its discontent and invigorate popular concerns about NATO encirclement and aggression. Russia could use Arctic security as a wedge issue to undermine and divide NATO members, also placing regional governance norms and mechanisms in jeopardy.



POLAR KNOWLEDGE CANADA


POLAR CONTINENTAL SHELF PROGRAM
PROGRAMME DU PLATEAU CONTINENTAL POLAIRE

SAVOIR POLAIRE CANADA
WWW.CANADA.CA/FR/SAVOIR-POLAIRE
WWW.CANADA.CA/EN/POLAR-KNOWLEDGE



Natural Resources Canada / The Atlas of Canada
nrcan-mcan.gc.ca

nrcan-mcan.gc.ca

Canada

Ressources naturelles Canada / L'Atlas du Canada
nrcan-mcan.gc.ca



ENVIRONMENT

LEAD AUTHORS: JUSTIN BARNES, JACKSON BELLAMY, WILFRID GREAVES, AND P. WHITNEY LACKENBAUER

Climate change, combined with advancements in technology, is leading to an increasingly accessible Arctic. A decade ago, few states or firms had the ability to operate in the Arctic. Today, state and commercial actors from around the world seek to share in the longer term benefits of an accessible Arctic. Over time, this interest is expected to generate a corresponding rise in commercial interest, research and tourism in and around Canada's northern territory. This rise in activity will also bring increased safety and security demands related to search and rescue and natural or man-made disasters to which Canada must be ready to respond.

Strong, Secure, Engaged (2017)

Environmental and ecological changes in the Canadian Arctic are being driven predominantly by climate change: a globally important issue that requires a global solution. Countries recently entered into the Paris Agreement in an attempt to mitigate climate change and limit warming to 2°C above pre-industrial levels (ideally 1.5°C) by reducing their greenhouse gas emissions (GHG) which are the main driver of climate change. Unchecked or unmitigated climate

change has the potential for unforeseen and dangerous consequences, with one recent projection (Steffen et al., 2018) predicting that a business as usual approach to GHG emissions will exceed the planetary thresholds which maintain our familiar and stable climatic conditions.

Climate change is occurring rapidly in the Arctic and will continue for the foreseeable future, even if Paris targets are met. Science shows that the Arctic is warming at a faster rate than the rest of the globe, with current and future implications for the region. While climate change may open new opportunities for increased access and economic activity in the Arctic, changing environmental and ecological conditions also pose serious challenges, especially for Indigenous populations that rely on a mixed subsistence-wage economy.

The [U.S.-Canada Joint Statement on Environment, Climate Change, and Arctic Leadership](#) of March 2016 articulated "a common vision of a prosperous and sustainable North American economy, and the opportunities afforded by advancing clean growth." Both countries also promised to "continue to respect and promote the rights of Indigenous peoples in all climate change decision making." Prime Minister Justin Trudeau and President Barack

Obama's [Joint Arctic Leaders' Statement](#) that December directed concrete actions to ensure "a strong, sustainable and viable Arctic economy and ecosystem, with low-impact shipping, science based management of marine resources, and free from the risks of offshore oil and gas activity," that would "set the stage for deeper partnerships with other Arctic nations, including through the Arctic Council."

While the Trump administration has changed the course of the U.S. (including outright denial of climate change), these joint statements continue to reflect Canada's priorities and various commitments reiterated in the ANPF and other policy statements. Moreover, the incoming Biden Administration has called climate change a threat to national security and highlighted climate policy in its transition planning, suggesting a [likely return to pre-2017 cooperation on Arctic climate change](#). Security threats in the region will be compounded by the effects of climate change and the disproportionate impact it will have on Indigenous populations in the region. Northerners are already experiencing more extreme weather events, such as intense storms, wildfires, and floods, which threaten their lives and property. Other climate change effects, including increasingly unpredictable weather patterns, thawing permafrost, and changing sea ice conditions, threaten food security, inhibit transportation and travel, endanger ecosystems, and impede traditional practices and ways of life.

Climate change also exacerbates emerging challenges with respect to critical infrastructure. Existing infrastructure deficits in the Canadian North – from housing, to broadband access, to energy supply, to ports, airports, and roads – are linked to poor health and social outcomes and limited economic possibilities. For example, transportation infrastructure connects Northern communities to each other and to goods and services in the south, as well

as enabling economic activity and facilitating certain forms of access for military activities. Accordingly, the ANPF emphasizes "the need for transformative investments in infrastructure, rather than a remedial approach that only perpetuates a state of crisis." While the framework notes how "partnering with communities and investing in regional infrastructure will solidify Canada's regional presence while exercising its sovereignty," adapting existing and new infrastructure to withstand changing environmental conditions will be expensive and difficult, compounded by uncertainty about the timing, forms, and full spectrum of climate change impacts.

During the engagement process leading up to the ANPF, Northern stakeholders and rightsholders raised critical questions about environmental protection and response, safe regional transportation, and search and rescue capabilities in the context of a rapidly changing climate. To respond effectively to these emerging challenges, they called for a whole-of-government approach to safety, security, and defence that would include a heightened CAF and Canadian Coast Guard presence in the region. This presence not only responds to environmental challenges, it may also entail a larger environmental footprint in the region.

The [DND/CAF code of environmental stewardship](#) requires that the military "integrate environmental concerns with other relevant concerns including those from operations, finance, safety, health and economic development in decision-making," and that it "meet or exceed the letter and spirit of all federal laws." SSE's emphasis on "greening defence" and on advancing government commitments to be a responsible environmental steward resonate with the United Nations 2030 Sustainable Development Goals, which call upon governments to take urgent action to combat climate change and its impacts, and to protect, restore and promote sustainable use of maritime and

terrestrial ecosystems. Accordingly, Canadians will increasingly expect that military activities in the Arctic reflect and support Canada's expressed intent to play a leadership role on the global stage when it comes to addressing climate change, contaminants, and other environmental challenges that have disproportionate impacts on and in the Arctic.

3.1 ENVIRONMENT

The ANPF notes that "the current lack of baseline data poses major challenges to evidence-based decision-making. The responsible use of data can help cultivate a better understanding of the 'big picture' of environmental issues, contributing to the development of informed, data-driven policy and decisions that can help Arctic and northern communities build resiliency in the face of climate change." Accordingly, as we gain more knowledge and are better able to understand climate change in the Arctic and globally, climate modelling and predictions will become more accurate.

The global impacts of climate change are readily discernable through general trends in sea ice loss, permafrost melt, and warming temperatures. The impacts of climate change on the Arctic are also highly regionalized, and the impacts of phenomenon such as relative sea level rise (a combination of the effects of actual sea-level rise and isostatic rebound) and wildfires are not experienced equally in all regions.

That stated, the accelerated rate at which climate change is occurring in the Arctic is causing rapid and significant environmental and ecosystem changes across the region. The extent and thickness of sea-ice is decreasing in the Arctic Ocean. Glaciers and ice caps are also melting, contributing to sea level rise, as does thermal expansion owing to warming temperatures. Thawing permafrost is causing major changes to the landscape and threatens the integrity of



infrastructure. Species ranges are shifting in response to warming, creating new ecosystems, and pest and diseases (zoonotic) are being introduced to areas where they were previously not found.

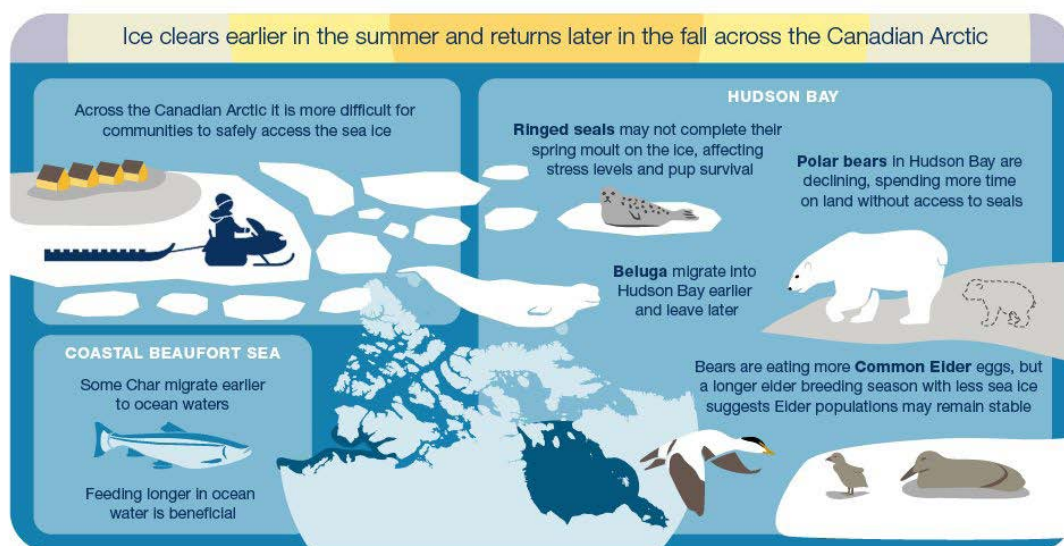
Ongoing climate change is resulting in the reduction in the thickness and extent of sea ice, with scientists projecting an ice-free summer in the Central Arctic Ocean as soon as 2035. Given that sea ice is an important habitat feature for marine ecosystems upon which many Arctic marine species rely, changes from an ice-covered habitat to an open water habitat for longer parts of the year are highly significant. Warming trends also result in a northward shift in the ranges of more southerly marine species northwards into Arctic waters that they previously did not inhabit. Furthermore, sea ice is critical for Inuit to hunt and move between islands. Similarly, seasonal travel over lake and river ice will be limited by later freeze-up, earlier break-up and reduced thickness.

Melting icecaps and glaciers are contributing to sea level rise in the Arctic and globally. Rising sea-levels will threaten low-lying communities and coastal infrastructure,

particularly in the western Canadian Arctic. In the eastern Canadian Arctic, isostatic rebound is lifting the land more rapidly than sea level is rising, resulting in an overall reduction in sea level. Where relative sea level is falling, coastal infrastructure may become less accessible and channels and harbours shallower, necessitating the use of ships with shallower draughts and lighter loads. More open water will mean increased frequency and intensity of storms which combined with sea level rise will cause larger storm surges and more severe flooding and erosion of coastal areas.

Permafrost is thawing in response to warming temperatures, and projected warming trends suggest that permafrost will be lost in half of the areas where it currently exists in the Canadian Arctic. In this case, regional differences in permafrost thawing and degradation also correlate with regional differences in warming surface air temperature and ground temperature, with ice-rich permafrost most vulnerable to thawing and degradation. Permafrost thawing and degradation on the landscape causes slumping, erosion, settling, and collapse, with obvious implications for current and

The Canadian Arctic: Changing Sea Ice is Affecting Subsistence Species



future infrastructure projects. Landscape changes may also alter surface and groundwater flows and distribution. In some cases, this may result in the draining or creation of wetlands and lakes or the rerouting of rivers. All of these dynamics directly affect the operating environment.

Biodiversity in terrestrial, freshwater and marine ecosystems also show a strong response to warming, with species ranges shifting and new ecosystems emerging as a result. Species that are more narrowly adapted to colder Arctic conditions will be less abundant and more limited in their distribution, whereas more southerly adapted species will expand to higher latitudes. Terrestrial vegetation will show a strong and rapid response to warming, particularly in species limited by temperature gradients (rather than those limited by other factors like latitude or light regimes, which may not change). The treeline will advance northwards and replace between 11 and 50% of all Arctic tundra, with implications for infrastructure and operations.

Conservation, including the establishment of protected areas and the co-management of resources, is a key priority in the ANPF, and Canadian governments are likely to undertake additional measures to protect species that are important for subsistence and conservation tourism, such as caribou and polar bears. Certain activities or projects may conflict with conservation objectives, and the vulnerability of certain species to human activities may constrain the location of infrastructure or when and where operations and activities are



conducted on land, at sea, and in the air.

Improving resilience to climate change through investments in infrastructure and equipment will be essential in the coming decades. Permafrost degradation is damaging older (legacy) infrastructure and causing it to fail in some cases. Simply trying to repair and replace failing infrastructure will not adequately address the Arctic infrastructure deficit nor build the necessary capacity for increased human presence in the region. Adding to this complexity, adaptation measures must be assessed regionally due to the differential ways in which climate change is impacting different parts of the Canadian Arctic.

Inequalities between Arctic inhabitants, particularly Indigenous populations, and the rest of Canadians persist. These inequalities, the rapid and pronounced effects of climate change on the Arctic, and the reliance on changing ecosystems for subsistence make Arctic peoples particularly vulnerable to the impacts of climate change. Socioeconomic inequalities

Although the warming of the Arctic and the North offers economic opportunities, which would bring much needed socio-economic development, employment and infrastructure investments that are acutely lacking in the region, higher levels of activity could bring the potential for damage to unique ecosystems and may also increase the risks associated with increased movement of people and goods, the pursuit of interests by foreign state and non-state actors in Canada's Arctic and northern territory, and human-induced disasters. It is not difficult to imagine, for example, how a naturally-occurring or human-induced disaster in the Arctic Archipelago would place tremendous strain on the capacities of all levels of government, as well as on local communities, to support affected people and minimize the damage to affected wildlife, infrastructure, and ecosystems. - [Arctic and Northern Policy Framework: Safety, Security, and Defence chapter](#) (September 2019)



between Arctic residents and other Canadians means that residents have a reduced capacity to adapt to change and that they may not be able to fully benefit from opportunities associated with climate change.

Although the transition to more efficient and renewable energy technologies is most often associated with mitigating climate change through reducing GHG emissions, these technologies can also be applied in the Arctic to make communities more resilient to climate change. Many communities in the Canadian Arctic rely solely on diesel generators for heat and electricity. While emissions from these generators do not contribute significantly to global climate change, they do have more localized environmental impacts and the transportation of diesel to these communities also poses a significant risk to the environment through fuel spills. Furthermore, the impacts of climate change are making transporting diesel to these communities more challenging and expensive. Renewable technologies may heighten community resilience to climate change, and more efficient generating technologies can reduce local adverse environmental impacts associated with conventional diesel generation. The military and other security practitioners would also benefit from more efficient, abundant, and reliable energy sources in the region.

Population growth and increasing human activity due to climate change places increased pressure and stress on the sensitive Arctic environment and ecosystems. Longstanding concerns about the fate of global contaminants in the Arctic and the implications for human health are likely to continue and grow as climate change introduces new contaminants into the food web. Furthermore, growing human activity in the region will likely increase the incidence of contamination and pollution, particularly in the marine environment if Arctic waters see a dramatic increase in traffic. Population growth in the Arctic will put increasing stress on ecosystems and the

environment, compounding the impacts of climate change. The fast-growing Indigenous population in the Arctic, concentrated in settlements (and increasingly in urban hubs), will put more pressure on species which are hunted for subsistence which are already stressed by the impacts of climate change and increasing activity. Economic activities, such as non-renewable resource extraction, also have significant environmental impacts that can have a deleterious effect on human and ecosystem health.

Implications

- a. **The Arctic will become increasingly accessible to a range of activities.** Although hype about the so-called “scramble for Arctic resources” has proven wildly over-inflated over the last fifteen years, climate change is expected to open the Arctic to a widening range of economic activities in the mining, oil and gas extraction, fishing, and tourism sectors. Both Arctic and non-Arctic states express a growing interest in the region. There will be a need to increase capacity to respond to a variety of needs and incidents to support activity in the region. There will also be increased military use and access to the Arctic region. Extending sovereignty and security to the Arctic and environmental protection will continue to be priorities in a changing Arctic.
- b. **There will be both challenges and opportunities associated with climate change in the Arctic.** Arctic warming is likely to mean increased access to Arctic resources. Critical infrastructure will be necessary to support economic activity in the Arctic and adapt to climate change. Infrastructure construction and maintenance will be challenged by environmental

factors such as thawing permafrost and changing sea levels. DND/CAF will be expected to construct and maintain its share of infrastructure in the Arctic, some of which will be dual use. Across the Arctic, meeting the needs of Arctic communities under changing environmental conditions with existing transportation infrastructure is increasingly challenging. Alternatives will have to be explored. Changing ecosystems are a challenge for both Indigenous subsistence economies and ecotourism. Conservation of species in the face of climate change will be a significant challenge.

- c. **Inequalities between the Arctic and the rest of Canada are compounded by the effects of climate change.** There are significant inequalities between the Arctic and the rest of Canada. The government of Canada has recently committed to addressing these inequalities in the ANPF. Populations with low levels of socioeconomic development are more likely to suffer the adverse effects of climate change. Considering the inequalities that currently exist between the Arctic and the rest of Canadians and the rapid rate at which climate change is occurring in the Arctic, the population of the Arctic is at an increased risk

to suffer the adverse effects of climate change in the region. Indigenous populations which rely on subsistence hunting are especially vulnerable to ecosystem change. Investments in the region which increase adaptability and resilience to climate change and improve environmental security will reduce the risk that the population of the Arctic will suffer the adverse effects of climate change.

- d. **Addressing climate change and environmental issues in the Arctic could be a source of stability in the region.** Climate change is having a disproportionate impact



on the Arctic. The Arctic is warming at more than twice the rate of the rest of the world and will continue to warm for the foreseeable future despite efforts to mitigate climate change. Growing international collaboration to address climate change and environmental issues in the Arctic could be a source of stability in international Arctic relations. The willingness of countries to engage in international relations to address important environmental issues in the Arctic is exemplified by the success of the Arctic Council. Climate and environmental change will be at the forefront as this region warms and becomes of increasing geopolitical significance.

- e. **Geoengineering and Runaway Climate Change.** Some commentators suggest that global geoengineering solutions which remove carbon dioxide from the atmosphere or block solar radiation may be needed to stabilize the climate in the future if we do not take effective action to mitigate it. However, these technologies also carry with them significant risks of dangerous unforeseen consequences. The effects of either runaway climate change or geoengineering (or both) would have enormous geopolitical implications globally and in the Arctic.

3.2 NATURAL DISASTERS

A naturally-occurring disaster in the Canadian Arctic would place tremendous strain on the capacities of all levels of government, as well as on local communities, to support affected people and minimize the damage to affected

wildlife, infrastructure, and ecosystems (ANPF). As shown by previous natural disasters in the North, some regional or territorial governments would likely require assistance to respond to a severe natural disasters.

Emergency risks are most common at the local level, with effects of natural disasters differing throughout the region. The most prominent risks in Yukon and the Northwest Territories are forest fires and flooding. In Nunavut, extreme weather emergencies including storms and blizzards are high.

The likelihood and prevalence of natural disasters is expected to increase partly due to escalations in the severity and prevalence of severe weather events; changes to storm seasons and storm strengths due to lengthening periods of open water; and cumulative effects of climate change impacts including permafrost melt, landslides, flooding, wildfires, storm surges and coastal erosion. Since 1918, there have been 34 incidents across the territories that have qualified as natural disasters by Public Safety Canada, costing an estimated \$94,503,620 and resulting in 4545 evacuees over 14 events.

Natural Disasters		
Event Group	Event Type	Occurrence
Meteorological	Flood	18
Hydrological	Wildfire	6
	Cold Event	3
	Storm Surge	1
	Storms and Severe Thunderstorms	1
Biological	Epidemic	3
	Pandemic	1
Geological	Earthquake	1
Total		34

Of the 34 disasters tracked over the 102-year period, 20 disasters (or 58.8% of total) have occurred in the past 32 years. Climate change, along with people's increasing exposure and vulnerability, is expected to magnify the impact of natural disasters as extreme weather events become increasingly frequent and intense in the coming decades.

Natural disasters are likely to have differing effects throughout the Arctic. There are regional geography and population density differences across the North which influence the vulnerability and resilience of communities to natural disasters. Regions in the Canadian Arctic will be able to cope with natural disasters differently based on their location, remoteness, infrastructure, and reliance on supply networks.

Threats from a natural disaster are amplified by a lack of infrastructure, outdated or fragile infrastructure, and generally low response capabilities to repair or replace damaged infrastructure. Thawing of ice-rich permafrost and increased coastal erosion also threaten coastal settlements, risking damage to already deficient infrastructure, including road networks used for travel and transport, and for access to traditional food sources. The rise of severe weather events coupled with accelerated landscape changes is making it difficult to actively adapt and prepare for potential natural disasters. Additionally, the high costs of adapting current infrastructure and building new infrastructure has proven to be a significant barrier.

The remoteness of most communities in the region leave infrastructure and assets

exposed. A severe natural disaster would be disruptive for remote communities as a heavy reliance on critical infrastructure and networks for supplies, energy, healthcare, and food exists. A natural disaster which interrupts or threatens the availability of country foods, which are integral to food security in communities outside of urban centres, through increased barriers or contamination, would require outside assistance.

A natural disaster which impacts the region's already limited communication infrastructure



and transportation infrastructure would be harmful for disaster response during an emergency. Communication infrastructure is inconsistent across the North, and should the system be compromised or overwhelmed by a natural disaster or overloading during an emergency response, there could be a breakdown in emergency response to a natural disaster. Responding to a natural disaster would be challenged by limited mobility and transportation in the region: less than 1% of Canada's two-lane roads are located in the territories, 0.2% of Canada's rail lines, numerous communities that can only be accessed by air with 10 fly-in communities in the Northwest Territories, one in Yukon, and all 25 communities in Nunavut. A serious natural disaster could force displacement or temporary relocation, putting increased pressure on existing infrastructure.

The region has a history of biological natural disasters (as defined by Public Safety Canada), including previous instances of epidemic and pandemic diseases. COVID-19 poses a serious threat to northern communities and the already strained healthcare network in the North. Should a community become seriously impacted by this disease, responding to the outbreak would be challenging.

Implications

- a. **Increased requirement for humanitarian support.** As natural disasters become more frequent cooperation between military, governmental, and non-governmental bodies will be required. Trust will be needed between civilian and military entities to ensure effective strategic coordination and planning during the execution of disaster response operations.
- b. **Increased requirement to improve resilience.** Civil and military vulnerabilities to environmental, climate, and natural disaster-related disturbances must be better understood, including disturbances to supply and distribution systems of food, water, and key resources. Changes to the social-economic environment of the North, including possible increases in tourism and shipping, pose additional vulnerabilities for emergency management policies to address.
- c. **Infrastructure deficits need to be addressed.** Infrastructure deficits in the North have the potential to curtail effective emergency response and management. Critical infrastructure requirements will increasingly need to consider a changing demography and environment to ensure continued provision of essential services and capabilities. Specifically, robust critical infrastructure is required in order to support communications, emergency management and military capabilities, and safe transportation in the region.
- d. **Increased need for situational awareness.** Meteorological monitoring and communications will become increasingly important for natural disaster mitigation and response. Monitoring capabilities of ice conditions and icebergs will need to be augmented to support the increased marine traffic through Northern waterways and to proactively limit emergency management response requests through cohesive mitigation and prevention efforts. Canada's involvement in and obligations for aeronautical and maritime search and rescue in the Arctic highlights the continued importance of international cooperation and Canada's ability to comprehensively respond to incidents.

3.3 HUMAN-MADE DISASTERS

In addition to natural disasters, the Canadian Arctic is at significant risk of human-made disasters that pose serious prospective challenges for Northerners and to federal and territorial governments. The rapid pace of warming and environmental change in the Arctic have enabled an increase in activities such as shipping, destination tourism, and natural resource extraction. While providing some benefits to northern economies, such activities involve increased risks, include the possibility of a nautical disaster, air accident, or major mine tailings or oil spill, either on land or offshore. The risks of such an event to the delicate Arctic ecosystem – alongside more quotidian concerns such as shipboard pollutants, wastewater dumping, and invasive species transported in ballast water and on vessels' hulls – have long concerned Canadian officials. Canada first enacted the *Arctic Waters Pollution Prevention Act* in 1970 so that vessels entering the Northwest Passage would be required to abide by regulations to limit pollution in Canada's northern waters.

The ability of Canadian governments to respond to a human-made environmental disaster in the Arctic would be hampered in similar ways as their response to a natural

disaster, in that resources and capabilities for emergency response in the region are limited and would be inadequate to deal with any sizeable accident. It would likely take days for sufficient marine and aerial assets to be deployed from the Atlantic and Pacific coasts and southern Canada to the North. Akin to the 1989 Exxon Valdez oil spill in Alaska, a major accident in the High Arctic would be devastating to marine life and ecosystems in the region.

To that end, a major focus of Arctic governance in the last decade has been on enhancing transnational cooperation on issues such as search and rescue (SAR) and marine oil pollution preparedness and response, each of which have been the subject of new multilateral agreements negotiated under the auspices of the Arctic Council to improve collaboration, information sharing, and technical cooperation between Arctic militaries, coast guards, and other responding agencies. The joint Canada-US moratorium on new Arctic offshore oil and gas drilling, announced in 2016 and likely to be supported by the incoming Biden Administration, also points to efforts to eliminate the possibility of an oil spill by prohibiting underlying practices such as oil and gas drilling that carry serious environmental risks.

Industrialized resource extraction, significant increases in marine traffic, and human activities such as road and highway construction and growth of settlements and urban areas are inherently damaging or disruptive to the natural environment. Particularly in delicate Arctic ecosystems, decision makers must balance other objectives with conservation and environmental protection. Environmental changes that make certain activities increasingly possible or economically viable in the Arctic also make those activities riskier, whether from physical instability of buildings and infrastructure due to thawing permafrost, greater exposure to more frequent extreme weather events, or the navigability



of “ice-free” Arctic waters heightening the risks of maritime accidents.

Implications

- a. **Ongoing need for transnational cooperation** and multilateral governance. The predicted increase in maritime and economic activities in the Arctic makes strengthening and deepening sub-national and international cooperation between Arctic governments and stakeholders essential to enforce regulations and minimize risk.
- b. **Necessary trade-offs between environmental protection and economic development.** As climate change and local environmental conditions worsen, policymakers will have to make difficult decisions when considering incompatible environmental and economic goals. Some proposals, particularly around large-scale resource extraction projects, will likely prove untenable without causing severe and irremediable environmental and social harm.
- c. **Emergency preparedness and disaster response resources must be increased.** Governments and stakeholders across all levels must increase their preparedness for disaster mitigation and response, and local emergency management resources enhanced so that Northern communities are less reliant on resources deployed from elsewhere.
- d. **Remote monitoring and surveillance capabilities are needed.** As with naturally-occurring disasters, some human-made disasters can be prevented or mitigated through effective and comprehensive remote monitoring and surveillance of Arctic lands and waters. Such tools will be critical to enable responsible economic development without compromising environmental safety.

Sea Ice and the Northwest Passage: More or Less Accessible?

The Northwest Passage example illustrates the complex relationship between pollution, environmental change, and the emergence of new Arctic security issues. Although the dispute over the legal status of the NWP is a long-standing issue between Canada and the United States, the urgency to resolve the issue has been minimal.

In response to the 1969 *Manhattan* voyage, the federal government passed the *Arctic Waters Pollution Prevention Act* (AWPPA) which regulated ships within 100 nautical miles (now extended to 200 n.m.) of Canada’s Arctic coastline and established a new legal standard later incorporated into the UN Convention on the Law of the Sea. The 1985 *Polar Sea* voyage led to the signing of the 1988 Canada-US Arctic Cooperation Agreement, wherein both countries agree to disagree over their legal claims while cooperating on practical use of these waters. With thick sea ice inhibiting access to these waters, this arrangement has proven sufficient.

Owing to climate change, Arctic sea ice has declined by approximately 50% over the last forty years. This is predicted to result in ice-free Arctic summers as soon as 2035, which generates some predications that the NWP will become a major conduit for transit shipping between Asia and Europe. The actual data about sea ice melt, combined with unusual weather patterns, produce high levels of uncertainty about ice conditions and navigability in the NWP. Far from being ice-free, floating ice that has broken from larger ice packs gets trapped in the relatively narrower passages of the Arctic Archipelago, impeding passage and producing unpredictable conditions. Accordingly, large increases in annual volumes of trans-Arctic shipping in North America (predicted by some commentators over the past fifteen years) have not materialized.

Conversely, the loss of multi-year sea ice in the High Arctic, increasingly variable weather, and the damage to critical infrastructure such as roads and airstrips due to coastal erosion and permafrost thawing may serve to reduce accessibility to many isolated Arctic communities. Inuit have traditionally travelled across ice and water as well as land, and greater constraints on their ability to do so safely may result in less accessibility for many Arctic residents. Thus, contrary to expectations that climate change is increasing access to the Arctic, in some contexts it can have the effect of further isolating Northerners from service centres located further south and inhibiting their mobility within the Arctic.



ECONOMICS AND RESOURCES

LEAD AUTHORS: ADAM LAJEUNESSE, PETER KIKKERT, ADAM MACDONALD, ALDO CHIRCOP, BRIAN BOW

Over the past several decades the Arctic has undergone a dramatic physical change. Sea-ice loss caused by climate change has accelerated, gradually stripping away the ice which has long limited shipping and resource development – particularly in the North American Arctic. The year 2019 saw a September ice minimum tied with 2007 and 2016 for second lowest in the satellite record. The 2010 decade, as a whole, witnessed consistently low and steadily declining ice thickness and concentration. This trend has opened the Northwest Passage and the waters of the circumpolar North to an unprecedented extent and the result has been a significant increase in shipping activity and growing interest in resource development.

The circumpolar economy, [valued at roughly \\$450 billion](#), is undergoing large-scale but uneven growth because of significant environmental change, new technologies, and growing interest from those inside and outside the region. The variation in economic development across the Arctic is owed in part to differences in climatic conditions, demographic dynamics, levels of industrialization, as well as Arctic states' priorities. The Canadian North has seen growing but still limited investment, while the Russian and Scandinavian Arctics are sites of large-scale resource

development and shipping activity.

This increase in shipping and development activity, along with the arrival of mainstream Arctic tourism, has led to new and expanded safety and security challenges for the Government of Canada centred around search and rescue (SAR), surveillance, aid to the civilian power, regulatory enforcement, and new constabulary duties. New national security challenges are also expected to accompany foreign investment as state-owned companies from countries like China increase their investments in the region.

The receding sea-ice and warming waters of the region may also encourage new fishing activity, both within Canada's EEZ and the Arctic Basin, possibly leading to future political challenges as Arctic and non-Arctic states establish fisheries regulations and agreements stretching across different jurisdictions.

[Canada's Arctic and Northern Policy Framework](#) (2019) highlights the need for "strong, sustainable, diversified, and inclusive local and regional economies," particularly through increased Indigenous ownership and participation, the reduction of income inequality, the optimization of resource development, economic diversification (including land-based, traditional

economic activities), and the enhancement of trade and investment opportunities. The framework also highlights the idea of a “conservation economy” (which makes conservation an important part of local economies) that the federal government is slowly growing in the Arctic in collaboration with northern Indigenous stakeholders. How will the government approach the debate between those who want to heavily regulate resource development and those who believe regulations are strangling the northern economy - a conflict that the framework explicitly acknowledges? The consultations that led to the ANPF highlighted “co-management of renewable resources ... as a venue for collaborative management that can help integrate different viewpoints,” but it remains to be seen how this will work in practice.

4.1 ARCTIC SHIPPING

Shipping activity in and through the Canadian Arctic has seen a steady increase in volume over the past three decades, with a rapid acceleration becoming clear in 2015. Most of the new shipping activity is centred on fishing, cargo, and tanker craft. There has also been a dramatic increase in cruise activity, with three large ships traversing the Northwest Passage between 2017 and 2019. In Canadian waters this activity has largely been destination, with ships travelling to and from Canadian destinations, rather than using the Northwest Passage as a route between the Atlantic and Pacific. This limited use is largely due to the route’s shallow waters, poor hydrographic surveying, and unpredictable ice-conditions. The 2019 shipping season, for instance, saw 24 transits while 2018 saw only two – the result of considerable variation in ice coverage.¹

Of the ships entering Canadian Arctic waters, an increasing percentage are foreign vessels. The 2019 season included transits from Belgium, the Netherlands, Slovakia, Bahamas, the United States, Malta,

France, the Cayman Islands, and Norway. These were cargo ships carrying pulp and carbon anodes to China, private cutters, and large cruise ships. This kind of shipping will likely increase as mining operations expand in the Canadian North and the need to import supplies and export product rises. Cruise activity is also on an upward trajectory, with growing interest in polar destinations leading to widespread construction of polar vessels, purpose build for the Arctic and Antarctic.

Foreign government activity in Canadian Arctic waters has been minimal, however there are signs of future interest. While American icebreaker operations in the Northwest Passage are covered by the 1988 Canada-US Arctic Cooperation Agreement, statements by the US Navy in recent years indicate a new interest in deploying warships into the Arctic – perhaps even as a challenge to Canada’s legal position. In 2018, China sent its icebreaker *Xue Long* through the Northwest Passage on short notice, leading Canada to alter its clearance processes. China has recently completed a second icebreaker and has announced plans for a third, nuclear-powered vessel. This fleet would give China the capability to access areas of the Canadian Arctic which the Canadian Coast Guard cannot.

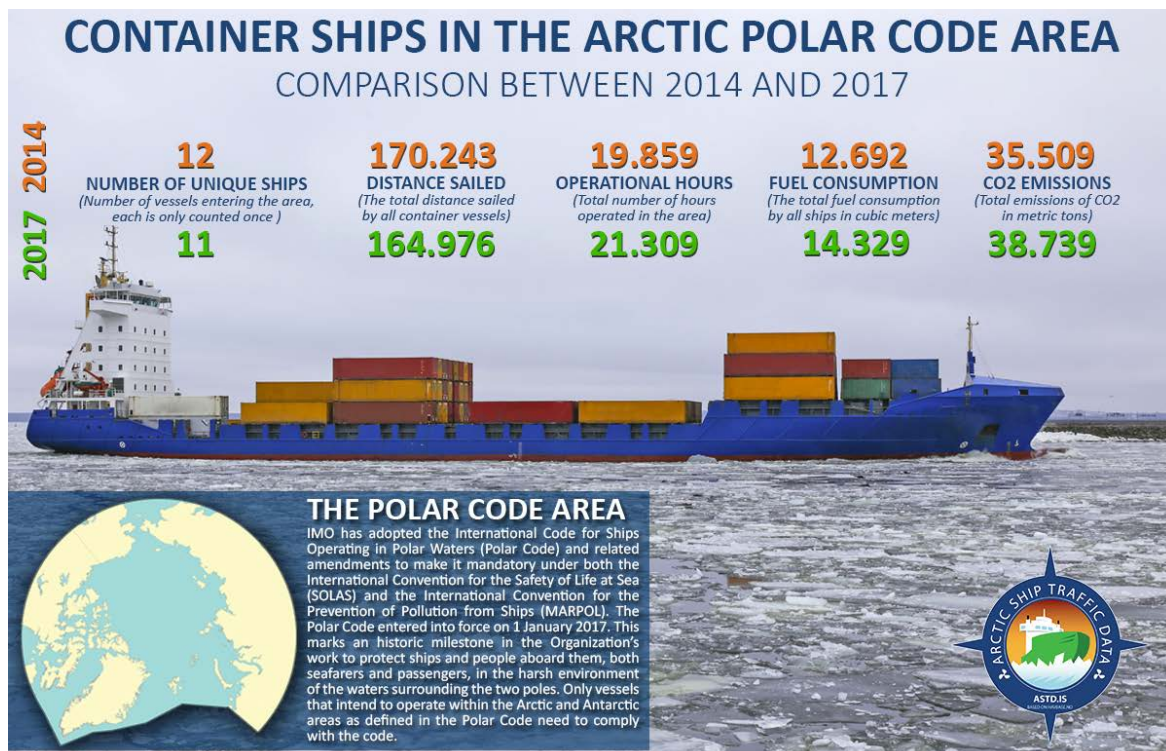
China’s declaration to help develop “polar silk roads” for mutual benefit appears to be an attempt at tethering the region’s development to its larger Belt and Road Initiative (BRI), a bilaterally based economic strategy designed to reconfigure and develop trade networks and infrastructure throughout Eurasia, largely through Chinese investment. The United States is vocal in its disapproval over Chinese investment in the Arctic, specifically over concerns that this is motivated by strategic and military considerations. Other Arctic States are monitoring the nature, motives, and impacts of Chinese investment on Arctic domestic and regional politics, including possible support to military goals and capabilities.

IMPLICATIONS

a. **Interest in the legal status of the Arctic waters has increased as the Arctic ice has receded.** Since at least 1969 the United States has challenged Canada's legal position that the Canadian sections of the Northwest Passage in its Arctic Archipelago constitute historical internal waters. This position was reiterated in the U.S. Arctic policies of [2009](#) and [2013](#), and most recently by [Secretary of State Mike Pompeo in May 2019](#). The Commission of the European Parliament adopted a similar position in [2008](#), strongly implying its disagreement with Canadian ownership – if not outright challenging it. In 2013, [Germany released a national Arctic policy statement](#) calling for international regulation of Arctic sea-lanes and freedom of navigation in the Arctic Ocean. According to the Germans, these international sea-lanes included the Northwest

Passage. That country's [2019 Arctic policy guidelines](#) were more circumspect on the matter – backing away from any outright challenge to Canadian sovereignty. [China's 2019 Arctic policy statement](#) was similarly ambiguous, highlighting the importance of Arctic shipping routes without decisively weighing in on their legal status. As the sea-ice continues to melt, and more states show an interest in asserting perceived transit shipping rights through the Northwest Passage, these legal disputes may take on heightened salience.

b. **Increased shipping activity will require improved situational awareness.** This new capability will come in the form of improved sensors and satellite reconnaissance, which reflects the priorities for layered sensor systems articulated by Canada and the United States in terms of North American defence modernization.



c. **Improved situational awareness will have to be paired with new platforms and resources.**

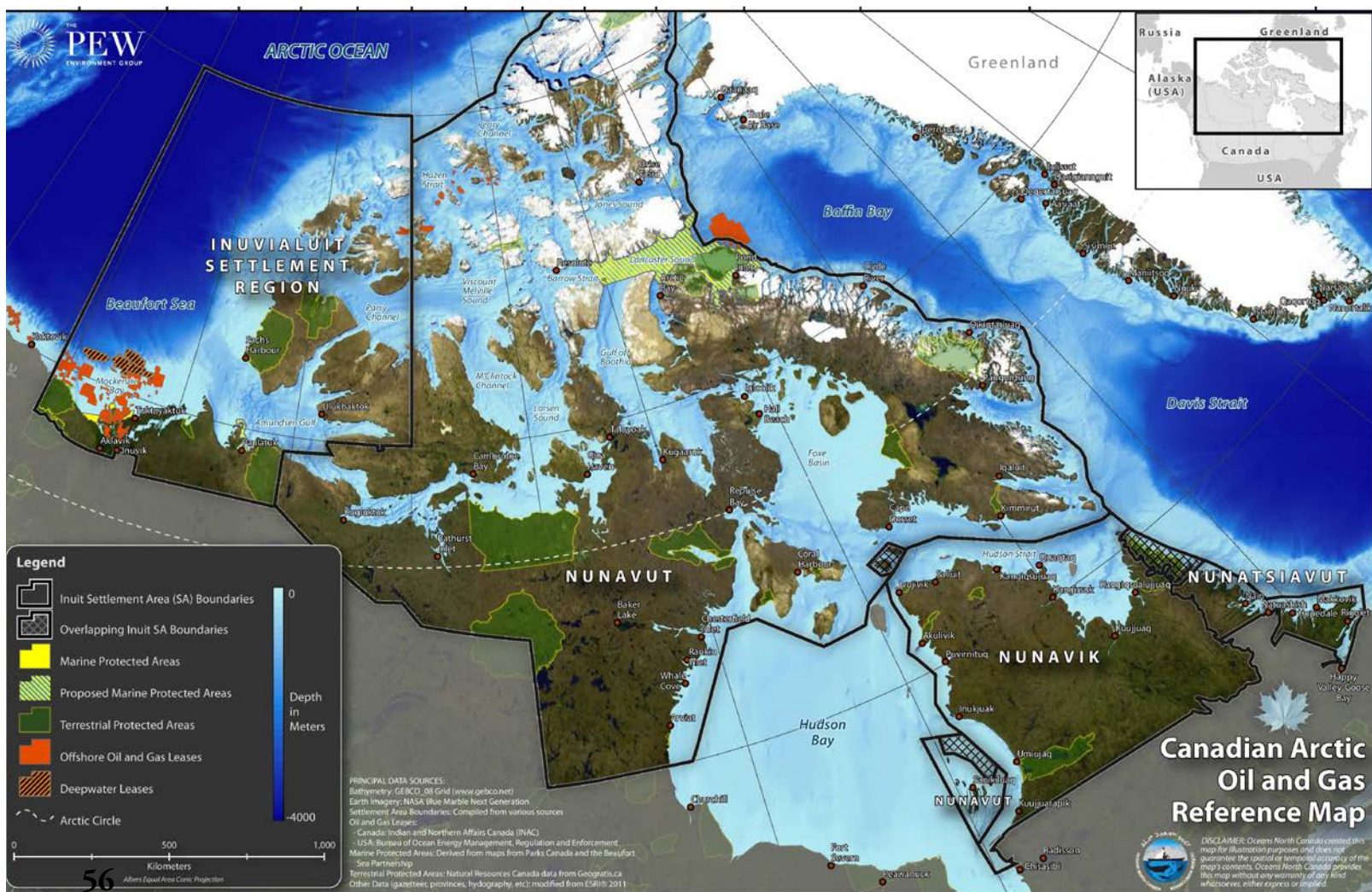
If shipping in the Northwest Passage continues to increase, so to will the state's need for a presence to enforce Canadian law and jurisdiction, and to respond to disasters and accidents. Large cruise ships offer a particular challenge, and an accident involving such a ship would require immediate and large-scale response.

opportunity. Nunavut currently has four active mines while the Northwest Territories has three. Despite the increase in interest and activity over the last decade, mining development remains relatively subdued and the large percentage increases in investment are taken from a low starting point and limited to a handful of major projects. This slow pace stems from the extremely high costs of northern operations and the limited transport and energy infrastructure in the region.

4.2 RESOURCE DEVELOPMENT

If Arctic shipping becomes more economical, Canadian Arctic resources will represent a more attractive development

Difficult logistics and high costs are the principal drags on northern investment; however, industry specific limitations have also contributed to the slow growth. The collapse of oil prices over the past several years, as well as the Canadian ban on



offshore oil and gas drilling in 2016, have effectively ended hydrocarbon exploration in the Canadian North for the time being. This is unlikely to continue in perpetuity, presuming that global demand for hydrocarbon energy sources will rebound and lead to resurgent prices at some point in the future.

By contrast, the Russian and Eurasian Arctic has seen more dramatic economic development, with an emphasis on oil and gas and resource extraction. Much of this activity, particularly in the offshore area, slowed in the wake of the Russian invasion of Ukraine as Western sanctions removed Russian access to vital partnerships with American and European oil companies. Consequently, they have sought investment and access to technologies from elsewhere, particularly China.

All Arctic States face a dearth of development capital. [It is estimated that \\$1 trillion](#) will be needed over the next two decades to fund over 900 projects across the circumpolar region. This has created an opportunity for Chinese state-owned companies and banks to finance much of this activity, primarily in Russia and Greenland. China's Arctic investments from 2005-2017 have been roughly \$1.4 trillion and largely dedicated to Russian hydrocarbon projects.² The \$27 billion Yamal gas project, for instance, was financed through a partnership with the Chinese state-owned oil and gas company CNPC and the Silk Road Fund. Concern over Chinese investment in North America is growing, leading American Secretary of State Mike Pompeo to openly denounce Beijing's Arctic investments in his [May 2019 speech](#).

Chinese shipping activity in the Arctic may increase in parallel with its investments. Both commercial Chinese shipping as well as state icebreaker activity is expected to increase. The Chinese shipping COSCO is increasing its activity along the Northern Sea Route while are part-owners and operate nine out of fifteen Arc7 LNG carriers.

This makes China by far the largest foreign operator of vessels along Russia's NSR, and COSCO aims to become a major partner in the transport of LNG on the route.

IMPLICATIONS

- a. **Increased Chinese shipping and investment in the Arctic continues to generate concern.** While no explicit security threat has been tied to Chinese activity in the Arctic, [U.S. defence policy](#) ties China's presence to surreptitious efforts to "support a strengthened, future Chinese military presence in the Arctic Ocean, potentially including deployment of submarines to the region."
- b. **Chinese investment into Arctic projects could produce dangerous levels of foreign influence.** Given the limited economic activity across much of Northern Canada, and the low levels of investment from Canadian sources, Chinese investment in resource or infrastructure projects is an appealing prospect for Northerners. Such investment could, however, provide a Chinese state-owned company with undue influence over the lives and prosperity of entire regions, and even entire Canadian territories.

Despite concerns over Chinese influence, most experts agree that Canada will require foreign partners and significant private sector investment in addressing its Arctic infrastructure deficit – specifically its dearth of ports, overland transportation routes, and telecommunications. The challenge will be to attract investment but also to create appropriate systems and measures to manage them to ensure they do not undermine national security or broader Canadian security relations with key allies.

4.3 THE CANADIAN ARCTIC AS THE RESOURCE: TOURISM

Tourism is on the rise throughout the circumpolar world, ranging from large-scale cruise ships, to sport fishing and hunting, to adventure and eco expeditions, to cultural tourism. As climate change and reduced transportation costs increase the accessibility of the Arctic, the number of cruise and tour operators involved in the region grows, and marketing campaigns sell the public on the “last chance” opportunity to see the polar environment before it disappears, experts anticipate that this multi-billion dollar industry will continue to expand. The massive tourist boom experienced by Iceland over the last decade is also driving tourists to look for other, less crowded Arctic destinations, including Greenland and Svalbard. In light of these trends, Canada’s Arctic and Northern Policy Framework identified tourism as one of the key pillars of northern development moving forward.

Conventional and expedition cruises to the Arctic have increased dramatically over the last two decades – [a trend that is](#)

[anticipated to continue](#). By 2022, at least 28 new expedition ships designed for polar conditions are expected to come into service, adding to the 80 already in operation. Several of these will meet Polar Class requirements, and the operators constructing these expedition vessels are offering trips to more remote places, deeper in the Arctic. For example, [Ponant announced plans](#) to dispatch *Le Commandant Charcot* on the first non-nuclear powered voyage to the North Pole in 2021. If demand continues to rise, the cruise industry may also consider consistently employing larger ships in the region to boost profits. While cruise ship traffic in the Canadian Arctic is much less than in the European Arctic and in the waters off Greenland, it has experienced a 70% increase in expedition cruise tourism over the last decade – although severe and unpredictable ice conditions have led to route and voyage cancellations.

While the media tends to focus on cruise tourism, there has also been a significant increase in cultural, adventure, and eco-tourism in the Arctic – everything from sport fishing and hunting, to hiking, dog-sledding, and ski trips, to



bird-watching, camping, and Northern Lights tours. A wide array of these kinds of activities are offered in the Canadian North – many by local companies. Independently owned and operated pleasure craft, generally sailboats and motor yachts, are also carrying tourists into the waters of Canada's Arctic Archipelago. These vessels represent the fastest growing shipping sector in Nunavut, with a 400% increase over the last decade.

There are indications that heightened tourism is starting to generate greater infrastructure investment around the Arctic. Airport renovations are currently underway in Nuuk and Ilulissat to attract nonstop international flights from North America and Europe. The deep water port currently under construction in Iqaluit and the port proposed for Nome, Alaska, have also been tied, in part, to the expansion of cruise tourism.

Please note that, although this section was written before COVID-19 pandemic travel restrictions led to the cancellation of the 2020 summer cruise tourism season in the Canadian Arctic, we anticipate that cruise tourism will resume following the discovery of a vaccine.

IMPLICATIONS

a. **An expanding tourism industry increases the risk of human-made disasters and amplifies SAR requirements.** In the last three decades, several marine incidents involving cruise ships in Canada's Arctic waters could have escalated into Mass Rescue Operations. Two notable examples include *MV Clipper Adventurer* (2010) and *Akademik Ioffe* (2018), both of which ran aground in Nunavut's Kitikmeot Region. In both situations good sea and weather conditions prevailed, which allowed passengers to be successfully offloaded. The possibility of future MROs demands

improved situational awareness, interdepartmental cooperation, training and exercises, and the use of community-based assets as force multipliers. Increased SAR cases from small-vessel tourism and adventure tourism should also be anticipated.

- b. **An expanding tourism industry calls for strong community-based SAR and emergency response assets.** Through the [Oceans Protection Plan](#), the Canadian Coast Guard is currently expanding the Coast Guard Auxiliary in the Arctic, is applying the Indigenous Community Boat Pilot Program to northern communities, and has established an inshore rescue boat station at Rankin Inlet. These community-based assets have already been used to respond to incidents involving small-vessel tourism and their importance will grow with increased human activity in the region. Future investments in initiatives along these lines, which seek to address safety concerns and build local capacity, are likely.
- c. **Cruise tourism increases the risk of environmental pollution, calling for increased local and regional environmental response capabilities.** Community members have been vocal about their concerns over the environmental pollution that could result from a cruise ship running aground in the Arctic. Currently, limited fuel and oil spill response capabilities exist in the North, making response to such an incident even more difficult.
- d. **An expanding tourism industry and small vessel tourism raise a wide range of regulatory, safety, and security issues.** Increased tourist activity in the

North produce challenges to Canada's regulations, increased criminal activity, ranging from illegal immigration and human trafficking to bootlegging, and a range of safety issues, from outbreaks of disease on cruise ships to missing passengers. It is particularly difficult to regulate and monitor pleasure craft, which community members have reported for breaking environmental regulations, illegal hunting, stealing archaeological artefacts, and selling alcohol in dry communities. Canadian agencies will have to ensure that the legislative and regulatory frameworks that govern transport are followed in the North, preserve the integrity of Canada's Northern borders, and bolster the clearance process of pleasure craft looking to operate in Canada's Arctic waters.

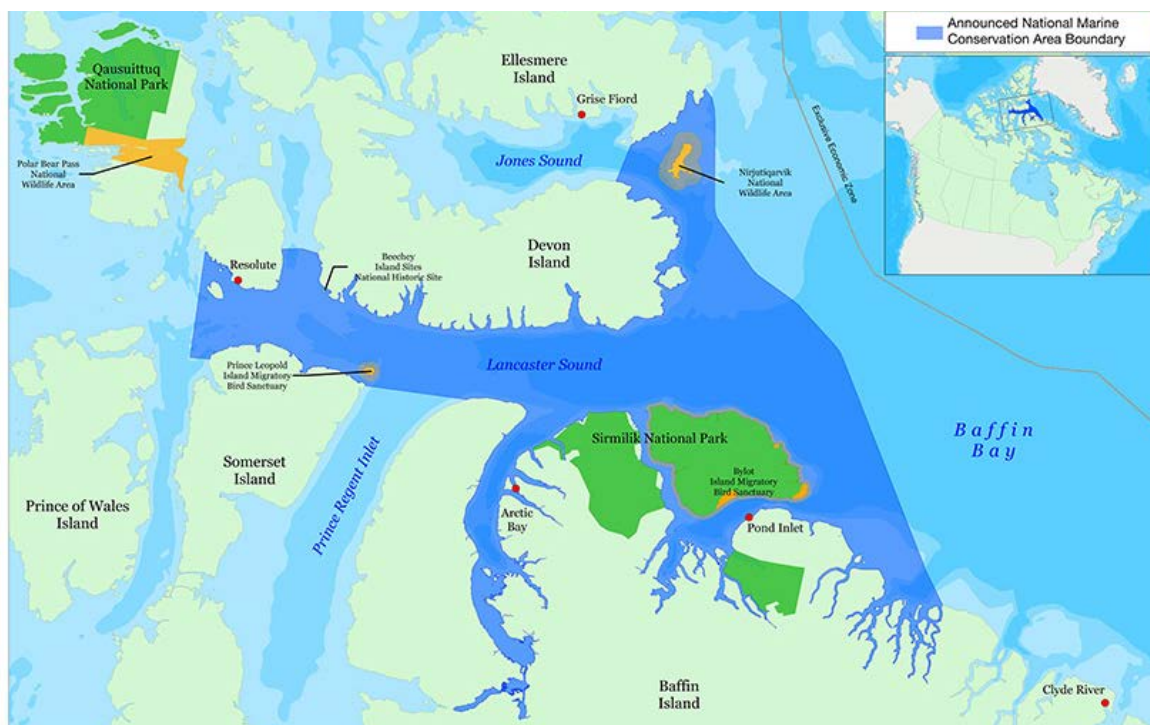
- e. **An expanding tourism industry demands close interdepartmental cooperation, partnership with Northern communities, and relationships with private industry.** To effectively regulate increased human activity in the region and address the array of safety and security implications this creates, federal and territorial departments will have to adopt a whole-of-government approach, engage with Northerners, and work with private industry. In the case of an emergency, such as a Mass Rescue Operation, these partners will have to work together. Government agencies will need to work with private industry to establish how industry assets and infrastructure can be used to address the challenges created by increased tourism.
- f. **Arctic tourism highlights Canada's international commitments and responsibilities.** The Arctic

Search and Rescue Agreement (formally the Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic) is an international treaty concluded among the member states of the Arctic Council that coordinates international search and rescue coverage and response in the region, establishes the areas of responsibility for each state, and ensures that states will aid one another in situations that demand cooperation and collaboration. Pursuant to this agreement, Canada is likely to continue to engage with Arctic partners through the Arctic Council's Emergency Prevention, Preparedness, and Response (EPPR) Working Group and the Arctic Coast Guard Forum, as well as bi-national and regional SAR exercises.

- g. **As the world's largest source of outbound tourism, China is likely to dominate Arctic tourism.** This had led to pushback in several Arctic states – for instance, local opposition to the plans of Chinese entrepreneur Huang Nubo's plans to build luxury resorts in remote parts of Iceland and Svalbard led to the rejection of these projects. Given China's complex relationship with several Arctic states, China's role in Arctic tourism will continue to raise security concerns, particularly as China is now among the top three source countries for tourists to the North and the number of Chinese tourists is likely to grow in the future.

4.4 THE CONSERVATION ECONOMY

Canada's Arctic and Northern Policy Framework highlights the idea of a conservation economy (which makes conservation an important part of local economies) that the federal government is slowly growing



in the Canadian Arctic in collaboration with northern Indigenous stakeholders. The [Qikiqtani Inuit Association's vision](#) for a conservation economy entails "economic wealth derived from local natural resources in a way that respects and preserves Inuit Qaujimajatuqangit, meets local needs and restores rather than depletes natural resources and social capital." Within such a system, Indigenous peoples assume roles and responsibilities in "environmental and wildlife monitoring; vessel management; emergency preparedness and response, search and rescue and tourism." Support for a conservation economy should also include the development of local marine and community infrastructure. [Mary Simon](#) suggests that a conservation economy "will support communities and individuals in regaining land-based life skills, reconnect with their cultural traditions, collect indigenous knowledge, and have the confidence that there will always be 'places that are theirs.'"

The most explicit application of the conservation economy in the Canadian Arctic has come with the creation of the 109,000-square-kilometre Tallurutiup

Imanga National Marine Conservation Area (Lancaster Sound). The Qikiqtani Inuit Association, with the support of Parks Canada and the Government of Nunavut, has established a Guardians program to monitor and manage the protected area. (An Inuit Guardians program has also been established for the Wrecks of HMS *Erebus* and HMS *Terror* National Historic Site near Gjoa Haven, Nunavut.) The federal government has also provided \$76.5 million toward building community harbours in Grise Fiord and Resolute Bay to support the developing conservation economy in the region. Other initiatives, like the Inuit-led [Nunavut Inuit Marine Monitoring Program](#) which collects information on shipping activities, environmental conditions, and wildlife, are likely models for future initiatives led by Northerners that embody the ANPF vision of strong partnerships.

IMPLICATIONS

- a. **Enhanced situational awareness, marine monitoring, and emergency response capabilities.** Given Northern residents' knowledge of the land and presence in potential high traffic areas, as well

as the political commitment to improve Indigenous-Crown relations, the Government of Canada is likely to increasingly partner with Indigenous organizations and communities to fund and support community-based programs to improve situational awareness and bolster the on-the-ground intelligence available to federal and territorial agencies responsible for safety and security portfolios. These groups also represent potential assets for emergency response.

4.5 FISHERIES

It is uncertain how climate change will impact Arctic fisheries over the next two decades. Changing environmental conditions could lead to fortuitous conditions for some fish stocks, cause commercially valuable species to shift to higher latitudes,

lengthen fishing seasons, and open new fishing grounds. The arrival of Atlantic mackerel in Greenland is a prime example of the possibilities – between 2011 and 2014 it moved from 0% to 23% of the island's fisheries exports.³ On the other hand, climate change could also diminish species due to new predators, invasive species, and other changes to the marine environment, including increased ocean acidity. Cost of travel to remote areas in the High Arctic might also outweigh the possible revenues from a catch.⁴

Currently, the Canadian Arctic has had little exposure to large-scale commercial fisheries, although certain projections have forecast that climate change might increase the number of commercially valuable species in the region. The Government of Nunavut has listed commercial fisheries as a vital pillar of its economic development plan. Fishing operations are expanding for turbot, Arctic char, and northern shrimp (at this



point mostly in Baffin Bay, Davis Strait, and Hudson Bay and Strait), and other communities such as Gjoa Haven, Taloyoak, Cape Dorset, and Qikitarjuaq are establishing test fisheries.

Several international and domestic initiatives have set moratoriums on fishing activities in parts of the Arctic Ocean. In 2014, for instance, the Inuvialuit Regional Corporation, the Inuvialuit Game Council, the Fisheries Joint Management Committee, and Fisheries and Oceans Canada agreed that, while small-scale community-based fisheries should be encouraged in the Beaufort Sea, large-scale offshore operations should be barred. The agreement prevents the start of commercial fisheries in over 831,000 square kilometres of the Canadian Beaufort. On the international level, a [December 2017 agreement](#) (signed in October 2018) between Canada, Russia, the United States, Greenland, Norway, China, South Korea, Iceland, Japan and the European Union set a moratorium on commercial fishing in the Central Arctic and launched a joint program of scientific research in the region to ascertain the sustainability of a fishery. The agreement takes a “proactive and precautionary approach” to future fishing activities in the area and provides a framework for the establishment of conservation and management measures and the participation of Arctic Indigenous peoples.

IMPLICATIONS

- a. **Food security in Inuit Nunangat.** The prospective expansion and sustainability of Arctic fisheries are a direct concern to the 53 coastal communities of Inuit Nunangat for which community-based fisheries provide an important source of country foods. New commercial opportunities associated with fisheries are likely to generate significant domestic and international interest, thus amplifying the importance of scientific research

and monitoring in partnership with Northern community members.

- b. **Illegal fishing.** Monitoring illegal or “dark fishing” activities will require effective situational awareness and surveillance as Canada’s Arctic waters and adjacent parts of the Arctic Ocean become increasingly accessible.
- c. **The political and jurisdictional challenges of fisheries expansion.** The potential expansion of commercial fishing activity in Canada’s EEZ and in the Central Arctic when the current moratorium expires could lead to political challenges and jurisdictional issues as new regulations and agreements are developed between Arctic and non-Arctic states. Countries with large and efficient fishing fleets, such as Japan and China, are likely to seek a major role in the development of Arctic fisheries, heightening the jurisdictional complexity involved in regulating regional fishing activities.

“RESOURCE DEVELOPMENT: RESPONSIBLE, SUSTAINABLE RESOURCE DEVELOPMENT AND JOB CREATION IS THE CORNERSTONE OF THE TERRITORIAL ECONOMIES. INDIGENOUS OWNERSHIP, INVESTMENT AND PARTICIPATION IN THE RESOURCE INDUSTRY ARE KEY TO THE SUCCESS OF THIS SECTOR. RESOURCE PROJECTS PROVIDE EDUCATION, TRAINING AND EMPLOYMENT OPPORTUNITIES IN COMMUNITIES AS WELL AS DIRECT INDIGENOUS PARTICIPATION IN SUPPLY AND SERVICES BUSINESS DEVELOPMENT.”

- PAN-TERRITORIAL VISION AND PRINCIPLES FOR SUSTAINABLE DEVELOPMENT (2017)



HUMAN

LEAD AUTHORS: JUSTIN BARNES AND P. WHITNEY LACKENBAUER

Strong, self-reliant people and communities working together for a vibrant, prosperous and sustainable Arctic and northern region at home and abroad, while expressing Canada's enduring Arctic sovereignty.

– *Arctic and Northern Policy Framework (ANPF) Vision (2019)*

The rapid pace of change in the Arctic presents new challenges to the health and wellbeing of residents across the circumpolar world. As a [2010 Circumpolar Health Survey](#) observed:

Living conditions are changing from an economy based on subsistence hunting and gathering to a cash-based economy. Across the circumpolar north there is increasing activity towards sustainable development via local resource development and widening involvement in the global economy. The influence of such changes on the physical health of Arctic residents on the one hand have been positive, resulting in improved housing conditions, a more stable supply of food, increased access to more western goods, and decreases in morbidity and mortality from infectious diseases. However, changes in lifestyle brought on

by the move away from traditional subsistence hunting and gathering and societal changes brought on by modernization have resulted in an increase in prevalence of chronic diseases such as diabetes, hypertension, obesity and cardiovascular diseases. In addition, child abuse, alcohol abuse, drug abuse, domestic violence, suicide, unintentional injury are also associated with rapid cultural change, as well as loss of cultural identity and self-esteem.

The report notes that improvements in transportation infrastructure and communications technologies (such as the internet and telemedicine), which are linked to globalization, connected previously isolated communities to larger urban centres. Increased connectivity has also introduced new vulnerabilities to infectious diseases (such as influenza, acute respiratory infections, and antibiotic-resistant pathogens) which might be imported into the Arctic by visitors to the region. Furthermore, transboundary environmental contaminants which originate in mid-latitude industrial and agricultural regions of the world continue to migrate to the Arctic via atmospheric, river and ocean transport. Their subsequent bio-magnification in Arctic

***"WHO WE ARE AND WHERE WE LIVE: THE TOTAL POPULATION OF THE TERRITORIES IS CURRENTLY SOME 113,000 PERSONS, WHICH IS ABOUT 1% OF CANADA'S POPULATION, LIVING IN 75 REMOTE AND RURAL COMMUNITIES. THE TERRITORIES ARE HOME TO A VAST AND RICH DIVERSITY OF CULTURES AND LANGUAGES, WITH INDIGENOUS PEOPLES MAKING UP 86 PERCENT OF THE POPULATION OF NUNAVUT, 50 PERCENT IN THE NORTHWEST TERRITORIES AND 25 PERCENT IN THE YUKON."* - [Pan-Territorial Vision and Principles for Sustainable Development](#) (2017)**



food webs and appearance in subsistence foods pose great concerns to Northerners. Furthermore, climate change is introducing new economic and health threats to Arctic communities, with the most vulnerable people likely to be those following a traditional lifestyle close to the land in remote communities. Direct health-related impacts might include more injuries, hypothermia, and frostbite related to travel, unpredictable ice and weather conditions, and heat stress in summer. Changes in access to safe drinking water and to country foods due to shifting migration patterns of species also raise concern amongst Northerners. Canada's Arctic is experiencing all of these dynamics.

In framing her [2017 report proposing a new Shared Arctic Leadership Model](#), Inuit leader Mary Simon highlighted that the Canadian Arctic continues "to exhibit among the worst national social indicators for basic wellness" and that, despite "all the hard-earned tools of empowerment, ... many individuals and families do not feel empowered and healthy." Many [statistics](#) bear out her observation about poor living standards. For example:

- 50% of Inuit households do not have acceptable housing, and the incidence of core housing need in the NWT is the second highest in Canada (with almost one in five households reporting the need for adequate, accessible and affordable housing).
- There is almost a ten percent gap between NWT residents and other Canadians about their perceived physical and mental health, with Indigenous populations reporting significantly poorer health and mental health.
- In 2019, Nunavut had the highest unemployment rate in Canada (13.4%), with Yukon the lowest at 3.6%.
- High rates of alcoholism, sexual and physical abuse including domestic violence, criminal incarceration, and

suicide.

- In 2016, the tuberculosis rate amongst Inuit was over 290x higher than that of the Canadian-born non-Indigenous population.
- As a 2017 study by the [Conference Board of Canada on "How Canada Performs"](#) observed, Canada's northern territories generally fall behind the Canadian average on measures of equity (eg. poverty, income distribution, gender and racial wage gaps) and social cohesion (eg. unemployment rate, homicides, suicides).

Given these challenges, it is not surprising that the federal government adopted "strong Arctic and northern people and communities" as a central theme for its co-developed [Arctic and Northern Policy Framework](#). Although the overall population of Canada's northern territories is small compared to the northern populations in other Arctic states, it includes substantial Indigenous populations that face distinct historical, cultural, and socio-economic challenges. First Nation, Métis, and Inuit populations in Northern Canada are culturally diverse, but also share demographic features that distinguish them from non-Indigenous populations. Long-standing inequalities generate political pressure for Northerners to receive comparable services, opportunities, and standards of living as those enjoyed by other Canadians.

5.1 DEMOGRAPHIC CHANGE

There is uneven population growth across Canada's North, and this is expected to continue over the next fifteen years. In 2016, the population of Yukon was 37,860 and is projected to grow by 19.5% to reach 45,230 in 2030. The Northwest Territories is projected to grow by only 3.5%,

from 44,469 in 2016 to 46,026 in 2035. Nunavut had the highest rate of population growth in all of Canada from 2001 - 2017, and it is expected to remain the highest in the territories and grow by 31% from 37,667 in 2017 to 48,042 in 2035.¹

Diverse populations of Inuit, First Nation, and Métis citizens in Canada's northern territories and provincial norths also give the regions distinct characteristics. According to [2016 census data](#), Indigenous peoples represent 23.3% of the Yukon's population, 50.7% of NWT, 85.9% of Nunavut, 91.4% of Nunavik, and 90.2% of Nunatsiavut.

Opportunities and challenges also stem from the North's comparatively youthful population compared to the rest of Canada. In Nunavut, for example, the median age is just over 26 (compared to just over 40 in Canada as a whole). Providing opportunities for education, employment, and competitive wages in a comparatively underdeveloped region dominated by public sector employment is likely to remain a significant challenge for governments.

Education and skill development will continue to pose significant challenges in the North. Many reports identify early childhood education, improvements in elementary, secondary and post-secondary education, and access to higher education

Cultural Identity					
	Aboriginal Identity	First Nations	Métis	Inuk	Non-Aboriginal
Yukon	23.3	19.1	2.9	0.6	76.7
Northwest Territories	50.7	32.1	8.2	9.9	49.3
Nunavut	85.9	0.5	0.5	84.7	14.1
Nunavik	91.4	1.0	0.2	90.0	8.6
Nunatsiavut	92.0	1.0	1.4	89.4	8.2
Labrador	8.9	5.5	1.5	1.4	91.1



"Youth across the Arctic understand that education is a portal to opportunity. They aspire to a quality education equivalent to other Canadians: an education that also reaffirms the central role of their culture and Indigenous languages in their identity as Canadians. A new Arctic Policy Framework, if it is to separate itself from many previous documents on the future of the Arctic, must speak to these young voices in this era of reconciliation." – Mary Simon, [A New Shared Arctic Leadership Model](#) (2017)

as essential preconditions to improve socio-economic and health indicators. The significant disparity in education levels between the North and the rest of Canada (e.g. 34% of Inuit in Inuit Nunangat aged 25 to 64 have a high school diploma compared to 86% of Canadians in the same group) continues to limit opportunities for Northerners. Furthermore, persistent differences between Indigenous and non-Indigenous education rates (e.g. 74% of Northwest Territories non-Indigenous residents aged 25 to 64 years old had a postsecondary certificate, diploma or degree, compared to 43% of Indigenous peoples) expose ongoing divisions within the Northern population.

Persistent economic, social, and gender inequalities, limited employment opportunities, and environmental concerns could drive potential out-migration from the Canadian North over the next two decades. As Northerners look to other parts of Canada for education and employment opportunities, the North could continue to experience a "brain drain" with which it has struggled for decades. Ongoing efforts by the Territories to expand post-secondary education options for Northerners in the region are likely to help curb some of this out-migration, but economies of scale

mean that comparatively small Northern colleges and universities are unlikely to compete with the breadth and depth of academic and professional programs available at well-established Southern institutions.

Implications

- a. **Differences in population distributions continue to strain resources.** Providing the same or similar levels of services across the North has proven to be challenging for governments, and this is expected to continue. The diverse population of the North also have differing needs, values, and priorities which require a situation-based approach, rather than blanket policies which cover the entire North.
- b. **Youth disenfranchisement could worsen health indicators, increase political instability, and lead to out-migration.** Northern young people's frustration with under-education and lack of training opportunities, unemployment and underemployment, and disenfranchisement could lead to instability if their realities and needs are

not acknowledged or met. Additionally, migration of educated youth out of the North is likely to continue because of a comparative lack of diversity in employment opportunities in the Arctic.

- c. **Conflict could arise due to differing political, economic, and environmental interests** within the Inuit, Métis and First Nations communities and between Indigenous groups and the federal government. Differing employment opportunities and prospects across the north, including factors involved with land claim negotiations and impact and benefit agreements, could increase friction between groups over priorities and desired futures, thus eroding political and social cohesion.

5.2 SETTLEMENT PATTERNS AND URBANIZATION

Over the last century, [scholar Marlene Laruelle observes](#) that three primary drivers led to waves of settlement and urbanization in the Circumpolar Arctic: 1) industrial activities; 2) the militarization of the Arctic; and 3) the development of regional administrative centres. The first driver, large-scale industrial activities (including fishing, forestry, energy, and mineral extraction) led to the establishment of small cities and towns across the Canadian North. The construction of military infrastructure during the Cold War (particularly the DEW Line) played a significant role in drawing many Inuit into coastal settlements in the 1950s and 1960s. Since that time, access to social services, public jobs, and other enticements and inducements have drawn Northerners increasingly into urban centres.

Canadian scholars Chris Southcott and Valoree Walker categorize three main types of communities in the Canadian North:

1. urban centres such as Whitehorse,

Yellowknife, and Iqaluit contain the largest concentrations of population and have the highest percentages of non-Indigenous residents, the highest levels of education, and their economies are primarily dedicated to providing services to their surrounding areas;

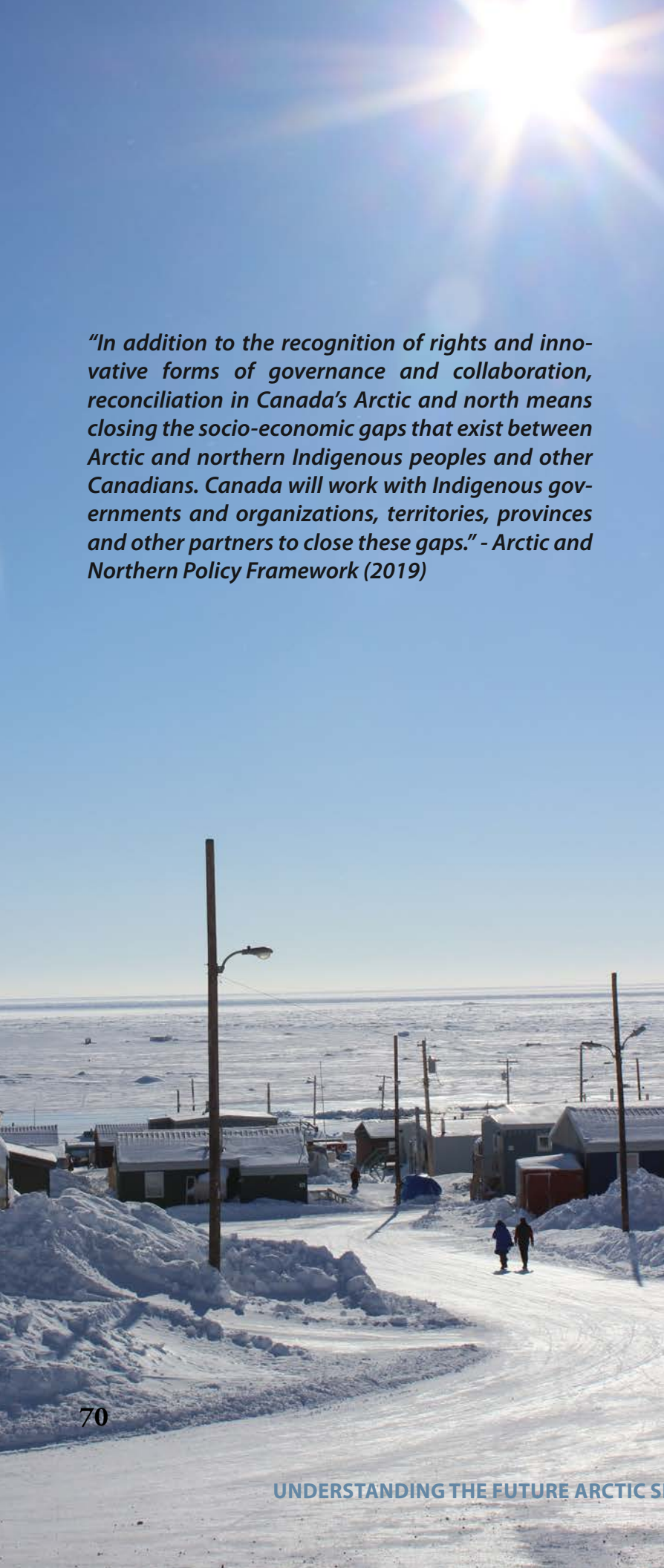
2. isolated and/or remote communities are primarily Indigenous, have the highest percentages of overcrowded housing, highest unemployment rates, and lowest levels of formal education; and
3. communities established for the resource-extraction industry have, over time, been established as company towns to support resource extraction activities. These communities are in decline, however, as fly-in/fly-out work camps have become increasingly popular and as existing resource-dependent communities gradually converge with Indigenous communities.²

Half of the world's population is now urbanized and the [United Nations predicts](#) that by 2050, 85.9% of the developed world and 64.1% of the developing world will live in cities. About two-thirds of the global Arctic population lives in urban conditions, and Indigenous peoples are progressively moving from smaller to larger settlements for educational and job opportunities and for amenities which smaller settlements lack. Canada's North is following this trend, with most of the territorial populations in Yukon and NWT concentrated in their capital cities (70% in Whitehorse and 50% in Yellowknife), while 78% of Nunavummiut live in the 24 communities outside of Nunavut's capital city of Iqaluit.

The populations of many smaller settlements are expected to decline over the next two decades, leading to questions about their viability and further out-migration.

"Canada sees a future in which the people of the Arctic and North are full participants in Canadian society, with access to the same services, opportunities and standards of living as those enjoyed by other Canadians. This ambition will require greater effort, focus, trust and collaboration amongst partners."

Arctic and Northern Policy Framework (2019)



"In addition to the recognition of rights and innovative forms of governance and collaboration, reconciliation in Canada's Arctic and north means closing the socio-economic gaps that exist between Arctic and northern Indigenous peoples and other Canadians. Canada will work with Indigenous governments and organizations, territories, provinces and other partners to close these gaps." - Arctic and Northern Policy Framework (2019)

Whitehorse is expected to grow to 78.5% of Yukon's population by 2030, and Yellowknife's share of NWT's population is expected to increase to 52.3% by 2030. Unlike the other territories, Nunavut has a deliberate policy of diffusing public sector jobs to smaller communities outside the capital of Iqaluit, which has only 21% of the territory's population. Thus, while Iqaluit is expected to grow, [Nunavut's population distribution](#) is projected to remain similar up to 2035.

Implications

- a. **Urbanization and changing settlement patterns could change the distribution of services.** As urban centres grow and smaller remote settlements shrink, the distribution of services to smaller communities could become increasingly expensive and difficult. Officials at national and regional levels need to be aware of centralizing and urbanizing trends and anticipate their effects on services. Furthermore, questions remain about the economic role of large settlements in supporting diversified economic growth in Northern regions.
- b. **Rapid urbanization and resource scarcity could exacerbate pressures on already strained and expensive food networks in the North.** As more people move into urban centres, urban Northerners may rely less on country foods and become increasingly dependent on other food networks. Interruptions to food networks, the high costs of food, and an increase in the consumption of processed foods could lead to increased food insecurity and other health issues.
- c. **Urbanization could lead to the concentration of illicit activities and vulnerabilities.** More concentrated criminal activities could

necessitate a greater role for the RCMP, as well as other defence and intelligence partners. Furthermore, settlements and urban centres which rely heavily on outside networks are vulnerable to natural and environmental disasters from human activities (e.g. cruise ships, resource extraction) and from impacts of climate change on communities and infrastructure.

5.3 INFRASTRUCTURE GAPS

The [Conference Board of Canada explains](#) that deficits in critical infrastructure keep communities isolated, inhibit the delivery of health and social services, and limit economic opportunities. For example, limited broadband access in Nunavut and NWT restrict their citizens' ability to participate in the digital economy or to take advantage of e-learning opportunities. "Given that new workplace skills, such as problem-solving in technology-rich environments, depend on access to adequate computing infrastructure and connectivity," the report notes, "many remote Northern and Indigenous communities continue to be at an economic disadvantage."

The ANPF echoes many Canadian studies that highlight the need for "transformative investments" in Arctic and Northern infrastructure, "rather than a remedial approach that only perpetuates a state of crisis." For example, the Territorial governments' [Pan-Territorial Vision for Sustainable Development](#) conceptualizes large-scale infrastructure investments as foundational to creating economic opportunity and prosperity for communities. In turn, the ANPF highlights how communities and organizations desire "partnerships and opportunities to play an active and constructive role in infrastructure investments through ... financial partnership, as well as the development of business capacity and skills." Accordingly, federal investment in northern infrastructure seeks to leverage private

sector investment and is often justified in terms of regional economic development.

Frequently cited infrastructure needs include broadband connectivity, housing, energy infrastructure, improved charting and mapping, port facilities, better airport facilities, and all-season roads to access communities and mineral resources. The deterioration of existing community and transportation infrastructure, which is vulnerable to thawing permafrost and extreme weather events, further compounds the issue.

Implications

- a. **Poor community infrastructure limits northern development and inhibits the delivery of essential services** such as health care and education. Community infrastructure, along with air and ground transport and energy infrastructure, is needed to attract investment and facilitate business development in order to grow the Arctic economy and raise the standard of living for Arctic residents. Discerning new models to entice these investments should be a priority over the next fifteen years.
- b. **Strategic investments in Northern telecommunications infrastructure** are likely to support improved education outcomes, open economic opportunities, stimulate Northern-based innovation and technology, and improve the well-being of Northern Canadians (particularly those living in physically isolated communities) over the next decade. This form of connectivity may also have significant effects on identities and social cohesion (discussed below).
- c. **Addressing Arctic infrastructure gaps invites investments in "dual-use" capabilities** that enhance defence and security as well as social and economic applications.

Social and Economic Inequity in Inuit Nunangat

Many Inuit face social and economic inequities that impact our health and wellbeing

Inuit Nunangat

52% of Inuit in Inuit Nunangat live in crowded homes*¹

34% of Inuit aged 25 to 64 in Inuit Nunangat have earned a high school diploma¹

70% of Inuit households in Nunavut are food insecure²

\$23,485 The median before tax individual income for Inuit in Inuit Nunangat¹

30 The number of physicians per 100,000 population in Nunavut⁴

47.5% of Inuit in Inuit Nunangat are employed¹

72.4 years The projected life expectancy for Inuit in Canada†⁵

12.3 The infant mortality rate per 1,000 for Inuit infants in Canada.⁶



IMR

All Canadians

9% of all Canadians live in crowded homes*¹

86% of all Canadians aged 25 to 64 have earned a high school diploma¹

8% of all households in Canada are food insecure³

\$92,011 The median before tax individual income for non-Indigenous people in Inuit Nunangat¹

119 The number of physicians per 100,000 population in Urban Health Authorities⁴

60.2% of all Canadians are employed¹

82.9 years The projected life expectancy for non-Indigenous people in Canada⁵

4.4 The non-indigenous infant mortality rate per 1,000 for Canada.⁶

* Should not be compared with crowding data for previous years. Based on the suitability definition (whether the dwelling has enough bedrooms for the size and composition of the household). The previous figure was based on the number of persons per room definition.

† Should not be compared with previous life expectancy data. The figure is a national 2017 projection of life expectancy for Inuit. Previous figures were for 2004-2008 for all residents of Inuit Nunangat, including non-Inuit.

1 Statistics Canada, 2016 Census. (crowded homes: 98-400-X2016163; high school diploma 98-400-X2016265; income: unpublished custom table provided to ITK; employment: 98-400-X2016266)

2 Grace M. Egeland, Inuit Health Survey 2007-2008: Nunavut (Ste-Anne-de-Bellevue, QC: Centre for Indigenous Peoples' Nutrition and Environment, May 2010), 12.

3 Shirin Roshanafshar and Emma Hawkins. Health at a Glance: Food Insecurity in Canada (Ottawa, ON: Statistics Canada, March 25, 2015).

4 Canadian Institute for Health Information, Supply, Distribution and Migration of Physicians in Canada, 2014 (Ottawa, ON: Canadian Institute for Health Information, September 2015).

5 Custom table based on Statistics Canada's Projections of the Aboriginal Population and Households in Canada, 2011 to 2036.

6 Sheppard et al 2017. "Birth outcomes among First Nations, Inuit and Metis populations." Health Reports Vol. 28. No. 11

d. **Competition for high-cost investments in infrastructure** could also divide Northerners. While public and Indigenous governments in the Canadian North, and myriad lobbying organizations, agree on the need for infrastructure, there is no consensus on how to queue specific priorities and where investments should focus. The *Pan-Territorial Vision for Sustainable Development* suggests that “these types of investment opportunities are not about dividing the pie, but working in true partnership, to make a better economic pie that will achieve a broader, deeper and sustained prosperity across all regions and territories.” While this common vision of long-term payoff is inspiring, it does not preclude competition for scarce resources (with potential implications for political and social cohesion) over the next fifteen years.

5.4 SOCIAL AND HEALTH INEQUALITIES

The ANPF boldly states that “the Government of Canada and its partners will close the gaps and divides that exist between this region, particularly in relation to its Indigenous peoples, and the rest of the country. The clear and ambitious goals and objectives of this framework point the way to a vibrant, sustainable and prosperous future.” It also promises that “in our shared future, Canada’s Arctic and North will no longer be pushed to the margins of the national community,” and that “its people will be full participants in Canadian society,

with access to the same services, opportunities and standards of living as those enjoyed by other Canadians” (emphasis added). Given existing gaps, this is an outcome that the Government of Canada will be hard pressed to realize over the next fifteen years – and, even with promised investments, the inability to deliver on this strong commitment is likely to continue to feed disillusionment with governments and weaken social cohesion.

Poor socio-economic health indicators reflect deeply entrenched problems and legacies of colonization. The residential school system, relocation programs, and the rejection of Indigenous consultation over resource extraction have had damaging effects on mental and physical health, language, culture, education, and Indigenous knowledge. High rates of substance abuse and suicide in Indigenous populations have been linked to intergenerational trauma caused by the impacts of colonialism. Concerns about the erosion of Indigenous languages and cultures also factor heavily into Northern Indigenous peoples' future-oriented strategies, which request government support for cultural revitalization efforts. Violence against Indigenous women and girls also remains a significant problem, with Indigenous women having a much higher likelihood of a violent death than non-Indigenous women, according to statistics cited in the 2019 final report of the [National Inquiry into Missing and Murdered Indigenous Women and Girls](#).

The delivery of healthcare services is challenging in the Arctic, producing disproportionate health challenges for residents of the region.

FOOD INSECURITY



**1,734 CHILDREN
IN NUNAVUT DO NOT HAVE
ANY FOOD FOR AT LEAST
ONE DAY EACH YEAR**

1,734 ሰዎች ወይም
ሙስና ክርስቲያን ምክትታል
ፋርስኛ ስራ ስራ ስራ
ፋርስኛ



Additional hurdles for healthcare delivery in the North include a lack of infrastructure and trained professionals; small, often isolated populations spread out over vast distances; and the need to deliver services in culturally-appropriate ways. Hospitals and specialized health services are often not available locally and many people are forced to fly from their home communities to access specialized care in regional or southern Canadian hubs. Improved medical technologies, communications (which support tele-health and other forms of remote delivery), pharmaceuticals, and treatment options are expected to improve the delivery of some services over the next fifteen years but are unlikely to overcome the full range of obstacles that lead to differentials in services between northern and southern Canada.

Reports also highlight the severity of mental health challenges in Northern communities compared to those in the rest of Canada, coupled with a lack of mental health facilities and services at the community level. The high rate of suicide among Indigenous peoples (particularly amongst youth) is a source of significant concern. For example, the ANPF reports that the rate of self-injury hospitalizations in Labrador is 231 per 100,000, which is three times the Canadian average. Addressing mental health is a prerequisite for addressing other social challenges and for building strong people and communities.

Comparatively poor health outcomes in Canada's North are complicated by social determinants such as poor food security, overcrowded housing, high unemployment, and low formal education levels. Shorter life expectancy (which is often considered a fundamental indicator of a population's overall health and wellness) in the North reveals gaps in a range of health factors including access to health care, nutrition, living conditions and lifestyle. Life expectancy in the North is notably lower than that of the rest of Canada (e.g. life expectancy for Inuit in Canada is 72.4

years, compared to 82.9 years for Canada's non-Indigenous population).

High rates of food insecurity in the Arctic are exacerbated by climate change and environmental contamination. The three highest levels of [household food insecurity in Canada](#) in 2017-2018 were in Nunavut (57% of households), Northwest Territories (21% of households), and Yukon (16.9% of households). Housing challenges in the North, including a lack of quality housing and overcrowding, are associated with high rates of communicable disease such as [tuberculosis](#). In Inuit Nunangat, for example, 52% of Inuit live in crowded homes, compared to 9% of Canadians overall.

The [Conference Board of Canada also reports](#) that costs of living and rates of poverty in the Territorial North are among the highest in the country. Although average incomes in the territorial appear to be high, these numbers do not factor in significantly higher costs of living and goods compared to southern Canada. It also conceals the striking difference in income distribution between Indigenous and non-Indigenous people in the territories, which affects related measures of social cohesion, including crime rates and life satisfaction. The Board cites the Organisation for Economic Co-operation and Development's observation that "the more unequal a society is, the more difficult it is to move up the social ladder, simply because children have a greater gap to make up."

Despite relatively high unemployment, crime rates, and poverty compared with the Canadian average, the Conference Board of Canada reports that the territories measure high in [life satisfaction scores](#). Nunavut's rating of 8.15 places it above the Canadian average (7.98), which is partly explained by the role of networks of family and other kinship ties that provide stability, share food, and contribute to a sense of belonging. Accordingly, culturally-specific measures of social cohesion are particularly relevant in remote Northern Indigenous

communities, including the proportion of the population that participates in traditional activities such as hunting, fishing, trapping, and arts and crafts. Nunavut has the highest rate of Indigenous participation in traditional activities in Canada, and the Indigenous populations in both Yukon and the N.W.T. had higher rates of participation in traditional activities than the national average. Participation in these types of activities is encouraged by land-based education programs, as well as the Canadian Rangers and Junior Canadian Ranger program.

Implications:

- a. **Northern and Indigenous communities are particularly susceptible and vulnerable to emerging health threats.** In a region with already limited resources and strained healthcare networks, responding to emerging threats such as pandemics will require more resources per capita than Southern populations. The resource-intensity associated with delivering services to small, dispersed populations compounds the challenges of addressing social determinants of health and improving quality of life.
- b. **Limitations or interruptions to an already strained food supply chain pose acute risks for Northern communities.** Communities that rely on limited food distribution networks are vulnerable to a serious interruption and require outside assistance. While various Northern strategies call for increased “food sovereignty” which innovative solutions such as community greenhouses may help to support, the combination of climate change and growing populations concentrated in specific areas are likely to increase pressures on flora and fauna proximate to communities and heighten (rather than



reduce) dependence on supply chains that bring in food from outside of the region over the next fifteen years.

- c. **Climate change poses a growing threat to the health of Northern populations.** Climate change impacts on Arctic ecosystems, traditional food sources, and infrastructure will cause various issues for Northern communities in the short, medium, and long term. Permafrost melt and coastal erosion will continue to change the landscape of the North, affect infrastructure, and alter transportation patterns. A changing climate and environment also impact migration patterns for Arctic fauna upon which Northerners rely, which could reduce food security in some regions. For communities which rely on shipments of food, health products, and other supplies, an increasingly unpredictable climate could prevent or limit the use of ice roads or waterways for the transportation of needed goods.
- d. **High disparities in income, formal education, and incarceration rates between Indigenous and non-Indigenous Canadians living in the North are likely to persist.** Longstanding structural factors make these disparities difficult, if not impossible, to overcome in the short-term. Managing expectations will be difficult. Furthermore, the gendered dimensions of these challenges require deliberate focus. Despite a proliferation of new formal and informal institutions and groups claiming to offer solutions to persistent gaps and problems, officials will be increasingly pressed to discern and reinforce best practices on how to improve the social and economic well-being of Northerners.

5.5 HUMAN NETWORKS AND INCREASING FRACTURED OR POLARIZED SOCIETY

The NATO SFA explains that polarization can “originate from the differences in a wide variety of areas from political (ideological, populist/mainstream) and social (ethnic, religious, racial, gender, urban/rural, young/old, educated/uneducated) to economic (rich/poor, employed/unemployed, etc.). The common denominator is the differing and possibly diverging interests of individuals.” The heightened empowerment of individuals, diffusion of information sources, and interest group politics that seek advantage for specific segments rather than for society as a whole can be progressive forces as well as sources of dangerous division that can fracture social cohesion and foment extremism.

The broader phenomenon of political polarization in North America and the broader world has been introduced in previous chapters. By contrast, Canada’s self-image as a tolerant, open society that embraces human and viewpoint diversity is an important source of strength. The NATO SFA notes that “authoritarian societies/countries may try to hide these unpleasant fractures and appear to be more stable, but they may shatter rather quickly; whereas democratic societies, because of greater transparency, seem to be more fragile, but are in fact more resilient due their openness to discuss and address challenges/differences.” Using this logic, Canada is likely to remain a highly resilient and cohesive society in the next fifteen years.

That stated, a growing awareness and amplification of socio-economic, cultural, and political divisions that help to explain the differential social and health outcomes between Indigenous and non-Indigenous Canadians, if left unaddressed, may become an unstable fault line in the future. The political emphasis on reconciliation with Indigenous peoples which involves apologizing for past wrongs committed against them,

addressing current deficits, and co-defining a shared, prosperous future seeks to avoid this outcome. Along similar lines, distinctions between Northern and Southern Canadians – and who has the right to speak about Northern issues – have the potential to marginalize key stakeholders and rightsholders who could otherwise offer solutions and support to address core challenges.

Connections and interactions within and between communities as well as with the rest of Canada and the world are changing through influences of the cyber domain, industry, social media, education, and globalization. These linkages are also reshaping definitions of spaces, places, and connections, producing new forms of interaction and social identities that may not conform to previous geographical or ethnic determinants. The ongoing expansion of human networks

can also create new threat vectors which allow malicious actors (often acting under false pretences) to influence and undermine social and democratic systems.

Implications:

- a. **Human networks in the Canadian Arctic are evolving.** While images of Indigenous peoples wearing traditional clothing and using traditional tools are important representations of identities and cultural resilience, they should be complemented by images depicting Northerners as avid users of Facebook and other social media, advanced technologies, and blending traditional and Western scientific knowledge. While the adoption of global social media applications may promote the erosion of place-specific forms





of human interaction, social media tools (such as the Instagram feed of Inuktitut Ilinniaqta paired with Inuktitut vocabulary) can lead to a cultural and “[linguistic renaissance](#).”

- b. **The emergence of Arctic/Northern identities and Indigeneity as assets.** The [Arctic Human Development Report II](#) notes that “culture, especially Indigenous culture in the North, has increasingly become a resource, both in the sense of a commodity and in the sense of a tool that makes external recognition easier.” This may introduce new advantages to living in the North, bolster cultural resilience, and entrench distinct Arctic/Northern identities. The growing recognition of the importance of local and Indigenous knowledge in many aspects of Arctic life (including its applications in education, science/ways of knowing, and governance) is likely to continue in the next fifteen years.
- c. **Fractures in Northern Canadian societies and between the North and South may undermine trust and legitimacy** in existing governance systems, alienate segments of the population, and lessen political participation through established democratic channels. Furthermore, viewpoint diversity on issues such as resource development, conservation, and political representation are likely to foment polarization amongst Arctic regions and groups and societies. This may make

groups increasingly susceptible to external influence and pressures seeking to exploit or create fractures in Canadian society.

- d. **Polarization between Canadians is likely to erode social cohesion, but is unlikely to produce major societal disruption.** Hardening partisan political allegiances, peaceful direct action by protesters against pipeline projects, and assertions of Indigenous sovereignty can be read as forms of dissatisfaction and sources of disruption, but they can also be seen as legitimate expressions of democratic freedoms. Widespread acceptance of the conventional rule of law in Canada is unlikely to diminish in the next fifteen years, despite recent media amplification of “defund police” and other anti-government movements.
- e. **Understanding the needs of youth and elderly persons.** The *Arctic Human Development Report II* and many Northern Canadian reports highlight the need to better understand the socio-cultural, economic, and political roles that these segments of the Northern population currently play and could play in the future. The ANPF includes promises to include youth more deliberately in devising public policy and foreign policies that are reflective of their aspirations and ambitions of Arctic youth, but mechanisms to do so remain to be defined.



TECHNOLOGY

LEAD AUTHORS: ANDREA CHARRON, LAURA CONRAD, ROMAN ELLIS, NICHOLAS GLESBY, NANCY TEEPLE, AND ROB HUEBERT.

A new decade means a new generation of technological advancements. Public and private innovations have led to rapid societal changes (such as the uptake of smartphones), affected various industries via automation and, in some cases, influenced geographical landscapes via the extraction of needed resources (such as the open pit tantalite mines) or by innovation (such as the dyke systems of the Netherlands).

The advancement and increased usage of technology will continue to shape society in the Canadian Arctic. Technological advancements are being harnessed to address northern and Arctic issues. In Canada's Arctic, however, the federal government expects [less technological development](#) given the current lack of infrastructure and small population as well as increased challenges associated with operating in harsh climates and the distance from larger centres where backup systems, parts and skilled personnel are more likely to reside. This lack of critical infrastructure will slow implementation of new and useful technologies as they emerge.

In the coming decades, it is expected that the Arctic will be challenged specifically by uneven rates of technological advancements across and within the

Arctic, especially within Canada's Arctic; the Arctic environment could both benefit from and be further harmed by technology; and dependency on industry to provide technological solutions for the Arctic will be greater than elsewhere in the world. Unmanned Autonomous Systems (UAS) are becoming increasingly relevant for defence and security considerations, but also for social purposes as well. Technological advancements bring both solutions and vulnerabilities, making cyber defence an increasingly important consideration in enhancing security and privacy. Accordingly, this chapter considers the technological trends that have direct relevance in the Arctic to Canada and its allies.

6.1 RATE OF MILITARY TECHNOLOGY ADVANCEMENT

Interoperability among allies could present challenges given disproportionate rates of technological development. The North American Arctic, however, is currently defended jointly by Canada and the United States via the binational North American Aerospace Defence Command (NORAD) and dozens of bilateral Canada-US arrangements. In theory, interoperability is not a particular challenge for Canada and the US. Upgrading old technology and the rate of

advancement of new capabilities, however, is an issue. The United States and Canada are laggards in terms of defence capabilities measured by year-round access and projection of power when compared to the other Arctic states, except Iceland. The North American Arctic has not required a year-round, persistent presence in the form of large military installations and standing armies because of factors assumed to make the Arctic a less likely direct target of attack. The Arctic has been, and is still thought to be, however, an avenue of approach, likely via the air/aerospace domain.

For both the United States and Canada, despite the different sizes and capabilities of the two militaries, keeping pace with new technology has been a problem of priority and budgets. Today's defence challenges do not require bigger bases or more personnel. Rather, technology is expected to be a force multiplier and the single best predictor of deterrence in the future.

In order to deter and defeat potential threats in the Arctic, detection is key. The discrepancy between the Arctic and southern Canada in terms of surveillance and situational awareness is the biggest technological gap that exists from a defence perspective. The North Warning System (NWS) is increasingly obsolete and new technologies, including space-based, ground-based and maritime-based parts, are needed to augment current NWS systems. Thus, both the Canadian and American militaries, as well as NATO, are calling for sensors that can detect, distract and discriminate targets and have robust sensing capabilities in all domains. From the most sophisticated hypersonic weapons, to small Unmanned Autonomous Systems (UAS), new sensors must be able discern the most sophisticated as well as simple threats and keep pace with the new high-speed decision-making tempo "at the speed of relevance."

Technological advancement makes data a force multiplier as well as a particular

vulnerability. Offensive cyber operations against networked ground-to-aerial-to-space systems could result in communication and system failures and are potential threats. Both militaries desire data fusion capabilities, data analytics, AI, machine learning and edge computing to outpace new threats. Neither military has these capabilities at a fully-integrated and sufficiently mature state to use them in decision-making, especially with respect to the Arctic.

For needed technological advances to be realized, cable or satellite-based high-bandwidth internet access is needed and gaps in other local infrastructure, including cell towers and access to cell phones and computers, must be filled to enable significant technological advancement. For example, states using Unmanned Autonomous Systems in the Arctic without connectivity options are only able to accumulate information and not distribute it. Canada's new RADARSAT Constellation is expected to generate vital data, but there are concerns the data generated and analyzed cannot be pushed from the south and received in the Arctic in a timely and readable format.

Despite these identified needs, Canada's Arctic is likely to experience less technological development than other jurisdictions owing to its lack of infrastructure, small population, and challenges associated with operating in harsh climates and in areas without large cities where backup systems, parts and skilled personnel are more likely to reside.

While sensors may be the current priority of the U.S. military, Canada requires more basic systems, such as fast and reliable telecommunications that will benefit both local residents as well as national agencies. Therefore, we anticipate that dual-use technology, whenever possible, will have the greatest impact in the Canadian North.

The rise in alarmism in response to developments in advanced weapons technology

by strategic competitors that pose security threats to North America and the Arctic region must be tempered with the low risk of conflict. Accidents, incidents, and miscalculation are more likely to result from miscommunication and misperception, and be compounded by uncertainty and mistrust. Thus, technological gaps in intelligence, surveillance, and reconnaissance (ISR) must be filled in the short-term (over the next 5-10 years) in order to provide adequate situational awareness of the region to avoid misperceiving foreign activity in the region.

Implications:

- a. **Compatibility issues and difficulties in communicating between alliance members** regarding the Arctic could arise if southern areas have more advanced technology compared to the Arctic.
- b. **Gaps in situational awareness** places challenges on interoperability between militaries, via ISR gaps, which could prevent critical data from being effectively communicated or transmitted to relevant security and defence partners in the future.
- c. **Near to long-term modernization of ISR capabilities – radars, sensors, satellites, and other networked systems – need to be protected from cyber operations** intended to degrade, disrupt, and destroy data collection, analysis, information sharing, and communications. Due to these vulnerabilities, redundancy and older systems and processes not prone to exploitation by adversaries will also be needed (e.g. paper maps).
- d. **The cyber threat against networked systems** may involve adversaries using cyber capabilities to steal information and/or eavesdrop to gain knowledge of plans, operations, and positions of CAF



and defence partners' assets in the region. These challenges impact the effectiveness of interoperability among the branches of the CAF and with its defence allies, in addition to other government department, partners, and local governments and agencies involved in Arctic exercises and operations.

- e. **Diplomacy may be needed to de-escalate tensions resulting from the advancement of capabilities** which enhance knowledge of the region. Gaps in ISR could also lead to increased misperception of foreign activity in region and could lead to an escalation of crises otherwise avoidable.
- f. **Local residents near ground-based systems (or any systems for that matter) must be involved in planning** to ensure that Indigenous-Crown agreements are not violated. Given the cost of shipping any equipment to the Arctic, the government will need to subsidize

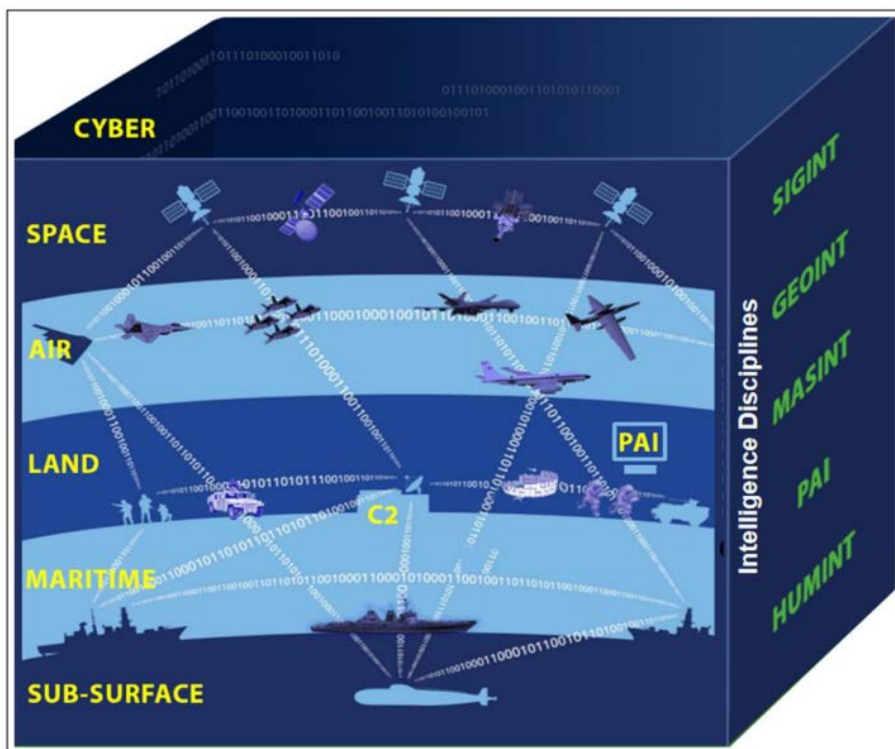
the transportation of any technology-related projects and this cannot come at the expense of helping local inhabitants with the cost of living generally, such as with the transportation of footstuffs.¹

6.2 UNMANNED AUTONOMOUS SYSTEMS (UAS)

UAS are a low-cost technology that can easily be used for a wide variety of functions, including natural disaster response, environmental monitoring, search and rescue, agriculture, or as intentional or unintentional weapons. UAS are systems which have the capability to undertake a predetermined or prescribed task with little to no human intervention. This technology is available to state and non-state actors, including individuals, which leads to security concerns regarding the risk of individuals using UAS for nefarious purposes. Militaries (including the CAF) have deployed UAS in the Arctic for various purposes. The Government of Canada is expanding its uptake of UAS in other areas as well, with Transport Canada and Environment and Climate Change Canada releasing tenders for a variety of UAS applications in the North.

While the North Warning System's (NWS) effectiveness has been declining as mentioned, situational awareness and monitoring of UAS has increasingly become an issue in the Canadian Arctic. UAS provide a potential opportunity to amplify a reimagined NWS that will be a system of systems with space-based, ground-based and maritime-based parts. Additionally, the NWS currently does not have the acuity or capability, for example, to detect UAS flying at lower speeds and lower altitudes, nor for other vehicles flying at higher speeds and altitudes.

Greater use of UAS in search and rescue scenarios may bring needed lifesaving equipment to communities and individuals in



distress while providing safety experts with valuable information on the condition of the injured, the terrain and the like, which may save precious time prior to SAR techs being deployed. UAS are also providing opportunities for enhanced environmental monitoring and remediation, ecosystem management, and monitoring climate change impacts which could have significant social benefits as well.

Implications:

- a. **An increase in UAS use could lead to greater surveillance capabilities for states in the air/near space, land, and maritime domains.** This surveillance role adds to existing situational awareness capabilities, provided by aviation, satellite imagery, and sensors, potentially filling a gap in detecting unusual phenomena in the region, including foreign intrusions, changing environmental conditions, and situations requiring an emergency response.
- b. **UAS require a means to transmit data to operators at the speed of relevance.** Transmissions of large packets of data of both a classified and unclassified nature are vulnerable to exploitation and manipulation. As the usage of this technology in the North increases, so too does the demand for infrastructure to support its benefits and regulations to manage its usage.
- c. Given that communities north of the tree line are more visible from the air, considerations must be made in **balancing security and privacy in the Canadian North.** UAS are vulnerable to exploitation and manipulation and these systems could be used by adversaries or governments in ways that violate the privacy of northern communities.

- d. **UAS activity could potentially interfere with aviation and disrupt local wildlife.** Evidence includes a change in mating and migration patterns which have second-order impacts on controlling animal populations in areas, in addition to changing the locations and times of year for the hunting traditions of northern peoples. The impact on wildlife has become an issue of public concern [after a video went viral in 2018](#) which depicted a cub struggling to climb a snow wall. Alternatively, if used correctly, UAS may help us better study and understand wildlife.

6.3 THE DEPENDENCY ON INDUSTRY TO PROVIDE TECHNOLOGICAL SOLUTIONS TO THE ARCTIC

All technological improvements are highly dependent on industry to develop, install, maintain and replace the technology. Choke points for improvements in the Arctic from a technological perspective are almost wholly dependent on industry to see the cost-benefit of hours of research and production. Whereas the military used to be on the leading edge of technology that was later adapted to civilian use, it is now the other way around.

The development of 5G wireless capabilities has resulted in a worldwide commercial technology race amongst China's Huawei and Europe's Ericsson and Nokia. With Five Eyes states mulling over contracts in domestic legislatures, the Government of Canada must coordinate with its international partners to ensure proper interoperability with data distribution, while trusting the secureness and stability of the network. That such an important capability is wholly in the hands of industry is an important consideration.

At the national level, interoperability between different manufacturers of these

services must be regulated in order to create a private sector equilibrium in pricing and connectivity. Without private and public cooperation, there will be vastly different levels of access to capabilities creating the potential for mass confusion and under-preparedness in unforeseen emergency circumstances.

Not only is it expensive to ship goods to the Arctic, but those expenses soar when one company has full control over pricing. Similar concerns may be drawn from a technological development perspective. Due to the high cost of entry to develop in the North, one may only find a few wealthy corporations with the means to begin investing. Individuals should be aware of the negative ramifications of private monopolies in the region. Public/private partnerships may help dilute the concentration of industry monopolies and encourage more local participation in decision-making.

Implications:

- a. Militaries are highly dependent on industries for technological advancement, which can often come with unknown foreign backing and investors – knowing the “customers’ customers” matters.
- b. **5G networks creates a problem with Five Eyes intelligence sharing relationship regarding the security and stability of networks.** Cyber vulnerabilities, especially espionage, disruption, attacks are relevant in the Arctic as communication technology infrastructure advances.
- c. **Industry monopolies could have notable negative implications in the North.** Monopolies may challenge interoperability between service companies needed for both strategic and societal purposes. Access to emerging technologies elsewhere in the country and affordable living may become more difficult to maintain and

achieve with higher prices imposed by monopolies.

6.4 TECHNOLOGY AND THE ENVIRONMENT

Technology development will have a variety of positive and negative implications for the environment in the Arctic. Technological advancements could be used to more effectively respond to an oil spill or remove harmful plastics from the Ocean. Recent advancements in energy technology are providing options for more renewable or efficient sources of energy. Although these technologies are not exclusive to the Arctic, the rate of climate change in the Arctic demands immediate solutions. Any technology that can reduce the Canadian Arctic’s dependency on diesel as a main fuel source would aid the health of residents and the environment.

Technology can also have some negative environmental impacts. Technology can result in more toxic waste and new generations of technology often last for a limited time before they become obsolete or parts malfunction. While programs do exist to recycle e-waste, they are limited across the Arctic. Older technology is more likely to end up in landfills or burned, which is extremely harmful to the environment. From legions of abandoned oil drums to leftover waste from the soon-to-be obsolete North Warning System, waste management of old and outdated technology is an important consideration.

Technology has aided ice scientists’ understanding of the life-cycle of ice in the Arctic. LIDAR (Light Detection and Ranging) is a remote sensing method that uses light in the form of a pulsed laser to measure variable distances and can be used to measure the thickness of ice. This means, however, that more UAS are used and more air traffic control will be needed. For example, the air and maritime space around the Canadian High Arctic Research Centre (CHARS) located in Cambridge Bay would be an area

in which to concentrate traffic control systems and monitoring.

Implications:

- a. With advancements in technology, a growing obligation exists to **identify and utilize technologies which decrease pollutants and emissions**, that can be applied to environmental cleanups, and can lead to cleaner oceans and waterways.
- b. **Technologies that increase understanding of the age and thickness of sea ice** in the region have an immense ecological impact, but also raises important strategic questions for the region. Identifying overlap between strategic and societal challenges could increase uptake in new technologies with applications in both realms.
- c. **Environmental degradation and climate change are both issues of significant importance to communities in the Arctic.** With growing interest in resource extraction and tourism, any technology that can make travel more efficient will also help to connect communities more reliably while polluting less.
- d. **Negative impacts of technology in the Arctic**, including technologies that use fossil fuels and produce CO₂ emissions or toxic waste resulting from inadequate disposal of obsolete or malfunctioning technology, would have negative effects on the Arctic environment and its communities.



6.5 TECHNOLOGY AND SOCIETY

At the regional level, the cost of living in the Canadian Arctic is much higher compared to their southern counterparts despite existing government subsidies. Food, housing, energy, and health costs can reach exorbitant levels because of distance and shipping costs. Advancements in technology, including geodesic dome greenhouses and better asphalt, concrete, and new composite materials, can help to address some of these important social challenges.

Access to affordable, healthy food options is essential to the prosperity of any society, and is an important building-block for modernization of the North that can be aided by technology. At the regional level, advancements in technology can lead to greater food security via better greenhouse technology, hydroponic systems and even future possibilities from cloning, which could lower the cost of food and distance travelled. Greenhouses developed from recycled sea containers and powered by renewable energy resources, such as solar panels and wind turbines, like those in Gjoa Haven, Nunavut, could improve the quality of life and have employment benefits for Arctic populations.²

The Canadian Arctic is sparsely populated and has a shortage of health experts. There is also a lack of medical training institutions in the Arctic. Mobile clinics and diagnostic services are an alternative to be explored. With the development and implementation of high-speed broadband and satellite internet, quicker access to medical advice via tele-health and telerobotic surgery could become more accessible. Providing some manner of accessible medical treatment is imperative for inhabitants in order to receive diagnoses, and referrals. Access to prescriptions and access to more sophisticated diagnostic equipment, however, is not likely to be solved until there is sufficient numbers of inhabitants.

Individual access to technology has significantly increased globally. In the Arctic however, the availability of technology has been less consistent. Many individuals living in the Arctic still do not have access to broadband internet. Those that do have access pay high prices for it and service is often very slow.³ It is the [goal of the current government in Canada](#) to increase technology acquisition in the Arctic over the coming years.

Implications:

- a. **With research and development also comes large private commercial interests and vast amounts of financial capital.** Without regulatory assistance or public development, Canadians living in the Arctic could fall prey to unaffordable and unsustainable pricing models leading to poor qualities of life.
- b. **Benefits of technology to northern individuals** include improved communications, faster transmission of data, and increase in regional, national, and global engagement for northern peoples.
- c. **An increase in access to technology could in turn lead to an increase in the ability of individuals to participate in criminal activity,** such as buying and selling on the dark web and in black markets. The dark web will pose challenges for law enforcement working to prevent individuals or groups from facilitating criminal activity online. As internet usage increases in the Arctic, individuals will increasingly be able to access the dark web or be influenced by misinformation and disinformation campaigns.
- d. **Increased access to technology could lead to a greater ability to connect individuals in times of crisis or emergency,** allow for more training and education opportunities, and greater understandings



of differences. More consistent connections with people living in the Arctic provides opportunities for better representation in government decision-making and improved delivery of social services to the region.

6.6 OVER-RELIANCE ON TECHNOLOGY SOLUTIONS

An increasing dependency on technology to conduct certain operations has led to an assumption that technology can solve most problems. In the context of the Arctic, this assumption could lead to inadequate government responses to social problems that exist in the Arctic. Addressing high suicide rates and the prominence of substance abuse in the Arctic requires a multi-dimensional approach as these are issues that technology cannot solve alone.

The world is rapidly digitizing and advancing in technological capabilities. With this comes the concern of over-reliance on these services. As technology advancements begin to reshape every sector of society - power grids, wireless telecommunications, agriculture, government, military - ensuring the protection of this imperative equipment is key. Protective assurances will provide stability, continuity of services, and reliability in cases of unforeseen emergencies.

As reliance on technology continues to increase, the Government of Canada must begin to prepare for adversarial targeting of key industries and equipment. A focus on strategic cyber-warfare defences should be considered. In Canada and other NATO states, a general investment in cyber warfare defences will be key to creating new security assurances as the nature of global warfare changes and evolves.

Over-reliance on new technology could create vulnerabilities in the Arctic. Thus, as the [NATO Strategic Foresight Assessment](#) highlights, relearning “old skills” that are “less vulnerable” in cases of emergency can increase resilience. By working with Inuit communities and the Canadian Rangers, integrating traditional knowledge into the military lexicon can instill the CAF and OGD with knowledge of how to operate in the Arctic without being solely reliant on technologies which may not always be available. The uniqueness of Canada’s Arctic, with less infrastructure and larger indigenous populations compared to other Arctic states, allows for new training opportunities within the alliance for surviving and operating in the North without southern technologies.

Similar to the global level, exposing individuals to indigenous and Inuit cultures will help break down longstanding misperceptions of the North. Adapting to Indigenous strategies of navigation and survival in the

Arctic may serve as a research opportunity to overcome many technological vulnerabilities elsewhere in Canada and abroad, pulling Canada away from technological dependencies.

Implications:

- a. **The assumption that technology can solve large scale social problems could lead to a lack of development in the Arctic.** At the national level this could lead to a false sense of having solved social problems or assuming that nothing else can be done to address them. At the regional level this could lead to resentment of the southern regions and increased isolation. It could also result in the presence of technology that no one knows how to use due to never being trained in such areas.
- b. **Over-reliance on networked systems linking society** creates vulnerabilities in key industries and equipment to disruption by accidents or individuals.
- c. **Some issues cannot be solved by technology** – social problems may continue regardless of technologies deployed and there could be negative impacts on populations that might see no government follow-up.
- d. **Involving Indigenous peoples and integrating traditional knowledge in Arctic operations with allies** is a reminder to the world that the Arctic is not a desolate wasteland, but rather the homeland to rich indigenous cultures. At both the regional and national levels, greater cooperation with Indigenous peoples as partners will increase relations with the federal government. By using traditional knowledge in conjunction with scientific knowledge, Indigenous peoples will not only feel more respected by the Canadian government but may be more willing to grant the Canadian Armed Forces and NATO allies with access to their homelands.



Related MINDS Policy Challenges

[MINDS Policy Challenges for 2020-2021](#) reflect policy challenges for the Department of National Defence and the Canadian Armed Forces (DND/CAF) and are the result of consultations with senior leadership across the Defence Team. These challenges represent key issues areas where DND/CAF could benefit from external expertise to challenge or complement their thinking. One challenge area is to better understand how Canada can work with both Arctic and non-Arctic partners to identify and address risks in the Arctic, including those in the non-military realm.

- Beyond the military domain, what threats exist in the Arctic? What are the foreign economic and military interests in Canada's North?
- DND/CAF works closely with partners (e.g. government, other Canadian partners, other Arctic countries, NATO, non-Arctic partners) in the Arctic. How can these relationships be more effective at delivering benefits and services?
- What is/will be the role of land, sea, air, and/or special operations forces in demonstrating Canadian sovereignty and exercising deterrence against activities undermining Canadian interests in the North? How do we operate in this environment to achieve these effects?
- Through SSE, Canada has committed to acquiring various technologies to increase its reach and mobility in the Arctic. Given the changing nature of the threats in the region, including those non-military in nature, are we investing in the right capabilities? Are there other capabilities that would support Canada's objectives in the Arctic?
- Are our policies and strategies compatible with other Arctic partners? How does Canada work with allies and partners who may have a different interpretation of the level of risk associated with activities in the non-military realm?
- What is the realistic scope of responsibility the Defence Team can assume in the Arctic, particularly given existing resources? What additional resources might be required to meet current and future expectations?
- How could climate change alter future defence requirements in the North and how could DND/CAF address climatic changes in the region?
- What other infrastructure does Canada need in the Arctic? How can CAF and other government departments leverage each other's capabilities to achieve a holistic presence and situational awareness in the North?
- Canada has recently released the Arctic and Northern Policy Framework (ANPF) to help focus and guide Government of Canada engagement in the North. How does this framework compare to similar Arctic strategic frameworks of Arctic and near-Arctic states?
- How does Canada's involvement with US, Five Eyes, and NATO affect other cooperative relationships in Arctic?



CONCLUSIONS

P. WHITNEY LACKENBAUER

New interpretive frameworks are essential in order to respond effectively to changes occurring in the region. Until these frameworks have been established, it may be difficult to understand what is happening in the Arctic, and provide options on how best to respond to crisis or emerging threats to Canadian security or sovereignty.

– *Canadian Forces Arctic Integrating Concept (2010)*

This report sought to apply the NATO *Strategic Foresight Analysis* (SFA) to a Canadian Arctic context. Academics associated with the North American and Arctic Defence and Security Network (NAADSN) were asked to identify key trends and implications that may shape the future security environment in the region. This product does not purport to predict the future as much as to offer visualizations of possible future challenges, opportunities, and relevant implications for Canada and its allies in a dynamic region that represents “an important international crossroads where issues of climate change, international trade, and global security meet.”

Canada has committed to assert international leadership to ensure that the Arctic remains a region characterized by peace, stability, and low tension where states can exercise their sovereign rights and responsibilities. Strategic competition outside of the Circumpolar Arctic is likely to continue to complicate relations within it, but our assessments suggest that this does not preclude cooperation where this serves Canada’s national and regional interests. Despite ideas from the Trump administration that the Arctic is a [conflict-ridden](#)

[region](#), we see the opposite. Commentators often draw a false correlation by conflating Arctic issues (those threats emerging in and from the region itself) with strategic issues that may have an Arctic dimension but are best framed at the international rather than regional level. Doing so may create the very misconceptions that build mistrust and sow the seeds of conflict. Dialogue and deterrence are compatible in a complex Arctic region that features both competition and cooperation.

Accelerating environmental change, surging international interest, technological and social change, and the emergence of all-domain threats have direct and indirect implications for Canadian defence and security. So do internal dynamics within the Canadian North, which present both opportunities and challenges for policymakers and practitioners. Recent efforts by the Government of Canada to co-creating policies with Northerners, and particularly Indigenous peoples, portend a future guided by a philosophy of “nothing about us without us.” Charting a future path also requires attentiveness to evolving international realities, where other states’ and actors’ priorities and interests are not always synonymous with Canada’s. Furthermore, as the global order continues to shift, Canada must remain attuned to the rising power and influence of non-Arctic state and non-state actors that are reshaping Arctic affairs – and blurring the boundaries between what is safety, security, and defence and what is trade, investment, development, economic, social, and foreign policy.



ENDNOTES

INTRODUCTION

1 See P. Whitney Lackenbauer, "'Use It or Lose It,' History, and the Fourth Surge," in *Canada and Arctic Sovereignty and Security: Historical Perspectives*, ed. Lackenbauer (Calgary: Centre for Military and Strategic Studies, 2011), 423-36; Lackenbauer, "Afterword," in Franklyn Griffiths, Rob Huebert, and Lackenbauer, *Canada and the Changing Arctic: Sovereignty, Security and Stewardship* (Waterloo: Wilfrid Laurier University Press, 2011), 227-32; Lackenbauer and Ryan Dean, eds., *Canada's Northern Strategy under the Harper Conservatives: Key Speeches and Documents on Sovereignty, Security, and Governance, 2006-15*, Documents on Canadian Arctic Sovereignty and Security (DCASS) No. 6 (Calgary and Waterloo: Centre for Military, Strategic and Security Studies/Centre on Foreign Policy and Federalism/Arctic Institute of North America, 2016); and Lackenbauer, "From 'Defending Sovereignty' to Comprehensive Security in a Whole of Government Framework: Government Narratives of Arctic Sovereignty and Security in the Harper Era," in *Understanding Sovereignty and Security in the Circumpolar Arctic*, ed. Wilfrid Greaves and Lackenbauer (Toronto: University of Toronto Press, forthcoming 2021). On this era, see also Petra Dolata, "A New Canada in the Arctic? Arctic Policies under Harper," *Études canadiennes/Canadian Studies: Revue interdisciplinaire des études canadiennes en France* 78 (2015): 131-154; Klaus Dodds, "We Are a Northern Country: Stephen Harper and the Canadian Arctic," *Polar Record* 47/4 (2011): 371-4; and Philippe Genest and Frederic Lasserre, "Souveraineté, sécurité, identité: éléments-clés du discours du gouvernement canadien sur l'Arctique," *Canadian Foreign Policy Journal* 21/1 (2015): 64-84.

CHAPTER ONE

1 P. Whitney Lackenbauer to Standing Committee on National Defence, 2nd Session, 41st Parliament, 9 December 2014.

2 See, for example, P.E. Solli, E. Wilson Rowe, and W. Yennie Lindgren, "Coming into the Cold: Asia's Arctic Interests," *Polar Geography*, 36/4 (2013): 253-270; Kimie Hara and Ken Coates, eds., *East Asia-Arctic Relations: Boundary, Security and International Politics* (Waterloo: Centre for International Governance Innovation, 2014); and P. Whitney Lackenbauer, Adam Lajeunesse, James Manicom, and Frédéric Lasserre, *China's Arctic Ambitions and What They Mean for Canada* (Calgary: University of Calgary Press, 2018).

3 See, for example, Terrence J. O'Shaughnessy and Peter M. Fesler, "Hardening the Shield: A Credible Deterrent & Capable Defense for North America" (Washington: Canada Institute, Woodrow Wilson International Center for Scholars, September 2020).

CHAPTER TWO

1 The process leading to the Arctic and Northern Policy Framework was a "whole of government" initiative led by Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) that involved unprecedented policy-making collaboration across 33 federal departments, as well as partnerships with Northerners and other stakeholders, featuring new approaches to deep and meaningful consultation. "The days of writing up policy papers and shopping them around town for comments are gone," director general of Northern strategic policy Wayne Walsh explained. "We were tasked with the development of a policy framework and vision from Northerners and for Northerners." Quoted in P. Whitney Lackenbauer and Peter Kikkert, [*"An Important International Crossroads": Implementing Canada's Arctic Priorities in Strong, Secure, Engaged*](#) (Toronto: Centre for National Security Studies, Canadian Forces College, 2018), 11.

CHAPTER FOUR

1 R.K. Headland et. al. "Transits of the Northwest Passage of the 2019 Navigation Season," Scott Polar Institute (December 2019). See also Jackie Dawson et. al., "Temporal and Spatial Patterns of Ship Traffic in the Canadian Arctic from 1990 to 2015," *Arctic* 71/1 (March 2018): 19; and Whitney Lackenbauer and Adam Lajeunesse, "On Uncertain Ice: The Future of Arctic Shipping and the Northwest Passage," Canadian Defence and Foreign Affairs Institute / University of Calgary School for Public Policy Paper (December 2014), 3-4.

2 Mark E. Rosen and Cara B. Thuringer. "Unconstrained Foreign Direct Investment: An Emerging Challenge to Arctic Security," *Center for Naval Analyses* (November 2017).

3 T. Jansen, S. Post, T. Kristiansen, G. Oskarsson, J. Boje, B. Mackenzie, M. Broberg, and H. Siegstad, "Ocean warming expands habitat of a rich natural resource and benefits a national economy," *Ecological Applications* 26 (2016): 2021-32; and Jimena

Alvarez, Dmitry Yumashev, and Gail Whiteman, "A framework for assessing the economic impacts of Arctic change," *Ambio* 49 (2020): 407-18.

4 E. Sala, J. Mayorga, C. Costello, D. Kroodsma, M.L.D. Palomares, D. Pauly, U. Rashid Sumaila, D. Zeller, "The economics of fishing the high seas," *Science Advances* 4 (2018): 1-14; and T.I. Van Pelt, H.P. Huntington, O.V. Romanenko, F.J. Mueter, "The missing middle: central Arctic Ocean gaps in fishery research and science coordination," *Marine Policy* 85 (2017): 79-86.

CHAPTER FIVE

1 Timothy Heleniak, "The future of the Arctic populations," *Polar Geography* (2020), DOI: 10.1080/1088937X.2019.1707316.

2 Chris Southcott and Valoree Walker, "A Portrait of the Social Economy of Northern Canada," in *Northern Communities Working Together: The Social Economy of Canada's North*, ed. Christ Southcott (Toronto: University of Toronto Press, 2015).

CONCLUSIONS

1 Arctic Council Task Force on Improved Connectivity in the Arctic, *Report: Improving Connectivity in the Arctic* (Tromsø: Arctic Council Secretariat, 2019).

2 Jill Macyshon and Jonathan Forani, "'Anything is possible': Nunavut greenhouses bring food, jobs to tundra," CTV News, 28 January 2020.

3 See Qiniq, "[Internet Designed for Nunavut](#)," accessed 10 January 2020, and "[Internet Plans](#)," BellMTS, accessed 10 January 2020.

APPENDIX A: ARCTIC THEMES, TRENDS, AND IMPLICATIONS

	TRENDS	IMPLICATIONS
POLITICAL	2.1 SHIFTS IN GEOSTRATEGIC POWER The resurgence of major power competition globally has implications for peace and security, and general Western concerns about the rise of Asia also extend to the Arctic.	a. Challenges to the rule-based order in the Arctic b. Increased requirement for cooperation with other actors c. Challenges to NORAD d. Challenges to NATO
	2.2 USE OF POWER POLITICS Canada's full contribution to continental defence efforts to detect, deter, and defend against or defeat threats from all domains remain to be determined, but its Arctic will inevitably factor heavily.	a. Increased potential of "spillover" from confrontation and competition elsewhere. b. Growing requirement for new forms of robust and credible deterrence. c. Deterrence by punishment still has its place. d. Nationalism and divergent risk and threat perception. e. Discerning Russia's Arctic thinking. f. Discerning China's Arctic thinking
	2.3 DEVOLUTION OF GOVERNANCE AND RECONCILIATION WITH INDIGENOUS PEOPLES Canada's cooperation with other Arctic states and partners is likely to reflect more direct involvement of Northern territorial and Indigenous governments and organizations.	a. The roles and influence of Indigenous peoples in the development of domestic and international policy are likely to expand over the next fifteen years. b. Indigenous and territorial governments will expect to play key roles in the co-management of all Arctic activities and decisions. c. Reconciliation is a process in which all Canadian institutions are expected to engage. d. An increasing focus on Indigenous distinctiveness.
	2.4 NON-ARCTIC STATE AND NON-STATE ACTOR INFLUENCE IN DOMESTIC AND INTERNATIONAL AFFAIRS A growing interest in Arctic affairs by non-Arctic state and non-state actors has significant implications for the evolving Arctic security environment.	a. Growing complexity due to non-Arctic state and non-state actors articulating and asserting interests in the Canadian Arctic and circumpolar regions. b. Analytical frameworks designed to anticipate non-Arctic state actors' roles in possible Arctic futures should not just fixate on material gains in the region. c. Opportunities for closer cooperation with non-Arctic state actors. d. Growing worries about the presence and influence of non-Arctic State-Owned or State-Controlled Enterprises in the region. e. Opportunities for closer cooperation with non-state actors in the Arctic.

	TRENDS	IMPLICATIONS
POLITICAL	2.5 REGIONAL GOVERNANCE AND THE INTERNATIONAL LEGAL REGIME Regional governance systems will face pressures from heightened international interest and strategic competition, and the international legal regime will play a pivotal role in guiding state-to-state relations.	a. Challenges to existing regional governance structures. b. Increased requirement for partnership and inclusive governance. c. Projecting stability beyond the Arctic region. d. Upholding the Law of the Sea. e. Safe Shipping and Search and Rescue (SAR). f. Resolving Maritime Boundaries.
	2.6 PUBLIC DISCONTENT/DISAFFECTION AND POLARIZATION Nefarious actors can harness and amplify political polarization through social media and the spreading of disinformation or 'fake news,' which can undermine political and social cohesion	a. Widening North/South political fault lines. b. Frustrations about the Non-Renewable Resource Economy. c. Competing Visions of Nunavut and Inuit Nunangat. d. Russia as the disaffected Arctic State.
ENVIRONMENT	3.1 CLIMATE AND ENVIRONMENTAL CHANGE Environmental and ecological changes in the Canadian Arctic are being driven predominantly by climate change, which exacerbates emerging regional challenges.	a. The Arctic will become increasingly accessible to a range of activities b. There will be both challenges and opportunities associated with climate change in the Arctic c. Inequalities between the Arctic and the rest of Canada are compounded by the effects of climate change d. Addressing climate change and environmental issues in the Arctic could be a source of stability in the region e. Geoengineering and Runaway Climate Change
	3.2 NATURAL DISASTERS The likelihood and prevalence of natural disasters is expected to increase, straining the capacities of all levels of government.	a. Increased requirement for humanitarian support. b. Increased requirement to improve resilience. c. Infrastructure deficits need to be addressed. d. Increased need for situational awareness
	3.3 HUMAN-MADE DISASTERS The Canadian Arctic is at significant risk of human-made disasters that pose serious prospective challenges for Northerners and to federal and territorial governments.	a. Ongoing need for transnational cooperation and multilateral governance. b. Necessary trade-offs between environmental protection and economic development. c. Emergency preparedness and disaster response resources must be increased. d. Remote monitoring and surveillance capabilities are needed

	TRENDS	IMPLICATIONS
	4.1 ARCTIC SHIPPING Shipping activity in and through the Canadian Arctic has seen a steady increase in volume, centred on fishing, cargo, and tanker craft, and there are signs of future interest by foreign interests.	a. Interest in the legal status of the Arctic waters has increased as the Arctic ice has receded. b. Increased shipping activity will require improved situational awareness. c. Improved situational awareness will have to be paired with new platforms and resources.
	4.2 RESOURCE DEVELOPMENT If Arctic shipping becomes more economical, Canadian Arctic resources will represent a more attractive development opportunity.	a. Increased Chinese shipping and investment in the Arctic continues to generate concern. b. Chinese investment into Arctic projects could produce dangerous levels of foreign influence. c. Canada will require foreign partners and significant private sector investment in addressing its Arctic infrastructure deficit.
	4.3 TOURISM Tourism is on the rise throughout the circumpolar world, ranging from large-scale cruise ships, to sport fishing and hunting, to adventure and eco expeditions, to cultural tourism.	a. An expanding tourism industry increases the risk of human-made disasters and amplifies SAR requirements. b. An expanding tourism industry calls for strong community-based SAR and emergency response assets. c. Cruise tourism increases the risk of environmental pollution, calling for increased local and regional environmental response capabilities. d. An expanding tourism industry and small vessel tourism raise a wide range of regulatory, safety, and security issues. e. An expanding tourism industry demands close interdepartmental cooperation, partnership with Northern communities, and relationships with private industry. f. Arctic tourism highlights Canada's international commitments and responsibilities. g. As the world's largest source of outbound tourism, China is likely to dominate Arctic tourism.
	4.4 THE CONSERVATION ECONOMY Canada's Arctic and Northern Policy Framework highlights the idea of a conservation economy (which makes conservation an important part of local economies) that the federal government is slowly growing in the Canadian Arctic in collaboration with northern Indigenous stakeholders.	a. Enhanced situational awareness, marine monitoring, and emergency response capabilities.

	TRENDS	IMPLICATIONS
ECONOMICS AND RESOURCES	4.5 FISHERIES It is uncertain how climate change will impact the Arctic's fisheries over the next two decades.	a. Food security in Inuit Nunangat. b. Illegal fishing. c. The political and jurisdictional challenges of fisheries expansion
HUMAN	5.1 DEMOGRAPHIC CHANGE There is uneven population growth across Canada's North, and this is expected to continue over the next fifteen years.	a. Differences in population distributions continue to strain resources. b. Youth disenfranchisement could worsen health indicators, increase political instability, and lead to out-migration. c. Conflict could arise due to differing political, economic, and environmental interests
	5.2 SETTLEMENT PATTERNS AND URBANIZATION The populations of many smaller settlements are expected to decline over the next two decades, while urban centres are expected to grow.	a. Urbanization and changing settlement patterns could change the distribution of services. b. Rapid urbanization and resource scarcity could exacerbate pressures on already strained and expensive food networks in the North. c. Urbanization could lead to the concentration of illicit activities and vulnerabilities.
	5.3 INFRASTRUCTURE GAPS Deficits in critical infrastructure keep communities isolated, inhibit the delivery of health and social services, and limit economic opportunities.	a. Poor community infrastructure limits northern development and inhibits the delivery of essential services. b. Strategic investments in Northern telecommunications infrastructure. c. Addressing Arctic infrastructure gaps invites investments in "dual-use" capabilities. d. Competition for high-cost investments in infrastructure.
	5.4 SOCIAL AND HEALTH INEQUALITIES The Government of Canada and its partners have committed to close the gaps and divides that exist between this region, particularly in relation to its Indigenous peoples, and the rest of the country.	a. Northern and Indigenous communities are particularly susceptible and vulnerable to emerging health threats. b. Limitations or interruptions to an already strained food supply chain pose acute risks for Northern communities. c. Climate change poses a growing threat to the health of Northern populations. d. High disparities in income, formal education, and incarceration rates between Indigenous and non-Indigenous Canadians living in the North are likely to persist.

	TRENDS	IMPLICATIONS
HUMAN	<p>5.5 HUMAN NETWORKS AND INCREASING FRACTURED OR POLARIZED SOCIETY</p> <p>The amplification of socio-economic, cultural, and political divisions may become an unstable fault line.</p>	<p>a. Human networks in the Canadian Arctic are evolving.</p> <p>b. The emergence of Arctic/Northern identities and Indigeneity as assets.</p> <p>c. Fractures in Northern Canadian societies and between the North and South may undermine trust and legitimacy in existing governance systems.</p> <p>d. Polarization between Canadians is likely to erode social cohesion, but is unlikely to produce major societal disruption.</p> <p>e. Understanding the needs of youth and elderly persons.</p>
TECHNOLOGY	<p>6.1 RATE OF MILITARY TECHNOLOGY ADVANCEMENT</p> <p>Technology is expected to be a force multiplier and the single best predictor of deterrence in the future.</p>	<p>a. Compatibility issues and difficulties in communicating between alliance members.</p> <p>b. Gaps in situational awareness places challenges on interoperability between militaries.</p> <p>c. Near- to long-term modernization of ISR capabilities need to be protected from cyber operations.</p> <p>d. Adversaries may use cyber capabilities to steal information and/or eavesdrop.</p> <p>e. Diplomacy may be needed to de-escalate tensions.</p> <p>f. Local residents proximate to any systems must be involved in planning.</p>
	<p>6.2 UNMANNED AUTONOMOUS SYSTEMS (UAS)</p> <p>UAS are a low-cost technology that can easily be used for a wide variety of functions.</p>	<p>a. An increase in UAS use could lead to greater surveillance capabilities for states in the air/ near space, land, and maritime domains.</p> <p>b. UAS require a means to transmit data to operators at the speed of relevance.</p> <p>c. Considerations must be made in balancing security and privacy in the Canadian North. UAS are vulnerable to exploitation and manipulation and these systems could be used by adversaries or governments in ways that violate the privacy of northern communities.</p> <p>d. UAS activity could potentially interfere with aviation and disrupt local wildlife.</p>

	TRENDS	IMPLICATIONS
TECHNOLOGY	<p>6.3 THE DEPENDENCEY ON INDUSTRY TO PROVIDE TECHNOLOGICAL SOLUTIONS TO THE ARCTIC</p> <p>Choke points for improvements in the Arctic from a technological perspective are almost wholly dependent on industry to see the cost-benefit of hours of research and production.</p>	<p>a. Militaries are highly dependent on industries for technological advancement, which can often come with unknown foreign backing and investors.</p> <p>b. 5G networks creates a problem with the Five Eyes intelligence sharing relationship.</p> <p>c. Industry monopolies could have notable negative implications in the North</p>
	<p>6.4 TECHNOLOGY AND THE ENVIRONMENT</p> <p>Technology development will have positive and negative implications for the Arctic environment.</p>	<p>a. A growing obligation exists to identify and utilize technologies which decrease pollutants and emissions, can be applied to environmental cleanups, and can lead to cleaner oceans and waterways.</p> <p>b. Technologies that increase understanding of the age and thickness of sea ice raise important strategic questions.</p> <p>c. Technology that can make travel more efficient will help to connect communities while reducing pollution.</p> <p>d. Negative impacts of technology in the Arctic on the Arctic environment and its communities.</p>
	<p>6.5 TECHNOLOGY AND SOCIETY</p> <p>Advancements in technology can help to address some of these important social challenges and reduce regional disparities.</p>	<p>a. Without regulatory assistance or public development, Canadians living in the Arctic could fall prey to unaffordable and unsustainable pricing models leading to poor qualities of life.</p> <p>b. Benefits of technology to northern individuals include improved communications, faster transmission of data, and increased engagement.</p> <p>c. An increase in access to technology could in turn lead to an increase in the ability of individuals to participate in criminal activity.</p> <p>d. Increased access to technology could lead to a greater ability to connect individuals in times of crisis or emergency.</p>

	TRENDS	IMPLICATIONS
TECHNOLOGY	<p>6.6 OVER-RELIANCE ON TECHNOLOGY SOLUTIONS</p> <p>An increasing dependency on technology to conduct certain operations has led to an assumption that technology can solve most problems, which could lead to inadequate government responses to social problems or create new vulnerabilities.</p>	<p>a. The assumption that technology can solve large scale social problems could lead to a lack of development in the Arctic.</p> <p>b. Over-reliance on networked systems linking society creates vulnerabilities.</p> <p>c. Negative impacts on populations when technology does not produce solutions promised by government.</p> <p>d. Involving Indigenous peoples and integrating traditional knowledge in Arctic operations.</p>

SELECTED BIBLIOGRAPHY

Abele, Frances, Thomas Courchene, Leslie Seidle, and France St-Hilaire, eds. *Northern Exposure: Peoples, Powers and Prospects for Canada's North*. Ottawa: Institute for Research on Public Policy, 2009.

Abou-Abssi, Erin. ["A New Way to Track Arctic Vessels."](#) Ottawa: Oceans North.

Alvarez, Jimena, Dmitry Yumashev, and Gail Whiteman, "A framework for assessing the economic impacts of Arctic change," *Ambio* 49 (2020): 407-418.

Arctic Climate Impact Assessment (ACIA). *Impacts of a Warming Arctic: ACIA Overview Report*. Cambridge: Cambridge University Press, 2004.

Arctic Council Task Force on Improved Connectivity in the Arctic. *Report: Improving Connectivity in the Arctic*. Arctic Council Secretariat. 2019.

Babin, Julie and Frédéric Lasserre. "Asian states at the Arctic Council: perceptions in Western States." *Polar Geography* 42/3 (2019): 145-159.

Banks, Nigel, and Maria Madalena das Neves. "The United Nations Convention on the Law of the Sea and the Arctic Ocean." In [The Palgrave Handbook of Arctic Policy and Politics](#), eds. Ken Coates and Carin Holroyd, 375-391. Palgrave Macmillan, Cham, 2020.

Barclay, Jill, Jayde Lavoie, Carly MacArthur, and Maria Nallim. [The Impacts of Climate Change on North American Defence and Security](#). NAADSN Policy Primer (25 September 2020).

Bartenstein, Kristin, and Suzanne Lalonde. "Shipping in the Canadian and Russian Arctic: Domestic Legal Responses to the Polar Code." In *Arctic Shipping: Climate Change, Commercial Traffic and Port Development*, eds. F. Lasserre and O. Faury, 137-56. London: Routledge, 2020.

Bellamy, Jackson. ["Alternative Energy in the Canadian North."](#) NAADSN Policy Primer (13 August 2020).

Berbrick, Walter and Rebecca Pincus. ["10 Big Ideas to 'Up America's Game in the Arctic,'"](#) *The Diplomat*, 22 September 2018.

Berkman, Paul, and Alexander Vylegzhanin, eds. *Environmental Security in the Arctic Ocean*. London: Palgrave Macmillan, 2012.

Berkman, Paul Arthur, and Oran Young. "Governance and environmental change in the Arctic Ocean." *Science* 324, no. 5925 (2009): 339-340.

Bielawski, Ellen. "Inuit indigenous knowledge and science in the Arctic." *Human ecology and climate change: People and resources in the far north* (1995): 219-228.

Borgerson, Scott G. "Arctic Meltdown: The Economic and Security Implications of Global Warming." *Foreign Affairs* 87/2 (2008): 63-77.

Bouchard, Christina. ["Arctic Highways as Critical Infrastructure."](#) NAADSN Policy Primer (19 August 2020).

Byers, Michael. "Cold, Dark, and Dangerous: International Cooperation in the Arctic and space." *Polar Record* 55/1 (2019): 32-47.

Byers, Michael. "Crises and International Cooperation: An Arctic Case Study." *International Relations* 31/4 (2017): 375-402.

Byers, Michael. *International Law and the Arctic*. Cambridge: Cambridge University Press, 2014.

Byers, Michael, and Nicole Covey. "Arctic SAR and the 'security dilemma.'" *International Journal* 74/4 (2019): 499-517.

Byers, Michael and Suzanne Lalonde. "Who controls the Northwest Passage?" *Vanderbilt Journal of Transnational Law* 42 (2009): 1133-1210.

Canada, "Government of Canada announces contract awards aimed at improving space-based earth observation capabilities" (December 14, 2018).

Canada. [Arctic and Northern Policy Framework](#). Ottawa: Crown-Indigenous Relations and Northern Affairs Canada, 2019.

Canada. [Canada's Northern Strategy: Our North, Our Heritage, Our Future](#). Ottawa: Aboriginal Affairs and Northern Development, 2009.

Canada. [Statement on Canada's Arctic Foreign Policy](#). Ottawa: Department of Foreign Affairs and International Trade, 2010.

Carter, Natalie, Jackie Dawson, J. Knopp, J. Joyce, M. Weber, Z. Kochanowicz and O. Mussells. *Arctic Corridors and Northern Voices: Governing marine transportation in the Canadian Arctic* (Cambridge Bay, Nunavut community report). Ottawa: University of Ottawa, 2018.

Carter, Natalie, Jackie Dawson, J. Joyce, A. Ogilvie. *Arctic Corridors and Northern Voices: Governing marine transportation in the Canadian Arctic* (Gjoa Haven, Nunavut community report). Ottawa: University of Ottawa, 2017.

Charles Duxbury, "[The 5 most important races for the Arctic](#)," *Politico*, 1 January 2020.

Charron, Andrea. "Canada, the Arctic, and NORAD: Status Quo or New Ball Game?" *International Journal* 70:2 (2015): 215-231.

Charron, Andrea. "[Canada, the United States and Arctic Security](#)," in *Canada's Arctic Agenda: Into the Vortex*, ed. John Higginbotham and Jennifer Spence, 93-102. Waterloo: Centre for International Governance Innovation, 2019.

Charron, Andrea, Troy Bouffard and James Fergusson. "[A Tale of Two Russias](#)," in *Breaking the Ice Curtain? Russia, Canada, and Arctic Security in a Changing Circumpolar World*, ed. P. Whitney Lackenbauer and Suzanne Lalonde, 61-74. Calgary: Canadian Global Affairs Institute, 2019.

Charron, Andrea and James Fergusson. "Out of Sight, Out of mind NORAD vis-à-vis CANUS Politics" *Canadian Foreign Policy Journal* (2019): 2-15.

Charron, Andrea, Jim Fergusson, Joseph Jockel, Chris Sands, and Joel Sokolsky. [NORAD: Beyond Modernization](#). Winnipeg: Centre for Defence and Security Studies, University of Manitoba, 2019.

Charron, Andrea, Joël Plouffe, and Stéphane Roussel. "Russian National Interests and the Arctic: Foreign Policy Implications for Canada." In *Canadian Foreign Policy in a Unipolar World*, eds. Christopher Kirkey and Michael Hawes, 55-75. Oxford: Oxford University Press, 2017.

Chater, Andrew. "Change and Continuity Among the Priorities of the Arctic Council Permanent Participants." In *Leadership for the North*, edited by Douglas Nord, 149-166. New York: Springer Nature, 2019.

Chater, Andrew. "An Examination of the Framing of Climate Change by the Government of Canada, 2006-2016." *Canadian Journal of Communication* 43/4 (2018): 583-600.

Chater, Andrew. "An Explanation for the Growing Institutional Capacity of the Arctic Council." *Northern Review*, 48 (2018): 51-80.

Chater, Andrew. "Security Governance Between Canada and Greenland." In *The North American Arctic: New Trends in Regional Security*, edited by Heather Nicol and Dwayne Menezes, 188-199. London, United Kingdom: University College London Press, 2019.

Chater, Andrew, Wilfred Greaves and Leah Sarson. "Assessing Security Governance in the Arctic." In *Routledge Handbook of Arctic Security*, edited by Gunhild Hoogensen Gjørsv, Jessica M. Shadian and Rasmus Gjedssø Bertelsen, 43-56. Abingdon, United Kingdom: Routledge, 2020.

Cherpako, Danielle. "[What is Russia Doing in the Arctic? Documenting Russian Military Actions in the North between 2014 – 2020](#)," NAADSN Policy Primer (7 August 2020).

Cheung, William, Gabriel Reygondeau, and Thomas Frölicher. "Large benefits to marine fisheries of meeting the 1.5°C global warming target," *Science* 354/6319 (2016): 1591-94.

Chircop, Aldo. "Canada and the Polar Code: Balancing Unilateralism and Multilateralism in the Regulation of Arctic Shipping." *Revue Belge de droit international* 51 (2018): 380-404.

Chircop, Aldo. "The Polar Code and the Arctic Marine Environment: Assessing the Regulation of the Environmental Risks of Shipping." *Journal of International Marine and Coastal Law* (2020): 533-569.

Chircop, Aldo, Ivan Bunik, Moira McConnell, and Kristoffer Svendsen. "Course Convergence? Comparative Perspectives on the Governance of Navigation and Shipping in Canadian and Russian Arctic Waters." *Ocean Yearbook Online* 28/1 (2014): 291-327.

Chircop, Aldo, F. Goerlandt, C. Aporta and R. Pelot, eds. *Governance of Arctic Shipping: Rethinking Risk, the Human Dimension and Regulation*. New York: Springer Polar Science, 2020.

Coates, Ken, Whitney Lackenbauer, William Morrison, and Greg Poelzer. *Arctic Front: Defending Canada's Interests in the Far North*. Toronto: Thomas Allen, 2008.

Csenkey, Kristen and Bruno Perron. "[Cyber Capacity Building in the Canadian Arctic and the North](#)," NAADSN Strategic Perspectives (October 2020).

Dawson, Jackie, Larissa Pizzolato, Stephen Howell, and Luke Copeland. "[Temporal and Spatial Patterns of Ship Traffic in the Canadian Arctic from 1990 to 2015](#)," *Arctic* 71/1 (2018): 15-26.

Dean, Ryan, and P. Whitney Lackenbauer. "[Canada and Geostrategy: From C.P. Stacey to Twenty-First Century Arctic Threat Assessment](#)," *Journal of Military and Strategic Studies* 20:1 (2019): 33-96.

Dean, Ryan, and P. Whitney Lackenbauer. "[China's Arctic Gambit? Contemplating Possible Scenarios](#)." *NAADSN Strategic Perspectives* (April 2020).

Dean, Ryan, P. Whitney Lackenbauer and Adam Lajeunesse. [Canadian Arctic Defence and Security Policy: An Overview of Key Documents, 1970-2012](#). Documents on Canadian Arctic Sovereignty and Security (DCASS) No. 1. Calgary and Waterloo: Centre for Military and Strategic Studies/Centre on Foreign Policy and Federalism, 2014.

Dolata, Petra. "A New Canada in the Arctic? Arctic Policies under Harper." *Revue Etudes Canadiennes* 78 (2015): 131-154.

Doyon, Jean-François, Frédéric Lasserre, Pauline Pic, Pierre-Louis Têtu, Mélanie Fournier, Linyan Huang, and Leah Beveridge. « [Perceptions et stratégies de l'industrie maritime de vrac relativement à l'ouverture des passages arctiques](#). » *Géotransports* 8 (2017): 5-22.

Edgar, Courtney. "[Nunavut government strikes new tourism partnerships](#)," *Nunatsiaq News*, 18 April 2019.

English, John. *Ice and Water: Politics, Peoples, and the Arctic Council*. Toronto: Allen Lane, 2013.

Exner-Pirot, Heather. "Canada's Arctic Council Chairmanship (2013–2015): A Post-Mortem." *Canadian Foreign Policy Journal* 22/1 (2016): 84-96.

Exner-Pirot, Heather, and Rob Huebert. "Arctic Security: The Canadian Context." In *Routledge Handbook of Arctic Security*, eds. Gunhild Hoogensen Gjør, Marc Lanteigne and Horatio Sam Aggrey, 140-51. Oxon: Routledge, 2020.

Eyre, Kenneth. [Custos Borealis: The Military in the Canadian North](#), ed. P. Whitney Lackenbauer. Peterborough: North American and Arctic Defence and Security Network, 2020.

Fisheries and Oceans Canada. [International Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean](#) (2018).

Fisheries and Oceans Canada. [Departmental Plan 2019-20](#).

Gavrilov, Viatcheslav. "Delimitation of the Continental Shelf in the Arctic Ocean: Present State and Possible Legal Solutions." In *A Bridge over Troubled Waters: Dispute Resolution in the Law of International Watercourses and the Law of the Sea*, eds. Helene Fabri, Erik Franckx, Marco Benatar, and Tamal Meshel, 416-444. Leiden: Brill Nijhoff, 2020.

Gill, Alan and David Sevingy. "[Sustainable Northern Development: The Case for a Northern Development Bank](#)." Waterloo: Centre for International Governance Innovation Papers Series, 27 January 2015.

Global Affairs Canada. "[Canadian Arctic Capabilities by Sector – Canada](#)."

Gosnel, Rachel. "[What Will the Future Hold for Arctic Economics?](#)" Centre for International Maritime Security Papers, 3 July 2018.

Government of Nunavut, Department of Economic Development and Transportation. [Annual Tourism Report, 2018-2019](#).

Government of Yukon. "[2018 another record year for Yukon tourism](#)."

Grant, Shelagh. *Polar Imperative*. Vancouver: Douglas & McIntyre, 2010.

Greaves, Wilfrid. "Arctic Break Up: Climate Change, Geopolitics, and the Fragmenting Arctic Security Region." In *Redefining Arctic Security: Arctic Yearbook 2019*, eds. Lassi Heininen, Heather Exner-Pirot, and Justin Barnes, 1-17. Akureyri: Northern Research Forum, 2019.

Greaves, Wilfrid. "Arctic (in)Security and Indigenous Peoples: Comparing Inuit in Canada and Sámi in Norway." *Security Dialogue* 47/6 (2016): 461-480.

Greaves, Wilfrid. "Cities and Human Security in a Warming Arctic." In *Climate Change and Security: Searching for a Paradigm Shift*, eds. Lassi Heininen and Heather Exner-Pirot, 61-89. London: Palgrave, 2020.

Greaves, Wilfrid. "Indigenous Peoples." In *Handbook on Arctic Security*, eds. Gunhild Hoogensen Gjør and Horatio Sam-Aggrey, 363-376. London: Routledge, 2020.

Greaves, Wilfrid. "[What a Biden presidency means for climate change and Canada](#)," *Policy Options* (10 November 2020). <https://policyoptions.irpp.org/magazines/november-2020/what-a-biden-presidency-means-for-climate-change-and-canada/>

Greaves, Wilfrid and P. Whitney Lackenbauer, eds. *Breaking Through: Understanding Sovereignty and Security in the Circumpolar Arctic*. Toronto: University of Toronto Press, forthcoming 2021.

Griffiths, Franklyn. "The Shipping News: Canada's Arctic Sovereignty Not on Thinning Ice." *International Journal* 58/2 (2003): 257-282.

Griffiths, Franklyn, Rob Huebert, and P. Whitney Lackenbauer. *Canada and the Changing Arctic. Sovereignty, Security and Stewardship*. Waterloo: Wilfrid Laurier University Press, 2011.

Gritsenko, Daria. "Vodka on Ice? Unveiling Russian Media Perceptions of the Arctic." *Energy Research & Social Science* 16 (2016): 8–12.

Headland, R.K., et. al. "[Transits of the Northwest Passage to the End of the 2019 Navigation Season](#)," Scott Polar Institute *InfoSheets* (17 March 2020).

Heininen, Lassi, Karen Everett, Barbora Padrtova, and Anni Reissell. *Arctic Policies and Strategies—Analysis, Synthesis, and Trends*. Laxenburg: International Institute for Applied Systems Analysis, 2020.

Henderson, James Youngblood. *Indigenous Diplomacy and the Rights of Peoples: Achieving UN Recognition*. Winnipeg: Purich, 2016.

Hønneland, Geir. *Russia and the Arctic: Environment, Identity and Foreign Policy*. New York: IB Tauris, 2015.

Huebert, Rob. "Arctic Security, Global Challenges in the Arctic Region." In *Global Challenges in the Arctic Region: Sovereignty, Environment and Geopolitical Balance*, eds. Elena Conde and Sara Iglesias Sanchez, 364–84. Oxon: Routledge, 2017.

Huebert, Rob. "Canada and NATO in the Arctic: Responding to Russia?" In *Canada's Arctic Agenda: Into the Vortex*, eds. John Higginbotham and Jennifer Spence, 85–92. Waterloo: Centre for International Governance Innovation, 2019.

Huebert, Rob. "Climate Change and Canadian Sovereignty in the Northwest Passage." *Isuma: Canadian Journal of Policy Research* 2/4 (2001): 86–94.

Huebert, Rob. "[A New Cold War in the Arctic?! The old one never ended!](#)" In *Redefining Arctic Security: Arctic Yearbook 2019*, eds. Lassi Heininen, Heather Exner-Pirot, and Justin Barnes. Akureyri: Northern Research Forum, 2019.

Huebert, Rob. "Mahan and Understanding the Future of Naval Competition in the Arctic Ocean, *Canadian Naval Review* 14/3 (2019): 10–15.

Huebert, Rob. "The Melting Ice and the Transforming Arctic Ocean." *Ocean Yearbook* 31 (2017): 57–79.

Huebert, Rob. "The Shipping News Part II: How Canada's Arctic Sovereignty is on Thinning Ice." *International Journal* 58/3 (2003): 295–308.

Huebert, Rob, Heather Exner-Pirot, Adam Lajeunesse, and Jay Gullledge. *Climate Change and International Security: The Arctic as Bellwether*. Arlington: Center for Climate and Energy Solutions, 2012.

Humpert, Malte. "COSCO continues to step up its operations in the Arctic," *High North News*, 13 June 2019.

Humpert, Malte. "[French Cruise Ship Set to Travel to North Pole in 2021](#)," *High North News*, 22 May 2019.

Innovation, Science and Economic Development Canada. "[High-Speed Access for All: Canada's Connectivity Strategy](#)," Press release, 16 July 2019.

Jansen, Teunis, Søren Post, Trond Kristiansen, Gudmundur Oskarsson, Jesper Boje, Brian MacKenzie, Mala Broberg, and Helle Siegstad. "[Ocean warming expands habitat of a rich natural resource and benefits a national economy](#)," *Ecological Applications* 26 (2016): 2021–2032.

Johnson, Margaret, Jackie Dawson, and Emma Stewart. "Marine Tourism in Nunavut: Issues and Opportunities for Economic Development in Arctic Canada," in *Perspectives in Rural Tourism Geographies*, eds. R. Koster and D. Carson, 115–136. Cham: Springer, 2015.

Kikkert, Peter. "Rising Above the Rhetoric: Northern Voices and the Strengthening of Canada's Capacity to Maintain a Stable Circumpolar World." *Northern Review* 33 (2011): 29–45.

Kikkert, Peter, and P. Whitney Lackenbauer. "The Militarization of the Arctic to 1990." In *The Palgrave Handbook of Arctic Policy and Politics*, eds. Ken Coates and Carin Holroyd, 487–506. Cham: Palgrave Macmillan, 2020.

Kikkert, Peter, and P. Whitney Lackenbauer. "[A Better Road Map Needed for Arctic and Northern Policy Framework](#)," *Policy Options* (17 September 2019).

Kikkert, Peter, and P. Whitney Lackenbauer. "[Canada's Arctic and Northern Policy Framework: A Roadmap for the Future?](#)" in *Arctic Yearbook 2019*, eds. Lassi Heininen and Heather Exner-Pirot: 332–39.

Kikkert, Peter, and P. Whitney Lackenbauer. *Using Civil-Military Operations to "Expand and Deepen" Relationships with Northern Communities: Examples from Alaska and Australia*. NAADSN Special Reports (July 2020).

Kikkert, Peter, P. Whitney Lackenbauer, and Angulalik Pedersen. [Kitikmeot Roundtable on Search and Rescue – General Report and Findings](#). Report from a workshop hosted at the Canadian High Arctic Research Station (CHARS) in Cambridge Bay, Nunavut, 31 January – 1 February 2020.

Klimenko, Ekaterina. *Russia's Evolving Arctic Strategy: Drivers, Challenges and New Opportunities*. SIPRI Policy Paper 42. Stockholm: Stockholm International Peace Research Institute, 2014.

Konyshov, Valery, and Alexander Sergunin. "The Changing Role of Military Power in the Arctic." In *The Global Arctic Handbook*, eds. Matthias Finger and Lassi Heininen, 171-195. Cham: Springer, 2019.

Kraska, James, ed. *Arctic Security in an Age of Climate Change*. Cambridge: Cambridge University Press, 2011.

Kraska, James. "International Security and International Law in the Northwest Passage." *Vanderbilt Journal of Transnational Law* 42 (2009): 1109-1132.

Krueger, Hanna. ["Arctic tourism is potential threat to environment as ice melts,"](#) *NBC News*, 11 January 2018.

Lackenbauer, P. Whitney. "Arctic Defence and Security: Transitioning to the Trudeau Government." In [Whole of Government through an Arctic Lens](#), ed. P. Whitney Lackenbauer and Heather Nicol. Antigonish: Mulroney Institute on Government, 2017. 308-340.

Lackenbauer, P. Whitney. ["Canada & Russia: Toward an Arctic Agenda,"](#) *Global Brief* (Summer/Fall 2016): 21-25

Lackenbauer, P. Whitney. *The Canadian Rangers: A Living History*. Vancouver: UBC Press, 2013.

Lackenbauer, P. Whitney. "'Global Arctic Leadership' in an Era of Cooperation and Competition," in [Canada's Arctic Agenda: Into the Vortex](#), ed. John Higginbotham and Jennifer Spence, 67-73. Waterloo: Centre for International Governance Innovation, 2019.

Lackenbauer, P. Whitney. "Mirror Images? Canada, Russia, and the Circumpolar World." *International Journal* 65:4 (2010): 879-97.

Lackenbauer, P. Whitney. "The North's Canadian Rangers," in *Strengthening the Canadian Armed Forces through Diversity and Inclusion*, eds. Alistair Edgar, Rupinder Mangat, and Bessma Momani, 67-86. Toronto: University of Toronto Press, 2019.

Lackenbauer, P. Whitney. "Polar Race or Polar Saga? Canada and the Circumpolar World." In *Arctic Security in an Age of Climate Change* ed. James Kraska. Cambridge: Cambridge University Press, 2011. 218-43.

Lackenbauer, P. Whitney. ["Why Fear Russia in the Arctic? Contemplating Scenarios as an Exercise in Assumption-Testing and 'Red Teaming,'"](#) NAADSN *Strategic Perspectives* (May 2020).

Lackenbauer, P. Whitney, and Ryan Dean, eds. [Canada's Northern Strategy under the Harper Conservatives: Key Speeches and Documents on Sovereignty, Security, and Governance, 2006-15](#). Documents on Canadian Arctic Sovereignty and Security (DCASS) No. 6. Calgary and Waterloo: Centre for Military, Strategic and Security Studies/Centre on Foreign Policy and Federalism/Arctic Institute of North America, 2016.

Lackenbauer, P. Whitney, Ryan Dean, and Rob Huebert, eds. [\(Re\)Conceptualizing Arctic Security: Selected Articles from the Journal of Military and Security Studies](#). Calgary: Centre for Military, Security and Strategic Studies, 2017.

Lackenbauer, P. Whitney, and Rob Huebert, "Premier Partners: Canada, the United States and Arctic Security." *Canadian Foreign Policy Journal* 20:3 (2014): 320-33.

Lackenbauer, P. Whitney, and Peter Kikkert. ["The Canadian Rangers and COVID-19,"](#) NAADSN *Policy Brief* (June 2020).

Lackenbauer, P. Whitney, and Peter Kikkert. [Measuring the Success of the Canadian Rangers](#). Peterborough: NAADSN, 2020.

Lackenbauer, P. Whitney, and Suzanne Lalonde, eds. [Breaking the Ice Curtain? Russia, Canada, and Arctic Security in a Changing Circumpolar World](#). Calgary: Canadian Global Affairs Institute, 2019.

Lackenbauer, P. Whitney, and Suzanne Lalonde. "Canada, Sovereignty, and 'Disputed' Arctic Boundaries: Myths, Misconceptions, and Legal Realities." In [The Networked North: Borders and Borderlands in the Canadian Arctic Region](#), ed. Heather Nicol and P. Whitney Lackenbauer. Waterloo: Borders in Globalization/Centre on Foreign Policy and Federalism. 2017. 95-113.

Lackenbauer, P. Whitney, Suzanne Lalonde, and Elizabeth Riddell-Dixon. [Canada and the Maritime Arctic: Boundaries, Shelves, and Waters](#). Peterborough: North American and Arctic Defence and Security Network, 2020. <https://www.naadsn.ca/wp-content/uploads/2020/03/CanadaMaritimeArctic-PWL-SL-ERD-2020.pdf>

Lackenbauer, P. Whitney, Adam Lajeunesse, Frédéric Lasserre, and James Manicom. [China's Arctic Ambitions and What They Mean for Canada](#). Calgary: University of Calgary Press, 2018.

- Lackenbauer, P. Whitney, and Adam Lajeunesse. [“On Uncertain Ice: The Future of Arctic Shipping and the Northwest Passage.”](#) Canadian Defence & Foreign Affairs Institute and School for the Public Policy Paper (December 2014).
- Lackenbauer, P. Whitney, and Adam Lajeunesse. [“The Canadian Armed Forces in the Arctic: Building Appropriate Capabilities.”](#) *Journal of Military and Strategic Studies* 16:4 (2016): 7-66.
- Lackenbauer, P. Whitney, and Heather Nicol, eds. [Whole of Government through an Arctic Lens](#). Antigonish: Mulroney Institute for Government, 2017.
- Lackenbauer, P. Whitney, Heather Nicol, and Wilfrid Greaves, eds. [One Arctic: The Arctic Council and Circumpolar Governance](#). Ottawa: Canadian Arctic Resources Committee, 2017.
- Lajeunesse, Adam. *Lock, Stock, and Icebergs: The Evolution of Canada's Arctic Maritime Sovereignty*. Vancouver: University of British Columbia Press, 2016.
- Lajeunesse, Adam. “Arctic Geopolitics and Security from the Canadian Perspective.” In *Handbook on Geopolitics and Security in the Arctic*, ed. Joachim Weber. Cham: Springer, 2020.
- Lajeunesse, Adam, and Rob Huebert, “Preparing for the Next Arctic Sovereignty Crisis: The Northwest Passage in the Age of Donald Trump.” *International Journal* 74/2 (2019): 226-239.
- Lajeunesse, Adam, and P. Whitney Lackenbauer, eds. [Canadian Armed Forces Arctic Operations, 1945-2015: Historical and Contemporary Lessons Learned](#). Fredericton: Gregg Centre for the Study of War and Society, 2017.
- Lajeunesse, Adam, and P. Whitney Lackenbauer. “China's Mining Interests in the North American Arctic.” In *Governing the North American Arctic: Lessons from the Past, Prospects for the Future*, eds. Dawn Berry and Halbert Jones, 74-99. London: Palgrave MacMillan, 2017.
- Lajeunesse, Adam, and P. Whitney Lackenbauer. “Defence Policy in the Canadian Arctic: From Jean Chrétien to Justin Trudeau,” in *Canadian Defence Policy in Theory and Practice*, eds. Thomas Juneau, Philippe Lagassé, and Srdjan Vucetic, 365-82. London: Palgrave Macmillan, 2019.
- Lalonde, “Canadian Arctic Maritime Sovereignty During the Trudeau Years.” In [Canada's Arctic Agenda: Into the Vortex](#), ed. John Higginbotham and Jennifer Spence, 75-82. Waterloo: Centre for International Governance Innovation, 2019.
- Lalonde, Suzanne. “Increased Traffic Through Canadian Arctic Waters: Canada's State of Readiness.” *Revue Juridique Themis* 38 (2004): 49-124.
- Lalonde, Suzanne. “La frontière maritime dans l'archipel arctique : un garde-fou essentiel pour le Canada,” *Annuaire français de droit international* 53 (2007): 609-639.
- Lalonde and C. Schofield, “Rising Seas and Retreating Coasts: Implications for the Arctic.” *International Journal of Marine and Coastal Law* (2020): 468-97.
- Lalonde, Suzanne, and Ted L. McDorman, eds. *International Law and Politics of the Arctic Ocean: Essays in Honor of Donat Pharand*. Leiden: Brill, 2015.
- Lam, Vicky, William Cheung, and Rashid Sumaila. [“Marine capture fisheries in the Arctic: Winners or losers under climate change and ocean acidification?”](#) *Fish and Fisheries* 17/2 (2014): 335-357.
- Landriault, Mathieu, ed. [L'année arctique 2019](#). Montréal : Observatoire de la politique et la sécurité de l'arctique (OPSA), 2019.
- Landriault, Mathieu. *Media, Security and Sovereignty in the Canadian Arctic: From the Manhattan to the Crystal Serenity*. New York: Routledge, 2019.
- Landriault, Mathieu. “Public Opinion on Canadian Arctic Sovereignty and Security.” *Arctic* 69/2 (2016): 160-168.
- Landriault, Mathieu. [La Sécurité Arctique 2000-2010 : Une décennie turbulente?](#) Peterborough: North American and Arctic Defence and Security Network, 2020.
- Landriault, Mathieu, Andrew Chater, Elana Wilson Rowe and P. Whitney Lackenbauer. *Governing Complexity in the Arctic Region*. Abingdon, United Kingdom: Routledge Press, 2020.
- Landriault, Mathieu, and Paul Minard. “Does Standing Up for Sovereignty Pay Off Politically? Arctic Military Announcements and Governing Party Support in Canada from 2006 to 2014.” *International Journal* 71/1 (2016): 41-61.
- Laruelle, Marlene. *Russia's Arctic Strategies and the Future of the Far North*. London: ME Sharpe, 2013.
- Lasserre, Frédéric. « Arctique : le passage du Nord-Ouest sous tension. » *Politique étrangère* (2017) : 141-153.

- Lasserre, Frédéric. « Géopolitique du passage du Nord-Ouest. Une perspective de relations internationales. » *Relations internationales* 170 (2017): 107-124.
- Lasserre, Frédéric, ed. *Passages et mers arctiques: Géopolitique d'une région en mutation*. Québec : Presses de l'Université du Québec, 2010.
- Lasserre, Frédéric. « Le retour du mythe des passages arctiques : quel trafic maritime dans l'Arctique au XXI^e siècle? » *Nordiques* 37 (2019): 9-24.
- Lasserre, Frédéric, Leah Beveridge, Michelle Fournier, Pierre-Louis Têtu, and Linyan Huang. "Polar Seaways? Maritime Transport in the Arctic: An Analysis of Shipowners' Intentions II," *Journal of Transport Geography* 57(2016):105-114.
- Lasserre, Frédéric, Jérôme Le Roy, and Richard Garon. "Is there an Arms Race in the Arctic?" *Journal of Military and Strategic Studies* 14:3-4 (2012): 1-56.
- Lasserre, Frédéric, and Stéphane Roussel. « [La question du passage du Nord-Ouest: un enjeu réellement stratégique entre Canada et États-Unis?](#) » *Paix et Sécurité Européenne et Internationale* 4 (2016) : 1-30.
- Lasserre, Frédéric, and Pierre-Louis Têtu. "Russian Air Patrols in the Arctic : Are Long-Range Bomber Patrols a Challenge to Canadian Security and Sovereignty?" *Arctic Yearbook* 2016: 305-27.
- Lemelin, Raynald, Jackie Dawson, Emma Stewart, Patrick Maher, and Michael Lueck. "Last-chance tourism: The boom, doom, and gloom of visiting vanishing destinations." *Current Issues in Tourism* 13 (2019): 477-493.
- Levinson-King, Robin. "[Huawei Heats up the Battle for Internet in Canada's North](#)." *BBC News*, 9 September 2019.
- Loukacheva, Natalia. *The Arctic Promise: Legal and Political Autonomy of Greenland and Nunavut*. Toronto: University of Toronto Press, 2007.
- Luedi, Jeremy. "[Chinese tourists flock to Canada's Far North](#)." *True North, Far East*, 8 August 2019.
- Macyshon, Jill and Jonathan Forani. "['Anything is possible': Nunavut greenhouses bring food, jobs to tundra](#)." *CTV News*, January 28th, 2020.
- McDorman, Ted. "The Northwest Passage: International Law, Politics and Cooperation." In *Changes in the Arctic Environment and the Law of the Sea*, eds. Myron Nordquist, Tomas Heidar, and John Norton Moore, 227-50. Leiden: Martinus Nijhoff, 2010.
- McDorman, Ted. "Old Issues and New Developments Respecting International Navigational Rights and Obligations in Arctic Waters," In *The Belt and Road Initiative and the Law of the Sea*, ed. Keyuan Zou, 41-55. Leiden: Brill Nijhoff, 2020.
- McDorman, Ted. "Regulation of Foreign Commercial Vessel Navigation in Canadian Waters: Issues of International Law." In *Regulation on Navigation of Foreign Vessels*, eds. Ted McDorman, Keyuan Zou, and Seokwoo Lee, 165-179. Brill Nijhoff, 2019.
- McDorman, Ted. *Salt Water Neighbours: International Ocean Law Relations between the United States and Canada*. Cambridge: Cambridge University Press, 2009.
- McRae, Donald. "Arctic Sovereignty: What is at Stake?" *Behind the Headlines* 64/1 (2007): 1-23.
- Pompeo, Michael. "[Looking North: Sharpening America's Arctic Focus](#)," Speech to the Arctic Council (Rovaniemi, Finland), 6 May 2019.
- National Snow & Ice Data Centre, "That's a Wrap: A Look Back at 2019 and the Past Decade." 7 January 2020.
- Nickels, Scot, ed. *Nilliajut: Inuit Perspectives on Security, Patriotism and Sovereignty*. Ottawa: Inuit Tapiriit Kanatami, 2013.
- Nicol, Heather. "The Evolving North American Arctic Security Context: Can Security Be Traditional?" In [The Palgrave Handbook of Arctic Policy and Politics](#), eds. Ken Coates and Carin Holroyd, 455-472. Cham: Palgrave Macmillan, 2020.
- Nicol, Heather. "Rescaling Borders of Investment: The Arctic Council and the Economic Development Policies." *Journal of Borderlands Studies* 33/2 (2018): 225-238.
- Nicol, Heather, and P. Whitney Lackenbauer, eds. *The Networked North: Borders and Borderlands in the Canadian Arctic Region*. Waterloo: Borders in Globalization/Centre on Foreign Policy and Federalism, 2017.
- Nicol, Heather, Adam Lajeunesse, P. Whitney Lackenbauer, and Karen Everett. "Regional Border Security Management in the Territorial North," in [The North American Arctic: Themes in Regional Security](#), ed. Dwayne Menezes and Heather Nicol. London: University College London Press, 2019. 134-54.
- Nikel, David. "[Achieving the Impossible: Growing Food in the High Arctic](#)." *Forbes*, 13 April 2019.

Oceans North. "[Fisheries](#)."

Østhagen, Andreas. *Coast Guards and Ocean Politics in the Arctic*. Singapore: Palgrave Macmillan, 2020.

Østhagen, Andreas. "High North, Low Politics—Maritime Cooperation with Russia in the Arctic." *Arctic Review* 7/1 (2016): 83-100.

Østhagen, Andreas. "Maritime boundary disputes: What are they and why do they matter?" *Marine Policy* 120 (2020): 104-118.

Østhagen, Andreas. [The New Geopolitics of the Arctic: Russia, China, and the EU](#). Wilfried Martens Centre for European Studies, 2019.

Østhagen, Andreas, Gregory Levi Sharp, and Paal Sigurd Hilde. "At Opposite Poles: Canada's and Norway's Approaches to Security in the Arctic." *Polar Journal* 8/1 (2018): 163-181.

Parks Canada, Nunavut Field Unit. "[Project Description: HMS Erebus and HMS Terror Inuit Guardian Program \(Wrecks of HMS Erebus and HMS Terror NHS\)](#)." 28 May 2018.

Peter Sherwin and Thomas Bishop. "[The Trillion-Dollar Reasons for an Arctic Infrastructure Standard](#)," *The Polar Connection*, 2019.

Pharand, Donat. "Arctic Waters and the Northwest Passage: A Final Revisit," *Ocean Development and International Law* 38/1&2 (2007): 3-69.

Pharand, Donat. *Canada's Arctic Waters in International Law*. Cambridge: Cambridge University, 1988.

Pic, Pauline and Frédéric Lasserre. "[What is 'Arctic' about 'Arctic security'?](#)" *Arctic Yearbook* 2019.

Poirier, Nathalie. "[A GBA+ Analysis of the Arctic and Northern Policy Framework – Safety, Security, and Defence Chapter](#)." NAADSN Policy Brief (August 2020).

Qikiqtani Inuit Association. [Arctic Bay Nauttiqsuqtiit, 2018-2019 Annual Report](#).

Qikiqtani Inuit Association. *QIA's Response to "Stronger Together: An Arctic and Northern Policy Framework for Canada."* Supplementary document provided to Special Senate Committee on the Arctic, January 2019.

"Qikiqtani Inuit seek more support for guardians of Nunavut's new marine conservation area." *Nunatsiaq News*, 17 June 2019.

Qiniq. "[Internet Designed for Nunavut](#)."

Quinn, Ellis. "[Inuit association gets \\$900,000 to monitor marine protected area in Arctic Canada](#)," *Eye on the Arctic*, 19 July 2018.

Quinn, Ellis. "[Tourism numbers in Canada's Northwest Territories up 7 per cent](#)," *Eye on the Arctic*, 8 November 2019.

Raspotnik, Andreas, and Andreas Østhagen. "[How much is the fish? When foreign policy meets fishing interests in the EU's Arctic endeavour](#)." *International Relations* (2020): 1-18.

Regehr, Ernie. [Deterrence, Arms Control, and Cooperative Security: Selected Writings on Arctic Security](#).

Ren, Carina and Daniela Chimirri, "[Arctic Tourism – More than an Industry?](#)" The Arctic Institute, 3 April 2018.

Riddell-Dixon, Elizabeth. *Breaking the Ice: Canada, Sovereignty, and the Arctic Extended Continental Shelf*. St. Catharines: Dundurn, 2017.

Riedlinger, Dyanna, and Fikret Berkes. "Contributions of traditional knowledge to understanding climate change in the Canadian Arctic." *Polar Record* 37/203 (2001): 315-328.

Roberts, Kari. "Jets, Flags, and a New Cold War? Demystifying Russia's Arctic Intentions." *International Journal* 65/4 (2010): 957-976.

Roberts, Kari. "Understanding Putin: The Politics of Identity and Geopolitics in Russian Foreign Policy Discourse," *International Journal* 72/1 (2017): 28-55.

Roberts, Kari. "Why Russia Will Play by the Rules in the Arctic." *Canadian Foreign Policy Journal* 21/2 (2015): 112-28.

Rosen, Mark, and Cara Thuringer. "[Unconstrained Foreign Direct Investment: An Emerging Challenge to Arctic Security](#)." Center for Naval Analyses, November 2017.

Rothwell, Donald R. *The Polar Region and the Development of International Law*. Cambridge: Cambridge University Press, 1996.

Sala, Enric, Juan Mayorga, Christopher Costello, et al. "The Economics of Fishing the High Seas." *Science Advances* 4 (2018): 1-14.

Schlanger, Zoë. "[Climate change is luring cruise ships to sail risky Arctic passages](#)," *Quartz*, 1 August 2019.

Sergunin, Alexander, and Valery Konyshchev. *Russia in the Arctic: Hard or Soft Power?* New York: Columbia University Press, 2015.

- Shadian, Jessica. *The Politics of Arctic Sovereignty: Oil, Ice, and Inuit Governance*. New York: Routledge, 2014.
- Sharman, Jon. [“A Great Power Play is Shaping Up’: China’s Military Using Scientific Research to Push into Arctic, Danish intelligence Report Says.”](#) *The Independent*. 19 November 2019.
- Simon, Mary. [Interim Report on the Shared Arctic Leadership Model](#). Ottawa: Crown-Indigenous Relations and Northern Affairs Canada, 2016.
- Simon, Mary. “Inuit and the Canadian Arctic: Sovereignty Begins at Home.” *Journal of Canadian Studies* 43/2 (2009): 250-60.
- Special Senate Committee on the Arctic. [Northern Lights: A Wake-Up Call for the Future of Canada](#). Ottawa: Senate of Canada, 2019.
- Stephen, Kathrin. “Societal Impacts of a Rapidly Changing Arctic.” *Current Climate Change Reports* 4 (2018): 223-237.
- Stuhl, Andrew. *Unfreezing the Arctic: Science, Colonialism, and the Transformation of Inuit Lands*. Chicago: University of Chicago Press, 2016.
- Tai, Travis, Nadja Steiner, Carie Hoover, William, Cheunga, Rashid. “Evaluating present and future potential of arctic fisheries in Canada.” *Marine Policy* 108 (2019): 1-11.
- Teeple, Nancy. [“U.S. Arctic Policy: Threats, Actors, and Outcomes.”](#) NAADSN Policy Brief (3 April 2020).
- Têtu, Pierre-Louis and Frédéric Lasserre. « Projets d’investissements miniers chinois dans l’Arctique. » *Recherches sociographiques* 58/2 (2017) : 415–446.
- Têtu, Pierre-Louis and Frédéric Lasserre. “Chinese investment in Greenland’s mining industry: Toward a new framework for foreign direct investment.” *Extractive Industries and Societies* 4/3 (2017): 661-671.
- Têtu, Pierre-Louis and Frédéric Lasserre. « Géographie de l’approvisionnement chinois en minerai de nickel : le Grand Nord québécois est-il un territoire prioritaire pour les entreprises chinoises? » *Annales de Géographie* 714 (2017): 216-243.
- Tømmerbakke, Siri Gulliksen. [“Norwegian Foreign Intelligence Services: China and Russia the Biggest Threats Against Norway,”](#) *High North News*, 10 February 2020.
- Transport Canada. [“Drones in the Canadian Arctic.”](#) 12 December 2020.
- Tranter, Emma. [“QIA announces fees for tourism operators accessing Inuit-owned land.”](#) *Nunatsiag News*, 11 October 2019.
- United States Committee on the Marine Transportation System. [A Ten-Year Projection of Maritime Activity in the U.S. Arctic Region, 2020-2030](#). Washington: CMTS, September 2019.
- United States Coast Guard. [Arctic Strategy](#). Washington: USCG, 2019.
- United States Navy. *Arctic Roadmap 2014-2030*. Washington: Navy Task Force Climate Change, 2014.
- United States Navy. [Strategic Outlook for the Arctic](#). Washington: Chief of Naval Operations, January 2019.
- United States. White House. [“National Strategy for the Arctic Region.”](#) 10 May 2013.
- United States. White House. Presidential Directives NSPD-66/HSPD-25, “The Arctic Region.” 9 January 2009
- Van Pelt, T.I., H.P. Huntington, O.V. Romanenko, and F.J. Mueter. “The missing middle: central Arctic Ocean gaps in fishery research and science coordination.” *Marine Policy* 85 (2017): 79-86.
- VanderZwaag, David. “Governance of the Arctic Ocean Beyond National Jurisdiction: Cooperative Currents, Restless Sea,” in *Ocean Law Debates*, eds. Harry Scheiber, Nilufer Oral, and Moon-Sang Kwon, 401-418. Leiden: Brill Nijhoff, 2018.
- VanderZwaag, David. “Governance of Fisheries in the Central Arctic Ocean: Cooperative Currents, Foggy Future” in *Governing Marine Living Resources in the Polar Regions*, ed. Nengye Liu, Cassandra M Brooks and Tianbao Qin, 92-108. Cheltenham, UK: Edward Elgar 2019.
- VanderZwaag, David. “Edging Towards Principled Ocean Governance: Law of the Sea and Beyond” in *The Future of Ocean Governance and Training: Essays in Honour of Elisabeth Mann Borgese (1918-2002)*, 117-127. Leiden: Brill, 2018.
- Vermillion, Stephanie. [“Why It’s About to Become Much Easier to Reach Greenland,”](#) *AFAR*, 2 February 2020.
- Vullierme, Magali. [“Questions soulevées par les impacts de la crise de la COVID-19 sur les Rangers et sur les communautés du Nunavik.”](#) NAADSN Policy Brief (June 2020).
- Wilson Rowe, Elana, and Helge Blakkisrud. “A New Kind of Arctic Power? Russia’s Policy Discourses and Diplomatic Practices in the Circumpolar North.” *Geopolitics* 19/1 (2014): 66–85.

- Wilson Rowe, Elana. *Arctic Governance: Power in Cross-Border Cooperation*. Manchester: Manchester University Press, 2018.
- Wilson, Gary, and Heather Smith. "The Inuit Circumpolar Council in an era of global and local change." *International Journal* 66/4 (2011): 909-921.
- Wilson, Gary. "Inuit Diplomacy in the Circumpolar North." *Canadian Foreign Policy Journal* 13/3 (2007): 65-80.
- Young, Oran. "The Arctic Council at Twenty: How to Remain Effective in a Rapidly Changing Environment." *University of California Irvine Law Review* 6 (2016): 99-119.

ACKNOWLEDGMENTS

First and foremost, we would like to thank the support of the Mobilizing Insights in National Defence and Security (MINDS) program of the Canadian Department of National Defence which provides core funding for the North American and Arctic Defence and Security Network (NAADSN) from 2019-2022. Lead author Whitney Lackenbauer would also like to thank the Canada Research Chair program and Trent University for enabling his research activities.

This Canadian strategic foresight analysis report was inspired by the NATO Transformation Strategic Foresight Analysis (SFA) Team's work, and particularly the SFA Regional Perspective Workshop on the "Arctic and the High North" convened in Oslo in September 2019. We offer our particular thanks to Lieutenant Colonel Adam Rutherford, GBR Royal Marines, an analyst with the Strategic Plans and Policy Directorate, for his support and encouragement.

We are grateful to the participants in NAADSN virtual events held in October 2020 to solicit feedback on the draft report. These conversations not only strengthened the report, they also portend future discussions and debates about the themes and implications included herein. Thanks to Dr. Shannon Nash, the NAADSN network manager, for organizing these events, and to Jill Barclay for her notes as rapporteur.

Finally, our special thanks to Jennifer Arthur-Lackenbauer for designing and laying out this publication under extraordinary time constraints, and to Corah Hodgson for her careful proofread of the report.

IMAGE CREDITS

Baffin Fisheries Coalition: 62

Canadian Northern Economic Development Agency (CANNOR): xiv, xv

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC): 6, 23

Department of Fisheries and Oceans: 42

Department of National Defence: xiii, xvi, xix, xx-xxi, xxiii, 4, 14, 16, 27, 28, 35, 38, 41, 43, 44, 46, 47, 52, 58, 66, 68, 75, 77, 80, 83, 87, 89, 90, 91, 92,

Inuit Tapiriit Kanatami: 36, 72

Library of Parliament: 18, 32

Natural Resources Canada: 37

NORAD: 21, 84

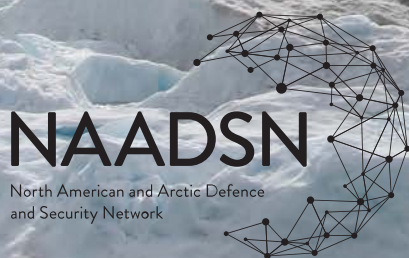
Oceans North: 56

Parks Canada: 61

Protection of the Arctic Marine Environment (PAME) Working Group, Arctic Council: 55

P. Whitney Lackenbauer: cover, ii, iii, iv, xxiv, 9, 10, 12, 24, 30, 64, 70, 78, 94

Qikiqtani Inuit Association: 73



NAADSN

North American and Arctic Defence
and Security Network