

CONFERENCE OF DEFENCE ASSOCIATIONS INSTITUTE

POLICY PAPERS



April 11, 2023

Canadian Climate Security: Implications and Ways Forward | Part 2

Mitchell Binding, Alexander Landry, Andrew D. McNaughton



CONFERENCE OF DEFENCE ASSOCIATIONS INSTITUTE

SINCE 1932

Conference of Defence Associations Institute

The Conference of Defence Associations Institute is a charitable and non-partisan organisation whose mandate is to provide research support to the CDA and promote informed public debate on security and defence issues and the vital role played by the Canadian Armed Forces.

Conference of Defence Associations Institute 75 Albert Street, suite 900
Ottawa, Ontario K1P 5E7 613 236 9903 www.cdainstitute.ca

Views expressed here are those of the authors and do not necessarily reflect those of the CDA Institute.

All logos and trademarks used are the property of their respective holders. Use in this publication is under non-commercial and normative fair use provisions of applicable Canadian law.

Institut de la Conférence des associations de la défense

L'Institut de la Conférence des associations de la défense est un organisme caritatif et non partisan dont le mandat est de fournir l'appui de recherches à la CAD, et de promouvoir le débat public sur les questions de sécurité et de défense, et le rôle essentiel des forces armées canadiennes.

Institut de la Conférence des associations de la défense 75 rue Albert,
bureau 900 Ottawa (Ontario) K1P 5E7 613 236 9903
www.cdainstitute.ca

Les opinions exprimées sont celles des auteurs, et ne reflètent pas nécessairement les opinions de L'Institut de la CAD.

Tous les logos et les marques de commerce utilisés sont la propriété de leurs détenteurs respectifs.

L'utilisation qui en est faite dans cette publication l'est en vertu des dispositions de la loi canadienne applicable sur l'utilisation équitable non commerciale et nominative.

CANADIAN CLIMATE SECURITY: IMPLICATIONS AND WAYS FORWARD | PART TWO



ABSTRACT

Part One of this climate security series introduced climate threats through the lens of security and stability followed by the strengths and weaknesses of Canada's capacity to adapt to those threats. Part Two applies Canadian adaptive capacities to the climate threats it will face in order to analyse the implications to Canadian security and consider those threats which will affect Canada the most. Fundamentally, this paper series demonstrates and assesses the relationship as *climate threats* (Part One) minus *adaptive capacity* (Part One) equals *implications* (Part Two).

Further building on this analysis, it will be demonstrated that, in order to address these implications effectively, Canada should utilize a Whole-of-Government (WoG) approach and leverage its proficiencies in the Defence, Diplomacy, and Development (3D) model to structure a more robust and bold response moving forward.

INTRODUCTION

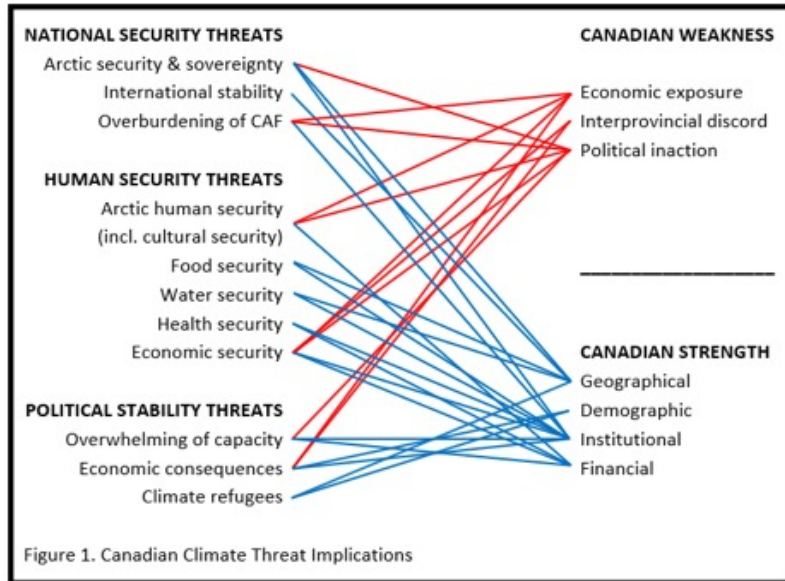
The benefit of a two-part series on the effects of climate change on Canadian security is that our ideas and arguments are tested by the time interval between publications. Specifically, the invasion of Ukraine by the Russian Federation in February 2022 has only exacerbated some of the issues intertwined with climate change, as Europe has faced an energy crisis since before the winter of 2022-23 that affected countries' commitments to emissions reductions, while countries in Africa and the Middle East have suffered from worsened food security as a result of a lack of Ukrainian grain exports.

Part One introduced climate threats through the lens of security and stability followed by the strengths and weaknesses of Canada's capacity to adapt to those threats.^[1] In brief, climate threats were grouped into those affecting national security, human security, and political stability. It was argued that Canada suffers weaknesses due to economic dependence on fossil fuel and resource extraction, as well as regional discord and political inaction. Nonetheless, it was found that Canada is well positioned to meet these threats due to its favourable geography, openness to immigration, and strong Canadian government and financial institutions. Accordingly, the second portion of this series will apply Canadian adaptive capacities to the climate threats it will face in order to analyse the implications to Canadian security and consider those threats which will affect Canada the most. It will then be demonstrated that, in order to address these implications effectively, Canada should utilize a Whole-of-Government (WoG) approach and leverage its proficiencies in the Defence, Diplomacy, and Development (3D) model.

IMPLICATIONS OF A CHANGING CLIMATE TO CANADA

Implications are widely discussed in the climate security literature, though many studies label worsened food and water security, increased pandemics, damaged infrastructure, and threats to political stability as the implications of climate change.^[2] One critical flaw of these studies is that they draw a direct line — equating these threats with their implications. Part One labelled these as climate threats resulting from the hazards of climate change, but not specifically as implications to Canadian security.^[3] If understood as an equation, these other studies formulate their results as *climate threats* equal *implications*, which lacks a layer of depth and applicability. As the Intergovernmental Panel on Climate Change (IPCC) observes, threats are not meaningful without also understanding vulnerability and adaptive capacity.^[4]

This paper series thus views the relationship as *climate threats* (Part One) minus *adaptive capacity* (Part One) equals *implications* (Part Two).^[5]



The first step is to outline the relationships between each threat and Canada’s capacity to address them. The complex interactions between Canada’s weaknesses and strengths and the climate threats upon which they will act can be difficult to keep straight conceptually, so it is helpful to observe these relationships visually. Figure 1 demonstrates the multifaceted ways that Canadian adaptation strengths and weaknesses

interact with climate threats as comprehensively assessed in Part One.

General impressions upon examining figure 1 are that, encouragingly, almost every threat is tied to more than one strength, thereby ensuring depth in addressing each threat by different avenues of approach. Predictably, the most well-connected strengths are geographical and institutional. The visual aid also effectively shows there are clusters where Canada’s adaptive capacity is the weakest. Weaknesses impact five climate threats specifically: national security and human security in the Arctic; human security and political stability related to economics; and overburdening of the Canadian Armed Forces (CAF).^[6] Of note, it does appear that economic security is double counted under threats, with an encore under weaknesses. This is due to there



being multiple threat interfaces where economic security may impact Canadian security — from climate hazards impacting almost every Canadian economic sector, but also the political interface whereby large portions of the population view climate policy itself as the economic threat.^[7] The complex nature of the climate threat to economic security thereby echoes in Canadian weaknesses in that economic exposure, unrelated to threats from climate change, has negatively affected Canada’s willingness to commit to climate change mitigation and adaptation efforts. Further analysis of these threats below will lead to the identification of overarching implications and suggested ways forward through the WoG approach.

IMPLICATIONS OF CLIMATE THREATS TO NATIONAL SECURITY

Part One of this series established the threats to Canadian national security as Arctic security and sovereignty, international instability, and the overburdening of the CAF. Examining these threats systematically, it becomes evident that some are both mitigated and exacerbated by the various strengths and weaknesses outlined above.

The threats to Canada in the Arctic and from international instability will initially be mitigated in part by Canadian geographical strength. Conversely, Arctic security and sovereignty will be weakened by Canada's geostrategic position. It is worth recalling Canada's geographic and geostrategic positions are not the same thing; while Canada will benefit from a "seat at the table" regarding Arctic matters due to its *geography*, and should ultimately benefit economically from increased activity in the North, Canada's ability to wield its influence to achieve its defence policy goals will be circumscribed by its *geostrategic* position vis-à-vis the US, China, Russia, and Europe.^[8]

As a function of its geographical advantage, Canada has so far utilized both the Arctic Council and bilateral diplomacy to achieve its Arctic policy ends. A shining example of this diplomatic tradition is the June 2022 resolution of the border dispute with Denmark (Greenland) over Hans Island, wherein the two countries agreed upon a land and maritime border (to include continental shelf rights).^[9] It is worth noting that the Arctic Council has formally closed official contact with Russia since March of 2022 as a result of Russia's invasion of Ukraine,^[10] although work within the UN Commission on the Limits of the Continental Shelf (CLCS) continues, having seen Russia's seabed claims data receive approving recommendation in February 2023 after more than 20 years of diplomacy within the United Nations body.^[11]

Weighed against this strength are other states' renewed interest and investment in the region, compared with Canada's relative lack of investment and political inaction. Russia has made significant investments in its defence infrastructure in its Arctic regions. Viewed as a potential strategic resource base (undersea resource extraction) as well as with the expectation the Northern Sea Route will be navigable year-round, the Northern Fleet and coast guard have benefited from substantial funding.^[12] It has been well-documented for several years that Russia has been building its Arctic military capacity.^[13]

Also troubling to national security is China's interest in the Arctic, particularly given Chinese acknowledgement that "the Arctic will become the economic crossroads and

geopolitical pivot of the globe... [and so China seeks] the absolute maximum amount of influence over Arctic affairs.”^[14] As a rising superpower, China’s influence is now identified by NATO as a future “challenge” to be addressed.^[15] Despite being a self-styled “Near-Arctic State,” the country has made more significant investments in its Arctic capabilities than Canada has as an Arctic State, planning for a “polar silk road” (primarily through Russia’s Arctic) with investments over \$90 billion so far in “Arctic infrastructure and assets.”^[16] With more nuclear icebreakers and submarines, the internal waterways and vast ocean of the Canadian Arctic open the door to potential intelligence-gathering activities, with some observers noting that “China keeps a close eye on the military activities of Arctic states in the Arctic.”^[17] To this effect, recent Department of National Defence (DND) and CAF reports of Chinese efforts to conduct surveillance operations in Canadian Arctic airspace and waters serve as examples of China’s growing operations in the area.



However, while there is disagreement as to the true intentions of China in the Arctic, most experts do not believe that the primary threat will be militaristic and will instead be economic and diplomatic.^[18] Toward this end, China seeks not only to ensure its access to maritime navigation routes through the region, it also has “already penetrated parts of Canada’s Arctic resource sector.”^[19] China currently owns and operates resource mines in Canada and utilises the

Northwest Passage (NWP) to ship these resources to China; there have long been concerns with Chinese infrastructure investments and their potential for “dual-use.”^[20]

From these trends emerges the requirement that Canada demonstrate a credible deterrent to its adversaries “harassing [its] military and commercial aircraft and ships in and around the Arctic,” not seeking to “engage in offensive operations, but fully prepared to defend its interests.”^[21] Yet, the trend has been that Canadian decision makers do not “take Arctic sovereignty issues seriously,” as demonstrated by the long-delayed and substantially scaled-back Nanisivik Naval Facility, according to well-known Arctic scholar Rob Huebert.^[22]

Turning to other aspects of national security, while international instability, perhaps misleadingly, occupies little space in figure 1, the amplitude of instability and frequency of events may nevertheless have significant impacts on Canadian security, especially insofar as it impacts key allies and “pivotal” nations.^[23] A major implication is that Canada should invest in efforts to prevent instability abroad by continuing to exercise its expeditionary strategic tradition,

as well as its critical intelligence capacity for anticipating specific climate threats that undermine stability and Canadian security.^[24] Toward this end, the new NATO Climate Change and Security Centre of Excellence (CCASCOE) offers a platform where Allies can exchange expertise and best practices collectively on the specific topic of climate change towards NATO's overall goals of defence and deterrence, crisis prevention, and cooperative security.

One significant issue facing the CAF in responding to international stability missions and increased domestic emergency response operations is its lack of capacity. This was made clear by the Chief of Defence Staff (CDS) in October 2022 in his Directive for CAF Reconstitution, even while mandating that the CAF continue to be prepared to “deliver... domestic humanitarian assistance and disaster response.”^[25] Specific to climate change implications, these shortcomings will be mitigated somewhat by the institutional strength of the Canadian government insofar as policy tools and better adaptation funding can be effectively leveraged.^[26] As such, weaknesses to this effect will be intensified by economic exposure, since, as discussed previously, pinched federal budgets will inevitably hurt the defence funding envelope. Furthermore, political inaction remains a weakness that threatens CAF capability if critical projects are not followed through.^[27] The implication here is that, given the government's reliance on the military during international and domestic crises, the CAF and other security agencies must be funded to a level fit for purpose. The pandemic highlighted personnel shortfalls that are exacerbated by the accelerating pace of international and domestic obligations that are usually in conflict with each other. This pressure point has been evident in previous years as simultaneous domestic responses have been engaged for natural disasters, as well as most recently in spring 2022 when Canada was called to place 3,400 troops on standby as part of NATO's potential response to the Russian invasion of Ukraine. As such, the CAF must be able to meet treaty obligations in line with the concepts discussed above as well as those domestic emergency response missions should the government continue to use the CAF in this capacity.

Accordingly, while Canada's Arctic security will benefit from its institutional strength (reference strong institutional relationships between government departments and a strong diplomatic tradition), it will be weakened by political inaction (reference promises for defence expenditures which often never materialize).^[28] A key implication is that, to mitigate funding shortfalls, Canada needs to better leverage its relations with close allies while enacting bolder policy at home — specifically in continental defence. Initiatives to this effect include Canada's renewed funding of NORAD modernization over the next five years, as well as Canada's commitment to hosting the CCASCOE.^[29] As NATO seeks to become the leading organization in analyzing and mitigating the impact of climate change on security, the CCASCOE will provide an opportunity for Canada to have a strong voice and to take action toward these threats, underlined by the visit of the Secretary General to the Canadian Arctic in August 2022 which

reflected a recognition of the effect climate change has on the region when it comes to security.^[30] Overall, the notion of cooperation with allied nations fits neatly in the concept of Canada exercising its “middlepowermanship.”^[31] Where Canadian governments find policy difficult to enact alone, they can make up by exercising influence in international forums. This influence, however, is only strong and effective if it is backed up by real investment of time and money.

These factors — increased competition in and for the Arctic, increased international stability and conflict, and decreased CAF capability to respond to these threats — will pose significant challenges as climate change continues. Canadian strengths, primarily geographical and institutional, provide the avenue for neutralizing these threats while working to overcome weaknesses in economic exposure and political inaction.

IMPLICATIONS OF CLIMATE THREATS TO HUMAN SECURITY

Part One found the primary threats to human security were food and water security in both the Canadian North and South, health security, and economic security.^[32] Recent analyses have placed food and water security as the most urgent of climate threats globally, predicting them to be “significant-to-catastrophic in the next two decades.”^[33] There are several reasons why Canada is well



positioned to respond to this threat in particular. Geographically, Canada will be spared the worst impacts of climate change and in some limited cases will benefit. Rising sea levels, despite Canada’s long coastline, will not be as damaging as they will be to other countries, and a warmer climate will increase the arable and habitable zone within Canadian borders. Institutionally, Canada will also be well-placed to meet threats to food and water security, with a reasonable social safety net and strong safeguards for environmental protections related to water.^[34] The implication here is that it will remain important to protect vulnerable populations from food price spikes and reduced access, but these will not manifest as existential threats to Canada as they will to other nations.^[35]

Health security, too, has been identified as a major threat. As per figure 1, no weaknesses in Part One specifically applied to this threat, yet it remains apparent in the wake of COVID-19 that all countries have significant room for improvement to better prepare for and adapt to global pandemics, including Canada — and geography will not protect it. Furthermore, it became apparent that Canada suffers from a lack of domestic production capacity, both in

Personal Protective Equipment and vaccine production. Consequently, Canada paid a premium to gain access.^[36] However, this fact at least demonstrates the benefit of Canadian financial strength, allowing it to protect its interests in a way less well-off countries would find impossible.^[37] Canada also benefits from institutional strength in its strong public health agencies and tendency for political figures to defer to public health authorities when appropriate.^[38] Yet, the healthcare system itself underwent massive strain throughout the pandemic and arguably has not yet recovered, as evidenced by the overflowing emergency rooms, exceptionally long wait times for medical procedures, and healthcare staff burnout and attrition.^[39] The implication for health security is that Canada needs to invest in stronger public health capacity, technology, domestic production, as well as carefully safeguarding the respect of institutions, but it likely will not present a primary security threat.

So, while the above threats to human security are indeed serious (and unquestionably require action), the adaptive capacity Canada possesses for dealing with them signifies they will not embody the most serious threats, which will instead likely be Arctic human security and national economic security.^[40] The institutional strength from which Canada benefits is stretched thin in the Arctic and needs urgent bolstering. Canadian financial strength could also alleviate threats to Arctic infrastructure, food and water security, and cultural security, but the political focus has historically neglected this region — especially regarding critical development shortfalls — so this strength cannot genuinely be applied to the Arctic thus far.^[41]

This highlights a major weakness toward the Arctic: political inaction. Political leaders have for decades promised investments in the Arctic, both in hard security infrastructure and in human security and development.^[42] Some investments are only now beginning to produce results, but the fulfillment rate remains low.^[43] The implication is that investments in security and safety measures like the Arctic and Offshore Patrol Ships (AOPS), increased CAF presence, and better tracking abilities through RADARSAT are necessary but not sufficient; more sustained investment in basic infrastructure and social capital is still needed.^[44] This inaction stands in contrast to other Arctic states. We have already explored the adversarial nature of Russian and Chinese investment and interest in the region, but Norway also provides valuable insight into investment in the Arctic. This country has much in common with Canadian energy-environment issues insofar as both economies rely to a significant extent on oil and gas to fuel their economies yet have generally progressive movements and governments pushing to move away from the reliance on high-emission energy sources. Norway presents an excellent example, then, by assertively investing in its energy transition while continuing to provide oil and natural gas to Europe (even more so since Russia's invasion of Ukraine), supporting Northern communities, and defending its Northern waters.^[45]

As such, political inaction segues well to economic security. The climate threat to economic security will be hastened by almost all of the weaknesses discussed in Part One. Economic exposure, provincial discord over climate and energy policy, and the resulting distrust in Western provinces of the federal government’s intentions regarding the energy sector have continued to foster alienation.^[46] While Part One detailed the effects of ignoring domestic economic realities while striving for reduced emissions, the implication here is that the advancement of climate policies must balance economic security if Canada is to protect the human security of its whole population. Otherwise, there is a risk of creating more human security risks than necessary. Major projects to solve this issue in the Canadian South will take a considerable amount of time and money, but the solution needs to take into account the construction of better energy infrastructure and access in the Arctic as well.

IMPLICATIONS OF CLIMATE THREATS TO POLITICAL STABILITY

Part One explored those climate threats to human security that could engender political stability risks if the threats are not seen by those affected to be taken seriously. This is expected to be more so where climate policy is at odds with local priorities or where the government is seen as the source of economic woes and harm to livelihoods.^[47]

Canada’s political inaction may weaken its adaptation to economic security challenges, further deteriorating political stability from economic exposure in the energy and resource sectors, interprovincial discord, and distrust of institutions. This will be particularly so where there is a perception that the economic consequences are worsened by the federal government; in the latter stages of COVID-19



lockdowns, Canada's institutional response eventually led to “Freedom Convoys” and protests across the country, culminating in Prime Minister Trudeau invoking the Emergencies Act.^[48] The implication is that political consensus is absolutely crucial to resolve the energy-environment impasse towards ensuring the future security and well-being of Canada.

These risks to political stability are otherwise lessened by strengths in government and financial institutions. The Emergencies Act Inquiry was conducted in order to hold the government accountable and likely succeeded in ensuring future governments restrain themselves from overstepping while continuing to have the tools to maintain political stability.

Moreover, polls have found that a strong majority of Canadians believe the government utilized the Act appropriately in the circumstances.^[49]

Canada also demonstrates other institutional strengths against instability. While economic insecurity and weaknesses could lead to unrest and anger amongst affected populations, the Canadian government has stepped up its commitments to progress on the energy-environment challenge.^[50] In further support of this strength, Canada has a stable and efficient financial system to safeguard political stability and to continue to invest in the development of technologies for mitigation and adaptation.^[51]

Canada's demographic strength will also aid in countering economic stagnation (and its consequent political ramifications) insofar as its historically beneficial view of higher immigration rates mitigating the aging populations seen in developed countries. The obvious caveat is that immigration levels and societal integration are interlocking components that must be equally addressed to avoid becoming their own source of political instability. The threat to political stability from climate refugees is an extension of the caveat to demographic strength; there are risks to accepting too many refugees at a time or ineffectively integrating them.^[52] However, this threat is concerning only if migrant flows are uncontrolled, which remains unlikely based on the strength of Canada's geographic position as well as vast and underpopulated areas for settlement. These geographic characteristics, in turn, provide Canada with a high absorptive capacity for immigrants, which allows for a more resilient system than other recipient countries; moreover, Canada's institutional strengths assure a well-adapted structure for integrating refugees and immigrants.^[53] To this effect, further benefits will be a strengthened diplomatic position, as accepting refugees may relieve pressure from allies. This discussion implies Canada should not only welcome climate migrants, but embrace the opportunity to benefit its economy, its allies, and its reputation as a humanitarian leader.

Part One also discussed the threat to political stability from an overwhelming burden on governance capacity from climate disasters. It was found, however, that Canadian institutional and financial strengths are expected to be up to the task of mitigating this threat, particularly since there are no countervailing weaknesses to derail efforts. In fact, political action regarding this threat has been reasonably forthcoming, and Canada has already established numerous institutional and financial tools in anticipation of disasters.^[54] Most recently, the Ministry of Public Safety and Emergency Preparedness underlined such a commitment in May 2022 with their announcement of the Humanitarian Workforce Program. This program, relying on funding of NGOs such as the Red Cross and St John Ambulance, is designed to “strengthen the preparedness and emergency response capacity in Canada by leveraging the contributions of the NGOs, as well as by enhancing whole-of-society collaboration.”^[55] The implication here is that

Canada should invest in disaster management capacity for the sake of citizen safety, but not fear the security implications as such.

OVERARCHING IMPLICATIONS

Based upon the examination of these relationships in the preceding sections, with the help of figure 1, it becomes apparent that the threats with the most weaknesses are tied to the Arctic (both national and human security) and economic threats (human security and political stability). Human security will be notably threatened, both at home and abroad, with the migration, economic, and political stability implications that accompany it. In fact, likely the largest threat to national security militarily will be the response to human security — the overburdening of the CAF due to domestic emergency response, which will impact operations and training.^[56] In the October 2022 Reconstitution Directive, the CAF announced a major shift in its posture and is now prioritizing the training and education of its members, as CAF personnel and readiness levels have now dropped to a point that have imperiled future operations, both domestic and expeditionary.^[57]

Challenges to economic security are among the biggest threats to Canada, and economic exposure is one of its main weaknesses in dealing with climate threats. An implication is that government policy should not prioritize climate change mitigation at the expense of adaptation and economic security — this would be counterproductive. Favouring reduction targets at the expense of domestic economic sectors risks alienating segments of the population, leading to political and electoral ramifications, thereby likely delaying target fulfillment. A difficult balance must be struck, as Canada has faced international scorn for favouring its economic health over mitigation efforts to assist other countries that are existentially threatened by climate change. As a multilateralist nation that values “having a seat at the table,” this international scorn has diplomatic consequences for Canada, and results in a diminished ability to wield other political tools abroad.^[58]

It is imperative to note the point of these implications is not to suggest that a lack of weakness amplifying a climate threat means there is no need for action on that front. Furthermore, many of these threats will be simultaneous, creating a need for much faster, more decisive actions on issues that already exist but could create crises due simply to an accelerated pace of change.^[59] Beginning in 2020 and continuing into 2023, the global pandemic, social unrest, conventional war involving a major power, and rampant inflation followed by recession all happened in quick succession. Climate threats will be the same. These types of crises are often concurrent and convergent. Indeed, many of these phenomena build off of each other,



creating second-order effects on energy and food security around the world.^[60] In the same sense, Canada will likely not have the privilege of separately addressing threats to Arctic sovereignty, international instability, rampant costs related to disaster rebuilding, and climate refugees.^[61] Moreover, the CAF may not be available as a last resort such as it has been on multiple occasions for different versions of Operations LENTUS, LASER, or VECTOR, as the military organization

is not currently suited to handle so many different operations concurrently, particularly as a result of the aforementioned “Directive on CAF Reconstitution.” As such, the final implication is that Canadian academics and policymakers must ponder these threats not as individual phenomena but as an approaching behemoth of threats that will need to be confronted in an integrated way.

WAYS FORWARD

An integrated approach is exactly what is called for.^[62] While some approach climate and Arctic security through a primarily military lens,^[63] the wider community supports a Whole-of-Government (WoG) approach.^[64] Canada is generally recognized as having coined the Defence, Diplomacy, and Development concept (3D) — itself one of the better-known approaches to WoG.^[65] Indeed, Canada has been leveraging the 3D approach in its expeditionary and stability operations for nearly two decades.^[66] As such, those in diplomatic and developmental circles, alongside the CAF, DND, and Global Affairs Canada (GAC), may draw on this experience and use it in a united front against climate threats.^[67]

We propose the 3D framework because it provides a systematic, three-pronged approach to ensure an effective solution to Canadian climate security problems. Although the 3D approach is utilized primarily abroad, it remains equally applicable to domestic climate security, as it has been shown that domestic crises may resemble those Canada has been called upon to confront in support of allies on an expeditionary basis.^[68] By applying the 3D concept to the implications elucidated above, this paper suggests several possible ways forward.

DEFENCE

There is a necessity to invest in improving military capabilities as the CAF continues to see increased demand for deployments domestically and abroad. The argument was earlier

made that climate change, and its effects on intermediary social factors, will breed instability in less developed regions.^[69] Canada should continue to focus efforts on facilitating stability and Security Sector Reform (SSR), but also specifically threats to water and food security.^[70] Where conflict is imminent or already ongoing, Canada should continue to contribute troops to minimize instability and its accompanying risks of regional spread and refugee flows.

An important example may be Central America and Mexico.^[71] Climate change currently poses a substantial threat to the region, leading to potential security implications to both the US and Canada as both immigration and refugee flows increase, yet Central America does not typically constitute a large portion of Canadian defence calculus.^[72] However, as climate disasters hit equatorial and underdeveloped countries particularly hard, it will prove beneficial to focus some defence energy on Mexico and Central America.^[73] Should the CAF recover its readiness levels, it could provide training to increase institutional resilience as well as best practices in responding to climate-related disasters.

These imperatives, both in this hemisphere and overseas, will require continued investment in CAF expeditionary capability across the spectrum of operations — from Humanitarian Assistance and Disaster Recovery (HADR), SSR, advisory missions, bolstering of Operational Support Hubs, as well as peace support operations and combat.^[74] These important investments will be required if Canada is going to succeed at contributing to international stability — a key element of safeguarding national security interests and contributing to Canadian international objectives.^[75]

Regarding the Arctic, while the need for warfighting equipment is often disputed, most experts advocate, at the bare minimum, investing in and expanding military capabilities; this should include logistical vehicles and equipment better suited and more resilient toward the growing impacts of climate change on the environment, renewed focus on infrastructure in the region, as well as investments in Arctic-capable ships and the ports to accommodate and service them.^[76] Improved surveillance of maritime approaches is considered an absolutely crucial component to securing Northern sovereignty and security; attempts to protect Arctic sovereignty are useless if Canada does not maintain situational awareness of the domain.^[77] Communications infrastructure is similarly important.^[78] Furthermore, NORAD is still using decades-old surveillance technology and requires significant investment in infrastructure and military equipment.^[79] Investments in these fields were included in the 2017 Defence Policy and are starting to bear fruit — providing important services to multiple government departments in the Arctic and benefits to the Canadian space, technology, industrial, and defence sectors — but still have a significant way to go.^[80]



While the military will remain the most muscular and operationally flexible instrument of government, it is rarely the lead agency on the ground in Canadian domestic operations. Emphasizing the WoG approach, Canada has other tools for domestic “defence” that are important, and indeed critical, to incorporate. Experts tend to agree that “cooperation between civilian and military actors is a crucial, if not the most important, capability in emergency situations.”^[81] Yet, domestic relief operations can be very ad hoc as government departments struggle to integrate capabilities across both military and civilian resources that do not often work together. Adding to the milieu, the Government of Canada has begun funding NGOs for capacity building and emergency response since 2022 under the umbrella of the *Humanitarian Workforce Program*, but this ground-up approach will require significant and sustained funding and recruitment over the next few years as climate disasters grow in seriousness.^[82] Further codification of lessons learned during these experiences, as well as military Operations NANOOK, NUNALIVUT, and NUNAKPUT, which integrate with other government departments in the North, are a valuable proving ground for what is working in a WoG framework and what is not.^[83]

Policymakers should further consider the important role federal agencies like the Canadian Coast Guard, Royal Canadian Mounted Police, Canadian Border Services Agency, Public Safety, Transport Canada, Global Affairs Canada, and Fisheries and Oceans Canada play

in defending Canada's sovereignty in the North.^[84] Each of these departments needs the proper investment and training to properly execute their mandates and to integrate more effectively into a WoG emergency management model. An especially important example would be the investment in more and better CCG icebreakers as well as the deep-sea ports to accommodate them as a *fundamental* capability for being able to operate in, and assert control over, the Arctic.^[85] This will have WoG benefits for commerce and trade, surveillance and environmental stewardship, transporting enforcement officials from other government departments on their own enforcement missions, as well as providing a more cost-effective way to support the CAF in its Northern operations.^[86]

The Canadian Rangers are also an immensely important resource for extending CAF reach in the Arctic and maintaining a strong link to Northern communities.^[87] P. Whitney Lackenbauer and Peter Kikkert, prominent Arctic scholars, have argued that “the Rangers represent a successful integration of national security and sovereignty agendas with community-based activities and local stewardship.”^[88] Particularly considering their already successful establishment in the North and its communities, the potential to further leverage them as a key stakeholder must be considered; however, some Northern scholars have argued that given small community sizes in the Arctic, the argument that the Rangers could be expanded is not realistic.^[89] A better solution would likely be to continue to fund their training and equipment, and increase the amount of departmental collaboration with this important group, focusing on “expansion of capability... rather than expanding the number of Rangers.”^[90] Comprehensive collaboration with these Northern communities and stakeholders is especially crucial, as “southern solutions’ don’t necessarily work for northern situations — many solutions assume an infrastructure that may not exist.”^[91]

The WoG argument is at least as important for disaster management in the Canadian South. The CAF is already called upon regularly for support in crises and this trend is expected to continue.^[92] Christian Leuprecht has examined several different avenues for improving CAF capability, with the most beneficial being the expansion of the reserve component for disaster response.^[93] With competing demands from international events and the extensive training that high-readiness troops require, the utilization of the reserve force for backfilling domestic emergency response is a more viable concept. Authors such as Vincent Lussier have also discussed using the Army Reserves within the scope of national security and emergency management; it is a concept that the US already heavily leverages with National Guard units generally being first on call to address natural disasters.^[94] With primary reserve regiments located in most communities in the Canadian south, there is a pool of resources that can be deployed to regions in dire need, specifically within closer reach than from the generally distant major Canadian Forces Bases. This reinvigorated focus on supporting communities and their

resilience to crises may provide one solution to the recruitment shortfalls experienced by the CAF in recent years.^[95] That said, this important solution will require funding and accepting at a political level the need for an integrated, technologically capable, and potentially larger military.^[96]

DIPLOMACY

There are diplomatic measures to be prioritized both internationally and domestically. In Part One, and in our analysis of the implications to national security in the first half of this paper, we reiterated the threat of armed attack to Canada remains minute, and that military solutions may in some cases worsen the situation with our closest allies.^[97] The largest threat to Canadian sovereignty remains disagreement from adversaries and allies alike on the legitimacy of Canadian maritime claims, specifically regarding the NWP and its status as either internal waters or an international strait. On this front, diplomatic cooperation amongst Arctic and “near-Arctic” states presents opportunities and limits the risks of exclusively military or arbitral approaches. Canada was the driving force behind the establishment of the Arctic Council, enabling “cooperation, coordination and interaction” amongst the eight Arctic states.^[98] As such, the Arctic Council is widely seen among Northern stakeholders as a valuable tool that Canada should employ to better effect.^[99] It is recognized that Russia has lost credibility as an honest actor on the international stage, which must include its dealings in the North and on the Arctic Council. Nonetheless, many mutually beneficial victories can be won with the other “Arctic seven,” and may provide a constructive avenue for dealing with an adversarial Russia in the future.^[100]

Most importantly, heavy lifting will need to be done diplomatically with American and European allies to protect Canadian interests.^[101] The best path forward is to work with the US to jointly manage the security of the Arctic within the broader continental defence picture.^[102] Canada can maintain its legal position that the NWP constitutes internal waters while governing as though it is an international strait — a way forward that protects the strategic interests of both Canada and its most important ally, and importantly, frees up resources for Northern development, while still maintaining security and control over the territory.^[103]

Beyond the Arctic, diplomatic innovation will be required as Canada seeks to renew its leadership on the global stage in other forums as well. Canada has a tough road ahead, especially since its failed bid for a seat on the UN Security Council in 2020 and its exclusion from AUKUS, the trilateral security pact between the US, UK, and Australia, in 2021. To complicate Canada’s position further, “the world today is becoming more multipolar and less multilateral,” a reality that will inhibit Canada’s role as a middle power.^[104]

Nonetheless, there remain several diplomatic levers to employ. First, the prioritization and funding of NORAD as part of a broader Arctic security framework will be important, both in its primary conception as an air and space domain, but also in more novel ways such as maritime domain awareness. Second, Canada should increase its contributions to NATO by increasing defence spending and providing troops to expeditionary operations while also supporting initiatives such as the NATO CCASCOE in Montreal.^[105] Further, Canada should continue to seek troop-contributing opportunities with the UN toward climate-related conflicts in hard-hit areas. This is a clear way to exercise Canada's expeditionary strategic tradition and the 3D model (congruent with both *defence* and *development* approaches) and focus on “problem” areas at their place of origin — working to reduce refugee flows while continuing to resettle those who are still forced to migrate.



On the domestic front, and drawing again from the implications of climate threats to political stability, federal-provincial and inter-provincial diplomacy will only continue to gain importance. Following indications of escalating Western alienation after the two most recent federal elections, Prime Minister Trudeau promoted one of his strongest Ministers to Deputy Prime Minister and simultaneously Minister of Intergovernmental Affairs. This move signified the recognition that national political unity had suffered, and that renewed focus was required to prevent further damage while attempting to mend the political rift between the Western provinces and Ottawa. Ironically, this may prove even more difficult following the by-election victory of Albertan Premier Danielle Smith in October 2022 on a relatively anti-federal campaign platform. Nevertheless, outreach to the West must continue in earnest to strengthen the ties among provincial and federal entities. Further domestic diplomacy will be required as Canada continues to ameliorate its relationship with its Indigenous communities and their traditional land and cultural rights, an issue that will continue to grow in importance as more of the country looks northward for economic opportunity.^[106] As seen in the 3D approach itself, one area of focus cannot come at the cost of the other; the way forward must be holistic and achievable for all Canadians. The focus on national unity in the face of divergent regional interests will be critical to maintain and improve moving forward.

DEVELOPMENT

Internationally, Canada has ample opportunity to aid vulnerable countries in developing adaptive capacity to better prepare for climate crises; such efforts will be beneficial in “reducing the likelihood of conflict and thus forced migration outflows.”^[107] Canada is in a good position to continue its history of working with other countries regarding governance, SSR,

and economic issues, but also with a focus on resilience to food and water threats and disaster preparedness — alongside those same focuses in the defence discussion.^[108] It is worth underlining that international climate finance should continue to be an important avenue through which Canada supports vulnerable countries, notably through the \$5.3 billion commitment over five years declared in 2021 at the G7 Leaders’ Summit.^[109] Nevertheless, significant hurdles remain in this area both for Canada and the international community considering the political impasse at the subsequent COP27 regarding a climate loss and damage fund for developing countries, as well as the failure to reach a new agreement regarding the reduction of fossil fuels.^[110]

Perhaps unexpectedly, there is just as much developmental work to do domestically. In the Arctic, physical and social investment as well as economic and technological innovation are critical to safeguarding national and human security moving forward. According to the National Indigenous Economic Development Board, the region still has huge development needs in “port facilities, runways, roads, bridges, telecommunications, housing, [and] energy,” even before considering aspirational goals of Net Zero Emissions infrastructure.^[111] The Premiers of the Yukon, Northwest Territories, and Nunavut, in their still-relevant 2007 pan-territorial action plan, articulated that Northern sovereignty was built on “robust infrastructures, educated and capable populations, and lower cost of living.”^[112] Even improving the region’s maps to modern standards would provide substantial benefit.^[113] These investments are important for both national and human security in the North.

Development in the Canadian South should focus on economic and technological innovations to facilitate energy transition and emissions reduction across industries. Canada often views itself as an energy superpower and should work towards fortifying such a role given its expertise in nuclear technology, including CANDU technology and the promising Small Modular Reactor.^[114] Investments have already been made and should continue in the development of promising hydrogen energy.^[115] These efforts only further gain importance considering the energy crisis among our allies in 2022-23 as a result of energy dependence on adversarial nations. Further, the IPCC calls for innovations in emissions-reduction technology like Carbon Capture and Storage, where Canada is already establishing a leading role.^[116] As such, this approach will have widespread benefits for contributing to Canadian efforts to reduce emissions and the effects of climate change, while also mitigating the threat to economic security and potential national disunity.^[117] Lastly, as in the Arctic, development of more resilient critical infrastructure in key risk areas and hard-hit communities is an important step to safeguarding Canadians.^[118]

These three prongs — defence, diplomacy, and development — already have many elements in place, with a degree of integration also present within government operations. The most important factor in moving forward is to tie these three prongs together with political solutions and consensus.^[119] The national discourse is, fortunately, well past debating whether climate change is real or whether there will be consequences. However, both climate and defence policies are often politicized along partisan lines and tend to change with electoral cycles.^[120] If Canada is to minimize its weaknesses and more effectively leverage its strengths to respond to climate threats, consensus will be fundamental.^[121]

Building and strengthening consensus will alleviate interprovincial discord and distrust of government intentions. Investments in hard-hit regions should be well-received across the country if they facilitate a “just” carbon-free transition and protect livelihoods. However, economic transitions are not straightforward; the economies that sustain regions contribute to regional identity and values, something that cannot be changed overnight and must be supported in transition.^[122]

Identifying “no regrets” policies that benefit stakeholders whether or not they suffer directly from climate disasters will provide obvious avenues for adaptation, as they improve cooperation and will prove beneficial across a variety of possible scenarios.^[123] Comprehensive economic studies have shown pathways to achieving net-zero emissions while maintaining a strong economy and implementing many of the suggestions put forth in this paper.^[124] One of the most important ways to move forward, building political consensus along the way, is through effective policy and economics that do not leave anyone behind. This must include Canadians from the West Coast, through the Prairies, Ontario, Quebec, the Maritimes, the Canadian North, and Indigenous Canadians across the country. Meeting these disparate security needs will require a comprehensive plan moving forward and bold political action. Fundamentally, in an expeditionary 3D model, it remains critical to sustain political will at home for the mission; the observation remains relevant within Canada.^[125]

CONCLUSION

Moving forward, the strategic problems Canada faces will only be exacerbated by climate change and its resultant threats, thereby rendering Canadian security more complex and difficult. Climate change remains a “threat multiplier.”^[126] However, climate change will create its own threats that require their own countermeasures, such as widespread threats to infrastructure, increased domestic operations wearing out the CAF, threats to global health, and economic threats from industrial and energy transition.

In order to analyse the implications of climate change to Canadian security, Part One of this series examined three categories of climate threats facing Canada: national security threats, including Arctic sovereignty and security and international stability; human security threats, including food, water, health, and economic security, especially in the Arctic; and political stability threats, including from economic consequences, government capacity overrun, and climate refugees.

In addressing each of these threats, both national weaknesses and strengths were examined, thereby delivering figure 1 as a referential product. Weaknesses included economic exposure, political inaction, and interprovincial discord. Strengths included geographic position, demographics and immigration, and institutional and financial assets.

In Part Two, we applied the adaptive capacity embodied in Canadian strengths and weaknesses to the climate threats discussed in Part One, thereby providing a deeper analysis of the implications to Canadian security from the changing climate. We have argued that the most serious threats are to economic security and to the Canadian Arctic. Further, international stability and overburdening of the CAF are both key areas that, if not addressed, will pose serious risks as well. The suggested ways forward centre on the 3D framework and were rounded out with a call for political consensus and bold policy action — with an appeal to “not leave anyone behind.”



We have endeavoured to contribute to the field of Canadian climate security by undertaking a more holistic view of Canadian security. However, prioritising a structured analysis methodology for examining threats, weaknesses, strengths, and implications resulted in some shoehorning considering the size of this topic and the scope of this paper. It should be noted that there was insufficient space for proper discussion of certain issues, specifically Arctic human security and

Indigenous cultural security, and it was outside the scope of this paper to address solutions to Canadian weaknesses discussed in Part One. Further research could examine and expand upon the policy suggestions put forth. The economic focus in this paper could receive particular scrutiny from researchers with an economic background. Comparative case studies will continue to be useful, perhaps regarding Norway, New Zealand, or the Netherlands — all of which have numerous similarities to the Canadian context. On the defence side, we note that the Canadian

Army has conducted climate threat modelling and operational analysis; the Royal Canadian Navy and Royal Canadian Air Force should do the same.^[127]

Canada has demonstrated on many occasions throughout its comparatively short history that it can rise to the challenge. Examples include the call to arms of the First and Second World Wars, Canada's commitment to peacekeeping throughout the latter half of the last century, and its position as a stalwart ally during the Global War on Terror. With the NATO 2022 Strategic Concept recognizing climate change as a "defining challenge of our time," it is clear that Canada once again has the opportunity to rally around the flag and demonstrate its commitment to its security, its people, and the environment. If Canadian politicians, defence professionals, and citizens take seriously the threats discussed in this paper and invest in the suggested solutions, Canada should be well-prepared to deal with all three categories of climate security threats. If they do not, and are forced to react instead of pre-empt, there will be significant and adverse implications to Canadian security and the livelihoods of Canadians in the decades to come.

AUTHOR BIOGRAPHIES:

Mitchell Binding is a pilot and Air Mission Commander at 408 Tactical Helicopter Squadron in Edmonton, Alberta. He completed his Bachelor of Arts in Military and Strategic Studies at the Royal Military College of Canada and his Master of Arts in International Relations and Contemporary War at King's College London, UK. His most important research has focused on climate security as well as Russian threat perceptions. He has deployed numerous times on Operation LENTUS to support over-burdened provincial emergency management during wildfires and severe floods. He also has two amazing kids that will be living with the effects of climate change for decades to come.

Alexander Landry is a Canadian military officer currently serving a rotation at NATO's Allied Land Command in Izmir, Türkiye. He completed his Bachelor of Chemical Engineering at the Royal Military College of Canada, his Master of Business Administration at the University of Fredericton, and is currently pursuing a Master of Arts in International Affairs and Strategic Studies at King's College London, UK. Alexander currently serves as the Doctrine and Terminology Panel Chair for the NATO Environmental Protection Working Group, and has come to know climate change as one of the defining challenges NATO faces. His research focuses primarily on community emergency management and security studies.

Andrew D. McNaughton is a CH-147 Chinook pilot at 450 Tactical Helicopter Squadron in Petawawa, Ontario. He completed his Bachelor of Arts in Military and Strategic Studies at the Royal Military College of Canada and his Master of Arts in War Studies (Air Power in the Modern World) at King's College London, UK. His research interests and publications focus on historical and contemporary Canadian air power issues. He has deployed air operations experience on Operation SOPRANO, the Canadian contribution to the United Nations Mission in South Sudan.

BIBLIOGRAPHY

[1] Mitchell Binding, “What Threats Does Climate Change Pose to Canada and How Are We Situated To Face Those Threats? Part One,” CDA Institute Vimy Paper 50 (March 2022), <https://cdainstitute.ca/wp-content/uploads/2022/04/VIMY-PAPER-VOL-50-Edited.pdf>.

[2] Gordon A. McBean, “Preface,” in *The Security of Canada and Canadians: Implications of Climate Change*, (London, ON: University of Western Ontario, 2010), iii, https://www.ivey.uwo.ca/cmsmedia/202722/climate_security_final.pdf; Steve Brock et al., “The World Climate and Security Report 2020,” (International Military Council on Climate and Security, 2020), 137, https://imccs.org/wp-content/uploads/2020/02/World-Climate-Security-Report-2020_2_13.pdf; Kate Guy et al., *A Security Threat Assessment of Global Climate Change: How Likely Warming Scenarios Indicate a Catastrophic Security Future* (Washington, DC: Center for Climate and Security, 2020); Library of Parliament, *Climate Change: Its Impact and Policy Implications* (Ottawa: Library of Parliament, 2020), <https://lop.parl.ca/staticfiles/PublicWebsite/Home/ResearchPublications/BackgroundPapers/PDF/2019-46-e.pdf>.

[3] The implications in these studies result from climate hazards, i.e., extreme weather patterns, droughts, sea-level rise, etc. We do not draw a line from hazards to impacts as we view the discussion of specific climate hazards as outside the scope of this paper. Our starting point for the analysis in both Part One and Two are the impacts, or what we call climate threats.

[4] Intergovernmental Panel on Climate Change (IPCC), “Summary for Policymakers,” in *Managing the Risks and Extreme Events and Disasters to Advance Climate Change Adaptation: A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change*, edited by P.R. Shukla et.al (Geneva: Intergovernmental Panel of Climate Change, 2012), 10, <https://www.ipcc.ch/report/managing-the-risks-of-extreme-events-and-disasters-to-advance-climate-change-adaptation/>; I.R. Noble et al., “Adaptation Needs and Options,” in *Climate Change 2014 - Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment of the Intergovernmental Panel on Climate Change* (Cambridge, Cambridge University Press, 2014), 836-8, <https://www.ipcc.ch/report/ar5/wg2/full-report-global-aspects/>; see also National Round Table on the Environment and the Economy, *Paying the Price: The Economic Impacts of Climate Change for Canada* (Ottawa: National Round Table on the Environment and the Economy, 2011), 126, <http://nrt-trn.ca/wp-content/uploads/2011/09/paying-the-price.pdf>; Jimena Eyzaguirre and Fiona Warren, “Adaptation: Linking Research and Practice,” in *Canada in a Changing Climate: Sector Perspectives on Impacts and Adaptation*, ed. Fionna Warren and Donald Lemmen (Ottawa: Natural Resources Canada, 2014), 256, 260, https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/earthsciences/pdf/assess/2014/pdf/Full-Report_Eng.pdf; Council of Canadian Academies (CCA), *Canada’s Top Climate Change Risks: The Expert Panel on Climate Change Risks and Adaptation Potential* (Ottawa: The Council of Canadian Academies, 2019), 27, <https://cca-reports.ca/wp-content/uploads/2019/07/Report-Canada-top-climate-change-risks.pdf>.

[5] Could also be conceived as Implications=Threats+Weaknesses-Strengths. Inspired by “strategy=ends+ways+means” in Harry R. Yarger, “Toward a Theory of Strategy: Art Lykke and the Army War College Strategy Model,” in *U.S. Army War College Guide to National Security Policy and Strategy*, 2nd Edition, ed. J. Boone Bartholomees, Jr. (Carlisle, PA: US Army War College, 2006), 110, <https://www.comw.org/qdr/fulltext/0606bartholomees.pdf>.

[6] Binding, “What Threats Does Climate Change Pose,” 4.

[7] It is worth noting that NATO also recognizes the impacts of Climate Change on security, having proclaimed it as a “defining challenge of our time” and committing to both mitigation and adaptation through the Climate Change and Security Action Plan. “NATO Climate Change and Security Action Plan,” NATO, updated June 14, 2021, https://www.nato.int/cps/en/natohq/official_texts_185174.htm.

[8] Kim Richard Nossal, “The Imperatives of Canada’s Strategic Geography,” in *Canadian Defence Policy in Theory and Practice*, ed. Thomas Juneau, Philippe Lagassé and Srdjan Vucetic, (Cham, Switzerland: Palgrave Macmillan 2019), 13, <https://doi.org/10.1007/978-3-030-26403-1>; Irvin Studin, “Why Canada may become a great global power this century,” *Policy Options* (June 2020), <https://policyoptions.irpp.org/magazines/june-2020/why-canada-may-become-a-great-global-power-this-century/>.

[9] “Canada and the Kingdom of Denmark, together with Greenland, reach historic agreement on long-standing boundary disputes,” Global Affairs Canada, Government of Canada, last modified June 14, 2022, <https://www.canada.ca/en/global-affairs/news/2022/06/canada-and-the-kingdom-of-denmark-together-with-greenland-reach-historic-agreement-on-long-standing-boundary-disputes.html>.

[10] “Joint Statement on Arctic Council Cooperation Following Russia’s Invasion of Ukraine,” Office of the Spokesperson, United States Department of State, updated March 3, 2022, <https://www.state.gov/joint-statement-on-arctic-council-cooperation-following-russias-invasion-of-ukraine/>.

[11] Martin Breum, “Russia gets approval for the data behind much of its Arctic Ocean seabed claim”, *Arctic Today*, February 17, 2023, <https://www.arctictoday.com/russia-gets-approval-for-the-data-behind-much-of-its-arctic-ocean-seabed-claim/>.

[12] Oleg Bukharin, “Russia’s Nuclear Icebreaker Fleet,” *Science and Global Security* 14, no. 25-31 (2006): 27, <https://doi.org/10.1080/08929880600620559>; Sergey Sukhankin, Troy Bouffard, and P. Whitney Lackenbauer, “Strategy, Competition, and Legitimization: Development of the Arctic Zone of the Russian Federation,” in *Arctic Yearbook 2021*, 5, https://arcticyearbook.com/images/yearbook/2021/Scholarly-Papers/12_AY2021_Sukhankin.pdf.

[13] Katherine Todd, “Canada’s Need for a Comprehensive Arctic Strategy Amid Russian and Chinese Threats,” NATO Association, November 25, 2022, <https://natoassociation.ca/canadas-need-for-a-comprehensive-arctic-strategy-amid-russian-and-chinese-threats/>.

[14] David Wright, “China’s Growing Interest in the Arctic,” in *(Re)Conceptualizing Arctic Security*, ed. P. Whitney Lackenbauer, Rob Huebert, and Ryan Dean (Calgary: University of Calgary Press, 2017), 468.

[15] North Atlantic Treaty Organisation, “Brussels Summit Communiqué,” press release no. 086 (2021), June 14, 2021, https://www.nato.int/cps/en/natohq/news_185000.htm.

[16] Mia Bennett, “How China Sees the Arctic: Reading Between Extraregional and Intraregional Narratives,” *Geopolitics* 20, no.3 (April 2015): 654, <http://dx.doi.org/10.1080/14650045.2015.1017757>; “How war in Ukraine is changing the Arctic,” *The Economist*, July 4, 2022, <https://www.economist.com/the-economist-explains/2022/07/04/how-war-in-ukraine-is-changing-the-arctic>

[17] Wright, “China’s Growing Interest in the Arctic,” 473.

[18] Wright, 473; Lackenbauer et.al, *China’s Arctic Ambitions – and What They Mean for Canada* (Calgary, University of Calgary Press, 2018), 25.

[19] Wright, 474; also Timothy Wright, “China’s New Arctic Stratagem: A Strategic Buyer’s Approach to the Arctic,” in *(Re)Conceptualizing Arctic Security*, 504.

[20] Michael Byers and Emma Lodge, “Canada’s Arctic Agenda: Into the Vortex,” in *China and the Canadian Arctic*, ed. John Hiddinbotham and Jennifer Spence (Waterloo, ON: Centre for International Governance Innovation, 2019), 6, https://www.jstor.org/stable/resrep21105.15?searchText=china+arctic+canada&searchUri=%2Faction%2FdoBasicSearch%3FQuery%3Dchina%2Barctic%2Bcanada&ab_segments=0%2Fbasic_search_gsv2%2Fcontrol&refreqid=fastly-default%3Aa32b00ebee8e113f74134281f49301b9&seq=6; Ismail Shakil and Siyi Liu, “Canada orders three Chinese firms to exit lithium mining,” *Reuters*, November 3, 2022, <https://www.reuters.com/markets/commodities/canada-orders-three-foreign-firms-divest-investments-critical-minerals-2022-11-02/>.

[21] Eugene Rumer et al., “Russia in the Arctic - A Critical Examination,” Carnegie Endowment for International Peace, March 2021, 15, https://carnegieendowment.org/files/Rumer_et_al_Russia_in_the_Arctic.pdf.

[22] Steven Chase, “Long-delayed naval facility in the High Arctic now postponed to 2023,” *Globe and Mail*, March 30, 2022, <https://www.theglobeandmail.com/politics/article-long-delayed-naval-facility-in-the-high-arctic-now-postponed-to-2023/>; see also “Nanisivik Analysis,” RUSI (NS), February 16, 2016, <https://rusi-ns.ca/nanisivik-analysis/>.

[23] Thomas Homer-Dixon, *Environment, Scarcity, and Violence*, (Princeton, NJ: Princeton University Press, 1999) 18; Government of Canada, *Strong, Secure, Engaged: Canada's Defence Policy*, (Ottawa: Department of National Defence, 2017), 52, <http://dgpapp.forces.gc.ca/en/canada-defence-policy/docs/canada-defence-policy-report.pdf>; Guy et al., *Security Threat Assessment*, 14; Brock et al., "The World Climate and Security Report 2020," 6.

[24] Greenspon et al, *Open Canada*, 68-9; Canada, *Strong, Secure, Engaged*, 49; CALWC (Canadian Army Land Warfare Centre), *B-GL-007-000/JP-011 Canada's Future Army, Volume 3: Alternate Worlds and Implications*, (Kingston, ON: Canadian Army Land Warfare Centre, 2017), 67; CCA, *Canada's Top Climate Change Risks*, 33-4; Greg Fyffe, "COVID-19 and Geopolitics: Security and Intelligence in a World Turned Upside Down," Centre for International Governance Innovation, last modified August 24, 2020, <https://www.cigionline.org/articles/covid-19-and-geopolitics-security-and-intelligence-world-turned-upside-down>.

[25] Eyre and Matthews, *CDS/DM Directive for CAF Reconstitution*.

[26] Nia Williams, "Canada to invest C\$1.6 bln in first national climate adaptation strategy," *Reuters*, November 24, 2022, <https://www.reuters.com/business/cop/canada-invest-c16-bln-first-national-climate-adaptation-strategy-2022-11-24/>; Romero-Lankao et al., "North America," 1478; Neil Chuka and Heather Hrychuk, "CAF Operations: A Comprehensive Approach to Enable Future Operations," in *Canadian Defence Policy*, 318.

[27] Philippe Lagassé, "Holding Canadian Governments to Account for National Defence," in *Canadian Defence Policy*, 45-6; David Perry, "Canadian Defence Budgeting," in *Canadian Defence Policy*, 63-4; Adam Chapnick and J. Craig Stone, "From Policy and Strategy to Outcomes," in *Canadian Defence Policy*, 82-3.

[28] Romero-Lankao et al., "North America," in *Climate Change 2014*, 1478; Stéphane Willems and Kevin Baumert, *Institutional Capacity and Climate Actions* (Paris: OECD Environment Directorate - International Energy Agency, 2003), <https://www.oecd.org/env/cc/21018790.pdf>; Brock et al., "The World Climate and Security Report 2020," 73, 75; Christian Leuprecht and Joel Sokolsky, "Defense Policy 'Walmart Style': Canadian Lessons in "not-so-grand" Grand Strategy," *Armed Forces & Society* 41, no. 3 (2015), <https://doi.org/10.1177/0095327X14536562>.

[29] Katarina Kertysova, "Perseverance amidst crisis: NATO's ambitious climate change and security agenda after Madrid," Commentary, European Leadership Network, last modified October 18, 2022, <https://www.europeanleadershipnetwork.org/commentary/perseverance-amidst-crisis-natos-ambitious-climate-change-and-security-agenda-after-madrid>; Greenspon et al., *Open Canada: A Global Positioning Strategy for a Networked Age* (Toronto: Canadian International Council (2010)), 67-8; Kerckhove and Petrolekas, "The Strategic Outlook for Canada 2014," 46; Andrea Charron and James Fergusson, "The Elephant in the Room: Canada and NORAD Modernization," in *The Strategic Outlook for Canada: 2018*, ed. Craig Leslie

Mantle and Christopher Cowan (Ottawa: Conference of Defence Associations Institute, 2018), 31, <https://cdainstitute.ca/wp-content/uploads/2018/02/strategic-outlook-2018.pdf>.

[30] “NATO chief’s first visit to Canadian Arctic signals thaw in Ottawa, expert says”, *The Canadian Press*, August 24, 2022, <https://www.cbc.ca/news/politics/nato-canada-arctic-visit-ottawa-1.6561282>.

[31] Robert W. Murray, “Middlepowermanship and Canadian Grand Strategy in the 21st Century,” *Seton Hall Journal of Diplomacy and International Relations* 14, no 2. (Summer/Fall 2013): 92.

[32] Binding, “What Threats Does Climate Change Pose,” 8.

[33] Brock et al., “The World Climate and Security Report 2020,” 147.

[34] Peter Berry et al., “Human Health,” in *Canada in a Changing Climate*, 200.

[35] Library of Parliament, *Climate Change*, 16-17.

[36] Sandrine Rastello and Kait Bolongaro, “Canada has reserved more vaccine doses per person than anywhere,” *BNN Bloomberg*, December 7, 2020, <https://www.bnnbloomberg.ca/canada-has-reserved-more-vaccine-doses-per-person-than-anywhere-1.1533041>; Ronald Labonte et al., “Canada’s ‘me first’ COVID-19 vaccine strategy may come at the cost of global health,” *The Conversation (Canada)*, September 27, 2020, <https://theconversation.com/canadas-me-first-covid-19-vaccine-strategy-may-come-at-the-cost-of-global-health-146908>.

[37] *Ibid*; “Procuring Vaccines for COVID-19,” Government of Canada, last modified September 14, 2022, <https://www.canada.ca/en/public-services-procurement/services/procuring-vaccines-covid19.html>.

[38] Margaret Biggs, “Crisis shows that good governance and strong institutions matter,” *Policy Options at 40*, (April 30, 2020), <https://policyoptions.irpp.org/magazines/april-2020/crisis-shows-that-good-governance-and-strong-institutions-matter>; “Chief Public Health Officer of Canada’s Report on the State of Public Health in Canada 2020,” Government of Canada, last modified October 27, 2021, <https://www.canada.ca/en/public-health/corporate/publications/chief-public-health-officer-reports-state-public-health-canada/from-risk-resilience-equity-approach-covid-19.html>; Colin Robertson and Frank Graves, “The Global Exchange: Time for Inspired Leadership,” January 18, 2021, in *The CGAI Podcast Network*, produced by the Canadian Global Affairs Institute, podcast, 3:00, https://www.cgai.ca/time_for_inspired_leadership.

[39] Canadian Nurses Association, “Physicians, nurses offer solutions to immediately address health human resource crisis,” news release, May 16, 2022, <https://www.cna-aiic.ca/en/blogs/cn-content/2022/05/16/physicians-nurses-offer-solutions-to-immediately-a>; Global News, “Canada’s premiers request additional health care funding as hospitals buckle under pressure,” July 11,

2022, *Global News at 5:30 Toronto*, Video, 1:54, <https://globalnews.ca/video/8982441/canadas-premiers-request-additional-health-care-funding-as-hospitals-buckle-under-pressure>.

[40] Binding, “What Threats Does Climate Change Pose,” 7.

[41] National Aboriginal Economic Development Board (NAEDB), *Recommendations on Northern Infrastructure to Support Economic Development* (Gatineau, QC: NAEDB, 2014) 9, <http://www.naedb-cndea.com/reports/northern-infrastructure-report.pdf>.

[42] NAEDB, *Study on Addressing the Infrastructure Needs*, 3.; Government of Canada, *Canada’s Arctic and Northern Policy Framework* (Ottawa: Crown-Indigenous Relations and Northern Affairs Canada, 2019), <https://www.rcaanc-cirnac.gc.ca/eng/1560523306861/1560523330587>.

[43] P. Whitney Lackenbauer, “From Polar Race to Polar Saga: An Integrated Strategy for Canada and the Circumpolar World,” in *Canada and the Changing Arctic: Sovereignty, Security, and Stewardship*, ed. Franklyn Griffiths, Robert Huebert, and P. Whitney Lackenbauer (Waterloo, ON: Wilfred Laurier University Press, 2011), 102-4; Adam Lajeunesse, *Lock, Stock, and Icebergs: A History of Canada’s Arctic Maritime Sovereignty* (Vancouver: University of British Columbia Press, 2016), 286, 304-6; Michael Byers and Stewart Webb, *Titanic Blunder: Arctic/Offshore Patrol Ships on Course for Disaster* (Ottawa: Canadian Centre for Policy Alternatives, 2016), 5-7; Beth Brown, “Nanisivik Analysis,” Royal United Services Institute of Nova Scotia, February 16, 2016, <https://rusi-ns.ca/nanisivik-analysis/>; Adam Lajeunesse and P. Whitney Lackenbauer, “Defence Policy in the Canadian Arctic: From Jean Cr tien to Justin Trudeau,” in *Canadian Defence in Policy and Practice*, 372, 376.

[44] Lackenbauer, “From Polar Race to Polar Saga,” 71; NAEDB, *Recommendations on Northern Infrastructure to Support Economic Development* (Gatineau, QC: NAEDB, 2016), 9-13, <http://www.naedb-cndea.com/reports/recommendations-on-northern-infrastructure.pdf>; CCA, *Canada’s Top Climate Change Risks*, 30, 32; Library of Parliament, *Climate Change*, 28-9.

[45] Terje Solsvik, “Norway plans to expand Arctic oil and gas drilling in new licensing round,” *Reuters*, March 17, 2022, <https://www.reuters.com/business/energy/norway-plans-expand-arctic-oil-gas-drilling-new-licensing-round-2022-03-17>; Center for Strategic & International Studies, “A Conversation with Minister Vidar Helgesen of Norway: Climate Change and the National and Corporate Interest,” June 6, 2017, Video, 57:05, <https://www.csis.org/events/conversation-minister-vidar-helgesen-norway-climate-change-and-national-and-corporate>.

[46] Binding, “What Threats Does Climate Change Pose,” 9-10.

[47] Intergovernmental Panel on Climate Change, *Climate Change 2014 - Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment of the Intergovernmental Panel on Climate Change* (Cambridge, Cambridge University Press, 2014), 87, 773, 205, <https://www.ipcc.ch/report/ar5/wg2/>.

[48] Catharine Tunney, “Battle lines drawn as the Emergencies Act inquiry gets underway in Ottawa,” *CBC News*, October 13, 2022, <https://www.cbc.ca/news/politics/convoy-inquiry-start-1.6613679>.

[49] Bruce Anderson and David Coletto, “Millions Following Emergencies Act Commission: Most are Concluding Ottawa Had No Better Choice,” Abacus Data, November 4, 2022, <https://abacusdata.ca/emergencies-act-inquiry-november-2022/>; Tom Yun, “Most Canadian back invocation of Emergencies Act during ‘Freedom Convoy’ protests: Nanos,” *CTV News*, last updated December 5, 2022, <https://www.ctvnews.ca/politics/most-canadians-back-invocation-of-emergencies-act-during-freedom-convoy-protests-nanos-1.6177341>.

[50] International Energy Agency, *Canada 2022 Energy Policy Review* (Paris, IEA, 2022), 11, <https://iea.blob.core.windows.net/assets/7ec2467c-78b4-4c0c-a966-a42b8861ec5a/Canada2022.pdf>.

[51] “Financial System Review - 2022,” Bank of Canada, last updated June 7, 2022, <https://www.bankofcanada.ca/2022/06/financial-system-review-2022/#vulnerabilities-canadian-financial-system>.

[52] Sarah Deardorff Miller, “Assessing the Impacts of Hosting Refugees,” *Centre for International Governance Innovation and World Refugee Council Research Paper* no. 4 (August 2018), <https://www.cigionline.org/sites/default/files/documents/WRC%20Research%20Paper%20no.4.pdf>; Robert Vineberg, “Canada’s Refugee Strategy: How It Can Be Improved,” *The School of Public Policy Publications - SPP Briefing Paper* 11, no. 14 (April 2018), <http://dx.doi.org/10.11575/sppp.v11i0.43344>.

[53] F. Leslie Seidle, “Resettling Syrian refugees: The Canadian advantage,” *Policy Options*, May 18, 2016, <https://policyoptions.irpp.org/magazines/may-2016/resettling-syrian-refugees-the-canadian-advantage/>; Naomi Alboim, “Lessons Learned from the Indochinese and Syrian Refugee Movements,” *Policy Options*, May 18, 2016, <https://policyoptions.irpp.org/magazines/may-2016/lessons-learned-from-the-indochinese-and-syrian-refugee-movements/>; “Migrant Integration Policy Index 2019 – Canada,” Migrant Integration Policy Index, accessed February 21, 2020, <https://www.mipex.eu/canada>.

[54] Chris J. Collins and Darren Blackburn, eds., *Introduction to Emergency Management in Canada* (Toronto: Emond Publishing, 2022), 16-32; Canada, *Canada’s Arctic and Northern Policy Framework*; Government of Canada, *Pan-Canadian Framework on Clean Growth and Climate Change: Third Annual Synthesis Report on the Status of Implementation*, (Gatineau, QC: Environment and Climate Change Canada, 2019), ii-iii, http://publications.gc.ca/collections/collection_2020/eccc/En1-77-2019-eng.pdf; CCA, *Canada’s Top Climate Change Risks*, 43.

[55] “Supporting a Humanitarian Workforce to Respond to COVID-19 and Other Large - Scale Emergencies,” Public Safety Canada, last modified May 4, 2022, <https://www.publicsafety.gc.ca/cnt/mrgnc-mngmnt/rspndng-mrgnc-vnts/hwf-tc-en.aspx>.

[56] Christian Leuprecht and Peter Kasurak, “The Canadian Armed Forces and Humanitarian Assistance and Disaster Relief: Defining a Role,” *Centre for International Governance Innovation*, August 24, 2020, <https://www.cigionline.org/articles/canadian-armed-forces-and-humanitarian-assistance-and-disaster-relief-defining-role>; Christian Leuprecht, “The moral hazard in using the Canadian military as provincial first responders,” *Commentary - MacDonald-Laurier Institute* (December 2020), https://macdonaldlaurier.ca/files/pdf/20201201_Moral_hazard_using_CDN_military_Leuprecht_COMMENTARY_FWeb.pdf.

[57] Eyre and Matthews, *CDS/DM Directive for CAF Reconstitution*.

[58] Leuprecht and Sokolsky, “Defense Policy ‘Walmart Style,’” 545; also see Canada, *Strong, Secure, Engaged*, 7; Justin Massie and Srdjan Vucetic, “Canadian Strategic Cultures: From Confederation to Trump,” in *Canadian Defence Policy*, 38.

[59] National Research Council, *Climate and Social Stress: Implications for Security Analysis* (Washington, DC: The National Academies Press, 2013), 3, <https://doi.org/10.17226/14682>; CNA Military Advisory Board, *National Security and the Accelerating Risks of Climate Change* (Alexandria, VA: CNA Corporation, 2014), 2, https://www.cna.org/archive/CNA_Files/pdf/mab_5-8-14.pdf; Lukas Ruttiger et al., *A New Climate for Peace: Taking Action on Climate and Fragility Risks* (Berlin: Adelphi, European Union Institute for Security Studies, 2015), 5, https://climate-diplomacy.org/sites/default/files/2020-11/NewClimateForPeace_FullReport_small_0.pdf; Guy et al., *A Security Threat Assessment*, 64; Brock et al., “The World Climate and Security Report 2020,” 105, ref ‘Disaster Tempo.’

[60] “Loss and damage: A moral imperative to act,” United Nations, accessed 8 December 2022, <https://www.un.org/en/climatechange/adelle-thomas-loss-and-damage>.

[61] Brock et al., “The World Climate and Security Report 2020,” 105; *House Permanent Select Committee on Intelligence, House Select Committee on Energy Independence and Global Warming: National Intelligence Assessment on the National Security Implications of Global Climate Change to 2030*, 110th Cong. 15-16 (2008) (Statement for the Record of Dr. Thomas Fingar, Deputy Director of National Intelligence for Analysis and Chairman of the National Intelligence Council).

[62] Lackenbauer, “From Polar Race to Polar Saga,” 71, 106; National Research Council, *Climate and Social Stress*, 7; P. Whitney Lackenbauer and Adam Lajeunesse, “The Emerging Arctic Security Environment: Putting the Military in its (Whole of Government) Place,” in *Whole of Government through an Arctic Lens*, ed. P. Whitney Lackenbauer and Heather Nicol (Antigonish,

NS: St. Francis Xavier University, 2017); Karen Everett and Emily Yamashita, “Emerging Issues for Whole of Government Approaches to the Canadian North,” in *Whole of Government through an Arctic Lens*; James Cotter, “Developing a Coherent Plan to Deal with Canada’s Conundrum in the Northwest Passage,” *Journal of Military and Strategic Studies* 11, no. 3 (2009): 346, 351; Brock et al., “The World Climate and Security Report 2020,” 148-9.

[63] Robert Huebert, “Canadian Arctic Maritime Security: The Return to Canada’s Third Ocean,” *Canadian Military Journal* 8, no. 2 (2007), <http://www.journal.forces.gc.ca/vo8/no2/doc/huebert-eng.pdf>; Scott G. Borgerson, “Arctic Meltdown: The Economic and Security Implications of Global Warming,” *Foreign Affairs* 87, no. 2 (2008): 65, <http://library.arcticportal.org/1570/1/BorgersonForeignAffairsarticle.pdf>; Dean McFadden, “The Navy and Canada’s National Interests in this Maritime Century,” *Canadian Military Journal* 10, no. 4 (2010): 54-5; Robert Huebert, “Introduction to Section 1: Geopolitics, Security, and the Changing Arctic,” in *(Re)Conceptualizing Arctic Security*, 5; Stephanie Pezard, “Emerging Challenges & Strategic Competition in the Arctic,” interview, *CDA Institute*, August 13th, 2020, <https://cdainstitute.ca/cda-institute-interview-with-stephanie-pezard-emerging-challenges-strategic-competition-in-the-arctic/>.

[64] See footnote 43.

[65] Cedric de Coning et al., *Norway’s Whole-of-Government Approach and its Engagement with Afghanistan*, (Oslo: The Norwegian Institute of International Affairs, 2009), 9, <https://nupi.brage.unit.no/nupi-xmlui/bitstream/handle/11250/276604/SIP-08-09-de+Coning+et+al.pdf?sequence=3>; Howard Coombs, “Canadian Whole of Government Operations: Kandahar September 2010 - July 2011,” The Conference of Defence Associations Institute (December 2012), 3, https://cdainstitute.ca/wp-content/uploads/2012/06/CDAInstitute_WOG_Dec2012.pdf.

[66] Andrew S. Thompson, “Canada in Haiti: Considering the 3-D Approach,” Conference Report, Centre for International Governance Innovation, November 3-4, 2005, https://www.files.ethz.ch/isn/19240/Haiti_conf_report.pdf; Coombs, “Canadian Whole of Government Operations,” 3-4; Dave Woychesin, ed., *The Comprehensive Approach: Perspectives from the Field* (Kingston, ON: Department of National Defence 2015); Nipa Banerjee, “Canada in Afghanistan: A Role Model for Canada’s Middle East Mission?,” *Centre for International Policy Studies*, February 17, 2016, <https://www.cips-cepi.ca/2016/02/17/canada-in-afghanistan-a-role-model-for-canadas-middle-east-mission/>.

[67] Relatedly, the new NATO CCASCOE holds a similar three-fold mission — *Awareness, Adaptation, and Mitigation* — to be actioned on a multi-sector approach, likely on a similar vector as the 3D concept considering it is a joint venture between DND and GAC moving forward.

[68] In Canadian use, the 3D model is an older version of the WoG model, yet it remains a useful adaptation framework. Stewart Patrick and Kaysie Brown, *Greater than the Sum of Its Parts?*

Assessing “Whole of Government” Approaches to Fragile States (New York: International Peace Academy, 2007), 6; Brock et al., “The World Climate and Security Report 2020,” 149.

[69] Homer-Dixon, *Environment, Scarcity, and Violence*, 4-7; CNA Military Advisory Board, *National Security and the Threat of Climate Change* (Alexandria, VA: CNA Corporation, 2007), 6, https://www.cna.org/cna_files/pdf/National%20Security%20and%20the%20Threat%20of%20Climate%20Change.pdf; Brock et al., 7.

[70] Brock et al., 6; Ruttinger et al., *A New Climate for Peace*, 99-105; Heather Conley and Donatienne Ruy, *Crossing Borders: How the Migration Crisis Transformed Europe’s External Policy* (Washington DC: Center for International and Security Studies, 2018), 41.

[71] Greenspon et al., *Open Canada*, 51-2; Romero-Lankao et al., “North America,” 1463; Charles Davies, “Below the Radar: Mexico and Canada’s National Security Challenges,” in *The Strategic Outlook for Canada 2018*, 22; Charles Davies, “Irresistible Forces: Long-Term Tectonic Influences on Canada’s National Security,” *Conference of Defence Associations Institute Vimy Paper* no 38. (2018), 28-9, <https://cdainstitute.ca/wp-content/uploads/2019/06/Vimy-Paper-Vol.-38-Final-Charles-Davies-1.pdf>; Brock et al., “The World Climate and Security Report 2020,” 66.

[72] Canada’s Defence Policy (*Canada, Strong, Secure, Engaged*, 2017) does not mention Mexico once, though it does have one small paragraph on “the Americas” on p.92.; Also see Binding, “What Threats Does Climate Change Pose,” 10.

[73] Greenspon et al., 51-2; Davies, “Below the Radar,” 22; Davies, “Irresistible Forces,” 28-9.

[74] Greenspon et al., 28-31; Leuprecht and Sokolsky, “Defense Policy ‘Walmart Style,’” 543, 545; Canada, *Strong, Secure, Engaged*, 61; Martin Shadwick, “The Canadian Armed Forces and Humanitarian Assistance and Disaster Relief (HADR),” *Canadian Military Journal* 18, no. 4 (Autumn 2018), <http://www.journal.forces.gc.ca/vol18/no4/PDF/CMJ184Ep76.pdf>; Leuprecht and Kasurak, “The Canadian Armed Forces and Humanitarian Assistance and Disaster Relief.”

[75] Greenspon et al., *Open Canada*, 68-9; Kerckhove and Petrolekas, “The Strategic Outlook for Canada 2014,” 37-8; Canada, *Strong, Secure, Engaged*, 49.

[76] Kyle Christensen, “The Navy in Canada’s Northern Archipelago,” in *Defence Requirements for Canada’s Arctic*, ed. Brian MacDonald (Ottawa: Conference of Defence Associations Institute, 2007), 79; Cotter, “Developing a Coherent Plan,” 333-5; Lackenbauer, “From Polar Race to Polar Saga,” 102-4; Lajeunesse, *Lock, Stock, and Icebergs*, 286, 304-6; Byers and Webb, *Titanic Blunder*, 5-7; P. Whitney Lackenbauer and Peter Kikkert, *An Important International Crossroads: Implementing Canada’s Arctic Priorities in Strong, Secure, Engaged - Symposium Report*, (Ottawa: Centre for National Security Studies, Canadian Forces College, 2018), 4-5,

<https://www.cfc.forces.gc.ca/CNSS/arctic-eng.pdf?cfc>; Lajeunesse and Lackenbauer, “Defence Policy in the Canadian Arctic,” 372, 376; CDA Institute, “Force Development Exchange: Future Maritime & Overland ISR Capabilities,” *Conference of Defence Associations Institute Expert Series 1* (2020), <https://cdainstitute.ca/wp-content/uploads/2020/05/ISR-REPORT-003.pdf>.

[77] Cotter, “Developing a Coherent Plan,” 333-5; Lackenbauer, “From Polar Race to Polar Saga,” 104; Lackenbauer and Kikkert, *An Important International Crossroads*, 4-5; Brock et al., “The World Climate and Security Report 2020,” 142; CDA Institute, “Force Development Exchange.”

[78] Imaituk Inc., “A Matter of Survival: Arctic Communications Infrastructure in the 21st Century,” in *Whole of Government through an Arctic Lens*, 200-2; Lackenbauer and Kikkert, *An Important International Crossroads*, 4-5; Brock et al., 142.

[79] “We Simply Cannot Ignore North American Defence,” An Interview with James Fergusson, CDA Institute, November 9, 2022, <https://cdainstitute.ca/james-fergusson-we-simply-cannot-ignore-north-american-defence/>.

[80] Canada, *Strong, Secure, Engaged*, reference AOPS, RADARSAT; “What is the RCM?” Canadian Space Agency, last modified December 19th, 2019, <https://www.asc-csa.gc.ca/eng/satellites/radarsat/what-is-rcm.asp>; Andrea Charron, “The United States Department of the Air Force’s Arctic Strategy, Space Force, the Unified Command Plan and the Implications for Canada,” Policy Paper, *Defence & Security Foresight Group* (September 2020): 2-4.

[81] Brock et al., “The World Climate and Security Report 2020,” 130.

[82] Public Safety Canada, “Government of Canada funds NGOs to build capacity, respond to emergencies, and keep communities safe,” Government of Canada, May 4, 2022, <https://www.canada.ca/en/public-safety-canada/news/2022/05/government-of-canada-funds-ngos-to-build-capacity-respond-to-emergencies-and-keep-communities-safe.html>.

[83] Lackenbauer and Lajeunesse, “The Emerging Arctic Security Environment,” 24-8; Alexandre Boisvert-Novak, “Different Yet Similar: Comparing Canada’s Whole-of-Government Approach Abroad and at Home,” (master’s thesis, Canadian Forces College, 2019), <https://www.cfc.forces.gc.ca/259/290/308/286/novak-boisvert.pdf>; “Operation NANOOK,” Department of National Defence, last modified November 25th, 2022, <https://www.canada.ca/en/department-national-defence/services/operations/military-operations/current-operations/operation-nanook.html>; Steven Burke, “Joint Task Force North Op NANOOK: Meeting Northern Challenges with Regional Collaboration,” (PowerPoint presentation, Royal United Services Institute of Nova Scotia, Halifax, NS, November 18, 2020), https://rusi-ns.ca/wp-content/uploads/2020/11/JTFN_201118.pdf; P. Whitney Lackenbauer and Peter Kikkert, *Measuring the Success of the Canadian Rangers* (Peterborough, ON: North American and Arctic Defence and Security Network - Trent University, 2020), 44-5.

[84] P. Whitney Lackenbauer and Adam Lajeunesse, “The Canadian Armed Forces in the Arctic,” *Journal of Military and Strategic Studies* 16, no. 4 (2016): 260, (footnote 55), <https://jmss.org/article/download/58175/pdf/>; Lackenbauer and Lajeunesse, “The Emerging Arctic Security Environment,” 14-17.

[85] Lajeunesse, *Lock, Stock, and Icebergs*, 304-6.

[86] Griffiths, Huebert, and Lackenbauer, *Canada and the Changing Arctic*, 111; Alexander Landry and Connor Hunerfauth, “The ESG Case for Developing the Northwest Passage,” *FrontLine*, February 19, 2023, <https://frontline.online/defence/featured/12314-The-ESG-Case-for-Developing-the-Northwest-Passage>.

[87] Lackenbauer and Kikkert, *Measuring the Success*, x-xii; also Adam Lajeunesse, *The Canadian Armed Forces in the Arctic: Purpose, Capabilities, and Requirements*, Policy Paper (Calgary: University of Calgary, 2015), 5-6; Canada, *Canada’s Arctic and Northern Policy Framework*.

[88] Lackenbauer and Kikkert, *Measuring the Success*, 1.

[89] Tim Halfkenny, ““Indigenous Communities are at the Heart of Canada’s North”: Leveraging Northern Knowledge and Diversity,” in *An Important International Crossroads*, 42.

[90] Lackenbauer and Kikkert, *Measuring the Success*, 21.

[91] LCol Raymond Chiasson, quoted in Erin Van Brunschot, “Symposium Report - Climate Change and Its Impact on National and Human Security” (Toronto: Canadian Forces College, 2020), 16; see also Lackenbauer, “From Polar Race to Polar Saga,” 87.

[92] Shadwick, “The Canadian Armed Forces,” 76-8; Van Brunschot, “Climate Change,” 23; Leuprecht and Kasurak, “The Canadian Armed Forces and Humanitarian Assistance and Disaster Relief.”

[93] Leuprecht, “The moral hazard,” 8; Brock et al., “The World Climate and Security Report 2020,” 143.

[94] Vincent Lussier, “The Army Reserves: An Instrument of National Security,” *Canadian Forces College JCSP* 46 (2020), <https://www.cfc.forces.gc.ca/259/290/22/305/Lussier.pdf>.

[95] Murray Brewster and Richard Raycraft, “Military personnel shortage will get worse before it gets better, top soldier says,” *CBC News*, October 6, 2022, https://www.cbc.ca/news/politics/e_y_r_e_-_s_h_o_r_t_a_g_e_-_directive-1.6608107#:~:text=%22As%20a%20result%2C%20CAF%20effective,the%20military's%20ability%20to%20recruit.

[96] Leuprecht, “The moral hazard,” 8.

[97] Binding, “What Threats Does Climate Change Pose,” 5.

[98] Government of Canada, *Declaration on the Establishment of the Arctic Council*, (Ottawa: Government of Canada, 1996), https://www.international.gc.ca/world-monde/international_relations-relations_internationales/arctic-arctique/declaration_ac-declaration_ca.aspx?lang=eng; Robert Huebert, “Canadian Arctic Sovereignty and Security in a Transforming Circumpolar World,” in *Canada and the Changing Arctic*, 36.

[99] Huebert, “Canadian Arctic Sovereignty,” 63-4; Lajeunesse, “Canada’s Arctic Sovereignty in the Arctic”; Canada, *Canada’s Arctic and Northern Policy Framework*; Government of Yukon, Government of the Northwest Territories, and Government of Nunavut, *A Northern Vision: A Stronger North and a Better Canada*, (Whitehorse, YT: Government of Yukon, 2007), https://web.archive.org/web/20120330094357/http://www.anorthernvision.ca/documents/newvision_english.pdf.

[100] “Security Challenges of Climate Change For Northern Indigenous Communities & Resolving Boundary Issues in the Arctic,” An Interview with Will Greaves, CDA Institute, October 26, 2022, <https://cdainstitute.ca/will-greaves-security-challenges-of-climate-change-for-northern-indigenous-communities-resolving-boundary-issues-in-the-arctic/>.

[101] Cotter, “Developing a Coherent Plan,” 352; Huebert, “Canadian Arctic Sovereignty,” 63-4; Lackenbauer, “From Polar Race to Polar Saga,” 129-30; Franklyn Griffiths, “Towards a Canadian Arctic Strategy,” in *Canada and the Changing Arctic*, 195; Lajeunesse, *Lock, Stock, and Icebergs*, 290-1, 294.

[102] P. Whitney Lackenbauer and Robert Huebert, “Premier Partners: Canada, the United States and Arctic Security,” *Canadian Foreign Policy Journal* 20, no. 3 (2014): 320-1.

[103] Lackenbauer, “From Polar Race to Polar Saga,” 129-30.

[104] Josep Borrell, “How to revive multilateralism in a multipolar world?” European Union Action Service, High Representative of the European Union for Foreign Affairs and Security Policy / Vice-President of the European Commission, March 16, 2021, https://www.eeas.europa.eu/eeas/how-revive-multilateralism-multipolar-world_en.

[105] “On Canada’s NATO Climate Change and Security Centre of Excellence,” CDA Institute, June 30, 2022, <https://cdainstitute.ca/on-canadas-nato-climate-change-and-security-centre-of-excellence-coe>.

[106] CCA, *Canada's Top Climate Change Risks*, 42; Canada, *Canada's Arctic and Northern Policy Framework*.

[107] Guy Abel et al., "Climate, Conflict and Forced Migration," *Global Environmental Change* 54 (2019): 246, <https://doi.org/10.1016/j.gloenvcha.2018.12.003>; see CNA, *National Security and the Threat of Climate Change*, 6 (Recommendation 3); Arpita Bhattacharyya and Michael Werz, "Climate Change, Migration, and Conflict in South Asia: Rising Tensions and Policy Options across the Subcontinent," *Center for American Progress* (2012), 1-2, https://cdn.americanprogress.org/wp-content/uploads/2012/11/ClimateMigrationSubContinentReport_small.pdf?_ga=2.110596997.169295657.1606517401-1871019758.1606517401; Ruttinger et al., *A New Climate for Peace*, 89-98; Conley and Ruy, *Crossing Borders*, 56-7.

[108] Greenspon et al., *Open Canada*, 28-31; Brock et al., "The World Climate and Security Report 2020," 149; "Climate Change and the Risk of Displacement in Asia," Policy Horizons Canada, Government of Canada, last updated February 1, 2014, <https://horizons.gc.ca/en/2014/02/01/climate-change-and-the-risk-of-displacement-in-asia/>.

[109] "Canada's international climate finance", *Government of Canada*, December 19, 2022, <https://www.canada.ca/en/services/environment/weather/climatechange/canada-international-action/climate-finance.html>.

[110] Esme Stallard, "COP27: What was agreed at the Sharm el Sheikh climate conference?" *British Broadcasting Corporation*, December 8, 2022, <https://www.bbc.com/news/science-environment-63781303>.

[111] NAEDB, *Recommendations on Northern Infrastructure*, 3.

[112] Lackenbauer, "From Polar Race to Polar Saga," 87.

[113] Lajeunesse, *Lock, Stock, and Icebergs*, 299.

[114] Greenspon et al., *Open Canada*, 71; John Stewart, "Nuclear Energy," in *Canada: Winning as a Sustainable Energy Powerhouse Volume II - The Details*, ed. Richard J. Marceau and Clement W. Bowman (Ottawa: Canadian Academy of Engineering, 2012), 95, 100-3, <https://cae-acg.ca/wp-content/uploads/2013/04/02-VolumeII-LR.pdf>; Daniel A. Meneley, "Nuclear Energy - The Path Forward," in *Canada: Becoming a Sustainable Energy Powerhouse* (Ottawa: Canadian Academy of Engineering, 2014), 152-3, <https://www.cae-acg.ca/wp-content/uploads/2014/06/CANADA-July9.pdf>; Kelly Ogle and John Gorman, "Nuclear Efficiencies," January 7, 2021, in *Energy Security*³, produced by the Canadian Global Affairs Institute, podcast, 20:00, 25:00, https://www.cgai.ca/nuclear_efficiencies.

[115] “Government of Canada makes significant investment in Alberta’s clean hydrogen sector,” Government of Canada, News release, November 8, 2022, <https://www.canada.ca/en/innovation-science-economic-development/news/2022/11/government-of-canada-makes-significant-investment-in-albertas-clean-hydrogen-sector-and-outlines-next-steps-to-help-canadian-industry-sectors-cut-p.html>; Natural Resources Canada, *Hydrogen Strategy for Canada: Seizing the Opportunities for Hydrogen* (Ottawa, Natural Resources Canada, 2020), 1, https://www.nrcan.gc.ca/sites/nrcan/files/environment/hydrogen/NRCan_Hydrogen%20Strategy%20for%20Canada%20Dec%2015%202200%20clean_low_accessible.pdf.

[116] IPCC, *IPCC Special Report on Carbon Dioxide Capture and Storage*, Working Group III of the Intergovernmental Panel on Climate Change, ed. Bert Metz et al., (New York: Cambridge University Press, 2005), https://www.ipcc.ch/site/assets/uploads/2018/03/srccs_wholereport-1.pdf; International Energy Agency, *Energy and Climate Change* (Paris: International Energy Agency, 2015), 105, <https://www.actu-environnement.com/media/pdf/news-24754-rapport-iae.pdf>; Krysta Biniek et al., “Driving CO₂ emissions to zero (and beyond) with carbon capture, use, and storage,” *McKinsey Quarterly*, June 30, 2020, <https://www.mckinsey.com/capabilities/sustainability/our-insights/driving-co2-emissions-to-zero-and-beyond-with-carbon-capture-use-and-storage>.

[117] Greenspon et al., *Open Canada*, 72-7.

[118] Williams, “Canada to invest;” Brock et al., “The World Climate and Security Report 2020,” 130; CCA, *Canada’s Top Climate Change Risks*, 30-2; Canada, *Pan-Canadian Framework*, 30-1.

[119] Roy Rempel, “Achieving Consensus and Effectiveness in Canadian Defence Policy,” in *Canadian Defence Policy*, 253; Brock et al., “The World Climate and Security Report 2020,” 130; Ogle and McConaghy, “Nuclear Efficiencies,” 12:00.

[120] Huebert, “Canadian Arctic Sovereignty,” 60; Lagassé, “Holding Canadian Governments to Account,” 45-6.

[121] Rempel, “Achieving Consensus and Effectiveness;” Brock et al.; Ogle and McConaghy, “Nuclear Efficiencies,” 12:00; Davies, “Irresistible Forces,” 33-5.

[122] Zinecker et al., *Real People, Real Change: Strategies for just energy transitions*, (Winnipeg: International Institute for Sustainable Development, 2018), iv-v, <https://www.iisd.org/system/files/publications/real-people-change-strategies-just-energy-transitions.pdf>; also John Calvert and Marjorie Griffin Cohen, *Climate Change and the Canadian Energy Sector: Implications for Labour and Trade Unions* (Ottawa: Canadian Centre for Policy Alternatives, 2011), 5, <https://policyalternatives.ca/publications/reports/climate-change-and-canadian-energy-sector>; CCA, *Technology and Policy Options for a Low-Emission Energy System in Canada* (Ottawa: Council of Canadian Academies, 2015), 129-30, <https://cca-reports.ca/wp-content/uploads/2018/10/>

[energyuse_fullreport_en.pdf](#); Government of Canada, “Task Force: Just Transition for Canadian Coal Power Workers and Communities,” Environment and Climate Change Canada (2019), http://publications.gc.ca/collections/collection_2019/eccc/En4-361-2019-eng.pdf; Library of Parliament, *Climate Change*, 18-19.

[123] Improvements to building codes, evacuation and relocation strategies for disasters, water conservation programs, investments in efficiency and new technologies. Joshua W. Busby, *Climate Change and National Security*, CSR no. 32, (New York: Council of Foreign Relations, 2007), 11; CCA, *Technology and Policy Options*, 130.

[124] D’Aprile et al., “New-Zero Europe: Decarbonization Pathways and Socioeconomic Implications, *McKinsey & Company* (November 2020), <https://www.mckinsey.com/capabilities/sustainability/our-insights/how-the-european-union-could-achieve-net-zero-emissions-at-net-zero-cost>; Henderson et al., “Climate math, What a 1.5 degree pathway would take,” *McKinsey Quarterly* (April 2020), <https://www.mckinsey.com/~media/McKinsey/Business%20Functions/Sustainability/Our%20Insights/Climate%20math%20What%20a%201%20point%205%20degree%20pathway%20would%20take/Climate-math-What-a-1-point-5-degree-pathway-would-take-vF.pdf?shouldIndex=false>.

[125] see Boisvert-Novak, “Different Yet Similar.”

[126] CNA Military Advisory Board, *National Security and the Threat of Climate Change*, 44.

[127] CALWC, *Canada’s Future Army*.