Beyond the Arctic: The Strategic and National Security Implications of Climate Change for Canada

A Monograph

by

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Abstract

Beyond the Arctic: The Strategic and National Security Implications of Climate Change for Canada, by MAJ Jean-Francois J. M. E. Lamarche, 51 pages.

Within the last thirty years, linkages between climate change, inter or intra-state conflicts, and national security have become more apparent. Three main adverse impacts of climate change impinge on environmental security: resource scarcity, the increase in frequency and intensity of natural hazards, and human migration. Additionally, current projections regarding global population growth, climbing temperatures, rising sea levels, and political instability suggest that the impact of climate on global and national security will likely continue to feed the conflict cycle and escalate tensions worldwide.

Given this context, this monograph will investigate the impacts of global climate change on the environmental and national security of Canada and the repercussions for the Canadian Armed Forces beyond the Arctic. This monograph is divided into four sections. The first section will provide a summary of the current state of affairs regarding climate change as a global phenomenon influencing environmental security. The second section will trace the linkages between the current environment and the ramifications for Canada as a nation. The third section will focus on Canada's national security policy in a climate-changing world. The last section will conclude the monograph and offer observations and implications for the contemporary and future of the CAF.

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Abbreviations

CA	Canadian Army
CAF	Canadian Armed Forces
CDS	Chief of Defence Staff
CMBG	Canadian Mechanized Brigade Group
CRED	Center for Research on the Epidemiology of Disasters
DA	Disaster Assistance
DART	Disaster Assistance Relief Team
DND	Department of National Defence
DoD	Department of Defense
DOTMLPF-P	Doctrine Organization Training Material Leadership Personnel Facilities Policy
IDP	Internally displaced persons
IPCC	Intergovernmental Panel on Climate Change
IRCC	Immigration, Refugee and Citizenship Canada
MRP	Managed Readiness Plan
NATO	North Atlantic Treaty Organization
NDS	National Defense Strategy
RJTF	Regional Joint Task Force
SECDEF	Secretary of Defense
UN	United Nations
UNDESA	UN Department of Economic and Social Affairs
UNFCCC	United Nations Framework Convention on Climate Change
UNHCR	United Nations High Commission for Refugees
US	United States
USMCA	United States–Mexico–Canada Agreement

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Introduction

> Humanity is conducting an unintended, uncontrolled, globally pervasive experiment whose ultimate consequences could be second only to a global nuclear war.
>
> —The Honorable Prime Minister Brian Mulroney

In 1988, Brian Mulroney, the late Prime Minister of Canada, pronounced these words during the first conference of the World Meteorological Organization, which would soon become the Intergovernmental Panel on Climate Change (IPCC). Consisting of more than 195 member nations across the globe, the IPCC's objective is to provide regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation.[1] Even if Prime Minister Mulroney issued his statement more than thirty years ago, many leaders and thinkers remain unaware of the dramatic consequences caused by the interaction between humans and their environment.

The nexus between climate change, security, and social organizations has been perceptible for a long time. Many environmental historians have presented the example of Easter Island, which collapsed in the eighteenth century because of resources depletion and ecological degradation.[2] The population of this island vanished due to extreme deforestation and soil erosion that led to a loss of raw material, decreased crop yields, and ultimately famine.[3] It did not take long before a resource-induced conflict erupted among the islanders that led to cannibalism, as revealed by the discovery of human bones bearing human teeth marks.[4] If this ecological and social collapse happened two centuries ago to a society secluded from other civilizations, it bears

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[1] Intergovernmental Panel on Climate Change, *IPCC Factsheet: What Is the IPCC?* (Geneva, Switzerland: IPCC Secretariat, 2013), accessed September 16, 2019, http://www.ipcc.ch/site/assets/uploads/2018/02/FS_what_ipcc.pdf.

[2] Christian Webersik, *Climate Change and Security* (Santa Barbara, CA: Praeger, 2010), 5; Jared Diamond, *Collapse: How Societies Choose to Fail or Succeed* (New York, NY: Viking Press, 2011).

[3] Harald Welzer, *Climate Wars: Why People Will Be Killed in the Twenty-First Century* (Malden, MA: Polity Press, 2012), 53.

[4] Ibid., 55.

significance for today's complex world characterized by geopolitical competition and deep climatic disturbances.

Climate change is now universally recognized as a global menace that will influence every region of the world at a much more rapid rate than anticipated. The examples are too plentiful to enumerate. For one, the rise in sea level alone could have disastrous consequences. Since 1988, the IPCC has provided governments at all levels with hundreds of thousands of scientific reports to develop climate policies in relation with the United Nations Framework Convention on Climate Change (UNFCCC).[5] The IPCC has warned that without climate action, sea levels could rise six feet by the end of 2100 and by as much as ten feet within two centuries, jeopardizing coastal communities around the globe.[6]

This rise in sea level constitutes a serious crisis since a quarter of the world's population lives near coasts and the majority of megacities are located in coastal areas, including neighboring countries with tense relations. Envision Pakistan, India, and China—all nuclear powers—skirmishing at their borders over access to shared rivers and land with large areas submerged under rising seas.[7] For other nations, it is a matter of mere survival. Consequently, reports that rising sea levels are exceeding worst expectations suggest that the Maldives will soon be inhabitable, displacing its 400,000 citizens decades ahead of schedule.[8]

Based on numerous similar scenarios, climate change has the potential of causing environmental alterations that could simultaneously induce failures in both natural and human

[5] Intergovernmental Panel on Climate Change, *IPCC Factsheet: What Is the IPCC*.

[6] John R. Wennersten, *Rising Tides: Climate Refugees in the Twenty-First Century* (Bloomington: Indiana University Press, 2017), 10.

[7] Ibid., 17.

[8] Penny Becklumb, *Climate Change and Forced Migration: Canada's Role* (Ottawa, Canada: Library of Parliament, 2010), 4.

systems, resulting in global calamity.[9] For instance, the US Department of Defense (DoD) has recognized climate change as a "threat multiplier" as it will intensify competition while placing additional burdens on economies, societies, and governance institutions.[10] These effects will aggravate stressors abroad such as poverty, environmental degradation, political instability, and social tensions—conditions that can enable terrorist activities and other forms of violence.[11]

Even if the direst consequences of a changing climate are expected to occur in less resilient regions of the world, it is also projected to impact North America. To that effect, sea levels are rising about four times faster than the global average along the Atlantic coast of the United States and may reach an augmentation of one meter by 2050.[12] This conservative forecast from the IPCC would mean that New York, Norfolk, and Boston would be inundated, and Miami may become uninhabitable, leading to migration and water scarcity that could fuel conflicts between the United States and Canada over access to the Great Lakes.[13] This scenario suggests that the eruption of tensions, even between friendly, rich neighbors, could hasten violence and instability. No continent is immune to changes in environmental security.

Environmental security is a product of the post-Cold War "newer security agenda" that includes non-traditional threats such as terrorism, proliferation of weapons of mass destruction, epidemics, and climate change, among others.[14] This concept has helped alter the approach to security issues. It is with this concept in mind that national governments, multilateral institutions,

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[9] John T. Ackerman, "Climate Change, National Security, and the Quadrennial Defense Review: Avoiding the Perfect Storm," *Strategic Studies Quarterly* 2, no.1 (Spring 2008): 70.

[10] Department of Defense, *Quadrennial Defense Review* (Washington, DC: Government Printing Press, 2014), 8.

[11] Ibid.,9.

[12] Melanie Grade, "Sea Level Rise Accelerating in US Atlantic Coast," US Geological Survey, June 2011, 8.

[13] Ibid.,9.

[14] Isaac Caverhill-Godkewitsch, "Facing the Future: Canada's Environmental Security Challenges in the 21st Century," *Journal of Military and Strategic Studies* 13, no. 3 (Spring 2011): 2.

and senior military, police, and intelligence officers have recently acknowledged the threat posed by climate change. This trend has been global, including Canada. Canada's vastness (encompassing seven climate zones—from temperate to arctic—as well as 40 degrees of latitude) will cause it to experience a broad range of climate change impacts—much broader than in most countries.[15] Yet again, the overall level of awareness and acceptance of the threat has not produced a consensus or become holistic in nature. As former Deputy Secretary to the Cabinet of Security and Intelligence Council Margaret Purdy argued in 2010,

> Today, the security implications of climate change are obscure, almost invisible, to Canadians. This situation seems to be rooted in one or more of the following assumptions. First, the skeptics are right: climate science is imprecise and uncertain, and scientists cannot agree on the origins or consequences of a changing climate. Second, the people who are raising concerns about the possible security implications of climate change are scaremongers who lack credibility and tend to exaggerate risks and dangers. Third, climate change scenarios are not serious enough to translate into genuine security concerns for Canada. Fourth, Canada's security arrangements are adequate to handle whatever happens, and therefore it is okay to wait and see. Fifth, only a few individuals appear interested in the topic, and most of them focus almost exclusively on Arctic-related risks. As a result, Canadians—including elected officials—are largely unaware of how a changing climate could affect Canada's security interests at home and abroad.[16]

Given this context, this monograph will investigate the impacts of global climate change on the environmental and national security of Canada, as well as the repercussions for the Canadian Armed Forces (CAF) beyond the Arctic region. The aim is not to diminish the importance of the Canadian North. On the contrary, the abundance of literature on the subject is an indicator of its significance. The increasing presence of strategic resources, the enhanced competition between nations, and the potential encroachment of Canadian sovereignty are all vital aspects of the environmental changes occurring now.

Nevertheless, most experts only mention the security implications of climate change beyond the Arctic in passing. However, the CAF must focus on climate change-related scenarios

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[15] Margaret Purdy, "From Obscurity to Action: Why Canada Must Tackle the Security Dimensions of Climate Change," *International Journal* 65, no. 2 (June 2010): 420.

[16] Ibid., 413.

beyond the Artic. All regions of the country—and all Canadians—may experience the security implications of temperature, precipitation, weather, and sea-level changes.[17] Major population centers, coastal cities, transportation and trade hubs, and other infrastructure considered critical to Canada's functioning and economic prosperity will be affected—from coast to coast.[18]

This monograph is divided into four sections. The first section will provide a summary of the current state of affairs regarding climate change as a global phenomenon influencing environmental security. It will focus on three main catalysts: resource scarcity, intensification and frequency of natural hazards, and human migration. Drawing on academic papers, projections, and governmental reports, the second section will trace the linkages between the current environment and the ramifications for Canada as a nation. The third section will analyze Canada's national security policy in a climate-changing world. It will explain the vision of the climate-security nexus through different governmental entities, as well as the impacts for the CAF at the strategic and operational levels. The last section will conclude the monograph and offer observations and implications for the CAF.

In short, when analyzing the main challenges that climate change poses for the national security of Canada, as well as to the CAF, a few salient points stand out. Climate change will fuel more conflicts over the globe and will have significant effects for Canada, which will require the creation of a more holistic "issue-based" strategy. In a context where the CAF are more mobilized at home and abroad, as seen in the last decade, a thorough review will be required to assess the effects of the additional stress placed on the force structure, procurement, training, readiness, recruitment, and retention. Military and civilian leaders will have to weight carefully all factors to decide how can the policy choices of the government can be realistically supported by the Department of National Defence (DND) and the CAF without overstraining the organization.

[17] Purdy, 429.

[18] Ibid.

The Global State of Affairs

Growing concerns about the impacts of human activity on the environment have been closely monitored since the 1980s, leading to the developing field of environmental security. Environmental security at first encompassed a wide range of policy problems while addressing the challenges that changes in the environmental system may present to humanity, societies, and its institutions.[19] Although environmental security concerns are established topics in academia and the realm of policy, it is only recently that climate change impacts have been included in this debate.[20] In the last twenty years, the dialog about climate change and its ramification on environmental security has evolved from being perceived as a discourse of alarmist activists to a global threat that will shape the collective future. At the same time, governments have defined climate change as a "threat multiplier" that may contribute to global insecurity by increasing vulnerabilities and fueling tensions.[21] In 2005, former United Nations (UN) Secretary-General Kofi Annan highlighted the relationship between climate change and security, arguing that,

> Climate change is also a threat to peace and security. Changing patterns in rainfall, for example, can heighten competition for resources, setting in motion potentially destabilizing tensions and migrations, especially in fragile States or volatile regions. … [T]he consequences of climate change could plunge the world into conflict.[22]

One of the main problems of the climate change and environmental security nexus is the extensive number of factors potentially influencing the global situation. Figure 1 below proposes a flow diagram to describe the multitude of variables that influence human security. In an effort to contribute to a more balanced and realistic assessment, three primary negative consequences

[19] Welzer, 1.

[20] Ibid., 15.

[21] Ibid., 16.

[22] United Nations Framework Convention on Climate Change, *Report on the Conference of the Parties on its Eleventh Session* (Bonn, Germany: United Nations Framework Convention on Climate Change, 2006), 16.

are usually accepted as main contributors to climate-related changes in environmental security: resource scarcity, intensification and frequency of natural hazards, and human migration.

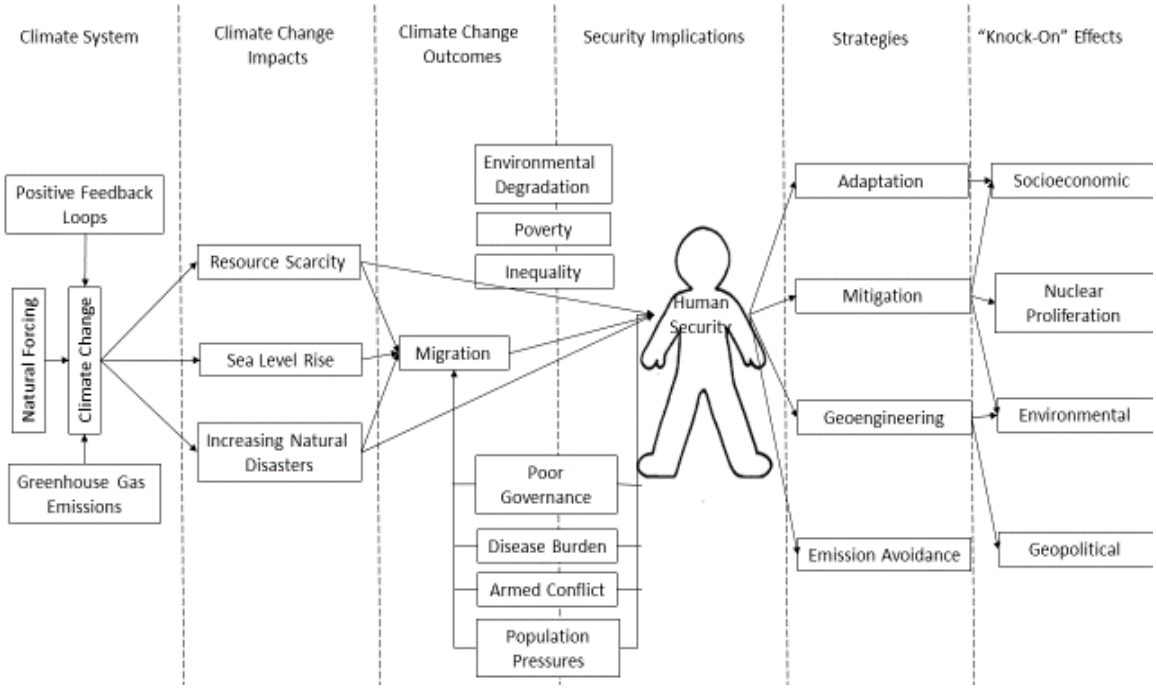

Figure 1. Human Security Flow Diagram. Halvard Buhang, "Climate Change, the Environment, and Armed Conflict" (paper presented at the Annual Meeting of the American Political Science Association, Boston, MA, August 28-31, 2008), 82.

The Impact of the Catalysts of Climate Change on Global Security

Reports on global warming are unequivocal. Global temperatures are rising at a pace never recorded before. Many of the observed changes occurring now are unprecedented over periods of decades to millennia.[23] Furthermore, the five warmest years ever recorded throughout history have occurred during the last five years.[24] As the world warms, changes in climate have influenced human systems, fauna, flora, and oceans alike on all continents.[25] More precisely, a

[23] Myles R. Allen, Vicente R. Barros, John Broome, et al., *Climate Change 2014: Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. Rajendra Kumar Pachauri and Leo Meyer (Geneva, Switzerland: International Panel on Climate Change), 2, accessed September 16, 2019, https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf.

[24] Climate Central, "The Ten Hottest Global Years on Record," last modified February 6, 2019, accessed September 23, 2019, https://www.climatecentral.org/gallery/graphics/the-10-hottest-global-years-on-record/.

[25] Ibid.

rise in average temperatures results in greater desertification, loss of arable land, deforestation, modification in the patterns of rainfall, ocean acidification, rise in sea level, and fresh water insufficiency.[26] At this time, the most affected regions of the world are found in the Southern Hemisphere and Asia. However, resource scarcity linked to global warming is afflicting the entire world. Figure 2 represents the widespread impacts attributed to climate change across the globe during the first decade of the twenty-first century.

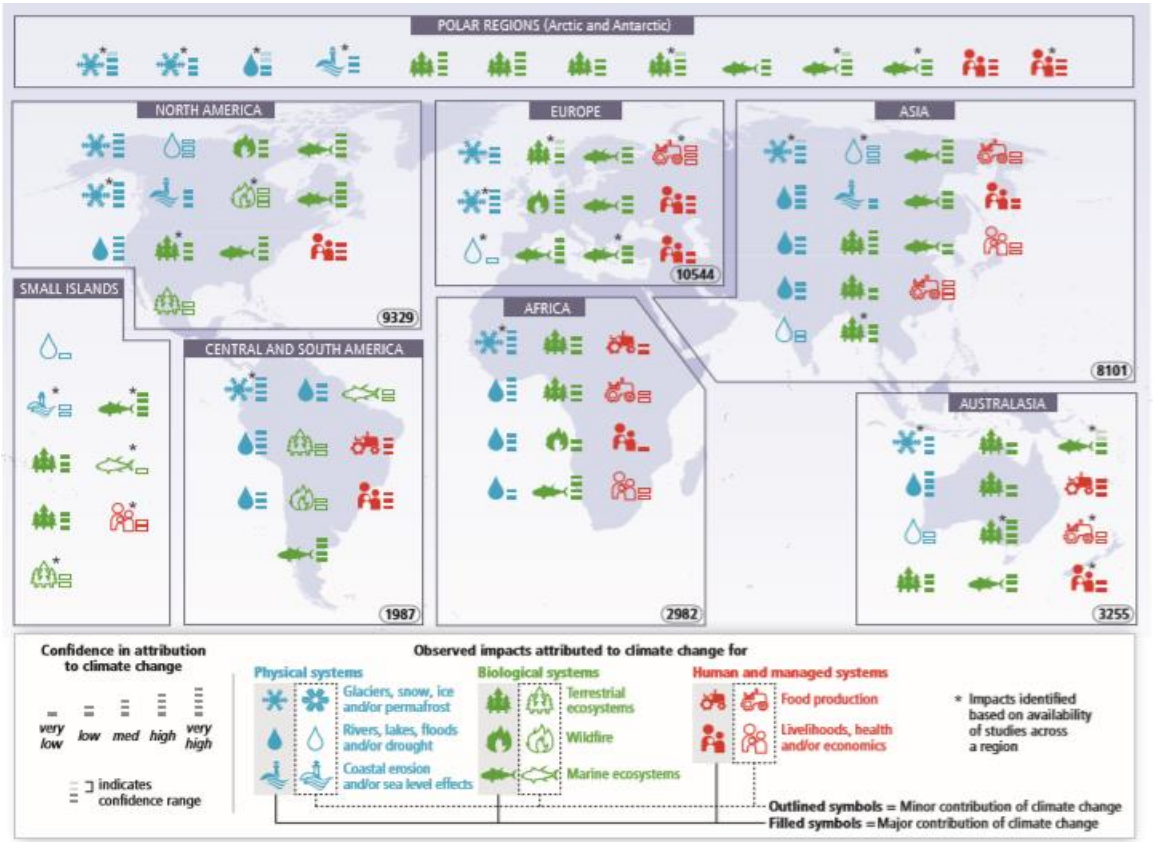

Figure 2. Widespread Impacts Attributed to Climate Change. International Panel on Climate Change, *Climate Change 2014: Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Geneva, Switzerland: International Panel on Climate Change Secretariat), 6.

Competition for resources becomes sharper as less water becomes available and the amount of food produced on accessible land is reduced, especially in relation to the projected increase in global population. To that effect, the UN Department of Economic and Social Affairs

[26] Climate Central, 6-10.

(UNDESA) anticipates that the global population will climb to 8.5 billion by 2030, 9.7 billion by 2050, and 11.2 billion by 2100.[27] By 2030, this population is likely to increase the demand for food by 35 percent, energy by 50 percent, and water consumption by 40 percent above sustainable existing water supplies.[28] Because it takes two hectares of land to produce the food necessary to feed one person, if current projections of world population come true, fewer available farms will have to produce three times as much as they do today.[29] Beyond the ability to be fed, the growing population will also have to compete for a greater demand in energy, perhaps prompting the emergence of resource wars.

Future conflicts over energy, water, minerals, and timber will become the most distinctive feature of the global security environment.[30] As these finite (energy and minerals) and renewable (water and timber) resources grow scarcer, no nation will wait until a vital element is depleted before acting in its national interest.[31] As oil, coal, timber, and water become insufficient to provide the required amount of energy, many nations could be tempted to turn towards nuclear power, ushering in a new age of nuclear proliferation. Current proliferation controls are inadequate for a world where nuclear power is a widespread, low-carbon energy option.[32] At present time, there are about 435 nuclear reactors in thirty countries, and the number of reactors is increasing. In the near term, it is projected that an additional twenty nations, ranging from highly

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[27] Kamal Baher, "World population expected to reach 9.7 billion by 2050," United Nations, July 29, 2015, accessed September 4, 2019, http://www.un.org/en/development/desa/news/population/2015-report.html.

[28] National Intelligence Council, *Global Trends 2030: Alternative Worlds* (Washington, DC: Office of the Director of National Intelligence, 2012), 30, accessed September 4, 2019, https://www.dni.gov/files/documents/GlobalTrends_2030.pdf.

[29] Wennersten, 23.

[30] James R. Lee, *Climate Change and Armed Conflict* (New York: Routledge, 2009), 14.

[31] Ibid., 15.

[32] Nick Mabey, *Delivering Climate Security: International Security Response to a Climate Changed World* (Philadelphia: Routledge, 2008), 72.

developed to still developing countries, are likely to acquire some form of nuclear power generation capability.[33]

The proliferation of nuclear reactors may encourage regional instability. The threat alone of one state moving towards nuclear power may incite its neighbors to do the same, heightening tensions in the entire region. Given the likely pressures to increase nuclear capacity rapidly in the face of climate change, greater efforts are needed to put a robust political framework and new technological options in place over the next decade.[34] As mentioned above, resource scarcity will play a major role in the sustainability and the security of the future international system. Similarly, intensification and frequency of natural hazards is also likely to bear negative consequences in the near future.

There is already the perception that the intensity and frequency of natural disasters is increasing. The two main categories of natural disasters include geological and hydro-meteorological.[35] According to the Center for Research on the Epidemiology of Disasters (CRED), climate change has affected the latter category of disasters over the last decade, driving an increase in tropical cyclones, flooding, droughts, and forest fires.[36] The year 2007 alone recorded 414 disasters, killing 17,000 people.[37] Unfortunately, that year was not an isolated one. Still, according to the CRED, a similar average per year has been noticed in the last decade, overshadowing the level at which these types of disasters occurred in the last century.[38] Figure 3

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[33] Department of National Defense, *The Future Security Environment 2008-2030* (Winnipeg, Canada: 17th Wing Publishing Office, 2010), 46.

[34] Ibid.

[35] Webersik, 47.

[36] Centre for Research on the Epidemiology of Disasters, "EM-DAT: The International Disaster Database," last modified August 13, 2019, accessed September 4, 2019, https://www.emdat.be/. To be considered a disaster, the CRED has established the following criteria: ten or more people dead, 100 or more people affected, the declaration of a state of emergency, and a call for international assistance.

[37] Halvard Buhang, "Climate Change, the Environment, and Armed Conflict" (paper presented at the Annual Meeting of the American Political Science Association, Boston, MA, August 28-31, 2008), 6.

[38] Centre for Research on the Epidemiology of Disasters.

depicts the average number of incidences of natural disasters and related casualties for the preceding decade in comparison to the year 2018.

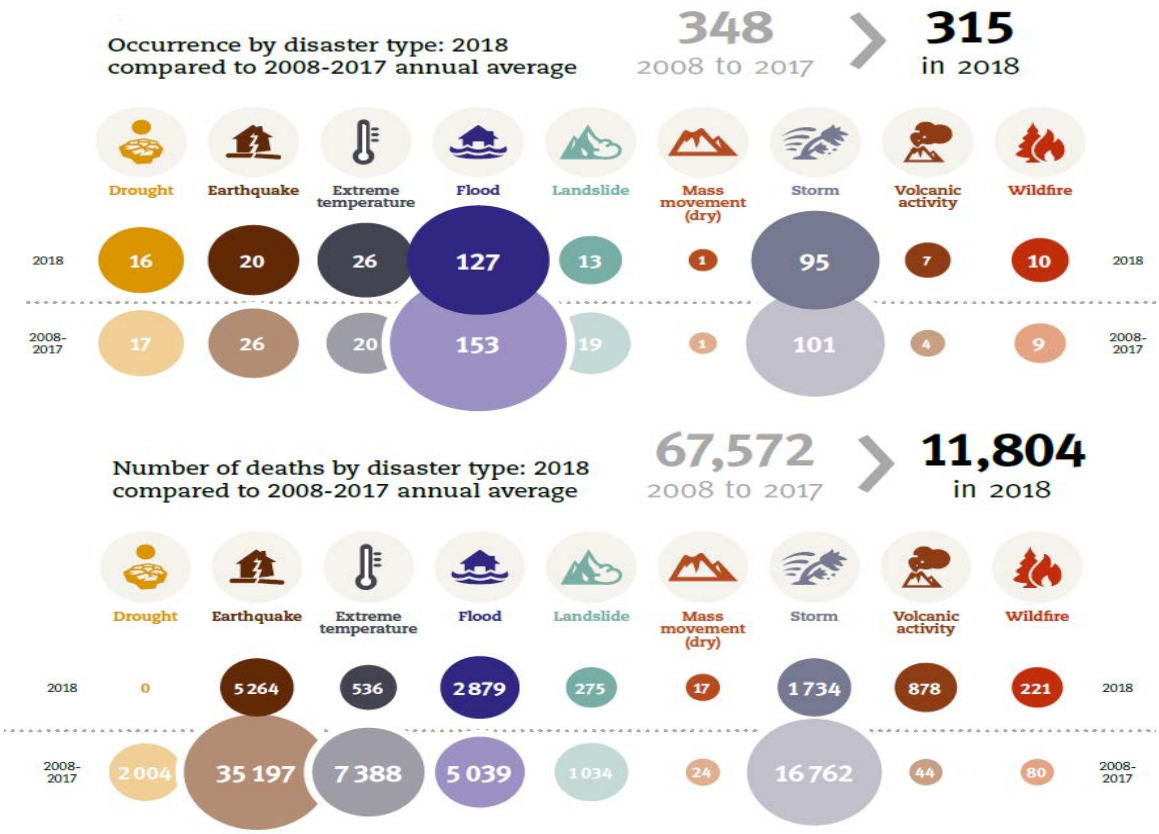

Figure 3. Occurrence of Natural Disaster and Related Deaths in 2018 Compared to 2008-2017. Centre for Research on the Epidemiology of Disasters, "EM-DAT: International Disaster Database," last modified August 13, 2019, accessed September 4, 2019, https://www.emdat.be, 8.

The increasing occurrence and intensity of these natural phenomena suggest greater repercussions for a larger population. Globally, 3.9 billion people, or about half the worldwide population, experienced natural disasters in 2018. When accounting for multiple disasters in the same region, this number jumps to 10.7 billion people.[39] More disasters mean even less available resources. Combined, these two aspects of climate change allow for heavy consequences on the global population. As people-centered aspects of environmental security affect a greater number of individuals, they will be forced to leave their homes and migrate elsewhere, becoming environmental migrants or climate refugees.

[39] Centre for Research on the Epidemiology of Disasters, 7.

Climate-related migration, or "climate refugees," represents the third major catalyst of climate-induced insecurity. Environmental migration is not a new phenomenon, but it has become more studied in the last thirty years. As early as 1990, the IPCC reported that the greatest single impact of climate change could be human migration, with millions of people displaced by shoreline erosion, coastal flooding, and agricultural disruption.[40] Consequently, in 1951, there were 1.5 million refugees worldwide. In January 2000, the UN High Commission for Refugees (UNHCR) considered 22.3 million people to be "of concern," with an additional 18 million internally displaced persons (IDP) as a result of war and environmental disaster for a total of over 50 million.[41] This trend continued later in the same decade; 2008 alone saw an augmentation of at least twenty million people displaced by sudden-onset disasters.[42] Some studies even suggest that environmental refugees will soon become the largest category of involuntary migration caused by a marked environmental disruption that jeopardizes their existence or seriously affects their quality of life.[43] It remains difficult to forecast the future number of environmental migrants. Currently, forecasts vary from 25 million to one billion environmental migrants by 2050, with 200 million being the most widely cited estimate.[44] If the most pessimistic projections materialize, one in nine people would be on the move by then. As astounding as these figures might sound, they do not mean that all concerned individuals would move outside of the borders of their own country.

Currently, international organizations use the following criteria to define environmentally induced migration: the origin of the environmental disruption (natural or technological), its

[40] Wennersten, 4.

[41] Ibid., 38.

[42] Ibid., 27.

[43] Essam El-Hinnawi, *Environmental refugees* (Nairobi, Kenya: United Nations Publications, 1985), 4.

[44] Baher.

duration (acute or gradual), and whether migration was a planned outcome of the environmental disruption (intentional or not).[45] In applying these principles, it is possible to accept the terms climate migrants (for voluntary migration), climate refugees (for forced, cross-border migration), and climate IDPs (for internal displacement).[46] Projections usually include all types of climate-induced movements, whether it is intra-or extra-national relocation. In many cases, if the level of awareness towards environmental migration has increased, a real problem persists: the lack of legal status for this category of people.

According to the UNHRC, refugee status entitles a person to safe asylum in another country for aid and assistance, including financial grants, food, tools, clinics, and shelters.[47] Nevertheless, neither the Geneva Convention nor the UNHRC regard environmental displacement as a determinant of refugee status. The UN defines a refugee as a person who is fleeing persecution due to his religion, nationality, politics, or sectarian origin.[48] In light of current forecasts, where up to one billion people might be facing climate-induced migration, it is crucial that this issue be regarded as a global one. Such a large population movement is not only the problem of stricken areas. More prosperous regions, namely North America and Europe, will have to do more in the future to absorb the influx of millions of refugees expected to follow climate change.[49] Nonetheless, resource scarcity, natural hazards, and climate migration are mutually influential. They all cause disturbances, paving a road towards insecurity and violence, therefore feeding the conflict cycle.

[45] Webersik, 71.

[46] Ibid., 72.

[47] United Nations High Commissioner for Refugees, Convention and Protocol Relating to the Status of Refugees, 1952, Chapter I, Article 1, Section A, Subsection 2.

[48] Ibid.

[49] Welzer, 11.

Climate Change as a Spark for the Conflict Cycle

As more frequent and intense natural disasters occur which, in turn, create resource scarcity, nations are put under significant stress while trying to prosper, or simply survive. In today's global era, many states depend heavily on natural resources to sustain their economic activity and when one country or faction exploits more than its share of these resources, it often affects the interests of other groups and nations. Conflicts over renewable resources occur in most parts of the world.[50] Whether it is the famine caused by agricultural mismanagement in South Sudan, responsible for the conflict between rival ethnic groups, or the food crisis that occurred during the Yemen civil war where more than 10,000 people have been killed, the effects of climate change on natural resource availability are more apparent than ever.[51]

In the last decade, findings of several major research projects have proven that natural resource scarcities are already contributing to violent conflicts, particularly in the developing world.[52] Fights over natural assets have grown more potent as demand for essential commodities increases daily and the supply-side looks more and more insecure. Hence, climate change will stress the world's economic, social, and political systems through seven compounded risks, putting pressure on states and societies in fragile situations. These risks are local resource competition, livelihood insecurity and migration, extreme weather events, volatile food prices and provision, transboundary water management, sea-level rise and coastal degradation, and unintended effects of climate policies.[53] In an increasingly connected world, dire consequences in

[50] Ashok Swain, "Environmental Conflict and Peacebuilding," in *Routledge Handbook of Environmental Conflict and Peacebuilding* (New York: Routledge, 2018), 3.

[51] Joe McCarthy, "These are Five Conflicts that Were Made Worse by Climate Change," Global Citizen, November 17, 2017, accessed December 4, 2019, https://www.globalcitizen.org/en/content/conflicts-affected-by-climate-change/.

[52] Ibid., 4.

[53] Randall Amster, "Environment, Climate Change, and Peace," in *Routledge Handbook of Environmental Conflict and Peacebuilding* (New York: Routledge, 2018), 76.

one country can produce global ripples. For example, the drought in Russia in the summer of 2010 led to forecasts of a much-reduced harvest, caused alarm in Moscow.[54] This resulted in a decision to stop exports of wheat as a precaution against likely future shortages, which in turn led to a spike in global grain prices as hoarding and speculation drove market behavior and other actors tried to buy what was available.[55] Such a spike in food prices represented a factor in the emergence of the Arab Spring and with it all the political turmoil that resulted subsequently.[56] More significantly, the conflict in Darfur has been described as the "first modern climate change conflict" where violence took place following a severe drought in the 1980s.[57] What was first reported as a tribal conflict between "Arab Horseback militias" and "African farmers" was, in fact, a war by a government on its own population, in which climate change played a decisive role.[58]

More precisely, the *Janjaweed*, a militia comprised of Arabs criminals recruited by the government, were used to confront African tribes under the motives of self-enrichment or consolidation of power in the hands of political dissidents since the 1970s.[59] The situation worsened when a disastrous famine struck the country in 1984. Because of historically lower rainfall, sedentary African farmers tried to protect their meager harvest by blocking access to their fields to Arab nomadic tribes whose pastureland had dried up. As a result, the nomadic groups were unable to use their traditional herding routes and started to fight their way through the blocked off fields.[60] As the drought continued, it produced more than 80,000 IDPs who were

[54] Amster, 49.

[55] Ibid.,50

[56] Ibid.

[57] Jeffrey Mazo, "Darfur: The First Modern Climate Change Conflict," in *Climate Conflict: How Global Warming Threatens Security and What to Do About It* (New York: Adelphi Books, 2014) 73-74.

[58] Welzer, 62.

[59] Ibid.

[60] Ibid., 63.

declared illegal refugees and targeted for deportation by the central government.[61] Following the military putsch of 1989, government-backed militias increasingly intervened, making the conflict sharper, ethnocentric, and more violent.[62] In sum, the drying climate disrupted traditional patterns of coexistence between farmers and herders and led to scarcity, which contributed to fighting. By 2003, it evolved into the full-fledged genocidal tragedy witnessed today where the casualty estimates range from 200,000 and 500,000.[63]

Because climate change creates disturbances on a global scale that intersects with both ecological and social systems, unintended outcomes can be disastrous from an international environmental security standpoint. One recent study concluded that between 1950 and 2000, 118 of 146 conflicts took place wholly or partially within climate hotspots.[64] During the same period, the probability for new civil conflict to emerge doubled throughout the tropics during El Niño years compared to La Niña years.[65] This oscillation in climate is believed to have had a role in 21 percent of all civil conflicts since 1950.[66] These studies also suggest that many of the countries affected by climate change suffer from political instabilities and weak governance that hasten the eruption of conflicts. As Jock Stirrup, former chief of the United Kingdom Defence Staff, argued, "Just glance at a map showing the area most likely to be affected and you are struck at once by the fact that they're exactly those parts of the world where we see fragility, instability and weak

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[61] Welzer, 63.

[62] Ibid.

[63] Mazo, 74.

[64] Richard A. Matthew, "Climate Change Adaptation and Peacebuilding," in *Routledge Handbook of Environmental Conflict and Peacebuilding* (New York: Routledge, 2018), 113.

[65] National Oceanic and Atmospheric Administration, "What are El Niño and La Niña?," last updated October 16, 2019, accessed October 30, 2019, https://oceanservice.noaa.gov/facts/ninonina.html. "El Niño and La Niña are opposite phases of what is known as the El Niño-Southern Oscillation (ENSO) cycle. The ENSO cycle is a scientific term that describes the fluctuations in temperature between the ocean and atmosphere in the east-central Equatorial Pacific. La Niña is sometimes referred to as the cold phase of ENSO, and El Niño as the warm phase. These deviations from normal surface temperatures can have large-scale impacts not only on ocean processes, but also on global weather and climate."

[66] Matthew, 114.

governance. It seems to me rather like pouring petrol onto a burning fire."[67] As illustrated in figure 4, natural disasters or climate change are often acting as preconditioned "risks" affecting a country or a "shock" that strikes a state's capacity to face a catastrophic event, often prompting violence, instability, or conflict.

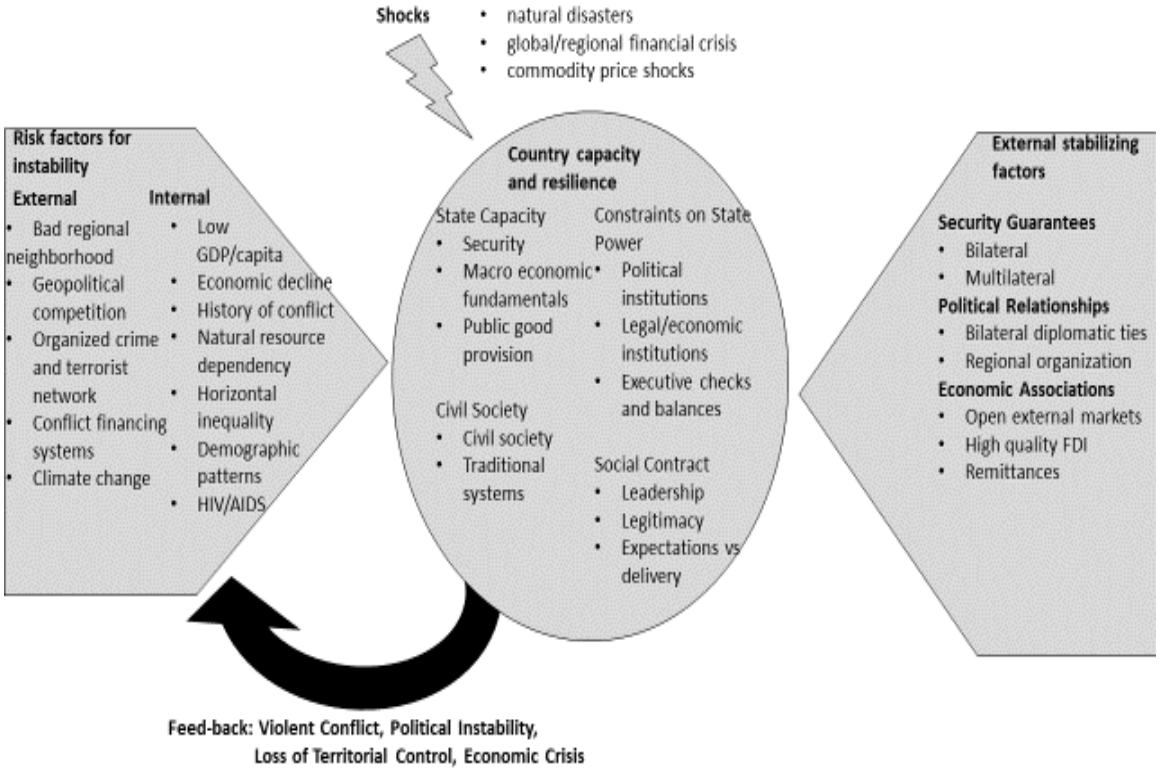

Figure 4. The Instability Framework. Nick Mabey, *Delivering Climate Security: International Security Response to a Climate Changed World* (Philadelphia, PA: Routledge, 2008), 105.

Climate change continues to highlight inequities within and between countries, between the core and periphery, and between the developed and less developed regions.[68] Ironically, nations viewed as "smaller polluters" are the first to experience the impacts of others countries. The unfairness of environmental insecurity is obvious as resilient countries and regions, such as the United States, China, Europe, Japan, Canada, and Australia, are responsible for the largest concentration of emissions while not suffering from these effects in the same proportion.[69]

[67] Purdy, 424.

[68] Welzer, 89.

[69] Webersik, 112.

Among these countries, Canada holds a unique place characterized by contradictions. It is one of the most climate resilient countries in the world, and yet it witnesses severe impacts first hand. Canada also prides itself in being one of the most climate-friendly nations, but it also exploits natural resources, such as oil, at a high rate.[70] Canada fully embraces the environmental agenda, but does not emphasized the security aspect of its domestic and foreign policies.

Canada's Position in a Climate Changing World

When considering Canada, it seems farfetched to associate this country with the negative impacts of a changing climate. However, that is far from the truth. This northern nation suffers from the same three catalysts (resource scarcity, intensification and frequency of natural hazards, and human migration) in an alarming way, twice as fast as other nations in some aspects. According to a recent assessment in Canada's *Changing Climate Report*, there is "high confidence" that Canada is warming at twice the global rate, and the North is warming at three times that rate.[71] Moreover, a 2007 study from Natural Resources Canada depicted an overall portrait of what the future has in store for each region of the country.

> Extreme weather will also put the health of Canadians at risk, as will more heat waves, smog episodes, and ecological changes that support the spread of vector-borne diseases. Atlantic Canada can expect more intense storm events, rising sea level, higher storm surges, coastal erosion, and flooding. Québec will see increased shoreline erosion in areas where social and economic activity is concentrated. In Ontario, water shortages are projected to become more frequent in the heavily populated southern regions. On the prairies, water scarcity will be the most serious climate risk. In British Columbia, water shortages and competition among water uses will increase, with implications for trans-border agreements with the US. At the same time, forests will be increasingly vulnerable to pest infestations and fire, and many areas will experience more frequent and sustained

[70] Canadian Association of Petroleum Producers, "Canada's Energy Resources," last modified October, 2019, accessed October 30, 2019, https://www.capp.ca/canadian-oil-and-natural-gas/canadas-petroleum-resources. Canada is the fifth-largest producer of natural gas and the sixth-largest producer of crude oil in the world. Canada's oil reserves total more than 170 billion barrels, representing the third-largest oil reserves in the world, after Venezuela and Saudi Arabia.

[71] Mona Nemer, "Canada's climate is warming twice as fast as global average," Government of Canada, Office of the Minister of Environment and Climate Change, April 2, 2019, accessed September 26, 2019, https://www.canada.ca/en/environment-climate-change/news/2019/04/canadas-climate-is-warming-twice-as-fast-as-global-average.html.

> drought. In northern and Arctic Canada, increased navigability of Arctic waters, expansion of land-based transportation networks, and access to new oil and gas sources may generate tensions on many fronts.[72]

By following the same method used to understand the global environment, it is possible to correlate the effects of each main adverse factor for Canada. In terms of resource scarcity, Canada might seem to be in an enviable position compared to many other nations. With its millions of lakes and rivers, Canada holds 7 percent of the world's renewable fresh water and more than 20 percent of the world's total freshwater resources.[73] With a population of thirty-eight million people, about half a percent of the world's populace, this is a considerable quantity. However, more than half of this water drains northward into the Arctic Ocean. As a result, the majority of the fresh water remains unavailable to 85 percent of Canadians who live along the country's southern border, meaning that the remaining supply, while still abundant, is heavily used and often overly stressed.[74] As water shortage becomes more likely, the most important concern over water for Canada is the protection of its own resources and the stabilization of the regions where tensions over water are increasing.[75] Especially in the Great Lakes region, home to most of Canadian industries and more than thirty million people, the consequences could be of the utmost intensity.

The Great Lakes are the world's largest surface freshwater ecosystems. They account for 84 percent of North America's available water sources and about 21 percent of the world's supply

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[72] D. S. Lemmen, J. Lacroix, and F. Bush, *From Impacts to Adaptation: Canada in a Changing Climate 2007* (Ottawa, Canada: Government Printing Office, 2008), 6-7.

[73] Government of Canada, "Water and the Environment," Office of the Minister of Environment and Climate Change, July 13, 2018, accessed September 26, 2019, https://www.canada.ca/en/environment-climate-change/services/water-overview/frequently-asked-questions.html.

[74] Ibid.

[75] Department of National Defense, 44.

of surface fresh water.[76] As water scarcity affects Canada, the impacts will naturally be much more important in the Southwestern United States. Because the status of the water contained in these lakes has been left unspecified by the newly-revised United States-Mexico-Canada Agreement (USMCA), it is unclear how Canada will react to the intent of its southern neighbor to drain theses resources to supply the thirsty Southwestern deserts.[77] On the other hand, not all predictions are gloomy in nature as Canada could potentially be one of the few "winners of climate change."[78]

With warmer temperatures, some regions of the globe, to include Canada, may experience longer growing seasons, boosting agricultural production and allowing for the cultivation of new and potentially more profitable crops that yield economic benefits.[79] Shifting the Northern limit for forestry, agriculture, and mineral exploitation by several hundred kilometers by the year 2050 could provide additional positive outcomes for the Canadian lumber, paper, farming, and oil industries.[80] If these positive effects seem to benefit the country, they also carry severe consequences. The thawing of permafrost will push the limit of cultivation to the north. It will also change the soil density, causing existing buildings to collapse and thrusting the local population, almost all members of aboriginal tribes, from their ancestral homes.[81] In turn, more construction projects to accommodate the population will lead to more thawing of

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[76] United States Environmental Protection Agency, "Facts and Figures about the Great Lakes," last modified April 4, 2019, accessed October 27, 2019, https://www.epa.gov/greatlakes/facts-and-figures-about-great-lakes.

[77] Bob McDonald, "Climate change: what to expect and are there really two sides?," interview by Johanna Wagstaffe, *Canadian Broadcasting Corporation*, November 7, 2017, accessed October 27, 2019, https://www.youtube.com/watch?time_continue=38&v=zRQvxLuvtX0.

[78] Purdy, 423.

[79] Department of National Defense, 41.

[80] M. L. Parry, O. F. Canziani, J. P. Palutikof, P. J. Van Der Linden, and C. E. Hanson, ed., "2007: Climate Change 2007: Impacts, Adaptation and Vulnerability", in *Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge, United Kingdom: Cambridge University Press, 2008), 55.

[81] McDonald.

permafrost. As a result, increased economic activities in remote regions can stress indigenous communities relying on traditional lifestyles and pose a security threat for a nation characterized by a small population and an even smaller military force. Holistically, it appears that positivism in this future context is quite shallow. As Purdy argued, "A few countries may benefit from climate change in the short term, but there will be no 'winners.' … [T]he new ecosystem is likely to be unstable and in continual flux for decades or longer. Today's 'winner' could be tomorrow's big-time loser."[82]

When analyzing the second catalyst of climate change, the occurrence and intensification of natural hazards, it already constitutes a significant problem for Canada. In fact, natural hazards makes up for 70 percent of all catastrophes.[83] In many models, Canada could also experience more severe weather events in the near future, such as tornadoes, ice storms, and hailstorms, even in areas previously immune from such extreme weather events.[84] Far less dramatic in nature than cyclones or hurricanes, devastating ice storms—such as the 1998 Québec's *Crise du Verglas*—caused widespread and long-term power outages that affected more than four million people.

Increased flooding may also cause future challenges. Already occurring at an increased rate, nuisance floods are expected to continue to proliferate in light of an estimated 10 to 30 percent annual increase of rainfall across Canada.[85] Furthermore, the cumulative effects of less extreme weather events, including nuisance flooding, could exceed the cost of extreme ones. Flooding alone could cost up to one trillion Canadian dollars by mid-century.[86]

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[82] Purdy, 425.

[83] Caverhill-Godkewitsch, 27.

[84] Ibid.

[85] Parry et al., 57.

[86] Matthew, "Climate Change Adaptation and Peacebuilding," in *Routledge Handbook of Environmental Conflict and Peacebuilding*, 111.

In addition to these meteorological conditions, the other main impact on the Canadian environment is forest fires. Current projections indicate that the window of high fire risk will increase between 10 to 30 percent per annum over current levels, and that burn areas will increase across Canada by 74 to 118 percent through the year 2100.[87] Overall, Canadian authorities at all levels have acknowledged the importance of the frequency and intensification of natural disasters within the country.

To meet these growing challenges, federal, provincial, and territorial public safety officials have adopted an integrated approach named the Disaster Financial Assistance Arrangements to better mitigate disasters. This policy facilitates the mobilization of federal resources when the means of a province or a territory have been exhausted in a time of crisis.[88] It is under this plan that all levels of government can submit a Request for Assistance (RFA) to other federal departments, such as DND, to operate in their area of responsibility, and under their leadership. In the case of DND's involvement, it also prescribes the expected timeframe for deployment of an assistance force, the costs involved, the type and duration of possible tasks and mandates, and the elaboration of reconstruction strategies.[89]

The third main adverse catalyst of climate change is population migration. This concept is susceptible of causing the heaviest repercussion for the nation's environmental security. Understandably, Canada is a country of choice for many climate-induced migrants. The possibility of having to accommodate a larger flow of migration has been recognized for some time now by academics and governmental authorities because of Canada's geographic vastness,

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[87] N. P. Gillett, A. J. Weaver, F. W. Zwiers, and M. D. Flannigan, "Detecting the Effect of Climate Change on Canadian Forest Fires," Geophysical Research Letters 31, *American Geophysical Union* 31, no. 18 (September 2004): 2.

[88] Government of Canada, *Pan-Canadian Framework on Clean Growth and Climate Change Canada's Plan to Address Climate Change and Grow the Economy* (Ottawa, Canada: Government Printing Office, 2016), accessed August 4, 2019, http://publications.gc.ca/collections/collection_2017/eccc/En4-294-2016-eng.pdf.

[89] Ibid.

abundance of natural resources, and low population density. Combined with the effects of the changing climate, there will be areas in the country, previously considered uninhabitable, that may become more temperate, putting Canada in the unique position of accepting more migrants in need.[90]

In the current global context, Canada ranks seventh for the total amount of immigrants that it welcomes annually and second for the net migration rate according to the UNDESA.[91] Each year since the early 1990s, Immigration, Refugee and Citizenship Canada (IRCC) has published departmental plans outlining the desired results and priorities to meet those goals. These plans also include expenditures, staffing, and other metrics to foster transparency.[92] Over the years, such measures contributed to shaping the face of Canadian society. Accordingly, in 2013, 20 percent of the Canadian population was foreign born (compared to 13 percent in the United States).[93] Immigrants are categorized in three major groups: economic immigrants (70 percent), family immigrants (18 percent), and humanitarian immigrants (12 percent).[94] In 2011 alone, Canada accepted 249,000 new permanent residents, including 36,200 for humanitarian reasons.[95] The growth in this domain has continued steadily to reach new heights with the current administration. To that effect, the current minister of IRCC, Ahmed D. Hussen, announced a newly revised target of somewhere between 310,000 and 360,000 new migrants for

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[90] Nicole Mortillaro, "Could Canada be a safe haven for climate refugees?" *Canadian Broadcasting Corporation*, June 20, 2019, accessed September 26, 2019, https://www.cbc.ca/news/technology/canada-climate-refugees-1.5165029.

[91] United Nation Department of Economic and Social Affairs, "World Population Prospects 2019," last modified August 29, 2019, accessed October 27, 2019, https://population.un.org/wpp/Download/Standard/Migration.

[92] Reiss Kuczera, "U.S. Refugee Policy in the Era of Homeland Security: A Comparative Government Analysis" (master's thesis, Naval Postgraduate School, Monterey, CA, 2017), 76.

[93] Ibid.,77.

[94] Ibid.

[95] Becklumb, *Climate Change*, 4.

the year 2020.[96] In light of this new plan, figure 5 below depicts the net increase in the number of new Canadians between 2016 and 2020.

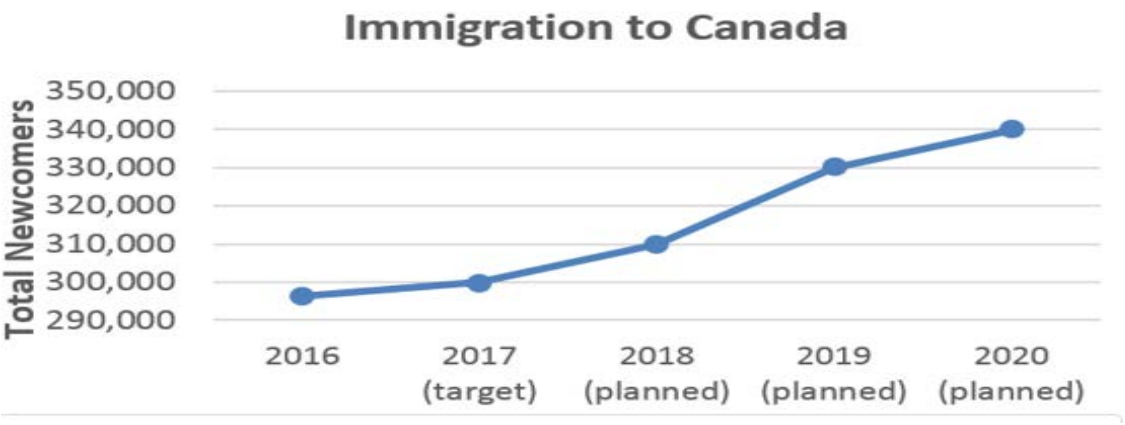

Figure 5. Planned Annual Immigration Level to Canada. Government of Canada, *IRCC Departmental Plan 2018–2019* (Ottawa, Canada: Government Printing Office, 2018), accessed October 27, 2019, https://www.canada.ca/en/immigration-refugees-citizenship/corporate/publications-manuals/departmental-plan-2018-2019/departmental-plan.html.

Although it is unclear what share of this target will consist of humanitarian migrants, the government has committed additional resources for the faster processing of asylum claims, the reduction of irregular migration, and the integration of more refugees.[97] The following motives underlined the decision of the Canadian government to welcome humanitarian migrants: supporting international peace order, mitigating further damage to the global ecosystem, fulfilling a moral obligation to take responsibility for the effects of climate change, and providing humanitarian assistance to those in need around the world.[98] While it is impossible to predict the exact flow of future environmental migration, the actual context suggests a significant increase. Under the actual targets of the Canadian government, up to fifty thousand migrants per year could be welcomed for humanitarian reasons, to include climate migrants.[99] Although this projection is

[96] Government of Canada, *Immigration, Refugees and Citizenship Canada Departmental Plan 2018–2019* (Ottawa, Canada: Government Printing Office, 2018), accessed October 27, 2019, https://www.canada.ca/en/immigration-refugees-citizenship/corporate/publications-manuals/departmental-plan-2018-2019/departmental-plan.html.

[97] Ibid.

[98] Becklumb, 5.

[99] Government of Canada, *Immigration, Refugees and Citizenship*.

vague and likely insufficient to absorb the potential flow of incoming migrants, it will certainly contribute to further changing the face of the Canadian society, as portrayed in table 1 below.

Table 1. Importance of Demographic Factors in Violent Conflict from 1984 to 2007.

Variable	Total Number of Cases	Background Factor	Minor Irritant	Major Irritant	Central Importance	Sole Determinant
Population Size*	22	3	15	1	2	1
Absolute Size	16	8	4	2	2	0
Size in Relation to Resources	19	1	8	7	2	1
Population Change	19	8	6	5	0	0
Absolute Rate of Growth	25	10	10	3	2	0
Differential Rate of Growth	9	3	5	1	0	0
Population Distribution	35	7	10	13	5	0
Rural/Urban Distribution	16	3	10	3	0	0
Population Density	7	2	3	2	0	0
Spatial Location in Relation to Resources	18	3	4	8	3	0
Spatial Location in Relation to Borders	15	4	5	4	2	0
Population Movement	30	11	6	8	5	0
Population Composition	32	1	6	11	13	1
Sex Distribution	4	2	2	0	0	0
Age Distribution	10	3	3	4	0	0
Segmental Division	31	2	1	10	12	6

* General factors are in bold, specific factors are not. The number of cases where a specific factor affected outcomes is typically less than the number of cases where the general factor did since for some, a given specific factor played no role.

Source: Carolyn Pumphrey, *Global Climate Change: National Security Implications* (Carlisle, PA: Strategic Studies Institute, 2008), 110.

From a social and cultural point of view, the environmental security literature often analyzes the risks associated with increased migration. From the social costs of integrating a large number of children and elderly, to the necessity of additional security screening measures to prevent the entrance of violent extremists, the challenges are numerous.[102] To be clear, IRCC and UNHCR studies have emphasized that there is no evidence that immigration causes crime; in fact, statistics reveal that immigrants commit fewer crimes and are incarcerated less often than

[102] Carolyn Pumphrey, *Global Climate Change: National Security Implications* (Carlisle, PA: Strategic Studies Institute, 2008), 110.

native-born Canadians.[103] Nonetheless, as the demographics of the Canadian society change, additional tensions may develop due to segmental division. Over the years, evidence has shown the impacts that demographic factors played in violent conflicts around the world.

Social tensions are already perceptible in some parts of Canadian society. As a result, the provincial government of Quebec recently passed Bill Twenty-One, entitled "An Act Respecting the Secularity of the State." This law effectively bans the display of religious symbols by public workers or any citizens receiving public services.[104] It intends to protect the identity of the Quebec nation that "has its own characteristics, one of which is its civil law tradition, distinct social values and a specific history that [has] led it to develop a particular attachment to state secularism."[105] If this law seems benign at first sight, the heated popular arguments that followed, as well as the increased radical attitudes from a portion of the native population towards naturalized citizens, are concerning. Moreover, this provincial law echoed throughout other parts of Canada, setting the stage for social upheaval. As the federal target for immigration is constantly growing to face the ever-increasing number of humanitarian migrants, climate-related or not, the government will have to contend with the duality of a spike in ethnocentrism and its own commitments on the world stage. The degree of laxity expressed in that sphere contributes to fueling critics of the Canadian policy style, often called a piecemeal approach.

Currently, the United States, New Zealand, Australia, Canada, and other nations have implemented a piecemeal approach to the problem of environmental migration. Lacking a well-articulated and programmatically-defined approach to the problem, these nations are partially

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[103] Reiss Kuczera, "U.S. Refugee Policy in the Era of Homeland Security: A Comparative Government Analysis" (MA thesis, Naval Postgraduate School, Monterey, CA, 2017), 85.

[104] National Assembly of Quebec, bill no. 21: *An Act Respecting the Secularism of the State*, 42nd Legislature 1st sess. (March 2019), accessed September 20, 2019, http://www.assnat.qc.ca/en/travaux-parlementaires/projets-loi/projet-loi-21-42-1.html, 6-7 (Canada).

[105] Ibid., 4.

absolving themselves of the responsibility to deal with the problem of climate refugees.[106] More recently, Canada's reticence on increasing its admission of refugees has been criticized by UN officials. Accordingly, a UNHCR representative in Canada, Jean-Nicolas Beuze, has pleaded against a "stigmatization of refugees" since a larger numbers of irregular migrant have crossed the Canadian border.[107] Additionally, Beuze states that Canada is able to welcome at least five times more refugees in comparison to other countries' contribution around the world, countries that are often poorer, less resilient, and in more dire economic shape than Canada.[108] Canada has an opportunity now to plan an orderly and effective response to the coming crisis through a coherent, complete, and comprehensive national policy.[109]

Canada's Environmental Security Policy

In light of the profound tensions that climate change will inflict on Canadian society, it is crucial that a holistic and coherent whole of government approach is developed. Yet, this is where many contradictions arise. Canada is often seen as a prime advocate of climate change policies. For example, it was one of the first countries to sign the 1998 Kyoto Protocol. However, Canada has one of the worst records of major signatories to the agreement with emissions rising about 26 percent since 1990, and it now registers about 34 percent above Canada's Kyoto targets.[110] The same pattern has been perceptible following the ratification of the 2015 Paris Agreement, which led critics of the federal government to criticize the climate change records of successive federal

[106] Angela Williams, "Turning the Tide: Recognizing Climate Change Refugees in International Law," *Law and Policy* 4, no. 30 (October 2008): 514.

[107] Caroline Plante, "Québec peut accueillir plus de réfugiés, dit l'ONU [Quebec can accommodate more refugees, says UN]," La Presse, August 8, 2019, accessed December 4, 2019, https://www.lapresse.ca/actualites/politique/201908/08/01-5236706-quebec-peut-accueillir-plus-de-refugies-dit-lonu.php. Since 2016, an average number of 1,700 irregular migrants are crossing the Canadian border per month.

[108] Ibid. Beuze invokes the example of Lebanon where one out of five is a refugee in the country.

[109] Mortillaro.

[110] Purdy, "From Obscurity to Action," 426.

governments, both Liberal and Conservative, as "years of failure and fantasy."[111] This characterization is owed to the lack of genuine commitment, policy confusion, and incoherence in Ottawa.[112] On a brighter note, the current administration recently published the *Pan-Canadian Framework on Clean Growth and Climate Change* (2016). This framework focuses on building climate resiliency across Canada by translating scientific information and traditional knowledge into action, building climate resilience through infrastructure, protecting and improving human health and well-being, supporting particularly vulnerable regions, and reducing climate-related hazards and disaster risks to provide a more stable and secure environment.[113] It thus highlights the domestic and foreign security threats that a changing climate can foster.

The *Pan-Canadian Framework* identifies Canada as an industrialized nation that can operationally define threats as any potential events or pressures generated by environmental change that substantially alter the operations of the government, economy, and citizens of Canada at home and abroad.[114] Consequently, the government's interests in foreign environmental security focuses on sustainable development abroad as well as the assessment of vulnerability to critical domestic infrastructure from environmental, accidental, and malicious sources.[115] If great strides have been made in the political sphere and public safety, it still requires more analysis from a National Defence viewpoint and its main instrument, the CAF.

What Does It Mean for the Canadian Armed Forces?

Across the world, almost every country has acknowledged that climate change is a serious security threat. In the United Kingdom, climate change is well nested within virtually all

[111] Purdy, "From Obscurity to Action," 426.

[112] Ibid.

[113] Government of Canada.

[114] Caverhill-Godkewitsch, 4.

[115] Ibid., 5.

forces planning activities. In New Zealand, a 2016 white paper outlined force-planning guidance for humanitarian assistance and disaster relief operations. The Australian Department of Defence emphasizes climate change as a necessity in the Indo-Pacific region. NATO has increased the prominence of response disasters in future alliance operations.[116] In the United States, the security challenges posed by climate change have been surprisingly well understood and analyzed by the defense establishment.[117]

To that effect, former Secretary of Defense Chuck Hagel stated, "climate change is a long-term trend, but with wise planning and risk mitigation now, we can reduce adverse impacts downrange."[118] This statement occurred in the foreword of the "Climate Change Adaptation Roadmap," which included three goals to identify and assess the effects of climate change on the DoD; integrate climate change considerations across the Department and manage associated risks; and collaborate with internal and external stakeholders on climate change challenges.[119] Furthermore, in 2014 the DoD recognized climate change as the sixth of eight security risks, ranking it above major energy market disruptions and significant security consequences associated with weak or failing states.[120] Consequently, each Global Combatant Command uses their Theater Campaign Plans, Operation Plans, Contingency Plans, and Theater Security

[116] D. P. G. G. Boucher, "Environmental Factors and Force Development," lecture presented at the Canadian Forces College's Climate Change Symposium, Toronto, February 12-13, 2018, 10, accessed August 4, 2019, https://www.cfc.forces.gc.ca/237/251/boucher-eng.pdf.

[117] Jessica F. Green, "Trump is officially withdrawing from the Paris climate agreement. That won't change much," The Washington Post, October 30, 2019, accessed October 30, 2019, https://www.washingtonpost.com/politics/2019/10/30/trumps-officially-withdrawing-paris-climate-agreement-that-wont-change-much/. The United States began the process of withdrawing from the 2015 Paris Agreement on Climate Change and with it, all the requirements for emission withdrawals and internationally agreed upon targets to limit the global raise in temperature.

[118] Office of the Assistant Secretary of Defense (Energy, Installations & Environment), *2014 Climate Change Adaptation Roadmap* (Washington, DC: US DoD, 2014), Foreword, accessed December 4, 2019, http://www.acq.osd.mil/eie/Downloads/CCARprint_wForward_e.pdf.

[119] Ibid., 12.

[120] Office of the Assistant Secretary of Defense, *2014 Climate Change Adaptation Roadmap*, 27.

Cooperation Plans as their means to identify climate risks.[121] By taking such active measures, the US defense establishment acknowledged that climate change is an issue that should be evaluated from all levels of military planning from policy-making to tactical execution. The CAF has not explored this area. No such tangible action plan is available within DND. For Canada's Defence Department, the nexus between climate change and security is summarized by a few sentences in its policy documents. However, the impacts of this subject are influencing all levels of military operations. Figure 6 below represents how climate security analysis is present at different levels.

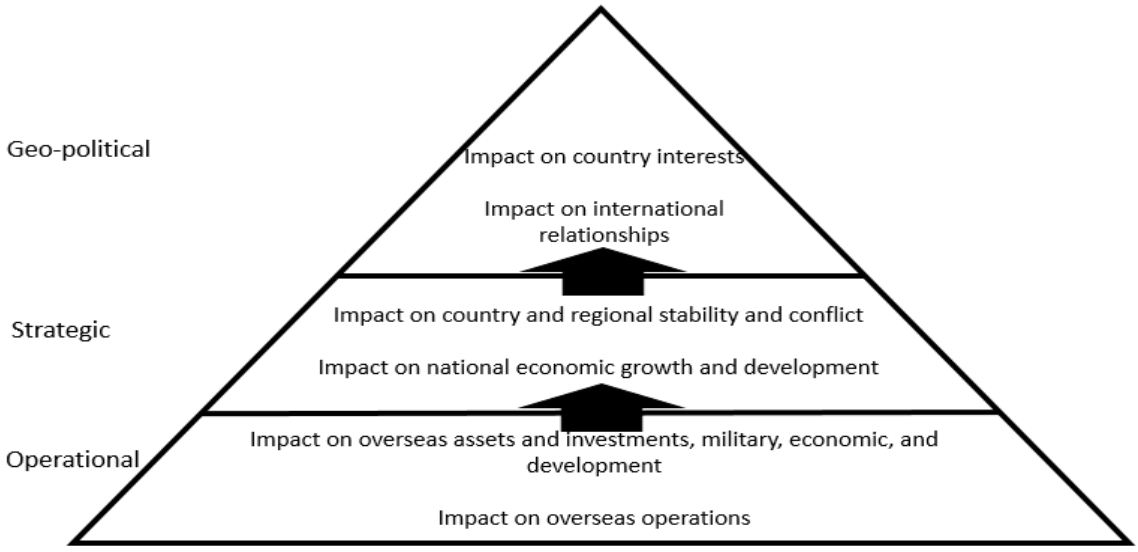

Figure 6. Pyramid of Climate Security Analysis, Nick Mabey, *Delivering Climate Security: International Security Response to a Climate Changed World* (Philadelphia: Routledge, 2008), 56.

This tool provides a better understanding of how climate change affects capability planning for future military operations, specific military assets, economic investments, project development, and impact on equipment and infrastructure.[122] More precisely, the treat to infrastructure, or basing, is one of the most tangible aspects. For example, DoD has recently published a study where each service evaluated its infrastructure's vulnerability to increased flooding, drought, wildfires, thawing permafrost, and rising rivers to identify a total of 46 bases

[121] Pumphrey, 6.

[122] Nick Mabey, *Delivering Climate Security: International Security Response to a Climate Changed World* (Philadelphia: Routledge, 2008), 56.

that are particularly threatened.[123] Even though similar information has not been made available by the DND, it can be assumed that with more than 20,000 buildings, 5,500 kilometers of roads and 3,000 kilometers of water works, a certain level of threat exists, especially for coastal installations.[124] This example, among others, serves to portray how the Canadian government has yet to produce an adequate interdepartmental approach to face the threat of climate change.

Although Canadian federal policymakers have recently stressed the importance of climate change and its impact on the national and international security domains, these political guidelines are not firmly represented in the National Defence Strategy (NDS). To that effect, the 2016 "Federal Adaptation Policy Framework" sought to "guide domestic action by the Government of Canada to address adaptation to the impacts of climate variability and change."[125] This document sets out a vision concerning the objectives, roles, strategies, and priorities for action of the federal government in the medium term, but it does not overlap with any published military documents.[126] If the different departments of the national government are actively planning for the forthcoming climate crisis, DND is trailing many others. As Lieutenant-Commander Ray Snook explained back in 2010, "Within DND, although the discussion, debate and action are embryonic, there is growing recognition that the threat is real, but much more needs to be done."[127]

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[123] Ben Watson, "These Are the US Military Bases Most Threatened by Climate Change," Defense One, June 12, 2019, accessed December 11, 2019, https://www.defenseone.com/threats/2019/06/these-are-us-military-bases-most-threatened-climate-change/157689/.

[124] Department of National Defense, *Strong, Secure, Engage, Canada's Defense Policy* (Ottawa, Canada: Queen's Printer, 2017), 52.

[125] Government of Canada, *Federal Adaptation Policy Framework* (Ottawa, Canada: Government Printing Office, 2016), accessed August 4, 2019, 7, https://www.canada.ca/content/dam/eccc/migration/cc/content/2/b/2/2b2a953e-756b-4e8c-a2ba-3fbdc3324dba/4214_federal-20adaptation-20policy-20framework_en.pdf. 8.

[126] Ibid.

[127] Ray Snook, "Climate Change and Its Implications for the Canadian Forces," *Canadian Naval Review* 6, no. 2 (Summer 2010): 16.

At the policy level, the two last NDSs provided the same lack of clarity. In 2010, the Canada First Defence Strategy focused solely on the Arctic region through a small array of tangible measures. Namely, it focused on investing in new patrol ships capable of sustained operations in the Arctic to closely monitor territorial waters, investing in a berthing and refueling facility in Nanisivik, expanding the size and capabilities of the Canadian Rangers, and establishing a new Arctic Training Centre in Resolute Bay.[128] Following the election of a Liberal government in 2015, a new NDS, entitled "Strong, Secure, Engage," increased the number of environmental severity concerns, but with a limited scope of proposed measures to adopt. It recognizes the nexus between climate change and security to a better extent, stating that:

> In addition to the underlying root causes of conflict, the effects of climate change can aggravate existing vulnerabilities, such as weak governance, and exacerbate sources of tension, such as resource scarcity. The effects of climate change must therefore be considered through a security lens. Climate change has emerged as a security challenge that knows no borders. The increased frequency, severity and magnitude of extreme weather events all over the world—one of the most immediate and visible results of climate change—will likely continue to generate humanitarian crises. The effects of climate change can also aggravate existing vulnerabilities, such as weak governance, and increase resource scarcity, which in turn heightens tensions and forces migrations. In Canada, climate change is transforming the Northern landscape, bringing an evolving set of safety and security challenges, from greater demand for search and rescue to increased international attention and military activity.[129]

The 2017 NDS advocates for the adoption of an active stance on the matter. Once again, the focus remains largely on the Arctic region with not much more on the other aspects of climate change-related challenges. More precisely, other than the construction of more icebreakers and patrol ships, a legacy from the previous NDS, the other measures conveyed by Strong, Secure, Engage can be summarized as looking to reduce the footprint of domestic installations; the attribution of energy performance contracts; modernizing 20 percent of the non-military vehicles

[128] Department of National Defense, *Canada First Defense Strategy* (Ottawa, Canada: Queen's Printer, 2017), 4-12. The Canadian Rangers are a sub-component of the CAF reserve force that provide a limited military presence and conduct sovereignty patrol in Canada's sparsely settled northern, coastal, and isolated areas where it would not be economically or practically viable to have conventional Army units.

[129] Department of National Defense, *Strong, Secure, Engage, Canada's Defense Policy*, 52.

to hybrid by 2020; and the investment of $225 million in a wide range of infrastructure projects to reduce the carbon footprint of DND.[130] Although well intentioned, these measures alone do not represent a tectonic shift in the approach promulgated by the government, even if the reality of the CAF has greatly changed in the decade. Strategic leaders of the CAF have witnessed firsthand the toll that climate change has taken on the deployment of the military forces, both domestically and abroad.

The CAF has a history of deploying at home for disaster relief operations. To that effect, Canadian joint doctrine is well established and very clear. Any provincial or territorial government can make the request for a Provision of Service and Humanitarian Assistance Operations. The CAF's response for domestic operations known as CONPLAN Lentus provides strategic effects in locations within twenty-four hours of receiving an RFA.[131] At that point, the Regional Joint Task Force (RJTF) Commander will employ the CAF assets assigned under the Immediate Response Unit (IRU).[132] This support will be limited to filling shortfalls in civil agency capabilities and can take the form of general duty forces or specialists such as engineers, health services, force protection, transport, aviation, and logistic assets.[133] While the procedure was not altered in several years, the frequency and duration of such deployments have changed radically in the last decade. Accordingly, in the period between 1990 and 2010, only six such deployments have occurred.[134] In contrast, twenty-eight deployments occurred between 2011 and 2019 that involved more than 16,000 soldiers, and they lasted for a combined duration of more

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[130] Department of National Defense, *Canada First Defense Strategy*, 4-12.

[131] Government of Canada National Defense, Defense Administrative Orders and Directives (DAOD) B-GJ-005-302/FP-001, *Domestic Operations* (Ottawa, Canada: Queen's Printer, 2011), 6-9.

[132] Government of Canada, "Regional joint task forces," accessed 29 October, 2019, https://www.canada.ca/en/department-national-defence/services/operations/military-operations/conduct/regional-task-force.html. The CAF has formed six standing RJTF in key locations across the country and they provide operational command and control to task forces deployed on CAF operations in Canada.

[133] Government of Canada National Defence, DAOD B-GJ-005-302/FP-001, 6-9.

[134] Neil Fancey, email message to author, October 4, 2019.

than 460 days for an augmentation of 1167 percent over the last decade.[135] Figure 7 below represents the frequency of deployments, duration, and number of troops involved in each case.

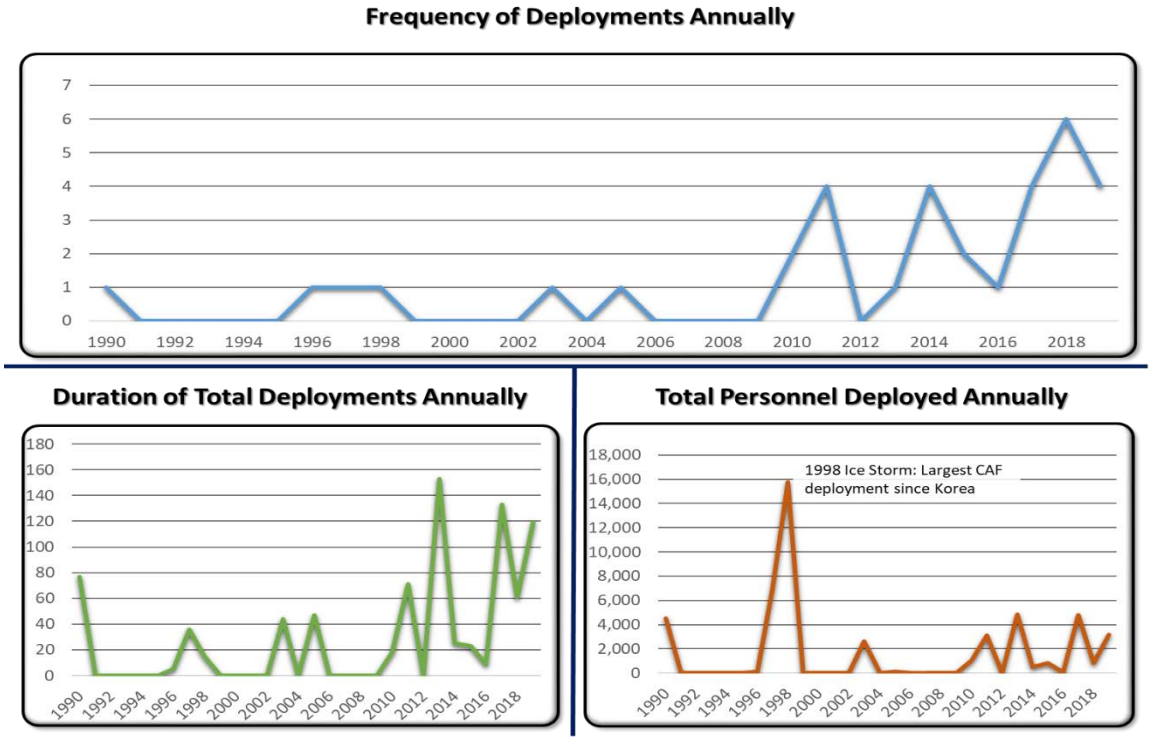

Figure 7. Frequency, Duration, and Number of Personnel Deployed During Domestic Disaster Relief Operations in Canada Annually. Neil Fancey, email message to author, October 4, 2019.

Not only does the CAF deploy more often, but it does so more rapidly, in greater numbers, and for a longer period. When looking at the trends from the last six years concerning deployments under CONPLAN Lentus, it is possible to see that military assets are engaged earlier and more frequently than ever before and that the military is, more often than not, employed to mitigate the effects of emergencies in advance as opposed to responding to a crisis.[136] To that effect, three out of the last nine RFAs were approved by the military before the emergencies exceeded the provincial resources.[137] There is also constant pressure to keep the troops deployed longer, even after the situation has stabilized and within the means of local authorities.

[135] Government of Canada National Defence, DAOD B-GJ-005-302/FP-001, 6-9.

[136] Yannick Michaud, email message to author, December 2, 2019.

[137] Ibid.

Additionally, because the media cover such operations heavily, they contribute to the positive of image of the CAF. Conversely, they also create a greater public expectation for an immediate response with the potential of becoming rapidly politicized.[138] Overall, this increased rate of deployment represents a significant burden for the military at the strategic and operational levels. For a joint force of 62,000 regular and 25,000 reservists, it means stretching the force even thinner, in terms of both meeting international commitments and maintaining a physical posture in Canada, where there is no significant military presence in most major Canadian cities and no "national guard."[139]

For the Canadian Army (CA), the Managed Readiness Plan (MRP) is used to synchronize and ensure the sustainability of the CA's commitments across missions and tasks over time and is based on a thirty-six month rotation between three phases: a Support Phase, a Road to High Readiness Phase, and a High Readiness Phase.[140] For example, during its last High Readiness Phase, 2 Canadian Mechanized Brigade Group (CMBG), the largest fighting formation in the CA, deployed more than 1820 members on expeditionary operations and approximately 1000 soldiers on domestic operations, out of a force of 4500.[141] In addition to its operational deployments, the same CMBG had to maintain the mandates of the IRU in addition to the NATO Response Force Pool, Non-Combatant Evacuation Operations, Decontamination Response unit, and the

[138] Yannick Michaud, email message to author, December 2, 2019.

[139] Purdy, 419.

[140] Jean-Marc Lanthier, Canadian Army Managed Readiness Plan Fiscal Year 2019/2020, June 3, 2019, (Ottawa, ON: National defense Headquarters), 2. The CA is composed of three regular force divisions and two other divisions for a total of five. The CA MRP alternates between the three main regular forces divisions on a twelve-month cycle. In turn, each division is made of one CMBG and two reserve force Brigade Groups.

[141] Jason Adair, 2 Canadian Mechanized Brigade Group Operating Plan 2019/2020, April 12, 2019, (Petawawa, ON: Headquarters 2 Canadian Mechanized Brigade Group), 3.

expeditionary Disaster Assistance Response Team (DART).[142] As 2 CMBG is now getting ready to embark on another cycle over the next twenty-four months, they will require to complete the equivalent of eight months of pre-deployment training to supply the same forecasted amount of soldiers to expeditionary missions while also maintaining more than 600 soldiers on stand-by at all times in case of domestic emergencies.[143] In addition to the military operations conducted on Canadian soil and abroad, the CAF also maintains an expeditionary contingent for Disaster Assistance (DA) relief operations under CONPLAN Renaissance.

Since 2014, CONPLAN Renaissance encompasses the conduct of expeditionary DA operations to provide direction for CAF response to a major international natural disaster.[144] The intent outlined in the CONPLAN is to deploy a Humanitarian Operations Task Force as part of a coordinated governmental response under the construct of the DART.[145] If the sustainment of the DART team does not represent a major endeavor in itself, the appetite for the government to supplement its structure can vary widely. For example, Operation HESTIA was the military response in Haiti following the 2010 earthquake. During this mission, over two thousand CAF personnel were deployed over a period of seventy-eight days at a cost of 184 million dollars, approximately 46 percent of the overall government's relief effort.[146] Taken together, CONPLAN Lentus and CONPLAN Renaissance represent a major challenge for the force's structure, readiness, retention, and the employment of personnel.

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[142] Stephen Cadden, Commander Canadian Army Doctrine and Training Centre High Readiness Forces 2020 Training Directive, May 1, 2019, (Kingston, ON: Commander Canadian Army Doctrine and Training Centre Headquarter), 1.

[143] Adair, 32-33.

[144] Clare K. Bramma, "Directing the Dart Towards Climate Change" (MA thesis, Joint Command and Staff Program, Canadian Forces College, Toronto, ON, 2017), 48.

[145] Ibid., 43.

[146] Ibid., 63.

In a recent interview, General Jonathan Vance, the Canadian Chief of Defence Staff (CDS), reflected on the meaning of sustained and more frequent deployments for the troops. He stated, "These calls for assistance are stretching the military beyond what it was originally designed to handle. … [O]ur force structure right now, I would say, is probably too small to be able to deal with all of the tasks."[147] The additional stress put on the force's battle rhythm translates into operational and personnel challenges. Still, according to General Vance, "If you think of the average year in the life of a soldier, they might be away six months doing an operation outside of Canada, come home, then they could be called out again by the thousands to be dealing with the effects of climate change, while also preparing for their next mission."[148] It is not only the frequency of the domestic deployments that becomes problematic, but also the requirement for additional training. Vance continued, "You just can't go out and fight a fire. You need some training to do that. So we're going to need some forces ready at hand, fully trained to be able to support local firefighters and so on."[149] Whereas the force is already trying to implement innovative solutions to diversify training and maximize readiness for the current mission set, the variety of the tasks at hand is constantly evolving. It now extends to other type of agencies, normally not covered by CAF support, namely the Canadian Border Services.

As a result of the 2010 earthquake in Haiti, the US Department of Homeland Security granted "protective status," or TPS, to 100,000 Haitians who were residing illegally in the United States.[150] When the Trump administration revoked their status in 2017, large numbers crossed the Canadian borders irregularly to ask for asylum. Rapidly, Canada Border Services Agency and the

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[147] Salimah Shivji, "Canada's military feeling the strain responding to climate change," *Canadian Broadcasting Corporation*, June 24, 2019, accessed October 27, 2019, https://www.cbc.ca/news/politics/canada-s-military-adopting-climate-change-1.5186337.

[148] Ibid.

[149] Ibid.

[150] Amanda A. Doran, "Where Should Haitians Go? Why Environmental Refugees are up the Creek without a Paddle," *Villanova Environmental Law Journal* 22, no. 11 (2011): 21.

Royal Canadian Mounted Police were unable to face the requirement and the CAF were deployed under Operation Element. The CAF mandate provided temporary lodgings to house migrants between two separate sites in different provinces.[151] Over a period of seventeen weeks, 370 soldiers were deployed and provided shelter for more than 2,000 persons.[152] Operation Element was the first of this type of border control operation to occur in the history of the CAF. However, as irregular migration continues to intensify, it is likely not the last time that the CAF will perform such operations and, therefore, has to prepare for it as well. When added together, the additional training required to build temporary infrastructure, fight floods, combat fire, and support border services takes a significant toll on time, resources, and manpower of an already overburdened force structure and training schedule.

Because of the limitations of the force structure, the same troops have to train to maintain the levels of readiness required for expeditionary deployments and be ready to be employed at home. The members are thus struggling to meet the mandated gateways required to deploy overseas, attend courses required for career progression, or fulfill institutional tasks. To that effect, the Commander of the Canadian Army has mandated a complete review of the ongoing requirements, entitled, "Survive, Adapt, and Thrive," to properly examine what the Army can and cannot do, leading to task reduction and enhanced efficiencies in personnel management.[153] When this extensive and exhausting routine is occurring year after year, this operational tempo has an impact on the retention of currently serving members.

In a 2018 report to the Standing Committee on Public Accounts, the Deputy Minister of DND recognized that the recruiting system did not meet the CAF strategic objectives and

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[151] Government of Canada, "Operation Element," last modified December 12, 2017, accessed December 4, 2019, https://www.canada.ca/en/department-national-defence/services/operations/military-operations/recently-completed/operation-element.html.

[152] Ibid.

[153] Marie-Claude Harvey, Canadian Army G3 SITREP, November 6, 2019, (Ottawa, ON: National defense Headquarters), 2.

acknowledged the fundamental necessity of institutional reform.[154] Not only is selection of new recruits problematic, but the retention of serving members constitutes another deficiency. To that effect, fiscal year 2016 saw more than twenty-five occupations suffer from an attrition rate of more than 10 percent because of retention challenges.[155] Combined with failed recruiting targets, it created a record-breaking year where 30 percent of all military occupations within the CAF were labelled as "critical."[156] These facts led to the creation of Operation Generation to stop the bleeding and meet the minimal requirements to remain afloat.

In this context, the equation is simple. As less soldiers serve in the CAF and demands for manpower multiply, it creates a perfect storm where more stress is placed on the remaining available effectives, leading to a worsening retention, and so on. In a situation where more soldiers are deployed on home soil than overseas, Canadian strategic and operational leaders must ensure that the armed forces remain flexible, responsive, and combat-capable for a wide range of operations, while still being able to cooperate with allies.[157] They must be selective and strategic to answer the following key questions when considering the deployment of Canadian armed forces. Which efforts would be of greatest relevance to our national security interests? Do we have the capacity to contribute meaningfully to a successful outcome?[158] Asking these questions seems to be easier than answering them, especially in the face of future projections where increased deployments related to climate change might just be too much to handle under the current CAF force structure.

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[154] Deputy Minister Department of National Defense, *Report to the House of Commons Standing Committee on Public Accounts on the Canadian Armed Forces Recruitment and Retention* (Ottawa, Canada: Government Printing Office, April 30, 2018), accessed October 29, 2019, https://www.ourcommons.ca/content/Committee/421/PACP/WebDoc/WD9821327/421_PACP_reldoc_PDF/PACP_DepartmentOfNationalDefence-ProgressReport-2018-04-30-e.PDF.

[155] Ibid., 17.

[156] Ibid., 12.

[157] Department of National Defense. *Securing an Open Society: Canada's National Security Policy* (Ottawa, Canada: Queen's Printer, 2004), 50.

[158] Ibid., 51.

Recommendations, Observations, and Conclusion

Even if a strong correlation between the impacts of global climate change and environmental security can be established, why is there still laxness in taking more actions that are tangible? The main argument often brought forward to explain this situation is the uncertainty of the matter. It is true that future uncertainty exists, but it is important to note that uncertainty is an inescapable element of projecting events in the future. In the case of climate change, however, the uncertainty is not that the earth's climate is changing, but rather the tempo and scale of how it will impact Canadian national security.[159] Even more worrying is the evidence suggesting that the potential effects may have been underestimated. Indeed, many climatologists now conclude that the IPCC, even in the worst-case emission scenarios, underestimated many aspects of climate change.[160] Among the more disturbing recent findings are that the impacts of climate change may persist for more than one thousand years, even after human-induced emissions of carbon dioxide stop completely.[161]

Uncertainty is no reason for paralysis; indeed, inaction equates to gross irresponsibility in the case of climate change. In fact, the costs of mitigation are relatively small compared to the cost of inaction. For example, climate change could cost the Canadian government between twenty-one and forty-three billion dollars per year by 2050 if it follows its current path.[162] Especially when considering the climate and security nexus, the uncertainty cannot be an excuse for delayed. Every day, the military deals with global uncertainty. Military planners know that, as military strategist Carl von Clausewitz wrote, "all action must, to a certain extent, be planned in a

[159] Snook, 2.

[160] Purdy, 414.

[161] Ibid.

[162] Government of Canada, *Pan-Canadian Framework on Clean Growth and Climate Change Canada's Plan to Address Climate Change and Grow the Economy*, 1.

mere twilight."[163] Worsening climate effects will lead to greater threats to global security. These factors will contribute to more outbreaks of violence, more segmental division, and more competition for resources around the globe and in Canada.[164]

In some aspects, Canada is already late off the block with respect to asserting the security implications of climate change, and therefore should not perpetuate these trends.[165] Instead, it should leverage its advantages. The country has a strong cadre of climate scientists and security analysts, and the added advantage of a small, centralized, and fairly cohesive security community.[166] The country is well positioned to address the climate change-security nexus in an integrated and holistic way. The adoption of a truly "Issues-Based Approach" would help to engineer an optimal strategy encompassing internal factors and national goals in relation with the country's desired global posture.[167] Furthermore, such a national policy would enable a proper "sizing and shaping" of the military force to provide the organizational and material strength required to operate advantageously in the near future.[168] However, a path towards a more stable future does not only go through a military response. Rather than over-emphasizing conflict as a result of climate disturbances, the focus should be placed on societal development, including building resilience against adverse effects of climate change.[169]

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[163] Carl Von Clausewitz, *On War* ed. and trans. Peter Paret, (Princeton: Princeton University Press, 1976), 140.

[164] Welzer, 161.

[165] Purdy, 431.

[166] Ibid., 432.

[167] Robert Worley, *Orchestrating the Instruments of Power: A Critical Examination of the U.S. National Security System*, (Lincoln: University of Nebraska Press, 2015), 96.

[168] Ibid., 104.

[169] Matthew, "Climate Change Adaptation and Peacebuilding," in *Routledge Handbook of Environmental Conflict and Peacebuilding*, 116.

Consequently, there are potential adverse effects of militarizing the response to climate change, namely the rise of "fortress societies" that protect their own at the expense of others.[170] Additionally, the invocation of "climate refugees" and "climate conflict" can fuel the militarization of climate policy and may provide a new legitimation for global militarism, just at the time when countries are required to shift public resources from funding soldiers and weaponry to building the green infrastructure required to address the climate crisis.[171] A final consideration relates to the potential for military resources to overrun civilian actors and create dependencies. As military forces are being ubiquitously involved in domestic and expeditionary DA operations, it may lead to overreliance upon the armed forces over local authorities, making it more difficult to sustain emergency responses over the medium and long-term.[172]

The key in finding the proper balance in the level of involvement and preparation for the CAF is to ensure the coordination of its approach at all levels, from the policy sphere to the tactical realm. While using the DOTMLPF-P tool to define the actual state of the CAF, some encouraging and some less reassuring aspects become apparent. From a doctrinal perspective, the current doctrine is well scoped and provides sufficient references to link the RFA from a provincial government to the CAF, resulting in a more expedient effect.[173]

The variables of organization, training, and personnel should be examined together. For the organization, both CONPLAN Lentus and Renaissance constitute separate lines of effort within the MRP in all regions of Canada under the control of the RJTFs. The reserve force is also a major contributor and helps mitigate the frictions in the generation of the force. However, this area is the most sensitive as the force structure is already stretched to a critical limit when considering the additional training required, the time deployed on domestic or expeditionary DA

[170] Amster, 78.

[171] Ibid., 79.

[172] Bramma, 64.

[173] Neil Fancey, email message to author, October 4, 2019.

operations, and the increasing occurrences of such mandates. The real question here is to define how much the elastic band can stretch before it breaks.

When looking at the materiel aspect, no clear direction has been taken. The Directorate for Capability Integration recognizes that climate change is a threat multiplier, but it remains unclear on how that will impact force development and future considerations.[174] With the exception of arctic patrol vessels, no other acquisition processes have been engaged. As the impact of global climate change becomes more widespread, the CAF will need to consider the effectiveness of military systems, capabilities, and platforms associated with operating in extreme environmental conditions.[175] Knowing that procurement is a multi-decade endeavor, no advancements are foreseeable in the near future. Conversely, with a greater leadership involvement, this reality could change quickly.

From the DND to the CDS, climate change has been recognized as a threat and all matters are acted upon from a synchronized approach within the main strategic and operational commands. On the other hand, if crises response procedures are clear, a better operational forecast is necessary. To this day, the recent declarations by the CDS to the effect that climate change creates additional demands for troops have yet to translate into strategic or operational directions.[176]

Lastly, the risks posed to facilities are real, tangible, and imminent. Some infrastructures, mostly navy bases, are under significant threat with rising sea levels. When considering that DND is the largest building owner in the federal government with installations in every province and

[174] Boucher.

[175] Department of National Defense, *The Future Security Environment 2008-2030* (Winnipeg, Canada: 17th Wing Publishing Office, 2010), 110.

[176] Adam Pellerine, email message to author, October 28, 2019.

more than 217 cities, the impact can be tremendous financially, but also strategically and operationally.[177]

To conclude, the Canadian approach to the climate change and security nexus is not flawless. In the face of growing tensions caused by resource scarcity, intensification and frequency of natural hazards, and human migration, good intentions and strongly-worded arguments are not enough. Nevertheless, the attention given to that subject reflects public and institutional will for change. As seen during the 2019 federal election, a strong mobilization of the population in every part of the country was instrumental in putting climate change and its consequences among the top collective priority.[178] Consequently, all political parties across the ideological spectrum heard that popular position and modified their electoral platform accordingly.[179] If this movement remains consistent, there is confidence that it will translate in the articulation of a better security strategy in the years ahead. The CAF has made progress during the last decade on this matter, and there is hope that a more comprehensive approach will be adopted in the near future, beyond the sole scope of the Arctic.

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[177] Snook, 15.

[178] Maryam Shah, "Climate change emerges as one of the top ballot-box issues among voters: Ipsos poll," *Global News*, October 9, 2019, accessed on October 29, 2019. https://globalnews.ca/news/6006868/climate-change-federal-election-issue-poll. In a poll conducted in the weeks prior to the 2019 Canadian Federal election, thirty-five percent of Canadians placed climate change as one of the top three most important election concerns, second only to health of the citizens at forty-five percent.

[179] Shawn McCarthy, "Federal election 2019: Where the four main parties stand on climate policy," *The Globe and Mail*, September 8, 2019, accessed October 29, 2019, https://www.theglobeandmail.com/politics/article-federal-election-2019-where-the-four-main-parties-stand-on-climate/.

Bibliography

Ackerman, John T. “Climate Change, National Security, and the Quadrennial Defense Review: Avoiding the Perfect Storm.” *Strategic Studies Quarterly* 2, no. 1 (Spring 2008): 56-96.

Ackerman, John T. “Climate Change, National Security, and the Quadrennial Defense Review: Avoiding the Perfect Storm.” *Strategic Studies Quarterly* 2, no. 1 (Spring 2008): 56-96.

Adair, Jason. *2 Canadian Mechanized Brigade Group Operating Plan 2019/2020*. Petawawa, ON: Headquarters 2 Canadian Mechanized Brigade Group, 2019.

Allen, Myles R., Vicente R. Barros, John Broome, Wolfgang Cramer, Renate Christ, John A. Church, Leon Clarke, Qin Dahe, Purnamita Dasgupta, Navroz K. Dubash, Ottmar Edenhofer, Ismail Elgizouli, Christopher B. Field, Piers Forster, Pierre Friedlingstein, Jan Fuglestvedt, Luis Gomez-Echeverri, Stephane Hallegatte, Gabriele Hegerl, Mark Howden, Kejun Jiang, Blanca Jimenez Cisneros, Vladimir Kattsov, Hoesung Lee, Katharine J. Mach, Jochem Marotzke, Michael D. Mastrandrea, Leo Meyer, Jan Minx Yacob Mulugetta, Karen O’Brien, Michael Oppenheimer, Joy J. Pereira, Ramón Pichs-Madruga, Rajendra K. Pachauri, Gian-Kasper Plattner, Hans-Otto Pörtner, Scott B. Power, Benjamin Preston, N. H. Ravindranath, Andy Reisinger, Keywan Riahi, Matilde Rusticucci, Robert Scholes, Kristin Seyboth, Youba Sokona, Robert Stavins, Thomas F. Stocker, Petra Tschakert, Detlef van Vuuren, Jean-Pascal van Ypersele. *Climate Change 2014: Synthesis Report*. Edited by Rajendra Kumar Pachauri and Leo Meyer. Geneva, Switzerland: International Panel on Climate Change, 2014. Accessed September 16, 2019. https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf.

Amster, Randall. “Environment, Climate Change, and Peace.” In *Routledge Handbook of Environmental Conflict and Peacebuilding*, 73-83. New York: Routledge, 2018.

Becklumb, Penny. *Climate Change and Forced Migration: Canada’s Role.* Publication No. 2010-04-E. Ottawa, Canada: Library of Parliament, 2010. Accessed August 4, 2019. https://lop.parl.ca/staticfiles/PublicWebsite/Home/ResearchPublications/BackgroundPapers/PDF/2010-04-e.pdf.

Boucher, D. P. G. G. “Environmental Factors and Force Development.” Lecture presented at the Canadian Forces College’s Climate Change Symposium. Toronto, February 12-13, 2018. Accessed August 4, 2019, https://www.cfc.forces.gc.ca/237/251/boucher-eng.pdf.

Bramma, Clare K. “Directing the Dart Towards Climate Change.” Master’s thesis, Joint Command and Staff Program, Canadian Forces College, Toronto, ON, 2017.

Buhang, Halvard. “Climate Change, the Environment, and Armed Conflict.” Paper presented at the Annual Meeting of the American Political Science Association, Boston, MA, August 28-31, 2008

Cadden, Stephen. *Commander Canadian Army Doctrine and Training Centre High Readiness Forces 2020 Training Directive*. Kingston, ON: Commander Canadian Army Doctrine and Training Centre Headquarter, 2019.

Caverhill-Godkewitsch, Isaac. “Facing the Future: Canada’s Environmental Security Challenges in the 21st Century.” *Journal of Military and Strategic Studies* 13, no. 3 (Spring 2011): 1-45.

Centre for Research on the Epidemiology of Disasters. “EM-DAT: The International Disaster Database.” Last modified August 13, 2017. Accessed September 4, 2019. https://www.emdat.be/.

Climate Central. “The Ten Hottest Global Years on Record.” Last modified February 6, 2019. Accessed September 23, 2019. https://www.climatecentral.org/gallery/graphics/the-10-hottest-global-years-on-record/.

Clausewitz, Carl Von. *On War*. Edited and translated by Peter Paret. Princeton: Princeton University Press, 1976.

CNA Military Advisory Board. *National Security and the Accelerating Risks of Climate Change*. Alexandria, VA: CNA Military Advisory Board, 2014.

Coward, Harold. *Hard Choices: Climate Change in Canada.* Waterloo: Wilfrid Laurier University Press, 2004.

Dalby, Simon. “Climate Change and Environmental Conflicts.” In *Routledge Handbook of Environmental Conflict and Peacebuilding*, 42-54. New York: Routledge, 2018.

Department of Defense. “2014 Climate Change Roadmap.” June 2014. Accessed August 3, 2019. https://www.acq.osd.mil/eie/downloads/CCARprint_wForward_e.pdf.

———. *Quadrennial Defense Review 2014.* Washington, DC: Government Printing Press, 2014.

———. *Canada First Defence Strategy.* Ottawa, Canada: Queen’s Printer, 2017.

Department of National Defence. *Securing an Open Society: Canada’s National Security Policy.* Ottawa, Canada: Queen’s Printer, 2004.

———. *Strong, Secure, Engage, Canada’s Defence Policy.* Ottawa, Canada: Queen’s Printer, 2017.

———. *The Future Security Environment 2008-2030.* Winnipeg, Canada: 17th Wing Publishing Office, 2010.

Deputy Minister Department of National Defence. *Report to the House of Commons Standing Committee on Public Accounts on the Canadian Armed Forces Recruitment and Retention.* Ottawa, Canada: Government Printing Office, April 30, 2018. Accessed October 29, 2019. https://www.ourcommons.ca/content/Committee/421/PACP/WebDoc/WD9821327/421_PACP_reldoc_PDF/PACP_DepartmentOfNationalDefence-ProgressReport-2018-04-30-e.PDF.

Diamond, Jared. *Collapse: How Societies Choose to Fail or Succeed.* New York: Viking Press, 2011.

Doran, Amanda A. “Where Should Haitians Go? Why Environmental Refugees are up the Creek without a Paddle.” *Villanova Environmental Law Journal* 22, no. 11 (2011): 1-25.

El-Hinnawi, Essam. *Environmental Refugees.* Nairobi, Kenya: United Nations Publications, 1985.

Gillett, N. P., A. J. Weaver, F. W. Zwiers, and M. D. Flannigan. “Detecting the Effect of Climate Change on Canadian Forest Fires.” Geophysical Research Letters 31. *American Geophysical Union* 31, no. 18 (September 2004): 1-4.

Gizewski, Peter J. *Canada’s Future Army: Alternative Futures and Implications.* Defence Research and Development Canada. Ottawa, Canada: Queen’s Printer, 2017.

Government of Canada National Defence. Defence Administrative Orders and Directives B-GJ-005-000/FP-001. *Canadian Military Doctrine.* Ottawa, Canada: Queen’s Printer, 2011.

———. Defence Administrative Orders and Directives B-GJ-005-300/FP-001. *Operations*. Ottawa, Canada: Queen’s Printer, 2011.

———. Defence Administrative Orders and Directives B-GJ-005-302/FP-001. *Domestic Operations.* Ottawa, Canada: Queen’s Printer, 2011.

———. Defence Administrative Orders and Directives B-GJ-005-307/FP-040. *Humanitarian Operations and Disaster Relief Operations.* Ottawa, Canada: Queen’s Printer, 2015.

Government of Canada. “Operation Element.” Last modified December 12, 2017. Accessed December 4, 2019, https://www.canada.ca/en/department-national-defence/services/operations/military-operations/recently-completed/operation-element.html.

———. “Water and the Environment.” Office of the Minister of Environment and Climate Change. July 13, 2018. Accessed September 26, 2019. https://www.canada.ca/en/environment-climate-change/services/water-overview/frequently-asked-questions.html.

———. *Canada’s Changing Climate Report.* Ottawa, Canada: Government Printing Office, 2019. Accessed August 4, 2019. https://changingclimate.ca/CCCR2019/.

———. *Canada’s Climate Change Actions and Target.* Ottawa, Canada: Government Printing Office, 2019. Accessed August 4, 2019. https://unfccc.int/sites/default/files/can_presentationma_sbi46.pdf.

———. *Climate Change and Forced Migration: Canada’s role.* Ottawa, Canada: Government Printing Office, 2010. Accessed August 4, 2019. https://lop.parl.ca/staticfiles/PublicWebsite/Home/ResearchPublications/BackgroundPapers/PDF/2010-04-e.pdf

———. *Federal Adaptation Policy Framework.* Ottawa, Canada: Government Printing Office, 2016. Accessed August 4, 2019. https://www.canada.ca/content/dam/eccc/migration/cc/content/2/b/2/2b2a953e-756b-4e8c-a2ba-3fbdc3324dba/4214_federal-20adaptation-20policy-20framework_en.pdf.

———. *Immigration, Refugees and Citizenship Canada Departmental Plan 2018–2019.* Ottawa, Canada: Government Printing Office, 2018. Accessed October 27, 2019. https://www.canada.ca/en/immigration-refugees-citizenship/corporate/publications-manuals/departmental-plan-2018-2019/departmental-plan.html.

———. *Pan-Canadian Framework on Clean Growth and Climate Change: Canada's Plan to Address Climate Change and Grow the Economy.* Ottawa, Canada: Government Printing Office, 2016. Accessed August 4, 2019. http://publications.gc.ca/collections/collection_2017/eccc/En4-294-2016-eng.pdf.

Grade, Melanie. "Sea Level Rise Accelerating in U.S. Atlantic Coast." US Geological Survey (June 2011): 1-17.

Harvey, Marie-Claude. *Canadian Army G3 SITREP*. Ottawa, ON: National Defence Headquarters, 2019.

International Panel on Climate Change. *IPCC Factsheet: What Is the IPCC?* Geneva, Switzerland: International Panel on Climate Change Secretariat, 2013. Accessed September 16 2019. http://www.ipcc.ch/site/assets/uploads/2018/02/FS_what_ipcc.pdf.

Jervis, Robert. *System Effects: Complexity in Political and Social Life.* Princeton: Princeton University Press, 1998.

Kamal, Baher. "World population expected to reach 9.7 billion by 2050." United Nations Department of Economic and Social Affairs. July 29, 2015. Accessed September 4, 2019. http://www.un.org/en/development/desa/news/population/2015-report.html.

Kuczera, Reiss. "U.S. Refugee Policy in the Era of Homeland Security: A Comparative Government Analysis." Master's thesis, Naval Postgraduate School, Monterey, CA, 2017.

Lanthier, Jean-Marc. *Canadian Army Managed Readiness Plan Fiscal Year 2019/2020*. Ottawa, ON: National defense Headquarters, 2019.

Lee, James R. *Climate Change and Armed Conflict.* New York: Routledge, 2009.

Lemmen, D. S., F. J. Warren, J. Lacroix, and F. Bush, editors. *From Impacts to Adaptation: Canada in a Changing Climate 2007.* Ottawa, Canada: Government Printing Office, 2008.

Mabey, Nick. *Delivering Climate Security: International Security Response to a Climate Changed World.* Philadelphia: Routledge, 2008.

Matthew, Richard A. "Climate Change Adaptation and Peacebuilding." In *Routledge Handbook of Environmental Conflict and Peacebuilding*, 108-121. New York: Routledge, 2018.

Mazo, Jeffrey. "Darfur: The First Modern Climate Change Conflict." In *Climate Conflict: How Global Warming Threatens Security and What to Do About It*, 73-74. New York: Adelphi Books, 2014.

McCarthy, Joe. “These are Five Conflicts that Were Made Worse by Climate Change.” Global Citizen. November 17, 2017. Accessed December 4, 2019. https://www.globalcitizen.org/en/content/conflicts-affected-by-climate-change/.

McCarthy, Shawn. “Federal election 2019: Where the four main parties stand on climate policy.” The Globe and Mail. September 8, 2019. Accessed October 29, 2019. https://www.theglobeandmail.com/politics/article-federal-election-2019-where-the-four-main-parties-stand-on-climate/

McDonald, Bob. “Climate change: what to expect and are there really two sides?” Interview by Johanna Wagstaffe. *Canadian Broadcasting Corporation*. November 7, 2017. Accessed October 27, 2019. https://www.youtube.com/watch?time_continue=38&v=zRQvxLuvtX0.

Mortillaro, Nicole. “Could Canada be a safe haven for climate refugees?” *Canadian Broadcasting Corporation*. June 20, 2019. Accessed September 26, 2019. https://www.cbc.ca/news/technology/canada-climate-refugees-1.5165029.

National Assembly of Quebec. Bill no. 21: An Act Respecting the Secularism of the State. 42nd Legislature, 1st sess. (March 2019). Accessed September 20, 2019. http://www.assnat.qc.ca/en/travaux-parlementaires/projets-loi/projet-loi-21-42-1.html (Canada).

National Intelligence Council. *Global Trends 2030: Alternative Worlds.* Washington, DC: Office of the Director of National Intelligence, 2012. Accessed September 4, 2019. https://www.dni.gov/files/documents/GlobalTrends_2030.pdf.

Nemer, Mona. “Canada’s climate is warming twice as fast as global average.” Government of Canada, Office of the Minister of Environment and Climate Change. April 2, 2019. Accessed September 26, 2019. https://www.canada.ca/en/environment-climate-change/news/2019/04/canadas-climate-is-warming-twice-as-fast-as-global-average.html.

Office of the Assistant Secretary of Defense (Energy, Installations & Environment). *2014 Climate Change Adaptation Roadmap.* Washington, DC: US Department of Defense, 2014. Accessed December 4, 2019. http://www.acq.osd.mil/eie/Downloads/CCARprint_wForward_e.pdf.

Parry, M. L., O. F. Canziani, J. P. Palutikof, P. J. Van Der Linden, and C. E. Hanson, editors. “2007: Climate Change 2007: Impacts, Adaptation and Vulnerability.” In *Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, United Kingdom: Cambridge University Press, 2008.

Plante, Caroline. “Québec peut accueillir plus de réfugiés, dit l’ONU [Quebec can accommodate more refugees, says UN].” La Presse. August 8, 2019. Accessed December 4, 2019. https://www.lapresse.ca/actualites/politique/201908/08/01-5236706-quebec-peut-accueillir-plus-de-refugies-dit-lonu.php.

Pumphrey, Carolyn. *Global Climate Change: National Security Implications.* Carlisle, PA: Strategic Studies Institute, 2008.

Purdy, Margaret. “From Obscurity to Action: Why Canada Must Tackle the Security Dimensions of Climate Change.” *International Journal* 65, no. 2 (June 2010): 411-33.

Reiss Kuczera. “U.S. Refugee Policy in the Era of Homeland Security: A Comparative Government Analysis.” Master’s thesis, Naval Postgraduate School, Monterey, CA, 2017.

Shah, Maryam. “Climate change emerges as one of the top ballot-box issues among voters: Ipsos poll.” Global News. October 9, 2019. Accessed on October 29, 2019. https://globalnews.ca/news/6006868/climate-change-federal-election-issue-poll.

Shivji, Salimah. “Canada’s military feeling the strain responding to climate change.” *Canadian Broadcasting Corporation*. June 24, 2019. Accessed October 27, 2019. https://www.cbc.ca/news/politics/canada-s-military-adopting-climate-change-1.5186337.

Snook, Ray. “Climate Change and Its Implications for the Canadian Forces.” *Canadian Naval Review* 6, no. 2 (Summer 2010): 10-16.

Stubblefield, Bradley A. “Climate Change and the Joint Force: An Assessment.” Monograph Thesis, School of Advanced Military Studies, US Army Command and General Staff College, Ft. Leavenworth, KS, 2017.

Swain, Ashok. “Environmental Conflict and Peacebuilding.” In *Routledge Handbook of Environmental Conflict and Peacebuilding*, 1-14. New York: Routledge, 2018.

United Nation Department of Economic and Social Affairs. “World Population Prospects 2019.” Last modified August 29, 2019. Accessed October 27, 2019. https://population.un.org/wpp/Download/Standard/Migration.

———. “World Population Expected to Reach 9.7 Billion by 2050.” July 29, 2015. Accessed September 4, 2019. http://www.un.org/en/development/desa/news/population/2015-report.html.

United Nations Framework Convention on Climate Change. *Report on the Conference of the Parties on its Eleventh Session.* Bonn, Germany: United Nations Framework Convention on Climate Change, 2006.

United Nations High Commissioner for Refugees. Convention and Protocol Relating to the Status of Refugees, 1952, Chapter I, Article 1, Section A, Subsection 2.

United States Environmental Protection Agency. “Facts and Figures about the Great Lakes.” Last modified April 4, 2019. Accessed October 27, 2019. https://www.epa.gov/greatlakes/facts-and-figures-about-great-lakes.

Watson, Ben. “These Are the US Military Bases Most Threatened by Climate Change.” Defense One. June 12, 2019. Accessed December 11, 2019. https://www.defenseone.com/threats/2019/06/these-are-us-military-bases-most-threatened-climate-change/157689/.

Webersik, Christian. *Climate Change and Security.* Santa Barbara, CA: Praeger, 2010.

Welzer, Harald. *Climate Wars: Why People Will Be Killed in the Twenty-First Century.* Malden, MA: Polity Press, 2012.

Wennersten, John R. *Rising Tides: Climate Refugees in the Twenty-First Century.* Bloomington: Indiana University Press, 2017.

Williams, Angela. "Turning the Tide: Recognizing Climate Change Refugees in International Law." *Law and Policy* 4, no. 30 (October 2008): 502-529.

Worley, Robert. *Orchestrating the Instruments of Power: A Critical Examination of the U.S. National Security System.* Lincoln: University of Nebraska Press, 2015.

Youngblut, Christine. *Climate Change: Issues in the Science and Its Use.* Alexandria: Institute for Defense Analysis, 2009.