EMERGENCY PREPAREDNESS IN CANADA'S NORTH:

AN EXAMINATION OF COMMUNITY CAPACITY

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INTRODUCTION

THE ARCTIC REGION

There is no commonly accepted definition of the "Arctic," just as there is no commonly accepted definition of Canada's "North." For the purposes of this paper, given its focus on community assets that relate to emergency preparedness, the Canadian portion of the Arctic Region, as demarcated in the map below from the Arctic Council's Arctic Human Development Report, will be the frame of reference. The terms "Arctic" and "North" are used interchangeably in the pages that follow.

FIG. 1: THE ARCTIC REGION
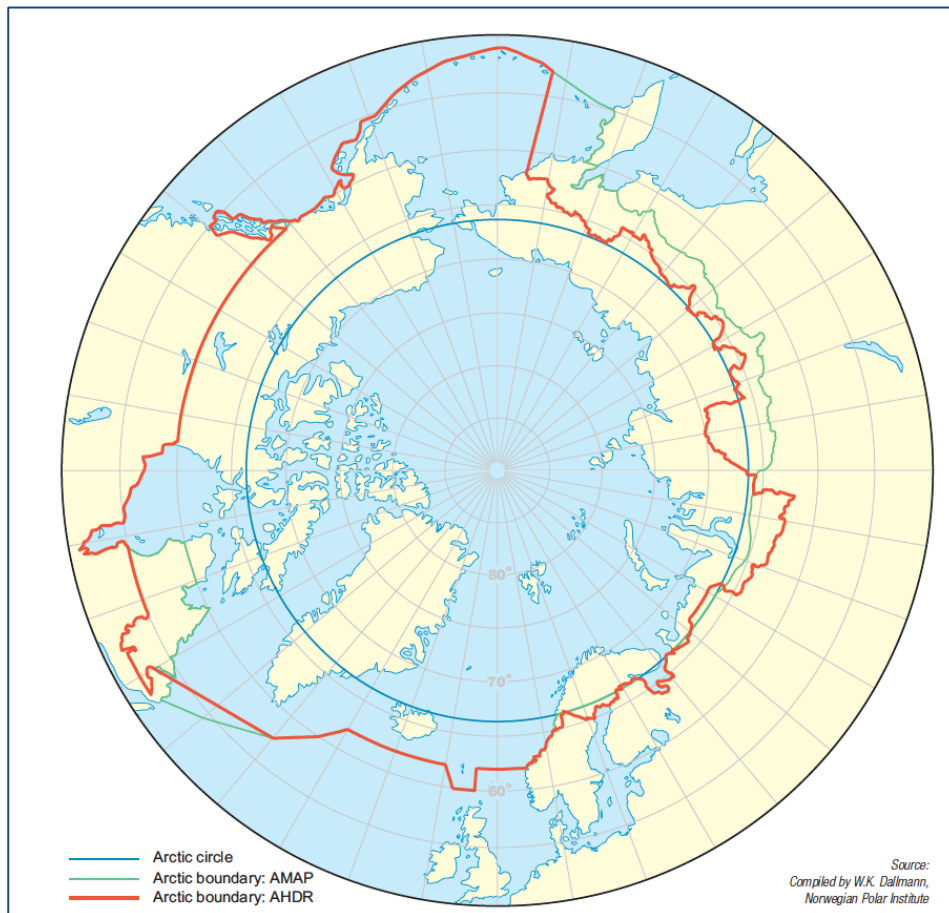
A COMMUNITY FOCUS

A key objective of the emergency management component of the Munk-Gordon Arctic Security Program is to give voice to community perspectives and community priorities in relation to emergencies in the Arctic. This paper focuses on community infrastructure and other emergency assets and is intended to supplement and complement other reports associated with this project, including reports from roundtables and workshops conducted in Whitehorse, Yellowknife and Iqaluit.

Two initial reports prepared for the Munk-Gordon Arctic Security Program, *Emergency Management in the Arctic: The Context Explained* [1] (referred to in this text as the "Context Paper"), and *Plan, Prepare and Practice: Getting Ready for Emergencies in Canada's North,* [2] provide valuable background information on important aspects of emergency management in Canada's North, as well as some very informative examples that illustrate how the Arctic context differs from many other parts of Canada in respect of emergency planning and preparedness. The reader is referred to these papers for descriptions of the geography, demography, transportation and communication systems of the region, and for additional information on Canada's emergency management organization, structures and procedures.

METHODOLOGY

In preparing this paper, the community information found on three websites in particular proved very informative on matters relating to community infrastructure and demographics. These sites made it possible to review the profiles of every community in Yukon, NWT and Nunavut. In the case of Nunavut, community profiles included valuable information on integrated community sustainability plans that outline community infrastructure priorities for the short, medium and long term, as well as progress on these plans. The three sites are:

♦ Government of Yukon Socio-Economic Web Portal: Yukon Community Profiles, http://www.yukoncommunities.yk.ca/resources/sources-of-information#
♦ Government of the Northwest Territories Bureau of Statistics: "Community Data," Northwest Territories Bureau of Statistics, http://www.statsnwt.ca/community-data/
♦ Government of Nunavut Community & Government Services: Government of Nunavut, ICSP Toolkit, http://www.buildingnunavut.com/en/communityprofiles/communityprofiles.asp.

The observations and conclusions in this paper are primarily based on a review of the available information on infrastructure and other emergency assets that can be found on these three websites, as well as on information obtained through communications with a number of people with experience in northern emergency matters.

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[1] Meredith Kravitz and Vanessa Gastaldo, *Emergency Management in the Arctic: the Context Explained* (Toronto: Munk-Gordon Arctic Security Program, 2013).
[2] Sarah-Maude Guindon, *Plan, Prepare and Practice: Getting Ready for Emergencies in Canada's North* (Toronto: Munk-Gordon Arctic Security Program, 2013).

SAFE COMMUNITIES

The safe communities concept arose during the First World Conference on Accident and Injury Prevention in Stockholm, Sweden, in 1989.[3] The subsequent *1st International Safe Communities Conference* convened under the auspices of the World Health Organization (WHO) defined a safe community as:

> …a neighborhood, a town or a city with a demarcated geographical area, which works to promote safety, injury prevention, violence, suicide and consequences of natural disasters. This work covers all age groups, gender and areas, and takes part of an international network as well.[4]

Of particular relevance in Canada's North are additional WHO indicators which state that a health community is:

> …one that is safe with affordable housing and accessible transportation systems, work for all who want to work, a healthy and safe environment with a sustainable ecosystem, and offers access to health care services which focus on prevention and staying healthy.[5]

A review of the information found on the websites noted above under the Methodology section reveals that many, if not most, Arctic communities lack sufficient affordable housing, employment opportunities, diversified transportation systems, and more than rudimentary health care services.

The *Ottawa Charter*, part of the World Health Organization Healthy Communities Initiative, states:

> The fundamental conditions and resources for health are peace, shelter, education, food, income, a stable eco-system, sustainable resources, social justice and equity.[6]

An important implication of this specification, according to some commentators, is that a broad definition of health suggests that for a community to be healthy all residents and sectors must look at all aspects of community life.[7]

The achievement of community health and safety is typically characterized as depending on a complex web of multi-party, multi-stakeholder, and multi-government interaction that takes place in a world that not only evolves as time unfolds, but sometimes does so randomly.[8]

Commentators also draw attention to collaboration as an important component of safe community models:

> The unifying element within these programmes is the emphasis on collaboration, partnership and community capacity building that is the core of the Safe Community model.[9]

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[3] See: "Welcome," XXI International Safe Communities Conference: Prevention to build safer environments, October 21-23, 2013, accessed March 24, 2014, http://meridasafecom2013.mx/en/welcome.

[4] Ibid.

[5] Southern Kennebec Healthy Communities Initiative. *Linking Local People to Local Data, A Snapshot in Time: Understanding Where We Are: Knowing Where We Want to Go (*Gardiner, Maine: Southern Kennebec Healthy Communities, 2004), p.1, accessed March 24, 2014, http://healthycommunitiesme.org/~hcca/assets/files/pdfs/Linking%20Local%20People%20to%20Local%20Data.pdf.

[6] World Health Organization. *Ottawa charter for health promotion* (MLA 7th Edition, May 1987), p. 16.

[7] Tom Wolff, *Healthy Communities: One Vision of Civic Democracy* (Amherst, Mass.: AHEC/Community Partners, n.d), accessed March 24, 2014, http://www.tomwolff.com/resources/cb_civic_democracy.pdf.

[8] Michael McIntyre (Associate Professor, Sprott School of Business, Carleton University), personal communication, February 12, 2014. Professor McIntyre conducts research in areas of governance and financial risk management.

Safe communities are therefore far more than the product of the best efforts of any single individual or organization. There is a need to co-ordinate across many individuals and organizations, and this lends complexity to a community's pursuit of safety and responsiveness to emergencies.[10]

THE QUESTIONS

The Munk-Gordon Arctic Security Program project on emergency management in Canada's Arctic asks two clear questions: "Are we ready?" and if not, "How do we get ready?" As the brief discussion of the safe communities concept implies, these deceptively simple questions belie the complexities that underlie efforts to answer them with equal simplicity and clarity:

1) The question "Are we ready" gives rise to at least three important sub-questions:

- ♦ Ready for what?
    - o What kinds of situations are considered emergencies and for whom? One person's emergency might be another person's daily operating experience.
- ♦ Who is "we"?
- ♦ Who is in jeopardy? Does this entity own the emergency? Is this the same entity that has responsibility for preparedness? How do we know if and when "we" are "ready"?
    - o How is readiness measured or determined?
    - o Do we have standard checklists or yardsticks to measure what sorts of assets are required in different sorts of emergency situations?
    - o Are analyses available to helps us gauge whether available emergency assets will be adequate, and if so, for how long?
    - o Does readiness include cascading emergencies of varying scope and duration?
    - o How proximate does an emergency have to be in time and space to engage local emergency measures (i.e., when does someone else's emergency become a local emergency? Is climate change an Arctic emergency?)?

2)   Similarly, the question "How do we get ready?" also has embedded sub-questions:

- ♦ Again, who is "we"? (Who is responsible for all the various levels of preparedness, particularly given the myriad jurisdictional issues within our federation and the "sticker shock" associated with acquiring assets for emergency response in the Arctic?)
- ♦ What hazards can we anticipate and what do we do about the ones we cannot anticipate?[11]

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[9] A. Spinks et al., "The 'WHO Safe Communities' model for the prevention of injury in whole populations," *Cochrane Database of Systematic Reviews*, Issue 3 (2009); Art. No.: CD004445. DOI: 10.1002/14651858.CD004445.pub3.

[10] Michael McIntyre, personal communication, February 12, 2014.

[11] In 1977, Cosmos 954, a Soviet-era nuclear-powered satellite, crashed to earth in the NWT east of Great Slave Lake. This was considered a lucky result by most observers around the world, because the crash had missed populated areas. However, a group of winter campers found the remnants of the satellite on a frozen lake the very next day and were evacuated to Yellowknife to undergo tests for radiation exposure. Such emergencies are clearly beyond the normal scope of community planning.

- ◆ What emergency situations do we consider too remote (in terms of probability, time or space) to be worthy of our planning and preparedness efforts?
- ◆ How should we measure readiness?
- ◆ Who is accountable or liable if something serious happens and the response is inadequate?
- ◆ Given limited resources, should we prepare socially and politically for *not* being ready?

This paper examines these questions from a community perspective and attempts to answer them. First, the question "Ready for what?" is explored in order to identify the sorts of emergencies that northern communities typically face. Next, the paper examines the question "Who is 'we'?" in order to discuss roles and responsibilities for the range of emergencies that might be encountered in the Arctic. Finally, there is a discussion of the question "Are we ready?" Because the paper concludes that it is not readily apparent how we are to measure readiness, this last section suggests that there is no convenient answer to the question "How do we get ready?" Communities must use a balance of probabilities to determine the sorts of emergencies that might occur and do their best, within given budgets, to acquire infrastructure, equipment and trained human capacity to address emergency situations as they occur. It is important to stress again that safe communities are far more than the product of the best efforts of any single individual or organization working with a fixed set of assets and infrastructure. There is a need to co-ordinate across many governments and organizations, and this lends considerable complexity to any community's pursuit of safety and emergency preparedness.[12]

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[12] Michael McIntyre, personal communication, February 12, 2014.

PART I: READY FOR WHAT?

WHAT ARE EMERGENCIES?

Emergencies and disasters are not always easy to define.[13] Even in the context of search and rescue, the Government of Canada's *Quadrennial Search and Rescue Review* observes that:

> There is currently no centralized or standardized accounting of search and rescue activities across Canada. Information on the rate of search and rescue incidents, their nature, and the effectiveness of the NSP response varies widely from jurisdiction to jurisdiction. At the most fundamental level, there is no commonly used definition of what constitutes a "SAR incident." Is it a person in distress in an urban area? Does it include those requiring towing assistance? How do you account for false alarms and missing persons, which also require investigation? Complicating matters, various organizations compile and retain data using software that may not be connected to current SAR systems.[14]

TYPES OF EMERGENCIES

Living and working in Canada's North has always been, and continues to be, challenging because of weather, winter darkness, remoteness, limited infrastructure, under-developed navigation and communication services, and a range of other factors.

Northern communities experience emergencies associated with natural events such as biological hazards,[15] forest and tundra fires, floods, storm surges, permafrost melt, earthquakes, land, mud and snow slides, avalanches, extreme cold weather, whiteouts, blizzards, high winds and tornado-like conditions. In some cases natural events affect one or more individuals or community assets. In other cases they might threaten one or more entire communities.

Climate change is a more pervasive situation which for many northerners is itself an unfolding emergency. The rapid changes to ecosystems in northern latitudes associated with climate change and variability are undermining some forms of local and traditional knowledge built up over generations. For peoples that continue to travel and use the land for traditional pursuits such as hunting, trapping, fishing and other forms of harvesting, conditions for ice, snow, forest fires, floods and other natural systems are becoming increasingly unpredictable. Reliance on their knowledge of natural systems has helped sustain aboriginal peoples in the region for thousands of years. In some cases, such as travelling on sea, river and lake ice, this traditional knowledge is becoming less reliable and emergency situations are arising.

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[13] Issues about defining "emergencies", "disasters", "hazards" and "vulnerabilities" are explored in more detail in *Plan, Prepare and Practice*.

[14] Canada. National Search and Rescue Secretariat. *Quadrennial Search and Rescue Review: Report,* Government of Canada, last modified February 19, 2014, accessed March 24, 2014, http://www.nss-snrs.gc.ca/en/quadrennial-review/quadrennialsarreview-report, p. 15.

[15] One example is naturally occurring anthrax in the buffalo populations in Wood Buffalo National Park and Fort Providence.

Many aboriginal groups have now concluded modern land claim treaties that guarantee certain wildlife harvesting rights. However, climate change appears to be responsible for significant changes in wildlife populations and patterns. This raises a number of cultural, social and food security issues for many northern communities.

In addition there are always accidents, mistakes and errors of omission caused by human activity, not just that of local residents but also of visitors to the region, which can cause human and environmental emergencies such as spills of hazardous substances, fires, and other events that can threaten communities and their inhabitants directly and indirectly.

Emergency events in or near a community caused by "outsiders" can impinge on essential services and thereby cause other sorts of unintended emergencies for community residents. The impacts on local communities and local people of these sorts of emergencies, referred to in this paper as "inundation events," can be similar to the impacts of infrastructure system failures and natural emergencies such as floods or fires, because they can place stresses on housing, food and fuel supplies, and other community assets and services.

For example, the offloading of passengers rescued from the stranded vessel *Clipper Adventurer* in Kugluktuk in August 2010, described in more detail elsewhere in this paper, demonstrates some of these concerns. The Context Paper offers other examples of unintended consequences such as the situation in 2009 when Canada's Operation NANOOK was in the North, in part, to conduct emergency response training scenarios. The demands placed on cellphone and Internet networks by out-of-territory personal associated with Operation NANOOK caused a communications infrastructure failure and other disruptions in Iqaluit.[16]

Preparing for these sorts of community challenges is quite distinct from emergency preparedness as it is commonly conceived. It is a simple reality of life in many northern communities that the systems of communication, transportation, infrastructure, equipment, food supply and other services, which we take for granted as Canadians, are extremely vulnerable to disruption or failure if there is an atypical influx of people into a community with additional demands. Such demands can be created not only by those who might face an emergency situation (e.g., passengers on a cruise ship), but also by non-resident emergency responders who themselves require support systems.

In the Arctic, an emergency event, whether caused by human or natural factors, can quickly cascade into a more profound situation because of remoteness, weather, limited transportation and communication options and other factors. Indeed, systems failures (e.g., heat, water, power, transportation, communication, resupply) and the hazards that lead to such failures (e.g., fire, floods, blizzards, extreme cold, high winds, human error) are perhaps the most critical emergencies faced by many Arctic communities, especially in winter.[17]

Emergency situations can also arise in northern communities as a result of situations occurring *outside* the Arctic region. Natural events outside the Arctic can affect systems upon which Arctic communities are highly dependent, such as air transport, satellite communications, food and energy resupply, and so on. External events of this sort within the past 20 years have included volcanic activity in Iceland and the Philippines that affected air traffic in Arctic regions; solar activity that affected northern communications; and non-Arctic events such as hurricanes, droughts and fires that have from time to time caused delays for critical resupply of goods or

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[16] Kravitz and Gastaldo, *The Context Explained*, p. 6.
[17] These matters were discussed at the emergency preparedness roundtables held in Whitehorse (December 11, 2013) and Yellowknife (November 5 and 6, 2013). Roundtable reports can be found at http://www.gordonfoundation.ca/pub/reports.

services to northern communities. Some commentators consider climate change and global warming to be unfolding emergencies.

Human-related events outside the Arctic region can also generate situations in the Arctic that, from the perspective of a northern resident, can take on emergency proportions. The financial crisis of 2008 resulted in oil prices soaring to $250 per barrel. Fuel resupply contracts suddenly escalated in price and community budgets were depleted by these price escalations. This in turn translated into unaffordable fuel oil and gasoline in some Arctic communities for some people. In Alaska, for example, some people had to leave their communities because they could no longer afford to stay.[18] Recent reports of a corporate decision by Boeing to end production and repairs of the gravel package for its 737 jets, the workhorse of air freight and passenger movement in the Arctic, could have significant impacts on northern communities where gravel runways are still the norm.

These external factors highlight other important, but difficult, questions associated with emergency preparedness and emergency response — matters of predictability, scale, duration, proximity, and causality. All of these issues have a bearing on how one approaches and prepares for emergencies in Arctic Canada.

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[18] See: Arctic Council Sustainable Development Working Group, *Report to Arctic Council Ministers: Arctic Energy,* (Tromso, Norway: Arctic Council, 2009).

HAZARD IDENTIFICATION

Hazard identification, from the perspective of northern communities, has been an important ongoing activity for emergency planning authorities in the Arctic:[19]

Understanding the hazards and risks that our communities face and gathering information from residents, community governments and other stakeholders is an important step in emergency planning,…Through the hazard identification risk assessment workshops we can aid territorial and municipal governments in planning for emergency situations." [Robert C. McLeod, NWT Minister of Municipal and Community Affairs][20]

There can be considerable variation in the range of perceived hazards among communities within a particular territory as well as across the three territories.

At the circumpolar level, the Arctic Council, through its working groups on Emergency Planning, Preparedness and Response (EPPR), Arctic Monitoring and Assessment (AMAP), Conservation of Arctic Flora and Fauna (CAFF), and Protection of the Arctic Marine Environment (PAME), conducts assessments and prepares reports on activities and risks, particularly in relation to the Arctic marine environment, that are also relevant to communities in the context of emergency planning:

> …the Arctic Council has compiled a report summarizing current knowledge and expertise on the behaviour of hazardous substances in Arctic waters, in order to promote the development of technologies and methods that will improve our ability to respond to accidents involving oil and other noxious substances.[21]

However, given that most emergencies are inherently unpredictable, hazard identification is only a tool to aid preparedness rather than a predictive science.

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[19] Kevin Brezinski (Director, Emergency Services, Government of the Northwest Territories) personal communication 22 November 2013 and Ed Zebedee (Director of Protection Services, Government of Nunavut), Personal communications. January 23, 2014. The report *NWT Hazard Identification Risk Assessment* is anticipated in 2014.

[20] Government of the Northwest Territories. Municipal and Community Affairs, "NWT Hazard Identification Risk Assessment," news release, June 6, 2013, accessed March 25, 2014, http://news.exec.gov.nt.ca/nwt-hazard-identification-risk-assessment/.

[21] Patrick Borbery, (Chair, Senior Arctic Officials, Arctic Council), in a speech to the Arctic Energy Summit [Akureyri, Iceland, 08 Oct 2013].

PRIMARY RISKS

In the table below,[22] a Munk-Gordon Arctic Security Program survey has summarized some of this information illustrating regional variation in the primary and secondary risks identified by northern communities:

Fig. 2

PRIMARY AND SECONDARY RISKS IN CANADA'S TERRITORIES [30]

	YUKON	NORTHWEST TERRITORIES	NUNAVUT
Primary Risks	- Forest fire/wildland fire - Flooding - Earthquake - Electrical power outage (especially in winter)	- Forest fire/wildland fire - Flooding	- Major infrastructure fire - Health emergency - Major power loss - Storm surge/extreme cold
Secondary Risks	- Chemical contamination spill - Auto accident blocking Alaska highway - Communications outage - Major frost or freeze	- Power outages - Fuel shortage - Fuel spills	- Loss/contamination of water supply - Hazardous materials/ chemical spill - Aircraft emergency (casualties, loss of runway)

Among the observations in the Context Paper is the following:

> What becomes apparent throughout this report is that, despite the changing nature of the Arctic region, *traditional emergency risks* are still the most common at the local level. Forest fires and flooding remain the most prominent risks in both the Yukon and the Northwest Territories, while extreme weather emergencies (particularly storms and blizzards) rank high in Nunavut. Some of the more radical shifts to the Arctic's social and economic environment, such as increased tourism and commercial shipping, have yet to be felt in full force.[23] [Emphasis added]

This reference to the prevalence of "traditional emergency risks" is also an important factor that needs to be taken into account in any assessment of community preparedness. Indeed, the budgets for many of the traditional emergency situations faced by communities do not specifically fall under the rubric of emergency preparedness — they are simply integral to maintaining communities in the North: water, power, heat, food, and medical and safety services.

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[22] Kravitz and Gastaldo, *The Context Explained*, p. 11.
[23] Kravitz and Gastaldo, *The Context Explained*, p. 2.

PART II: "WE?": ROLES AND RESPONSIBILITIES

WHO'S INVOLVED

It is not always clear who owns any given potential or actual emergency in the Arctic. For example, the Government of Canada's *Quadrennial SAR Review* highlights two main lines of activity that underlie Canada's SAR Program: prevention and response. It notes that[24]:

> Prevention can have a profound impact on the frequency and severity of SAR incidents, and is a shared responsibility across the entire NSP [National SAR Program] partnership.
>
> The responsibility for response is divided by domain (air, maritime, ground):
> ♦ The Federal Government is responsible for the aeronautical and maritime elements of SAR response (through the Canadian Armed Forces and the Canadian Coast Guard), and for ground SAR in National Parks and Historic Sites (through Parks Canada);[25]
>
> ♦ The provinces and territories are responsible for SAR response on land (i.e. ground SAR) and inland waters; and,
>
> ♦ Volunteers play an integral role across the air, maritime and ground domains.
>
> …
>
> To meet their individually unique circumstances, each province/territory has its own arrangements for coordination and delivery of SAR response. Despite differences in their legislative and regulatory bases for organizing SAR, provincial/territorial approaches to SAR are usually organized under emergency management agencies, and/or are placed under the authority of law enforcement agencies (RCMP, provincial and/or local) to coordinate SAR operations within their jurisdiction. Provincial/territorial geographical areas of responsibility are generally limited to their provincial or territorial jurisdictions.[26]

In other words, a particular emergency might engage every level of government[27] and a range of other organizations and stakeholders.

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[24] *Quadrennial Search and Rescue Review*, p. 1.

[25] The report states that "The federal approach to aeronautical and maritime SAR is guided by international standards and conventions, including the *Convention on International Civil Aviation* (1944), the *International Convention for the Safety of Life at Sea* (1974), the *International Convention on Maritime Search and Rescue* (1979), the *Agreement on Cooperation on Aeronautical and Maritime Search and Rescue* (1979), the *International COSPAS-SARSAT Program Agreement* (1988), and the *Agreement on Cooperation on Aeronautical and Maritime SAR in the Arctic* (2011)."

[26] Ibid., p. 8.

[27] Even other Arctic states could become involved. The Arctic Council has developed agreements on Arctic search and rescue as well as for co-operation on marine oil pollution preparedness and response in the Arctic.

WHO'S IN CHARGE?

A critical question in any emergency situation is "Who's in charge?" The answer to this question can also generally help identify where responsibilities lie for emergency planning and preparedness, including acquisition and development of emergency assets. Canada's emergency preparedness systems have relatively clear answers for these questions but in practice matters can become blurred.

As the Munk-Gordon Arctic Security Program regional roundtable on emergency preparedness, held in Iqaluit in October 2013, demonstrated,

> One of the main findings of the study indicated that although both local and national response to the incident would have been timely, there was no clear consensus among responders over who would, and should, take charge of the rescue. Most of those in the community of Pangnirtung believed the Senior Administrative Officer (SAO) would take command as dictated by the community's Emergency Response Plan, while JRCC Halifax felt the Officer-in-charge would coordinate the rescue from Halifax in accordance with its national SAR mandate and procedures.

> The discussion that ensued around the issue of jurisdiction and authority in a major disaster raised some important points regarding the need for better clarification and understanding of roles and jurisdictions between communities and national agencies, and the need for clarification among responders as to who should be in charge and at what point. What is the exact role of the community in a multi-jurisdictional EM response, especially on those occasions when a major disaster occurs close to a community? Who is responsible for conflict resolution during a response? How can responder agencies build trust and improve awareness of the needs and capacities of other responders?[28]

At the national level, the Minister of National Defence, is lead Minister for search and rescue (SAR) in Canada:

> The Canadian Armed Forces (CAF) is responsible for aeronautical SAR anywhere within Canada's designated area of responsibility, and for the effective operation of the coordinated aeronautical and maritime SAR system.

> While ground SAR and other humanitarian operations fall outside of the military's primary SAR responsibilities, they are nevertheless often called upon to assist other federal departments or provincial/territorial governments.

> Moreover, the Canadian Rangers may routinely be asked to assist in ground SAR operations, as they can provide SAR specialists with invaluable knowledge and advice on the terrain, weather and conditions in the search area. The Province of Ontario, for example, recently concluded a Memorandum of Understanding with the Canadian Rangers, which sets out the process through which the Rangers' assistance can be requested.

> The Canadian Coast Guard is responsible for maritime SAR in areas of federal responsibility (i.e. in the Great Lakes/St. Lawrence River system and coastal waters). As such, the Canadian Coast Guard detects maritime incidents, works with the Canadian Armed Forces in the coordination and delivery of maritime SAR response within areas of federal responsibility, provides maritime resources to assist with aeronautical SAR operations as necessary, and when and where available, provides SAR resources to assist in humanitarian incidents within provincial/territorial jurisdiction.

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[28] The scenario involved a vessel in distress near Pangnirtung, Nunavut. Liane Benoit, personal communication, March 2014. The case study is available at http://gordonfoundation.ca/publication/732.

Parks Canada, under the Canada National Parks Act, is responsible for visitor safety on all lands within its jurisdiction– i.e. ground and inland water incidents in the 44 National Parks and the more than 120 National Historic Sites across Canada, including in the Arctic.[29]

National parks in the three northern territories constitute a total area of approximately 275,000 km^2.[30]

Territorial governments have emergency management responsibilities for matters occurring in their respective territories. However, each of the three territories has its own approach to emergency preparedness and response at the community level. Territorial legislation in Yukon, Northwest Territories and Nunavut sets out the particular framework for community emergency management and community responsibilities in respect of emergencies in their local areas. Considerable efforts have been made by territorial governments to assist communities with their emergency planning and preparedness responsibilities. [31] This legislation is reviewed and discussed in more detail in Appendix 1.

COMMUNITY ROLES AND RESPONSIBILITIES

In Canada's North, communities have a central role to play, not just in search and rescue, but in emergency management in general.

Arctic emergency events often, but not always, occur relatively close to communities for the simple reason that people tend to conduct activities near where people live.[32] Therefore, in the early stages of many emergencies, including SAR, communities are generally at the center of the nested decision-making model that exists in emergency management systems. Residents of local communities are often the first to identify and report emergencies, as well as the first to respond. Additional agencies and resources are engaged as circumstances require.

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[29] This report contains a notification urging accuracy if cited. Therefore, these paragraphs have been quoted in their entirety. *Quadrennial Search and Rescue Review*, p. 7.

[30] Nunavut includes Auyuittuq National Park (19,089 km^2), located near Pangnirtung on Baffin Island in the eastern Arctic; Quttinirpaaq National Park (37,775 km^2), located on northern Ellesmere Island and formerly known as Ellesmere Island National Park Reserve; Sirmilik National Park (22,252 km^2), located on the northern tip of Baffin Island near Pond Inlet; and Ukkusiksalik National Park (20,500 km^2), located west of Repulse Bay. The NWT includes**:** Aulavik National Park (12,000 km^2) located on Banks Island*;* Nááts'ihch'oh National Park Reserve (4,850 km^2) adjoining Nahanni National Park Reserve to west; Nahanni National Park Reserve (30,050 km$^{2)}$, located in the southwest part of the Northwest Territories; Tuktut Nogait National Park (16,340 km²), located in the northeast corner of mainland Northwest Territories; Wood Buffalo National Park (44,807 km ^{2}), Canada's largest national park, straddling the NWT/Alberta border near Fort Smith, NWT; and the proposed Thaidene Nene National Park Reserve (30,000 km^2), located at the east end of Great Slave Lake near Łutsel K'e. Yukon includes**:** Ivvavik National Park (10,168 km²), located in northern Yukon on the coast of the Beaufort Sea; Kluane National Park (22,013 km^2), located in southwestern Yukon; and Vuntut National Park (4,345 km^2), located in northern Yukon adjacent to Ivvavik National Park.

[31] See, for example, online resources available to communities in the NWT at: Northwest Territories Municipal and Community Affairs, *Emergency Preparedness*, accessed March 24, 2014, http://www.maca.gov.nt.ca/?page_id=790.

[32] Roy, Joel (17 Wing, Winnipeg/Air Force Training Centre Commander), SAR presentation, Winnipeg, January 31, 2014.

INDUSTRY OPERATORS

Over the years, petroleum industry operations in the Arctic have engaged a number of communities in matters of emergency management, particularly in the Beaufort Sea region. Regulatory requirements and guidelines describe the documentation operators must file to support offshore exploration programs. Industry operators must have in place emergency response plans that outline preparations for unexpected events and contingencies, including spill response.[33] (The National Energy Board and the Canadian Coast Guard have primary responsibilities for emergency response to oil and gas spills in Canada's Arctic offshore.

For example, Imperial's project description for its Beaufort Sea Exploration Joint Venture Drilling Program (Sept 2013) outlines a tiered approach to "non-routine" events such as spills. It describes work in the 1970s and 1980s which involved working with communities to develop inventories of equipment and trained people to deal with various types of emergency situations:

> …the Beaufort Sea Oil Spill Cooperative…employed as many as 20 Inuvialuit in the early 1980s. The Beaufort Sea Oil Spill Cooperative was jointly funded by three operators in the 1970s to the 1990s, with the goal of maintaining an inventory of equipment and a core group of trained personnel for spills beyond Tier 1 capability. Each company maintained a base level of Tier 1 equipment at Tuktoyaktuk and at various drill locations and other operating areas such as McKinley Bay. In addition to stock piling a range of equipment for offshore oil spills, the cooperative developed a group of trained and committed workers to provide routine spill responses, field experiments and provide support for other environmental projects. The cooperative provided a visible presence for spill response and attention to clean operations at Canmar's base in Tuktoyaktuk. [14.3.5.4.6 Community-Based Spill Response Organization p.14-91 ;(see sections 14.3.5.4.1 to 14.3.5.4.3 for explanations of Tier 1 to Tier 3 capabilities.

An oil spill response plan can be a stand-alone document or part of a broader emergency response plan. Regardless of the form they take, industry emergency plans need to cover matters such as the drilling contractors' emergency response plans, vessel emergency plans, aircraft emergency procedures, support base emergency procedures, waste management plans and response plans, and strategies for shoreline response. The objective of these regulatory requirements is to ensure that operators demonstrate their independent capacities and abilities to reduce risks and respond to a range of emergencies.[34]

In other industries, such as vessel-based tourism, international and national authorities have adopted numerous guidelines and regulations directed at reducing emergencies associated with passengers and ecosystems in Arctic waters. For example, in November 2007, the International Maritime Organization (IMO) adopted *Guidelines on Voyage Planning for Passenger Ships Operating in Remote Areas,* which require voyage planning to take into account the following:

- ♦ the source, date and quality of the hydrographic data of charts used;
- ♦ safe areas;
- ♦ no-go areas;
- ♦ surveyed marine corridors if available;

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[33] Imperial Oil and ExxonMobil , *Beaufort Sea Exploration Joint Venture Drilling Program: Project Description*, (Imperial Oil and ExxonMobil, 2013), p. 4-92. This report was submitted to the Environmental Impact Screening Committee in September 2013.
[34] Ibid. Section 14.3.6.2 of the Report, p. 14-93 to 14-97, outlines the table of contents for an Oil Spill Response Plan, and notes that it will be reviewed with Inuvialuit before it is finalized.

♦ and contingency plans for emergencies in the event of limited assistance being available in areas remote from SAR facilities.[35]

Similarly, Transport Canada's has issued *Guidelines for the Operation of Passenger Vessels in Canadian Arctic Waters*.[36]

However, despite best efforts by various industry operators to be independent and self-reliant in their Arctic operations, it is rare that an Arctic emergency does not touch one or more northern communities or their residents, either in direct roles as volunteer emergency responders or as staging points for evacuees or operational bases for responders from other agencies.

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[35] Transportation Safety Board of Canada. *Marine Investigation Report M10H0006: Grounding: Passenger Vessel Clipper Adventurer, Coronation Gulf, Nunavut, 27 August 2010*, accessed March 25, 2014, http://www.bst-tsb.gc.ca/eng/rapports-reports/marine/2010/m10h0006/m10h0006.pdf, p. 3.

[36] Transport Canada, *Guidelines for the Operation of Passenger Vessels in Canadian Arctic Waters*, *TP 13670E*, last modified March 2005, accessed March 25, 2014, http://www.tc.gc.ca/media/documents/marinesafety/tp13670e.pdf.

PART III: ARE WE READY?

THE APPROACH

There is no shortage of literature and multimedia on processes for emergency management, including checklists and templates for identifying hazards, preparing emergency plans, creating emergency asset inventories, and establishing emergency networks and partnerships. Canada's networks and systems for generating the "paperwork" of preparedness are extensive and they do truly commendable work.

Cogent analyses and inventories of on-the-ground capacity, including human capacity and training, to handle a wide range of emergencies, are not so readily available, particularly in respect of the North. On the human side there is also much literature on the need for partnerships, co-operation, collaboration, sharing, capacity-building, hazard identification and communication. However, the difficult issues around training potential responders and building and maintaining infrastructure and equipment for emergency response fall by the wayside. Financing emergency preparedness is always conducted in the context of allocating scarce resources and competing with other worthy priorities.

In preparing this report, the issue of current community assets available to handle emergencies was approached in two ways.

♦ First, information was sought on community assets to determine the status of infrastructure, equipment and human resources that might be relevant for certain specified types of emergencies. Detailed information was not always easy to obtain from authorities who are sensitive, for a range of reasons, about disclosing such information. Among these reasons are: privacy, security, political embarrassment, or simple lack of information, often as a result of different priorities and a lack of resources to compile the information. Nonetheless, there is a considerable amount of information relating to community infrastructure, services and profiles (demographics) available online.[37] In the case of Nunavut, community infrastructure priorities and plans are also identified.

♦ Second, various emergency officials were contacted to determine whether there are broadly accepted checklists as to what sort of assets (human, equipment, infrastructure) are typically required to handle emergencies of varying scales in remote regions over various time frames. While some useful information can be gleaned from incident reports,[38] the variables involved in emergencies are too numerous to allow meaningful checklists that could guide a community in accumulating assets that would be required for anticipated emergency events. While fire engines are obvious assets for responding to emergencies caused by fires, emergency planning, including asset acquisition, is based on likelihoods and adaptation to the circumstances. In this sense, capacity building for many types of emergencies is more an art than a science. In addition, the operating environment in the North is sufficiently different from other parts of Canada that some

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[37] See, for example:

NWT: "Community Data," *Northwest Territories Bureau of Statistics*, http://www.statsnwt.ca/community-data/ ;

Yukon: *Yukon Community Profiles*, http://www.yukoncommunities.yk.ca/resources/sources-of-information#;

Nunavut: Government of Nunavut, *ICSP Toolkit*, http://www.buildingnunavut.com/en/communityprofiles/communityprofiles.asp.

[38] See for example: Transportation Safety Board of Canada. *Marine Investigation Report M10h0006.*

experiences outside the region might not be instructive. Challenges caused by weather, remoteness, lack of infrastructure and communications networks, limited transportation options, to name just a few, require local knowledge and experience to ensure that emergency responders from outside the region are themselves able to conduct activities safely.

THE PAPERWORK OF PREPAREDNESS

Emergency preparedness involves numerous integrated layers that need to be considered: planning, monitoring, alerting and reporting, infrastructure, equipment, financial and human resources, training, co-ordination and communications, and emotional or social endurance and resilience.

In the Arctic context especially, readiness also has to consider whether "we" are ready to support and keep safe the responders themselves, given that in some cases people from outside the region will be required to deal with certain technical or specialized requirements.

There seems to be a tendency in emergency management studies to place the emphasis on organizational structures and procedures for commanding, co-ordinating and conducting emergency response activities. Planning, tabletop exercises and scenario exercises, while extremely useful, might not be good indicators of preparedness:

> The practice scenarios created by the Canadian Forces to test Arctic readiness, while valuable, have one critical operational difference when compared to real-time search and rescue or local level emergencies: the assumption that large air and marine resources are already positioned in Canada's Arctic region. Not only are such resources normally positioned in Southern Canada, these practice scenarios are carefully orchestrated, with months of planning to position personnel and equipment. During a real-time emergency, these luxuries obviously do not exist. The limitations of these exercises need to be recognized when trying to use them as evidence of preparedness.[39]

Similarly, the existence of an emergency plan is also not necessarily evidence of preparedness. The emergency plans of many communities seem quite difficult to obtain (e.g. various officials advised that the emergency plan for Yellowknife is "secret"). In other cases, the emergency plan might not be at the forefront of people's thinking when emergency events suddenly arise. People act immediately rather than tracking down the plan to determine how they thought they should act when a plan was initially prepared. The emergency situation involving the cruise ship *Clipper Adventurer* illustrates this latter point.

More than 120 passengers and crew were taken off the *Clipper Adventurer* on August 29, 2010 by the Coast Guard icebreaker, the *Amundsen*, and delivered to Kugluktuk after midnight on Aug. 30.[40]

> But no one in Kugluktuk knew the rescued group planned to head to the community until the early evening of Aug. 29. Almost everyone in the community of 1,400 had gone fishing. Someone from the Amundsen

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[39] Kravitz and Gastaldo, *The Context Explained*, p. 2.
[40] Jane George, "Stranded Passenger Find Warm Welcome in Kugluktuk," Nunatsiaq News, August 30, 2010, accessed March 24, 2014, http://www.nunatsiaqonline.ca/stories/article/3008109_Stranded-passengers_crew_find_warm_welcome_in_Kugluktuk.

finally roused Irene Horn, co-owner of the Coppermine Inn in Kugluktuk. Apparently, Horn was the only one answering a phone at that time because she was preparing Sunday supper for the inn's guests.[41]

The main emergency co-ordinator in Kugluktuk, other hamlet staff and local people improvised a plan on-the-spot to deal with this marine emergency:

> "There was nothing in place," said Novak— and if there was such a plan neither he nor the hamlet's senior administrative official, both recent arrivals to their jobs, knew where it was. But that didn't stop Novak from acting. "At this point, my main concern was addressing their needs that they had at the time and using what resources I could," he told Nunatsiaq News. This was his challenge, dealing with a shipload of people, aged 15 to 90, due to arrive in Kugluktuk off the Amundsen after midnight on Aug. 30.[42]

While weather and aircraft availability permitted the stranded passengers in this particular case to be evacuated from Kugluktuk some 12 hours after they arrived, it can be expected that most communities do not plan for outlier or random potential emergencies caused by visitors to their region. Nonetheless they might be called to action by the proximity to their community of an emergency event.

COMMUNITY INFRASTRUCTURE, EQUIPMENT AND OTHER ASSETS

There are 33 communities in the Northwest Territories, 26 In Yukon and 25 in Nunavut. It has already been mentioned that there is a considerable amount of publically-available information about current human and physical assets actually in communities[43] in Canada's three territories.[44] In some cases emergency management officials[45] in Canada's North have more detailed up-to-date community-level information about assets such as vehicles and cached equipment that could also be available to emergency responders once an emergency, disaster or SAR event has occurred. Any thorough analysis as to whether these assets are adequate or inadequate to meet emergencies that might occur in or near any given Arctic community needs to take account of the potential hazards and risks, and whether these situations are reasonably within the power of communities to manage or control. Even a cursory review of this information indicates that apart from the major centres such as Whitehorse, Yellowknife, Inuvik, Hay River, Norman Wells, Fort Smith and Iqaluit, most communities have only basic infrastructure and equipment for conducting local emergency measures (e.g. responding to local fires, providing basic medical services, infrastructure maintenance and repair, small scale search and rescue). While adequate to handle many small-scale local situations, most communities do not have the infrastructure, equipment or human capacity to manage or support large-scale or highly technical situations (e.g. major marine rescues, aviation accidents, hazardous materials containment, etc.).

In broad terms, emergencies caused by the activities of community residents or other northern residents tend to be managed by communities with resilience in the normal course of life in the North. This is not to say that communities are always well-equipped to cope with natural events or conduct land search and rescue, or to

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[41] Ibid.

[42] Ibid.

[43] Northern Quebec and Labrador have not been included in this paper but community profiles for those regions would likely portray a similar picture.

[44] See the community information websites for the three territories outlined previously in this paper.

[45] Ed Zebedee (Director of Protection Services, Government of Nunavut, Iqaluit), personal communication, January 23, 2014.

manage failures in water, heat and power systems, or to deal with medical or other human emergencies. However, the range of such incidents tends to be within the scope of the "normal" expectations of northern residents.

On the other hand, as has already been mentioned, some human-related emergencies involving non-residents can tax the emergency preparedness of smaller communities because they are often ill-equipped to absorb significant numbers of non-residents (including non-resident responders). Depletion of community food and fuel supplies, for example, can also lead to rapid escalation in prices in a community.

The sudden appearance in Kugluktuk of stranded passengers from the *Clipper Adventurer* is often cited as an example of this sort of "inundation event."[46] In that particular case, the emergency was of relatively short duration. If an inundation event happens late in the shipping season there might be no prospect of resupply by sealift for 6 to 8 months. The stranded passengers in Kugluktuk were evacuated by jet; however, as was mentioned earlier in this paper, if Boeing discontinues the production and servicing of the gravel package on its 737 jets, there could be a range of logistical issues created by an inability of large jet aircraft to land in communities with gravel strips.

Clearly, preparing for the entire broad range of potential hazards and risks is beyond the emergency planning capacity of small and even large northern communities. The sorts of emergencies which are typically handled by communities, alone or with some outside assistance, include lost or stranded residents or tourists; equipment and infrastructure failures which disrupt heat, power, water and other services; medical emergencies which involve evacuations to medical facilities in regional or southern centres; as well as emergency situations caused by weather or other natural events in or near the community. Even in these situations "readiness" is a relative term. If there is a local fire and the single local fire truck is under repair, or the fire occurs at the power/heat plant during a winter blizzard, an emergency situation can escalate quickly.

For this reason, when asking the question "Are we ready?" it is important to acknowledge the embedded questions described at the outset of this paper. If "we" means local people, and "ready" means capable of dealing with local emergencies, the answer appears to be a qualified "yes, in many cases". This conclusion is based on an empirical observation: many communities across the North frequently experience power outages, boil-water orders, lost or stranded residents, medical emergencies, supply shortages, equipment failures, and a host of other situations which might be considered emergencies. These situations are most often managed quickly and quietly without escalating into large emergencies.

In June, 2008, for example, the Hamlet of Pangnirtung declared a state of emergency after a flash flood forced the closure of both its bridges and cut the community off from its fresh water reservoir, sewage facilities and landfill.[47] This potentially serious emergency was handled with imagination and effectiveness by local residents, with the assistance of the territorial and federal governments.[48]

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[46] See: Jane George, "Stranded passengers find warmth in Kugluktuk," and see also: Transportation Safety Board of Canada. *Marine Investigation Report M10H0006*.

[47] See: Karen MacKenzie, "Flooding Cuts Off Part of Pangnirtung," *Northern News Services Online*, June 16, 2008, accessed March 125, 2014, http://www.nnsl.com/frames/newspapers/2008-06/jun16_08se.html.

[48] Ed Zebedee (Director of Protection Services, Government of Nunavut, Iqaluit), personal communication, January 23, 2014.

However, the answer to "Are we ready?" changes dramatically if the question is whether or not local communities are equipped to deal with emergencies such as oil spills, aviation and marine disasters, and protracted "inundation events." The answer appears to be "No, in most cases."

If we assume that local communities are involved in such emergencies to assist emergency responders from outside the community or territory, key issues will be the scope and the duration of the emergency situation. As mentioned above, emergency responders from outside a community can themselves constitute an "inundation event". The degree of support any given community can provide will depend on the types and levels of demands placed on it (e.g., accommodation, food, fuel, medical services, specialized or heavy equipment, aircraft, vehicles, human resources, etc.). Emergency responders, whether local or non-resident, in these situations are dependent on supply lines.[49] If transportation and communication systems are disrupted during an emergency event in the Arctic (e.g., poor or extreme weather) this can obviously complicate matters. Canada's broader emergency response networks do not appear to be well equipped to deal with such situations. As described in other papers from the Munk-Gordon Arctic Security Program, relatively few emergency response assets are present in the Arctic year round, although federal departments and agencies are working towards establishing four primary hubs and five secondary hubs in the Arctic for purposes of search and rescue.[50] Some of these assets might be available to communities for use in ground SAR and other sorts of emergencies.

HUMAN CAPACITY

While infrastructure and equipment are important for responding to emergency situations, human capacity is the critically important factor. In SAR and other emergency situations, all levels of government, the private sector, numerous paid and volunteer organizations, and numerous individual volunteers, from Canada and other countries, might become involved.[51]

In northern communities especially, where trained personnel are usually in short supply, volunteers make up the core of emergency response teams.[52] In the case of SAR, the *Quadrennial Search and Rescue Review Report* acknowledges the vital role played by volunteers:

> The strong volunteer component of the NSP provides all levels of government with a greater set of resources to meet SAR requirements. In addition to providing critical manpower, the volunteers also represent the community's link to municipal, provincial/territorial and federal organizations in the delivery of SAR services. Along with local authorities and police forces, volunteers have the unique local knowledge, expertise, and experience required for an effective response.[53]

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[49] See for example: PROLOG Canada Inc., *The Northern Transportation Assessment*, (Calgary: PROLOG Canada Inc., 2011).

[50] The primary hubs have been identified as Iqaluit, Yellowknife, Resolute Bay, and Inuvik; the secondary hubs are Rankin Inlet, Whitehorse, Cambridge Bay, Hall Beach and Alert: Commander Joel Roy (17th Wing, Winnipeg, Air Force Training Centre), presentation made in Winnipeg, Manitoba, January 31, 2014.

[51] *Quadrennial Search and Rescue Review*, p. 4.

[52] Three key national SAR associations support SAR volunteers: the Civil Air Search and Rescue Association, a Canada-wide volunteer association; the Canadian Coast Guard Auxiliary, a Canada-wide volunteer association involved with maritime SAR; and the Search and Rescue Volunteer Association of Canada, established by provincial and territorial associations for ground SAR volunteers. *Quadrennial Search and Rescue Review*, p. 13.

[53] Ibid.

> …volunteers offer a critical conduit into the local community, raising awareness and promoting safety amongst Canadians. They also serve as an enormous asset, providing additional response capacity across the aeronautical, maritime and ground SAR domains. These volunteers are skilled and dedicated citizens, who commit their time to help ensure the safety and survival of their fellow Canadians. In many cases, they represent the backbone of Canada's SAR system, as they are often the first to reach Canadians in peril.[54]

The demographic information contained in the community profiles found on the three websites cited at the beginning of this paper illustrates that many communities have a limited number of individuals in age groups that are likely to engage in emergency response activities. Specialized training and skills for this sort of work are also in short supply.

While training is often identified as a critically important element of emergency management, it is very difficult to be specific about what types of training would be of most general use in Arctic communities.

The challenge is to identify core areas of training that would be valuable across the wide range of circumstances, hazards and risks facing communities. Forest fires are hazards that have a high probability of occurring annually in Yukon and NWT, often very close to communities. Tundra fires are known in Nunavut and NWT but they are far less common occurrences. Forest-fire training would therefore not likely be a major demand in Nunavut or in NWT communities above the treeline. However, general firefighting training would likely be identified as helpful in most communities across the North, for dealing with residential and infrastructure fires.

Similarly, boating skills (inland and marine), communications, hazardous spills containment and so on, all have general utility for residents of northern communities but might not align with the hazards that any given community will identify as priority concerns for their region. Decisions about training require assumptions about the types of hazards that might threaten a community and the probability of certain types of emergencies occurring. Residents of communities are in the best position to identify these needs.

In summary, without making assumptions about what types of emergencies will face a community, it is almost impossible to know whether or not a community is prepared simply by considering the status of its community assets.

READY OR NOT?

The Government of Canada released its *Quadrennial Search and Rescue Review* in December 2013 to provide a comprehensive perspective on Canada's National SAR Program (NSR).[55] The Report observes that

> The divided responsibilities, varied approaches and complementary capabilities between levels of government and across paid and volunteer organizations result in a fluid and flexible system, able to meet the diverse challenges that arise across the country.[56]

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[54] Ibid., p. 15.
[55] Ibid., p. 4.
[56] Ibid., p. 14.

However, a recent television documentary[57] examined whether or not Canada really is "able to meet the diverse challenges across the country." It concluded that activity levels leading to SAR situations are increasing, while investment and capacity to respond appear to be falling behind. In some cases, the funding for assets that are required to respond to emergencies is being significantly cut by governments for budget reasons.

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[57] This documentary aired on the CBC's *Doc Zone* on January 18, 2014.

PART IV: SOME OBSERVATIONS

ASSUMPTIONS ABOUT ARCTIC EMERGENCY SITUATIONS

In preparing this report, a number of assumptions and preoccupations were encountered in the literature and interviews that can have a bearing on the answers to the questions "Are we ready?" and "How do we get ready?". An inability to predict the future, a failure to distinguish among the many types of potential emergencies, the parties that would affected by them, and the probabilities of their occurrence appear to be at the heart of many of these assumptions.

1. INCREASING NUMBERS OF EMERGENCIES

Primary among the assumptions in media reports and other commentaries relating to emergency preparedness in the Arctic is the expectation that increased activity in the Arctic will lead to more emergencies:

> …as marine activity continues to expand in the Arctic, statistical trends indicate that the potential risk of vessel mishaps and marine pollution incidents also increases.[58]

Similar expectations exist in respect of land-based activities. The Government of Canada's *Quadrennial Search and Rescue Review* observes that

> … increased commercial and tourist activity in the North will demand a deeper awareness of the requirements and responsibilities for successful SAR in that region. [59]

2. PARTIES AFFECTED

While the prediction of an increase in the number of emergencies might prove accurate, the quotations above appear to illustrate a subtle bias towards the interests of non-residents active in the region such as mariners, tourists, adventurers, resource developers, etc., while de-emphasizing the circumstances of those who are permanently resident in the Arctic.

Countless activities go on every day in the Arctic amongst the people who live and work there year round; however, there seems to be an unstated assumption that local residents can take of themselves. Indeed this is, and has often been, the case. However, it is possible to distinguish between the sorts of emergency situations that northerners find themselves in from time to time, and those emergency situations that could potentially

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[58] B. Ellis and L. Brigham, Co-editors, *Arctic Marine Shipping Assessment 2009 Report* (Akureyri, Icelan: Arctic Council, 2009), p. 168.
[59] *Quadrennial Search and Rescue Review*, p. 15.

befall the growing number of people who visit the region for commercial, business or personal reasons. It matters, therefore, whether we take an *inside-looking-in* perspective or an *outside-looking-in* perspective in our planning processes.

3. OIL SPILLS

Oil spills, particularly in the offshore, appear to be a central concern and focus of many writers. It is often assumed ships will be involved in producing these spills. But again, the tendency is to focus on activities of new entrants to the region, in particular the people who will explore for and develop offshore resources for transport from the Arctic to southern markets. There is comparatively sparse mention of the annual resupply of Arctic communities by ships and fuel barges and the potential and actual emergencies they have faced bringing fuel and other goods into the Arctic for many decades. Better navigational aids, shipping charts and infrastructure in communities for landing supplies would reduce the risk of accidents.

4. SEARCH AND RESCUE

Similarly, there seems to be an assumption that most Arctic emergency situations will involve search and rescue.[60] This is not the case. Indeed, the traditional emergency risks (fires, floods, power failures, etc.) identified as the predominant concerns of northern communities in the Context Paper (see above Fig. 2), generally do not involve search and rescue.

Emergency planning for the Arctic should continue to test these and other assumptions and preoccupations.

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[60] *The Quadrennial Search and Rescue Review* states: "there is no commonly used definition of what constitutes a "SAR incident," p. 15.

PART V: CONCLUSIONS

CRITICAL GAPS

It is widely recognized that Canada's North can be a difficult and unforgiving environment in which to conduct SAR and other emergency response measures. Additional factors that complicate response initiatives include:

1. INFRASTRUCTURE

A Global Agenda Council of the World Economic Forum concluded in a recent report on the Arctic that:

> "…a pressing need for physical infrastructure exists. This includes transportation (ports, harbours, roads, airports and railways), energy supply (power plants, pipelines and drilling platforms), telecommunications, buildings, water and waste management. Specialized transportation equipment is also a high priority, including icebreaking ships, airships, helicopters, planes, oil-spill remediation vessels and low-impact, land-based transportation. These types of infrastructure, currently lacking relative to anticipated needs, are important preconditions for sustainable Arctic development."[61]

While this conclusion relates to the circumpolar Arctic region in general, in a report in November 2013, the Conference Board of Canada also reached a similar conclusion about search and rescue and disaster response capacity in the Canada's North, in particular in relation to marine waters:

> At present, the evidence suggests that overall SAR and disaster response capacity in the North is inadequate…. infrastructure is lacking with regard to SAR and disaster response.[62]

2. TRAINING

In addition to a lack of infrastructure for emergency response in the Arctic, there is a general consensus that the effectiveness of emergency measures is dependent on the human element. Notwithstanding emergency planning, developing organizational structures, conducting tabletop exercises and building networks and partnerships, ultimately emergency response depends on the expertise and skills of responders. There is often a lack of properly trained emergency response personnel in, or quickly available to, communities in the North. Trained personnel, training facilities and resources for training are critical gaps in emergency preparedness in the region. However, training programs need to be carefully aligned with the types of hazards that have a high probability of occurring in any given community. Forest fire training is not likely to be much use in Pond Inlet, and marine oil spill response is probably not entirely relevant in Whati.

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[61] World Economic Forum Global Agenda Council on the Arctic, *Demystifying the Arctic* (Davos-Klosters, Switzerland: World Economic Forum, 2014), p. 9.
[62] Stefan Fournier and Margaret Caron-Vuotari, *Changing Tides: Economic Development in Canada's Northern Marine Waters,* (Ottawa *:* Conference Board of Canada., 2013), p. 15-17.

3. COMMUNICATIONS, MONITORING AND NOTIFICATION

In the difficult operating conditions of the Arctic, monitoring, early detection, and reliable communications are essential elements of effective emergency management. Real-time weather information is only one example of the information that is necessary for emergency responders. The Government of Canada's recent *Quadrennial Search and Rescue Review* observes:

> …technology (i.e. sensors, radio communications, GPS/mapping, etc.) can serve as a force multiplier in enabling a more effective SAR response, however it can also give rise to interoperability challenges. As such, the introduction of new technologies must be carefully managed so as to ensure that they enhance – and do not detract from – the seamless delivery of SAR in Canada.[63]

Similarly assumptions about the workability of certain technologies in the North need to brought into line with reality, particularly where responders unfamiliar with the region are called into action. Better communication systems and timely notification procedures could also help mitigate the sorts of "inundation events" described above in connection with the *Clipper Adventurer* and Kugluktuk.

4. RESPONSE EQUIPMENT

Recent reports have noted that some equipment and technologies that are useful to emergency responders in more southerly latitudes are ill-suited or unproven in the Arctic. For example, the Conference Board of Canada cites a report that claims some oil spill equipment and measures typically used by industry to respond to spills are largely unproven in Arctic waters.[64] The workability and interoperability of communications equipment intended for use in the Arctic is also critically important.

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[63] *Quadrennial Search and Rescue Review*, p. 13.
[64] Fournier and Caron-Vuotari, *Changing Tides*, p. 17.

5. GOVERNANCE ISSUES

The Government of Canada's *Quadrennial Search And Rescue Review* [65] contains important observations regarding decision-making and coordination among the multiple actors that are often involved in emergency management:

♦ Prevention: "…the responsibilities and authorities for prevention are not as clearly delineated as in the area of response, prevention efforts often fall secondary to response efforts, and collaboration across the system remains weak. This runs contrary to the logic that prevention should be at the forefront of an effective SAR program….a more holistic and coordinated approach to prevention should be pursued.[66]

♦ Response: "Although a SAR response is initiated by a specific organization – based on the nature and location of a SAR incident – the complete response is frequently multi-jurisdictional to ensure the most effective assets are deployed. Critical to the success of this type of system is the ease and speed with which a responsible jurisdiction can access the most capable, timely and appropriate assistance. This, in effect, has been described as "seamless" SAR, wherein all issues are subordinate to the primacy of saving a life, and mutual aid – across organizations –stands as a fundamental principle of the system….NSP partners must ensure that effective mechanisms and procedures are in place to transmit distress signals to the appropriate responding agency in a timely manner. All partners should be intimately familiar with the protocols and procedures of the jurisdictions with which they engage, so that they know who to call, and how to call them.[67]

♦ Other initiatives to enhance interoperability could also be further pursued, with NSP partners collaborating in qualifications, radio communications, or call-out procedures, for instance) could be explored, while remaining mindful of the benefits that the NSP – and indeed, all Canadians – derive from the diverse and tailored approaches to SAR that exist across the country.[68]

6. INSURANCE

Recent media reports have noted that Lloyd's Market Association, which represents a group of insurance underwriters, considers the risks of polar shipping to be "extreme." The insurance industry is concerned that the rate at which maritime traffic is increasing in Arctic waters is

…outstripping policy makers' ability to create a legislative framework in the high north. As the underwriters note, satellite navigation does not function properly in the region and rescue services take a long time to arrive. "Accurate marine charts are almost impossible to obtain but despite the obvious hazards, the market frequently receives intelligence about vessels with inadequate ice-class operating around the fringes of the Arctic ice sheet," Lloyd's Market Association said.[69]

Insurance issues, in the context of northern communities and climate change, have also been the subject of study of the former National Round Table on the Environment and the Economy (NRTEE). The 2009 NRTEE report concluded communities in Canada's North are unprepared to cope effectively with the looming threat that

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[65] Available at: http://www.nss-snrs.gc.ca/assets/NSS_Internet/docs/en/qsr-report.pdf .
[66] *Quadrennial Search and Rescue Review*, p. 13.
[67] Ibid.
[68] Ibid., p. 13-14.
[69] Steven Chase, "New deal nears on 'polar code' to regulate Arctic shipping", *Globe and Mail,* January 21, 2104.

climate change poses to roads, buildings, industrial waste sites, energy and other critical infrastructure.[70] Whether or not insurance plays a key role in emergency management in Canada's North is beyond the scope of this paper.

…

Given the size of Canada's Arctic and variations among and within the northern territories, there is insufficient human capacity, infrastructure and equipment to address all potential emergency situations. It is generally accepted that it would be too costly and inefficient even to attempt to prepare for all eventualities, at all times of the year, in all communities of the North. Inevitably, there will need to be trade-offs and, more importantly, multi-purpose investments that broaden the capacity to respond to as many types of emergencies as is practically possible.

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[70] National Round Table on the Environment and the Economy, *True North: Adapting Infrastructure to Climate Change in Northern Canada* (Ottawa: National Round Table on the Environment and the Economy, 2009).

APPENDIX 1: TERRITORIAL LEGISLATION GOVERNING EMERGENCY MANAGEMENT

This appendix describes legislative provisions in each territory that are directly applicable to the roles local communities play in emergency management

NWT LEGISLATION

In the NWT, by law, the communities have significant roles and responsibilities in relation to emergency management. The NWT *Civil Emergency Measures Act*[71] requires that communities have a community emergency measures plan. The Act also contains the following important provisions:

POWERS AND DUTIES OF LOCAL AUTHORITIES

7. (1) Each local authority
> (a) shall appoint a committee to advise the local authority on the development of emergency plans and programs;
> (b) shall establish and maintain a community emergency measures agency;
> (c) shall appoint a coordinator of the community emergency measures agency and establish the duties of the coordinator including the preparation and coordination of emergency plans and programs for the community;
> (d) shall prepare and approve emergency plans and programs; and
> (e) may enter into agreements with and make payments to organizations for the provision of services in the development or implementation of emergency plans or programs.

SEARCHES OUTSIDE COMMUNITY

7. (2)   The local authority may conduct searches outside the boundaries of the community.

REPAYMENT OF EMERGENCY EXPENDITURES

8. The Minister may, by order, require a local authority to pay to the Comptroller General the amount of an expenditure made by the Government of the Northwest Territories within or for the benefit of the community with respect to a disaster or the portion of the expenditure specified in the order, at the times and on the terms as to payment of interest and otherwise as are specified in the order.

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[71] *Civil Emergency Measures Act*, R.S.N.W.T. 1988, c. C-9.

DECLARATION OF STATE OF LOCAL EMERGENCY

STATE OF LOCAL EMERGENCY

14. (1) If a local authority is satisfied that an emergency exists or may exist within the community, the local authority may, by resolution, declare a state of local emergency to exist in all or part of the community.

DURATION OF DECLARATION

14. (4) A declaration of a state of local emergency expires seven days after it is made unless it is sooner cancelled by the Minister or terminated or renewed by the local authority.

…

POWERS OF LOCAL AUTHORITY

17. (1) On making a declaration of a state of local emergency the local authority may, for the duration of the order, do all acts and take all necessary proceedings, including
    (a) causing an emergency plan or program to be put into operation;
    (b) acquiring or using real or personal property, whether private or public considered necessary to prevent, combat or alleviate the effects of an emergency or disaster;
    (c) authorizing or requiring a qualified person to render aid of the type that the person is qualified to provide; or
    (d) causing the demolition or removal of vegetation, structures, equipment or vehicles, if this is necessary or appropriate to reach the scene of a disaster or to attempt to prevent or combat a disaster.

AUTHORIZATION

17. (3) A local authority may authorize any person, at any time, to exercise any power referred to in subsection (1), in the operation of an emergency plan or program, in relation to any part of the community affected by a declaration of a state of local emergency.

PAYMENT OF EXPENSES

17. (4) Subject to the Cities, Towns and Villages Act, Hamlets Act and Charter Communities Act, a local authority that is the council of a municipal corporation may, during or within 60 days after the declaration of a state of local emergency, by by-law, borrow the necessary sums to pay expenses caused by the emergency, including payment for services provided by the Government of the Northwest Territories or by the Government of Canada where the services were provided at the request of the local authority.

The Government of the Northwest Territories has made available resources such as templates and planning tools to aid communities in the development of their emergency plans. It recommends that Phase 1 is to set up an emergency management committee to identify hazards and to do a hazard risk assessment. In this phase the GNWT also recommends "documenting all available resources to use in an emergency."[72] Communities are encouraged to keep these plans and inventories up to date. This begs the question as to where communities might obtain adequate resources to undertake certain types of infrastructure development, equipment procurement and training programs that would ensure emergency plans can be implemented.

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[72] See: Northwest Territories Municipal and Community Affairs, "Emergency Preparedness."

YUKON LEGISLATION

Yukon legislation is less definitive about the central role of communities in emergency management. The Yukon *Civil Emergency Measures Act*[73] provides that the executive of the Yukon Government is the primary authority responsible for emergency planning. Section 4 states:

GOVERNMENT OF THE YUKON EMERGENCY PLANS

4. For the purposes of carrying out any civil emergency plan, the Commissioner in Executive Council may
   (a) enter into agreements with the Government of Canada, the government of any province, a municipality or any person;
   (b) in conjunction with the Government of Canada, the government of any province, a municipality or any person, prepare plans for the meeting of any emergency;
   (c) make surveys of the resources and facilities in the Yukon;
   (d) establish training and public information programs; and
   (e) take any other preparatory steps as are considered necessary or advisable to ensure the existence of adequately trained and equipped personnel to meet any emergency including the complete or partial mobilization of civil emergency organizations, the testing of the sufficiency of any civil emergency plan and the efficiency of the organization relating to the plan.

However, municipalities in Yukon are required to develop emergency plans for their communities and may declare a state of emergency in relation to their community. The Yukon *Civil Emergency Measures Act* includes the following important provisions:

MUNICIPAL BYLAWS

(2) A municipal civil emergency plan shall
   (a) specify the powers and duties of the Civil Emergency Measures Commission established under subsection 192(1) of the Municipal Act; and
   (b) assign to municipal officers and employees those responsibilities necessary for the effective implementation of the plan in the case of a declaration of a state of emergency in or including the municipality under this Act.
   (3) A municipal civil emergency measures plan may be co-ordinated with a civil emergency plan under paragraph 2(2)(a) or a civil emergency plan of another municipality. S.Y. 2002, c.34, s.5
   5(1) The council of every municipality shall by bylaw establish a municipal civil emergency plan.

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[73] *Civil Emergency Measures Act*, R.S.Y. 2002, c34.

MUNICIPAL STATE OF EMERGENCY

7(1) The mayor of a municipality may declare that a state of emergency exists in the municipality if
    (a) the mayor has reasonable grounds to believe and does believe that a substantial danger to public safety or to property in the municipality exists or is imminent as the result of fire, explosion, flood, earthquake, landslide, weather, epidemic, transportation accident, electrical power failure, nuclear accident or any similar disaster; and
    (b) the mayor is authorized to declare the state of emergency by resolution of the council passed after its consideration of the occurrence of events that reasonably may be expected to lead to the need to declare the state of emergency.

PUTTING EMERGENCY PLAN INTO OPERATION

8(2) A municipality is authorized to put its civil emergency plan into operation when a state of emergency is in effect in the municipality under section 6 or 7.

GOVERNMENT MAY ACT IN STATE OF EMERGENCY

9(1) Despite any other Act, when a state of emergency has been declared to exist under section 6 or 7, the Minister may do all things considered advisable for the purpose of dealing with the emergency and, without restricting the generality of the foregoing, may
    (a) do those acts considered necessary for
        (i) the protection of persons and property,
        (ii) maintaining, clearing and controlling the use of roads and streets,
        (iii) requisitioning or otherwise obtaining and distributing accommodation, food and clothing and providing other welfare services,
        (iv) providing and maintaining water supplies, electrical power and sewage disposal,
        (v) assisting in the enforcement of the law,
        (vi) fighting or preventing fire, and
        (vii) protecting the health, safety and welfare of the inhabitants of the area;
    (b) make regulations considered proper to put into effect any civil emergency plan; and
    (c) require any municipality to provide assistance as considered necessary during the emergency and authorize the payment of the cost of that assistance out of the revenues of the Government of the Yukon.

(2) When a civil emergency plan referred to in section 8 is in effect in a municipality,
    (a) the council may hold its meetings at any convenient location in or outside the municipality;
    (b) the council is empowered to do all things it considers necessary for the purpose of dealing with the emergency including, without limiting the generality of the foregoing, those acts it considers necessary for
        (i) protecting property in the municipality,
        (ii) maintaining, clearing and controlling the use of roads and streets in the municipality,
        (iii) requisitioning in the municipality or otherwise obtaining and distributing accommodation, food and clothing,
        (iv) providing other welfare services in addition to those referred to in clause (iii),
        (v) providing and maintaining water supplies, electrical power, sewage disposal and other utility services,

(vi) assisting in the enforcement of the law, and
(vii) generally, protecting the health and safety of persons in the municipality;
and
(c) the council may make any bylaws it considers necessary to put into effect the civil emergency plan of the municipality.

In addition, the Yukon *Municipal Act*[74] provides for the creation of an Emergency Measures Commission:

EMERGENCY MEASURES COMMISSION

192(1) Subject to the provisions of the Civil Emergency Measures Act, council shall by bylaw establish a civil emergency measures commission and appoint its members.
(2) Council may appoint a civil emergency co-ordinator who shall carry out the instructions of the commission.
(3) Council may empower the commission to incur liabilities within the amounts included therefor in the annual budget. S.Y. 1998, c.19, s.192.

The *Yukon Emergency Measures Organization* plays a central role in emergency management in the territory and provides assistance to communities when requested.[75] The Yukon Government may assume responsibility for direction and co-ordination of an emergency when it clearly affects areas under territorial jurisdiction (e.g., any emergency not in a municipality, or emergencies on Territorial lands) or in an emergency declared by the territorial government.[76]

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[74] *Municipal Act*, R.S.Y. 2002, c.154.

[75] Yukon Emergency Measures Organization is divided into 13 geographical preparedness areas, mirroring the RCMP detachment boundaries. Eight of these areas have incorporated municipalities that have appointed a Municipal EMO Coordinator to chair the local Emergency Planning Committee. In the remaining areas, the Emergency Measures Organization, in consultation with the local community, appoints an appropriate coordinator." "About EMO," *Yukon Government Department of Community Services*, last updated July 23, 2013, accessed March 25, 2014,: http://www.community.gov.yk.ca/emo/about_emo.html].

[76] Tagish Emergency Measures Team, *Tagish Community Emergency Plan* (Tagish, Yukon: Yukon Emergency Measures Organization, 2010), p. 3.

NUNAVUT LEGISLATION

In comparison with the NWT and Yukon, the Nunavut *Emergency Measures Act*[77] provides for a somewhat different approach. The Act creates the office of an Emergency Management Officer to co-ordinate the Government of Nunavut's response to an emergency; to ensure that emergency management programs are prepared and that they comply with the established policies, standards and other measures; to monitor the testing and implementation of emergency management programs; and to undertake other duties assigned by the Minister.[78]

However, the Act also requires "emergency management programs" to be undertaken by government institutions, municipalities and enterprises. In the case of municipalities the Act provides:

EMERGENCY MANAGEMENT PROGRAM - MUNICIPAL COUNCIL

6. (1) Every municipal council shall
    (a) identify
        (i) the risks of an emergency occurring in the community,
        (ii) the risks to the community that may be caused by an emergency, and
        (iii) in the case of a body designated under subsection 1(3), the
        risks to a neighbouring community that may be caused by an emergency; and
    (b) do the following in accordance with the policies, criteria and other measures established by the Minister:
        (i) prepare an emergency management program in respect of those risks,
        (ii) maintain, test and implement the program,
        (iii) conduct exercises and training in relation to the program.

CONTENT OF EMERGENCY MANAGEMENT PROGRAM

(2) A municipal council shall include in an emergency management program
    (a) any program, arrangement or other measure to provide for the continuity of the operations of the municipal corporation in the event of an emergency; and
    (b) any other information required by the Minister.
(3) Every municipal council shall send to the Minister, within 120 days after the end of each year, a report on the status of its emergency management program that contains the prescribed information.

These requirements will put considerable responsibilities in the hands of local communities. However, these provisions of the Act only come into force upon order of the Commissioner.

Similarly to the NWT and Yukon, Nunavut communities are charged with powers to declare and deal with local emergencies. The Act states:

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[77] *Emergency Measures Act*, S.Nu 2007, c.10.
[78] S.Nu 2007, c.10, s 20.

DECLARATION OF A STATE OF LOCAL EMERGENCY

STATE OF LOCAL EMERGENCY

16.   (1) If a municipal council is satisfied that an emergency exists or may exist within the community, the municipal council may, by resolution, declare a state of local emergency to exist in all or part of the community.

(2) A declaration of a state of local emergency must identify the nature of the emergency and the part of the community in which it exists.

POWERS OF MUNICIPAL CORPORATION

18.   (1) On the declaration of a state of local emergency, the municipal corporation may, for the duration of the declaration, do any act and take any measure the municipal corporation considers necessary, including any of or all the following:

(a) implement its emergency management program;

(b) acquire or use real or personal property, whether private or public, the municipal corporation considers necessary or appropriate to prevent or respond to an emergency or mitigate the effects of an emergency;

(c) construct works that the municipal corporation, with the approval of the Emergency Management Officer, considers necessary or appropriate to prevent or respond to an emergency or mitigate the effects of an emergency;

(d) authorize or require a qualified person to render assistance of the type that the person is qualified to provide;

(e) cause the demolition or removal of vegetation, structures, equipment or vehicles, that the municipal corporation, with the approval of the Emergency Management Officer, considers necessary or appropriate to reach the scene of an emergency or to attempt to prevent or respond to an emergency.

(2) In the implementation of an emergency management program, a municipal council may authorize a person to exercise any power listed to in subsection (1) in relation to any part of the community affected by a declaration of a state of local emergency.

(3) Subject to the Cities, Towns and Villages Act and the Hamlets Act, a municipal council may, by by-law, during, or within 60 days after the declaration of, a state of local emergency, borrow the amounts necessary to pay any expenses caused by the emergency.

(4) A by-law referred to in subsection (3) requires the approval of the Minister but does not require the approval of ratepayers.

The Act also requires each municipal council to designate a Municipal Emergency Management Coordinator:

22.   (1) Every municipal council shall designate a municipal emergency management coordinator.

DUTIES AND POWERS

(2) The municipal emergency management coordinator
    (a) shall
        (i) co-ordinate the municipal corporation's response to an emergency,
        (ii) advise and assist the municipal council on the preparation of an emergency management program for the community, and
        (iii) co-ordinate the municipal corporation's testing and implementation of the emergency management program for the community; and
    (b) may enter into agreements with and make payments to organizations for the provision of services in the development or implementation of an emergency management program for the community.

EMERGENCY MEASURES ORGANIZATION

(3) A municipal council may establish an emergency measures organization to assist in emergency management.